BNY Mellon 2018 Annual Report

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While we are focused on driving change,
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much of the great culture of our company.

CHARLIE SCHARF
Chairman and Chief Executive Officer

Companies must constantly think about how they must change and evolve or they risk both short-term performance and long-term sustainability.

This is especially true for large companies as smaller, more nimble competitors target their margins and innovate more rapidly. At BNY Mellon, we are challenging ourselves to evolve so as to both maximize our short- and medium-term performance and create a path for long-term continued success.

Our rich history of success over more than two centuries is a distinct advantage. While we are focused on driving change, we do this with a keen eye towards preserving much of the great culture of our company. Though we are proud of who we are and how we serve our clients, we also believe we can deliver more for our clients, shareholders and employees by setting higher standards of performance and pushing ourselves to create new and differentiated solutions for our clients.

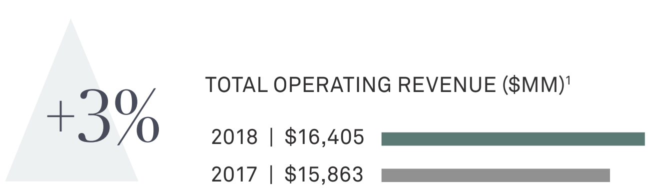
Our evolution will take time, but we have confidence that we will build on our success.

2018 Financial Performance

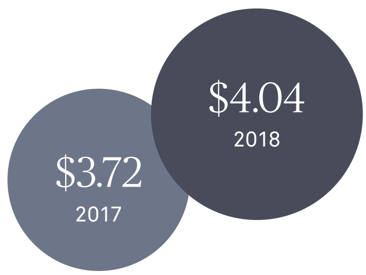
Our financial results for 2018 have a number of complicating factors, but I will do my best to explain them. On a reported basis, our earnings per share increased 9%. These results included several notable items in both 2018 and 2017 that make our results difficult to compare.

In last year's letter, I discussed why we break these items out. To reiterate, our goal is to provide you with the necessary detail to analyze our performance. We try and explain our results as well as provide transparency on items that we believe do not fully represent the future earnings power of the company. As I said last year, we are going through a period of transition, and I am encouraging our leaders to take actions that will add cost in the short term but will benefit us in the long term. As such, I do not believe all items in our GAAP results represent the future earnings profile of our company, but ultimately, our disclosures will allow you to make your own judgment.

Excluding notable items in 2017 and 2018, earnings per share increased 18%[1]. Approximately seven percentage points of this increase was due to benefits



[1]For a reconciliation of these non–GAAP measures, see page XXIII.



+9%

EARNINGS PER SHARE
ON REPORTED BASIS

+18%

OPERATING EARNINGS
PER SHARE[1]

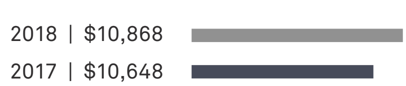
EXCLUDES
NOTABLE ITEMS

from changes in U.S. tax laws. Our overall revenue grew 3% as Investment Services revenue growth of 6% was partially offset by lower Investment Management growth of 2%. Our expenses grew 2%. We increased what we spend on technology by approximately $350 million while reducing all other expenses to partially offset the increase. Importantly, we continued to return a significant amount of capital to our shareholders.

Our financial performance and franchise growth were relatively consistent with that of prior years, but we are reorienting our expense base toward technology. We have an opportunity to leverage our unique global franchise and great client relationships and ultimately increase the rate of revenue and profit growth, while also maintaining continued strong returns.

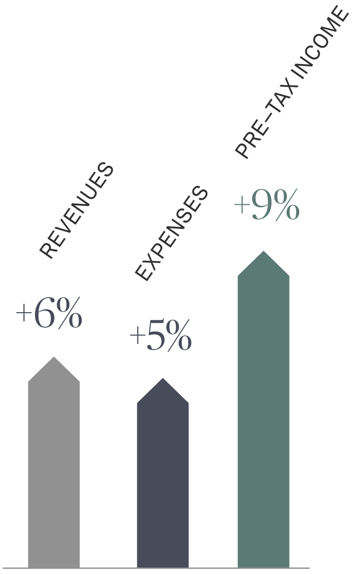
2%

TOTAL OPERATING EXPENSE ($MM)[1]



34%

2018 OPERATING
PRE-TAX MARGIN[1]

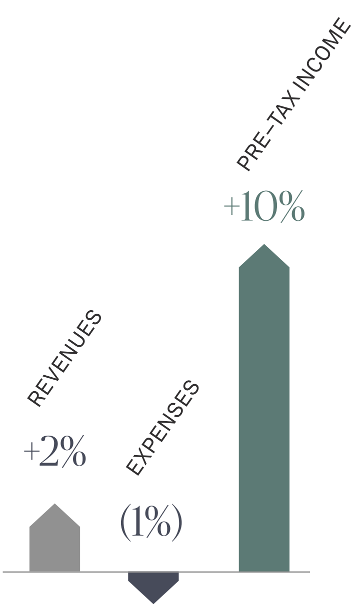


INVESTMENT SERVICES PERFORMANCE[2]

Our Investment Services revenue increased 6%, expenses were up 5% and pre-tax income increased 9%. Our pre-tax margin was 36%, up from 35% in the prior year.

Our Clearance and Collateral Management and Depositary Receipts businesses both achieved double-digit revenue growth, while Asset Servicing and Corporate Trust saw mid-single-digit revenue growth. Pershing and Treasury Services had revenue growth in the low- to mid-single-digit range.

Assets under custody and/or administration decreased by 1% as the negative impact of market declines and the stronger U.S. dollar were partially offset by new business.



INVESTMENT MANAGEMENT PERFORMANCE[2]

Investment Management's financial performance reflected a difficult environment for the industry. Revenues increased 2%, expenses were down 1% and pre-tax income increased 10%. Pre-tax margin was 35% for the year, up from 33% in 2017. Strength in our liability-driven investment (LDI) business was offset by weakness in our traditional active and passive strategies.

Our assets under management declined by 9%, impacted by lower equity markets and outflows, particularly in our active strategies. Changes in foreign exchange rates and declines in market values drove approximately 60% of the decline and outflows of $84 billion from cash, index and our active strategies were partially offset by $45 billion of inflows into liability-driven strategies.

Revenues in our Wealth Management business increased 2% for the year, driven primarily by the impact of higher equity markets throughout the year.

[2]Results on an operating basis.

Our Business

Our business purpose is clear. We help markets function smoothly, we help investors access a broad range of banking and investment products, and we are viewed as one of the safest institutions that helps facilitate investing globally.

Our business model is strong. We provide the expertise and scale others cannot achieve on their own as we process and manage cash and securities on our clients' behalf. In addition, we provide value-added services to enhance our core capabilities. We are amongst the best in the world at what we do and we benefit from our clients' growth and the growth of the financial markets themselves. We are positioned to benefit from the increasing opportunity in the wealth management space through our own direct relationships as well as from being a core technology and solutions provider to intermediaries through our Pershing platform. We have the opportunity to leverage this platform to create even stronger results.

FOCUS ON ORGANIC GROWTH

While we are fortunate that our business benefits from rising interest rates and from strong and growing financial markets, we remain focused on driving growth based on our actions.

Across our businesses, we are separating out those external factors to identify how much of our growth is organic, meaning driven by our actions and decisions. That discipline is forcing a different level of conversation inside the company about what we are doing to grow the business. As I will discuss, some businesses are ahead of others in this evolution.

We have seen organic growth in several of our businesses that either have differentiated capabilities or in which we have been investing for a number of years. The following graphic outlines this growth.

Businesses seeing organic growth:

In **CLEARANCE AND COLLATERAL MANAGEMENT**, our unique position as the sole provider of U.S. government clearing coupled with over $3 trillion of tri-party collateral management balances allows us to help clients optimize their funding needs in ways that others cannot.

In our **MARKETS** business, we have been investing in our Foreign Exchange platform and expanding the scope of our product offering. While our focus is primarily on serving clients who we do business with elsewhere in the company, our updated platform and product lineup has enabled us to capture a greater share of our clients' business.

DEFINITION: Organic growth is the expansion of our business independent of external factors such as market performance.

Our **LDI** offering in Asset Management has seen strong growth. We have differentiated capabilities and a stellar track record in delivering tailored solutions to meet the specific needs of our pension fund and insurance clients.

Our **CASH AND LIQUIDITY** capabilities span the entire company and represent more than $900 billion of client balances.

Other businesses have shown growth, but have been heavily reliant on external factors, like rising interest rates and financial markets. We aren't being complacent about this and believe we can do more to grow organically and are taking action.

In **ASSET SERVICING**, we face continued pricing pressure for our traditional custody and administration services. Fortunately, we have significant scale benefits that we continue to realize and are making investments to provide data management solutions and expand our servicing of ETFs and alternative asset classes. These new capabilities will allow us to both protect our core and grow in new ways.

PERSHING is an incredibly unique platform. We love our position as the industry leader providing a complete set of technology and processing solutions for our clients. While our recent performance has been muted due to two large client losses (which we've spoken about at length), we see a significant opportunity to accelerate organic growth in both the traditional broker-dealer channel and in the emerging Registered Investment Advisor (RIA) space. In fact, our pipeline of signed new clients in the process of being onboarded is the largest in many years.

Our **TREASURY SERVICES** business has benefited from the rising rate environment but underlying franchise growth has been stagnant. We have new leadership in place and see significant opportunity for organic growth by reorienting the business around our differentiated payments capabilities.

In **WEALTH MANAGEMENT**, we also have new leadership in place and see opportunities to grow our underlying franchise. We are strengthening our client-facing teams while building out our banking and investment offerings to provide more holistic solutions to our clients.

We have other businesses that don't necessarily benefit as much from rising markets or are in periods of transition.

We are a market leader in **CORPORATE TRUST**. While our business had underperformed in recent years, the new management team's work in repositioning our sales and service teams has yielded incremental growth in growing asset classes like insurance-linked securities and collateralized loan obligations (CLOs). We feel good about our efforts and are capturing additional share, which will benefit us when issuance volumes are robust.

In **ASSET MANAGEMENT**, our traditional active strategies have not been immune to the broader industry headwinds. We are working on abating recent outflows by developing distinctive multi-asset capabilities that deliver solutions for our clients. Our ongoing work in further consolidating our business in North America into one multi-asset company, Mellon, is a good example of how we are repositioning the business.

As we look forward, our expectations regarding our ability to increase our growth rates are not outsized.

Given the operating leverage in our business, small increases in revenue growth rates should drive more meaningful increases in our EPS growth.

Focusing on Quality & Efficiency

I have said several times that scale is an important driver of our ability to be successful. We provide services and solutions for our clients where we can gain the benefits of scale that they cannot achieve on their own, or where we can create solutions that either they cannot or where the quality of our solution is greater than they could create independently.

This is about us bringing our ability to execute day in and day out, building solutions efficiently, improving them over time and sharing those benefits with our clients.

Our focus on execution is paramount and is a necessary precursor to executing a longer-term strategic vision. Quality and efficiency are linked and critical for our success. Creating a more efficient organization will improve our quality and our focus on quality will lead us to efficiency.

A simple example is where we use technology to automate something that was previously done by people. Automation removes the possibility for human error, and allows us to perform the task on a much timelier basis and less expensively. The same is true for simplification of our management processes. Removing unnecessary processes reduces our cost and will generally lead to better and more timely answers, which allow us to be more responsive to our clients.

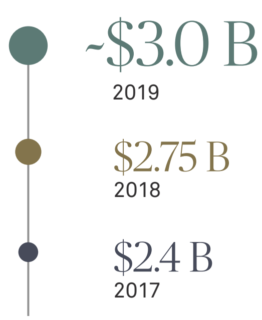
There are a number of areas where we have made great progress in increasing our efficiency:

- In 2018, we cleared and settled ~88 million transactions with the Federal Reserve, with 99.8% being fully automated.
- We settled ~$230 trillion of securities globally with ~97% fully automated.
- We process, on average, ~$2 trillion of payments each day, with 94% fully automated.
- There are a number of areas where we experienced volume increases in 2018 and were able to significantly increase productivity.

We need to bring this level of efficiency and automation across all our other businesses. This focus on execution is paramount and while making progress, we still have much more opportunity.

TECHNOLOGY

All we do is enabled by technology. Our platforms allow us to process cash and securities and manage assets and liabilities for others. We can drive a more efficient and a more complete product set than we have today and we will invest in new platforms and capabilities to do so. We have increased our technology spend to accomplish this and will continue to do so.



TECHNOLOGY INVESTMENT

In 2018, we increased what we spend on technology from approximately $2.4 billion to $2.75 billion. We expect this to be approximately $3.0 billion in 2019. Remember, we expect to continue to drive efficiency elsewhere to help fund much of this increased investment.

The increase in spend is directed to hardware and software for our existing infrastructure and to building additional capabilities. While we are spending more on infrastructure than what I would have hoped, it is not optional. We provide key services to our clients and we are obligated to have the strongest platforms. Today's strength helps us earn the right to ask for more business as we extend our capabilities.

We are investing in a new data center, as well as making significant investments in new, modern environments in our existing data centers. These investments are critical to strengthening our core infrastructure and resiliency, which are central to our value proposition. These investments will also help us create a more flexible operating platform from which we can innovate faster in the future.

While creating the best operating platform is technology priority number one, it is not in lieu of investing in developing capabilities for clients.

We are making a significant number of investments that are intended to differentiate us in the marketplace and capitalize on our growth opportunities over time. Below are some examples:

- Consolidating our remaining custody platforms.
- Improving transparency intra-day into performance for clients.
- Upgrading to a best-in-class platform for servicing traditional loan and CLO products in Corporate Trust.
- Building new capabilities to better support alternative asset managers, such as credit managers.
- Redesigning our client portal to offer an integrated experience across all devices to further penetrate the RIA opportunity in Pershing.
- Building a fully integrated Wealth Management platform across investments and banking that includes self-service capabilities.
- Continuing to extend our capabilities to service wealth managers in the UK through Pershing.
- Increasing our investment in ETF servicing infrastructure.
- Extending LDI capabilities in the U.S.

Talent & Leadership

It takes many strong leaders to manage a company of our size and complexity. I continue to be impressed with the subject matter expertise, desire to serve our clients and the proud culture within our company.

We have made significant changes to the leadership team over the past couple of years with a goal of ensuring we have the best talent with a healthy mix of historical context and fresh thinking.

We have promoted many from within and we have also hired great talent from the outside. Outside hires bring different skills and experiences, and help accelerate our evolution. This year we added a series of leaders to our executive team who we think will complement our existing leaders. These include: Paul Camp (Treasury Services), Catherine Keating (Wealth Management), Emily Portney (U.S. Asset Servicing), Roman Regelman (Digital) and Akash Shah (Strategy).

In addition, Lester Owens joined us in February to lead Operations globally. We have also added numerous leaders in Technology across our infrastructure, data and development teams. We expect all of these leaders will add meaningfully to our ability to advance our efforts.

Our focus on talent goes beyond the leadership team. We are doing a series of things to ensure we have the best talent at BNY Mellon at all levels.

We are creating more differentiation in our performance ratings, salaries and incentive compensation. In addition, we are striving to provide even more direct, honest and helpful feedback to our employees.

I understand there is a debate regarding performance reviews and ratings. Some believe an annual process should be replaced with continual feedback. I don't disagree, but that can only be accomplished when an organization has a level of maturity in their performance management process that we currently lack. Therefore, I firmly believe that performance reviews and ratings are extremely important tools for us to ensure we provide clear feedback in a consistent way to everyone at our company.

Historically we have not differentiated nearly enough in how we have evaluated people. While this makes for an easier conversation with employees, we are doing both them and the company a disservice. Candid feedback is critical to helping people improve their performance and ratings we assign should provide clarity of our conclusion—and then we can work towards improving performance.

STRONG PERFORMERS SHOULD BE REWARDED more than average and underperformers. Salary changes and year-end bonuses should both be an incentive to an employee but also recognition of performance.

I would be remiss if I didn't address the actions behind the severance charge we recorded in the fourth quarter of 2018. Asking people to leave the company is one of the toughest decisions managers need to make and one I wish we did not have to act on.

Unfortunately, for us to serve all of our stakeholders over the long term, we must take these actions.

As I have said many times in this letter, our clients expect us to create scale and pass on many of the benefits to them. If our costs are not competitive, we cannot price our products to both win business and benefit BNY Mellon. The biggest piece of our cost base is employee salary and benefits and we must ensure that we are employing the right number of people to deliver our services and build our capabilities for the future.

Much of what we are doing is eliminating management layers and increasing spans of control across the company.

Through our planned actions, we reduced two layers throughout the entire organization and increased the average span of control—or the number of direct reports per manager—by almost 45%. While the associated changes result in lower costs, they also help advance our culture by improving decision making and accountability, allowing us to move more quickly and making sure we have our best people in roles, which allow them to grow and contribute more significantly to our growth agenda. Giving people more responsibility is a good thing.

DIVERSITY

We believe in the power of diversity. I was taught many years ago that most answers are waiting to be found in the facts. That means that work must be done ahead of decisions, data must be analyzed and the work must be presented clearly and concisely. But to arrive at the right decision, you must have the right people around a table reviewing the information.

The "right" people means a diverse group—in every way. This means different skills, disciplines and backgrounds.

This includes race, ethnicity, gender and sexual orientation, as well as different skills, disciplines and backgrounds. Without this diversity, you will not have the experiences necessary to arrive at the right conclusion.

We are working to ensure we are advancing diversity from entry levels all of the way to our Board of Directors. We are setting goals for ourselves regarding representation for diverse groups, we expect our leaders to personally be engaged with our employee resource groups and be externally visible in advancing our efforts and we are focused on increasing diverse representation of our senior leaders.

BOARD OF DIRECTORS

I would like to thank Mark Nordenberg as he retires from our Board after serving for more than 20 years. Mark has contributed meaningfully in many ways, especially in his role as Chairman of our Corporate Governance and Nominating Committee. Importantly, Mark has also represented us in the Pittsburgh community, where we employ over 7,000 people. We are grateful for Mark's contributions over so many years.

Capital Allocation

We continue to believe that capital management is one of the most significant decisions we make, and we remain committed to continuing to use that resource wisely. Our prioritization has not changed.

Our first priority will always be ensuring that our capital meets or exceeds the requirements and expectations of our regulators, rating agencies, clients and counterparties. We then compare the returns of investing organically in the company, pursuing mergers and acquisitions, further increasing dividends or buying back our common stock.

Ultimately, we will pursue the path of highest return for our shareholders.

In recent years, we have been in a position to consistently return the majority of the capital that we generate to shareholders. During 2018, we increased our dividend by 17% and repurchased $3.3 billion of common stock. This included the repurchase of an additional $830 million of common stock that was approved and executed in the fourth quarter.

+17%

2018 DIVIDENDS

$3.3B

2018 STOCK REPURCHASE

100%+

SHAREHOLDER PAYOUT RATIO

Longer Term

While our focus on the short and medium term is necessary for us today, it is not sufficient.

We have to think more strategically about where our businesses are going and what we need to do to create differentiation in a changing world.

We are at the beginning of mapping out this journey and have a series of initiatives underway.

In our **ASSET SERVICING** business, we are building out our capabilities in higher-growth products, including alternatives and ETFs. We are enhancing real-time intraday reporting and providing data analytics to help clients better manage their cash, manage risk and increase distribution.

We are also pursuing ways to simplify and improve the integration of activities from portfolio management to accounting to custody for clients. We believe that our clients will want choice and flexibility as they seek the best solution based on their internal requirements and products. Their unique needs require that we provide an open solution that integrates with other platforms. We are actively working with external partners and advancing our own solutions to increase quality, reduce cost and provide more information to our clients to help them drive higher returns.

In **PERSHING**, we continue to help our broker-dealer clients create more operating leverage by using our scale and platform to lower their costs and increase the quality of the products they offer. We are allocating more resources to the RIA marketplace as the wealth management business shifts towards this model. We are also dedicating more resources to other geographies such as the UK, where we think there are meaningful opportunities for growth.

In **TREASURY SERVICES**, we are investing to improve our payments capabilities and thinking more strategically about how payments are going to evolve in the future. We are also digitizing our core capabilities as our clients' expectations around the way they interact and consume our products evolve.

We are uniquely positioned in our **CLEARANCE AND COLLATERAL MANAGEMENT** business and are investing to add capabilities to extend the service to our market participants, help clients optimize their funding needs and provide more options for clients.

The **ASSET MANAGEMENT** industry is going through dramatic change as returns have not supported existing fee structures. With pressure on performance and fees, we are working to ensure we have top-tier performance, investment products and solutions appropriate for today's marketplace, as well as broad distribution capabilities and an efficient operating infrastructure.

We have the industry-leading **LIABILITY-DRIVEN SOLUTIONS** business and it's growing well. We have strong capabilities in European credit and are expanding our CLO, loan and high-yield capabilities. We are transforming our U.S. business into Mellon, an integrated, single multi-asset solutions provider. We are not immune to the market environment and expect 2019 to be a difficult year, but we remain focused on creating differentiated capabilities.

Our **WEALTH MANAGEMENT** business is a strong platform for us to build from. We are becoming more targeted in our client base, strengthening our banking and investment product set, and creating stronger technology for both our advisors and clients.

At a recent all employee town hall, I was asked what my vision for success was for BNY Mellon.

I responded that we should strive for our clients to think of us as a partner they *must* do business with because we are the unquestioned leader in our businesses.

This is represented by the quality of our work, but more importantly in the value we add to them as a partner. When we achieve that, we also become the company that the best people in the industry want to work for. We are well on our way and I want to thank my more than 50,000 partners around the world who work every day to achieve this goal.

Charlie Scharf
Chairman and Chief Executive Officer

Financial Highlights

Financial Highlights

The Bank of New York Mellon Corporation (and its subsidiaries)

(dollar amounts in millions, except per common share amounts and unless otherwise noted)	2018	2017
Financial Results		
Net income applicable to shareholders of The Bank of New York Mellon Corporation	**$ 4,266**	$ 4,090
Preferred stock dividends	**(169)**	(175)
Net income applicable to common shareholders of The Bank of New York Mellon Corporation	**$ 4,097**	$ 3,915
Earnings per common share – diluted	**$ 4.04**	$ 3.72
Key Data		
Total revenue (a)	**$ 16,392**	$ 15,543
Total expense	**11,211**	10,957
Fee revenue as a percentage of total revenue	**78%**	78%
Percentage of non-U.S. total revenue	**37%**	36%
Assets under custody and/or administration at year end *(in trillions)* (b)	**$ 33.1**	$ 33.3
Assets under management at year end *(in billions)* (c)	**$ 1,722**	$ 1,893
Balance Sheet at December 31		
Total assets	**$ 362,873**	$ 371,758
Total deposits	**238,778**	244,322
Total The Bank of New York Mellon Corporation common shareholders' equity	**37,096**	37,709
Capital Ratios at December 31		
Consolidated regulatory capital ratios (d)		
Common Equity Tier 1 ("CET1") ratio	**10.7%**	10.3%
Tier 1 capital ratio	**12.8**	12.3
Total (Tier 1 plus Tier 2) capital ratio	**13.6**	13.0
Tier 1 leverage ratio	**6.6**	6.4
Supplementary leverage ratio ("SLR") (e)	**6.0**	5.9
The Bank of New York Corporation common shareholders' equity to total assets ratio	**10.2**	10.1

(a) Includes fee and other revenue, net interest revenue and income from consolidated investment management funds.
(b) Includes the assets under custody and/or administration of CIBC Mellon Global Securities Services Company, a joint venture.
(c) Excludes securities lending cash management assets and assets managed in the Investment Services business.
(d) For our CET1, Tier 1 capital and Total capital ratios, our effective capital ratios under the U.S. capital rules are the lower of the ratios as calculated under the Standardized and Advanced Approaches, which for the periods noted above was the Advanced Approaches. Beginning Jan. 1, 2018, consolidated regulatory ratios are fully phased-in. The consolidated regulatory ratios for 2017 are presented on an estimated fully phased-in basis. For additional information on our capital ratios, see "Capital" beginning on page 45.
(e) SLR became a binding measure on Jan. 1, 2018. For additional information on our SLR, see "Capital" beginning on page 45.

Supplemental Information

Explanation of GAAP and Non-GAAP financial measures

We have included in this Letter to Shareholders certain non-GAAP measures which exclude the notable items described below. We believe that these measures provide additional useful information to investors as they align with our strategy, are consistent with how management views the business and are used to measure the annual performance of our executive officers.

Net Income and EPS Reconciliation (dollars in millions, except per share amounts)	**2018** Results	**2018** Diluted EPS	2017 Results	2017 Diluted EPS	**2018 vs. 2017** Results	**2018 vs. 2017** Diluted EPS
Net income applicable to common shareholders of The Bank of New York Mellon Corporation – GAAP	**$ 4,097**	**$ 4.04**	$ 3,915	$ 3.72	**5%**	**9%**
Exclude the impact of notable items: (a)(b)						
Total revenue	**(13)**		(320)			
Total noninterest expense	**343**		309			
Provision for income taxes	**(188)**		(789)			
Net impact of notable items	**(168)**	**(0.17)**	160	0.15		
Net income applicate to common shareholders of The Bank of New York Mellon Corporation, excluding notable items – Non-GAAP	**$ 4,265**	**$ 4.21**	$ 3,755	$ 3.57	**14%**	**18%**

(a) 2018 includes adjustments to provisional estimates for U.S. tax legislation and other changes, severance, expenses associated with consolidating real estate and litigation expense, each recorded in 4Q18. Also includes expenses associated with consolidating real estate recorded in 2Q18 and adjustments to provisional estimates for U.S. tax legislation and other changes and litigation expense, both recorded in 3Q18.
(b) 2017 includes the estimated net benefit of U.S. tax legislation, severance, an asset impairment and investment securities losses related to the sale of certain securities, each recorded in 4Q17, and litigation expense recorded in 2017.

Total Revenue and Total Noninterest Expense Reconciliation (dollars in millions)	**2018**	2017	**2018 vs. 2017**
Total revenue – GAAP	**$ 16,392**	$ 15,543	**5%**
Exclude: Notable items (a)(b)	**(13)**	(320)	
Total revenue, excluding notable items – Non-GAAP	**$ 16,405**	$ 15,863	**3%**
Total noninterest expense – GAAP	**$ 11,211**	$ 10,957	**2%**
Exclude: Notable items (a)(b)	**343**	309	
Total noninterest expense, excluding notable items – Non-GAAP	**$ 10,868**	$ 10,648	**2%**

(a) 2018 includes adjustments to provisional estimates for U.S. tax legislation and other changes, severance, expenses associated with consolidating real estate and litigation expense, each recorded in 4Q18. Also includes expenses associated with consolidating real estate recorded in 2Q18 and adjustments to provisional estimates for U.S. tax legislation and other changes and litigation expense, both recorded in 3Q18.
(b) 2017 includes the estimated net benefit of U.S. tax legislation, severance, an asset impairment and investment securities losses related to the sale of certain securities, each recorded in 4Q17, and litigation expense recorded in 2017.

Pre-tax Operating Margin Reconciliation (dollars in millions)	2018	2017	2018 vs. 2017
Income before taxes – GAAP	$ 5,192	$ 4,610	13%
Exclude the impact of notable items: (a)(b)			
Total revenue	(13)	(320)	
Total noninterest expense	343	309	
Income before taxes, excluding notable items – Non-GAAP	$ 5,548	$ 5,239	6%
Total revenue – GAAP	$ 16,392	$ 15,543	5%
Exclude: Notable items (a)(b)	(13)	(320)	
Total revenue, excluding notable items – Non-GAAP	$ 16,405	$ 15,863	3%
Pre-tax operating margin – GAAP (c)	32%	30%	
Pre-tax operating margin, excluding notable items – Non-GAAP (c)	34%	33%	

(a) 2018 includes adjustments to provisional estimates for U.S. tax legislation and other changes, severance, expenses associated with consolidating real estate and litigation expense, each recorded in 4Q18. Also includes expenses associated with consolidating real estate recorded in 2Q18 and adjustments to provisional estimates for U.S. tax legislation and other changes and litigation expense, both recorded in 3Q18.
(b) 2017 includes the estimated net benefit of U.S. tax legislation, severance, an asset impairment and investment securities losses related to the sale of certain securities, each recorded in 4Q17, and litigation expense recorded in 2017.
(c) Income before taxes divided by total revenue.

Investment Services Business Reconciliation (dollars in millions)	2018	2017	2018 vs. 2017
Total revenue – GAAP	$ 12,298	$ 11,585	6%
Total noninterest expense – GAAP	8,058	7,747	4
Exclude: Notable items (a)(b)	170	214	
Total noninterest expense, excluding notable items – Non-GAAP	$ 7,888	$ 7,534	5%
Provision for credit losses	1	(7)	
Income before income taxes – GAAP	$ 4,239	$ 3,845	10%
Income before income taxes, excluding notable items – Non-GAAP	$ 4,409	$ 4,059	9%
Pre-tax operating margin – GAAP (c)	34%	33%	
Pre-tax operating margin, excluding notable items – Non-GAAP (c)	36%	35%	

(a) 2018 includes severance and litigation expense recorded in 4Q18. Also, includes litigation expense recorded in 3Q18.
(b) 2017 includes severance, and an asset impairment recorded in 4Q17 and litigation expense recorded in 2017.
(c) Income before taxes divided by total revenue.

Investment Management Business Reconciliation (dollars in millions)	2018	2017	2018 vs. 2017
Total revenue – GAAP	$ 4,084	$ 3,997	2%
Less: Distribution and servicing expense	407	422	
Total revenue, net of distribution and servicing expense	$ 3,677	$ 3,575	3%
Total noninterest expense – GAAP	$ 2,818	$ 2,854	(1)%
Exclude: Notable items (a)(b)	28	35	
Total noninterest expense, excluding notable items – Non-GAAP	$ 2,790	$ 2,819	(1)%
Provision for credit losses	3	2	
Income before income taxes – GAAP	$ 1,263	$ 1,141	11%
Income before income taxes, excluding notable items – Non-GAAP	$ 1,291	$ 1,176	10%
Pre-tax operating margin - GAAP (c)	31%	29%	
Pre-tax operating margin, excluding notable items – Non-GAAP (c)	35%	33%	

(a) 2018 includes severance and litigation expense recorded in 4Q18.
(b) 2017 includes severance recorded in 4Q17 and litigation expense recorded in 2017.
(c) Income before taxes divided by total revenue.

THE BANK OF NEW YORK MELLON CORPORATION
2018 Annual Report
Table of Contents

The Bank of New York Mellon Corporation (and its subsidiaries)

Financial Summary

(dollar amounts in millions, except per common share amounts and unless otherwise noted)	**2018**	2017	2016	2015	2014
Selected income statement information:					
Fee and other revenue	**$ 12,794**	$ 12,165	$ 12,073	$ 12,082	$ 12,649
(Loss) income from consolidated investment management funds	**(13)**	70	26	86	163
Net interest revenue	**3,611**	3,308	3,138	3,026	2,880
Total revenue	**16,392**	15,543	15,237	15,194	15,692
Provision for credit losses	**(11)**	(24)	(11)	160	(48)
Noninterest expense	**11,211**	10,957	10,523	10,799	12,177
Income before income taxes	**5,192**	4,610	4,725	4,235	3,563
Provision for income taxes	**938**	496	1,177	1,013	912
Net income	**4,254**	4,114	3,548	3,222	2,651
Net loss (income) attributable to noncontrolling interests *(a)*	**12**	(24)	(1)	(64)	(84)
Net income applicable to shareholders of The Bank of New York Mellon Corporation	**4,266**	4,090	3,547	3,158	2,567
Preferred stock dividends	**(169)**	(175)	(122)	(105)	(73)
Net income applicable to common shareholders of The Bank of New York Mellon Corporation	**$ 4,097**	$ 3,915	$ 3,425	$ 3,053	$ 2,494
Earnings per share applicable to common shareholders of The Bank of New York Mellon Corporation:					
Basic	**$ 4.06**	$ 3.74	$ 3.16	$ 2.73	$ 2.17
Diluted	**$ 4.04**	$ 3.72	$ 3.15	$ 2.71	$ 2.15
Average common shares and equivalents outstanding of The Bank of New York Mellon Corporation *(in thousands)*:					
Basic	**1,002,922**	1,034,281	1,066,286	1,104,719	1,129,897
Diluted	**1,007,141**	1,040,290	1,072,013	1,112,511	1,137,480
Selected balance sheet information (at period-end):					
Interest-earning assets	**$ 308,749**	$ 316,261	$ 280,332	$ 338,955	$ 317,646
Total assets	**362,873**	371,758	333,469	393,780	385,303
Deposits	**238,778**	244,322	221,490	279,610	265,869
Long-term debt	**29,163**	27,979	24,463	21,547	20,264
Preferred stock	**3,542**	3,542	3,542	2,552	1,562
Total The Bank of New York Mellon Corporation common shareholders' equity	**37,096**	37,709	35,269	35,485	35,879
At Dec. 31					
Assets under custody and/or administration *(in trillions) (b)*	**$ 33.1**	$ 33.3	$ 29.9	$ 28.9	$ 28.5
Assets under management *(in billions) (c)*	**1,722**	1,893	1,648	1,625	1,686
Market value of securities on loan *(in billions) (d)*	**373**	408	296	277	289
Selected ratios:					
Return on common equity	**10.8%**	10.8%	9.6%	8.6%	6.8%
Return on tangible common equity – Non-GAAP *(e)*	**22.5**	23.9	21.2	19.7	16.0
Return on average assets	**1.19**	1.14	0.96	0.82	0.67
Pre-tax operating margin	**32**	30	31	28	23
Fee revenue as a percentage of total revenue	**78**	78	79	79	80
Percentage of non-U.S. total revenue	**37**	36	34	36	38
Net interest margin	**1.25**	1.14	1.03	0.96	0.95

(a) Primarily attributable to noncontrolling interests related to consolidated investment management funds.

(b) Includes the assets under custody and/or administration of CIBC Mellon Global Securities Services Company ("CIBC Mellon"), a joint venture with the Canadian Imperial Bank of Commerce, of $1.2 trillion at Dec. 31, 2018, $1.3 trillion at Dec. 31, 2017, $1.2 trillion at Dec. 31, 2016, $1.0 trillion at Dec. 31, 2015 and $1.1 trillion at Dec. 31, 2014.

(c) Excludes securities lending cash management assets and assets managed in the Investment Services business.

(d) Represents the total amount of securities on loan in our agency securities lending program managed by the Investment Services business. Excludes securities for which BNY Mellon acts as an agent on behalf of CIBC Mellon clients, which totaled $58 billion at Dec. 31, 2018, $71 billion at Dec. 31, 2017, $63 billion at Dec. 31, 2016, $55 billion at Dec. 31, 2015 and $65 billion at Dec. 31, 2014.

(e) Return on tangible common equity, a Non-GAAP measure, excludes goodwill and intangible assets, net of deferred tax liabilities. See "Supplemental information - Explanation of GAAP and Non-GAAP financial measures" beginning on page 105 for the reconciliation of the Non-GAAP measure.

The Bank of New York Mellon Corporation (and its subsidiaries)

Financial Summary (continued)

(dollar amounts in millions, except per common share amounts and unless otherwise noted)	**2018**	2017	2016	2015	2014
Cash dividends per common share	**$ 1.04**	$ 0.86	$ 0.72	$ 0.68	$ 0.66
Common dividend payout ratio	**26%**	23 %	23%	25%	31%
Common dividend yield	**2.2%**	1.6 %	1.5%	1.6%	1.6%
Closing stock price per common share	**$ 47.07**	$ 53.86	$ 47.38	$ 41.22	$ 40.57
Market capitalization *(in billions)*	**$ 45.2**	$ 54.6	$ 49.6	$ 44.7	$ 45.4
Book value per common share	**$ 38.63**	$ 37.21	$ 33.67	$ 32.69	$ 32.09
Tangible book value per common share – Non-GAAP *(a)*	**$ 19.04**	$ 18.24	$ 16.19	$ 15.27	$ 14.70
Full-time employees	**51,300**	52,500	52,000	51,200	50,300
Year-end common shares outstanding *(in thousands)*	**960,426**	1,013,442	1,047,488	1,085,343	1,118,228
Average total equity to average total assets	**12.1%**	11.7 %	10.7%	10.2%	10.2%
Capital ratios (at period-end):					
Consolidated regulatory capital ratios - fully phased-in basis: *(b)(c)*					
Advanced:					
CET1 ratio	**10.7%**	10.3 %	9.7%	9.5%	9.8%
Tier 1 capital ratio	**12.8**	12.3	11.8	11.0	10.8
Total (Tier 1 plus Tier 2) capital ratio	**13.6**	13.0	12.1	11.1	11.0
Standardized:					
CET1 ratio	**11.7**	11.5	11.3	10.2	10.6
Tier 1 capital ratio	**14.1**	13.7	13.6	11.8	11.6
Total (Tier 1 plus Tier 2) capital ratio	**15.1**	14.7	14.2	12.0	12.0
Tier 1 leverage ratio	**6.6**	6.4	N/A	N/A	N/A
Supplementary leverage ratio ("SLR")	**6.0**	5.9	5.6	4.9	4.4
Consolidated regulatory capital ratios - transitional basis: *(b)(d)*					
Advanced:					
CET1 ratio	**N/A**	10.7 %	10.6%	10.8%	11.2%
Tier 1 capital ratio	**N/A**	12.7	12.6	12.3	12.2
Total (Tier 1 plus Tier 2) capital ratio	**N/A**	13.4	13.0	12.5	12.5
Tier 1 leverage ratio	**N/A**	6.6	6.6	6.0	5.6
SLR	**N/A**	6.1	6.0	5.4	N/A
BNY Mellon shareholders' equity to total assets ratio	**11.2%**	11.1 %	11.6%	9.7%	9.7%
BNY Mellon common shareholders' equity to total assets ratio	**10.2**	10.1	10.6	9.0	9.3

(a) Tangible book value per common share – Non-GAAP excludes goodwill and intangible assets, net of deferred tax liabilities. See "Supplemental information – Explanation of GAAP and Non-GAAP financial measures" beginning on page 105 for the reconciliation of the Non-GAAP measure.

(b) Risk-based capital ratios at Dec. 31, 2014 do not reflect the adoption of accounting guidance related to Consolidations in Accounting Standards Update ("ASU") 2015-02.

(c) For our Common Equity Tier 1 ("CET1"), Tier 1 and Total capital ratios, our effective capital ratios under U.S. capital rules are the lower of the ratios as calculated under the Standardized and Advanced Approaches. Beginning Jan. 1, 2018, consolidated regulatory ratios are fully phased-in. The consolidated regulatory ratios for all prior periods are presented on an estimated fully phased-in basis. For additional information on our regulatory capital ratios, see "Capital" beginning on page 45.

(d) Reflects transitional adjustments to CET1, Tier 1 capital and Tier 2 capital required in period periods under U.S. capital rules.

Results of Operations

General

In this Annual Report, references to "our," "we," "us," "BNY Mellon," the "Company" and similar terms refer to The Bank of New York Mellon Corporation and its consolidated subsidiaries. The term "Parent" refers to The Bank of New York Mellon Corporation but not its subsidiaries.

BNY Mellon's actual results of future operations may differ from those estimated or anticipated in certain forward-looking statements contained herein for reasons which are discussed below and under the heading "Forward-looking Statements." When used in this Annual Report, words such as "estimate," "forecast," "project," "anticipate," "likely," "target," "expect," "intend," "continue," "seek," "believe," "plan," "goal," "could," "should," "would," "may," "might," "will," "strategy," "synergies," "opportunities," "trends," "future" and words of similar meaning, may signify forward-looking statements.

Certain business terms and commonly used acronyms used in this Annual Report are defined in the Glossary and Acronyms sections.

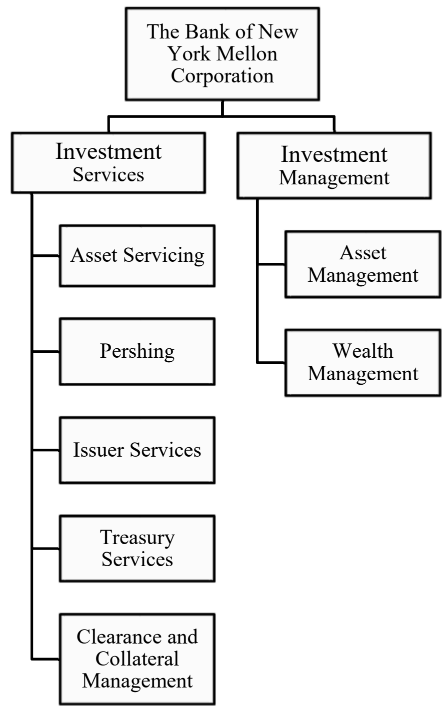
The following should be read in conjunction with the Consolidated Financial Statements included in this report. Investors should also read the section titled "Forward-looking Statements."

Overview

Established in 1784 by Alexander Hamilton, we were the first company listed on the New York Stock Exchange (NYSE: BK). With a more than 230-year history, BNY Mellon is a global company that manages and services assets for financial institutions, corporations and individual investors in 35 countries.

BNY Mellon has two business segments, Investment Services and Investment Management, which offer a comprehensive set of capabilities and deep expertise across the investment lifecycle, enabling the Company to provide solutions to buy-side and sell-side market participants, as well as leading institutional and wealth management clients globally.

The diagram below presents our two business segments and lines of business, with the remaining operations in the Other segment.



Key 2018 events

Share repurchase program and increase in cash dividend on common stock

In June 2018, our Board of Directors approved the repurchase of up to $2.4 billion of common stock starting in the third quarter of 2018 and continuing through the second quarter of 2019.

In July 2018, our Board of Directors approved a 17% increase in the quarterly cash dividend per common share, from $0.24 to $0.28 per share. The first payment of the increased quarterly cash dividend was made on Aug. 10, 2018.

In December 2018, our Board of Directors approved the repurchase of $830 million of additional common stock, all of which was repurchased in the fourth quarter of 2018. These repurchases were in addition to the repurchase of $2.4 billion of common stock previously approved by the Board.

Corporate headquarters

In July 2018, BNY Mellon relocated its corporate headquarters to 240 Greenwich Street in lower Manhattan.

Summary of financial highlights

We reported net income applicable to common shareholders of BNY Mellon of $4.1 billion, or $4.04 per diluted common share, in 2018, including a net charge of $168 million, or $(0.17) per diluted common share, related to severance, expenses associated with consolidating real estate and litigation expense, partially offset by adjustments to provisional estimates for U.S. tax legislation. In 2017, net income applicable to common shareholders of BNY Mellon was $3.9 billion, or $3.72 per diluted common share, including a net benefit of $160 million, or $0.15 per diluted common share, related to the estimated net benefit related to U.S. tax legislation, partially offset by severance, litigation expense and other charges.

Highlights of 2018 results

- Assets under custody and/or administration (“AUC/A”) totaled $33.1 trillion at Dec. 31, 2018 compared with $33.3 trillion at Dec. 31, 2017. The 1% decrease primarily reflects lower market values and the unfavorable impact of a stronger U.S. dollar on a spot basis, partially offset by net new business. (See “Investment Services business” beginning on page 14.)
- Assets under management (“AUM”) totaled $1.7 trillion at Dec. 31, 2018 compared with $1.9 trillion at Dec. 31, 2017. The 9% decrease primarily reflects the unfavorable impact of a stronger U.S. dollar (principally versus the British pound) on a spot basis, lower market values, net outflows, the divestiture of CenterSquare Investment Management (“CenterSquare”) and other changes. AUM excludes securities lending cash management assets and assets managed in the Investment Services business. (See “Investment Management business” beginning on page 17.)
- Investment services fees totaled $7.8 billion in 2018, an increase of 5% compared with $7.5 billion in 2017, primarily reflecting higher equity market values, net new business, including growth in collateral management and higher Depositary Receipts revenue, partially offset by the previously disclosed lost business in Pershing. (See “Investment Services business” beginning on page 14.)
- Investment management and performance fees totaled $3.7 billion in 2018 compared with $3.6 billion in 2017, an increase of 3%, primarily reflecting higher market values, performance fees and the favorable impact of a weaker U.S. dollar (principally versus the British pound), partially offset by the impact of net outflows. On a constant currency basis (Non-GAAP), investment management and performance fees increased 2% compared with 2017. (See “Investment Management business” beginning on page 17.)
- Foreign exchange and other trading revenue totaled $732 million in 2018 compared with $668 million in 2017. Foreign exchange revenue totaled $663 million in 2018, an increase of 4% compared with $638 million in 2017. The increase in foreign exchange revenue primarily reflects higher volumes, partially offset by foreign currency hedging. (See “Fee and other revenue” beginning on page 7.)
- Net interest revenue totaled $3.6 billion in 2018 compared with $3.3 billion in 2017, an increase of 9%. The increase primarily reflects higher interest rates. Net interest margin was 1.25% in 2018 compared with 1.14% in 2017. (See “Net interest revenue” beginning on page 9.)
- The provision for credit losses was a credit of $11 million in 2018 and a credit of $24 million in 2017. (See “Asset quality and allowance for credit losses” beginning on page 35.)
- Noninterest expense totaled $11.2 billion in 2018 compared with $11.0 billion in 2017. The 2% increase primarily reflects investments in technology, expenses associated with consolidating our real estate and the unfavorable impact of a weaker U.S. dollar, partially offset by lower bank assessment charges. (See “Noninterest expense” beginning on page 12.)
- The provision for income taxes was $938 million (18.1% effective tax rate) in 2018, including the impact of the adjustments to provisional estimates for U.S. tax legislation and the tax impact of severance, expenses associated with consolidating real estate and litigation expense. (See “Income taxes” on page 12.)
- The net unrealized pre-tax loss on our total securities portfolio was $907 million at Dec. 31,

2018, compared with a pre-tax loss of $85 million at Dec. 31, 2017, including the impact of related hedges. The increase in net unrealized pre-tax loss was primarily driven by an increase in interest rates. (See “Securities” beginning on page 29.)

- Our CET1 ratio calculated under the Advanced Approach was 10.7% at Dec. 31, 2018 and 10.7%, on a transitional basis, at Dec. 31, 2017. The ratio was unchanged compared to Dec. 31, 2017, reflecting capital deployed through common stock repurchases and dividend payments, and the final phase-in requirements under U.S. capital rules, offset by capital generated through earnings and lower risk-weighted assets (“RWAs”). (See “Capital” beginning on page 45.)
- Our SLR was 6.0% at Dec. 31, 2018 and 6.1%, on a transitional basis, at Dec. 31, 2017. (See “Capital” beginning on page 45.)

Results for 2017

In 2017, we reported net income applicable to common shareholders of BNY Mellon of $3.9 billion, or $3.72 per diluted common share. These results were primarily driven by:

- Investment services fees totaled $7.5 billion in 2017, an increase of 3% compared with $7.2 billion in 2016, primarily reflecting higher money market fees, higher equity market values and net new business, including growth in collateral management, partially offset by the previously disclosed lost business in Pershing and lower volumes in certain Depositary Receipts programs.
- Investment management and performance fees totaled $3.6 billion in 2017 compared with $3.4 billion in 2016, an increase of 7%, primarily reflecting higher market values, money market fees and performance fees, partially offset by the unfavorable impact of a stronger U.S. dollar (principally versus the British pound).
- Foreign exchange and other trading revenue totaled $668 million in 2017 compared with $701 million in 2016. Foreign exchange revenue totaled $638 million in 2017, a decrease of 7%, compared with $687 million in 2016. The decrease in foreign exchange revenue primarily reflects lower volatility, partially offset by higher volumes.
- The provision for credit losses was a credit of $24 million in 2017.
- Noninterest expense totaled $11.0 billion in 2017 compared with $10.5 billion in 2016. The 4% increase primarily reflects higher staff, software, and professional, legal and other purchased services expenses.
- The provision for income taxes was $496 million (10.8% effective tax rate), including the estimated tax benefit related to U.S. tax legislation.

Results for 2016

In 2016, we reported net income applicable to common shareholders of BNY Mellon of $3.4 billion, or $3.15 per diluted common share. These results were primarily driven by:

- Investment services fees totaled $7.2 billion, primarily reflecting higher money market fees and securities lending revenue, partially offset by the unfavorable impact of lost business on clearing services fees, the unfavorable impact of a stronger U.S. dollar and the downsizing of the UK transfer agency business.
- Investment management and performance fees totaled $3.4 billion, primarily reflecting the unfavorable impact of a stronger U.S. dollar (principally versus the British pound), net outflows of AUM and lower performance fees, partially offset by higher market values and money market fees.
- Foreign exchange and other trading revenue totaled $701 million, of which $687 million represented foreign exchange revenue. The decrease in foreign exchange revenue primarily reflects the impact of clients migrating to lower margin products and lower volumes.
- The provision for credit losses was a credit of $11 million.
- Noninterest expense totaled $10.5 billion primarily reflecting lower expenses in nearly all categories, driven by the favorable impact of a stronger U.S. dollar, lower staff, other, litigation and legal expenses and the benefit of the business improvement process. The decrease was partially offset by higher bank assessment charges, distribution and servicing and software expenses.
- The provision for income taxes was $1.2 billion (24.9% effective tax rate) in 2016.

Fee and other revenue

Fee and other revenue *(dollars in millions, unless otherwise noted)*	**2018**	2017	2016	**2018 vs. 2017**	2017 vs. 2016
Investment services fees:					
Asset servicing *(a)*	**$ 4,608**	$ 4,383	$ 4,244	**5 %**	3%
Clearing services	**1,578**	1,553	1,404	**2**	11
Issuer services	**1,099**	977	1,026	**12**	(5)
Treasury services	**554**	557	547	**(1)**	2
Total investment services fees	**7,839**	7,470	7,221	**5**	3
Investment management and performance fees	**3,685**	3,584	3,350	**3**	7
Foreign exchange and other trading revenue	**732**	668	701	**10**	(5)
Financing-related fees	**207**	216	219	**(4)**	(1)
Distribution and servicing	**139**	160	166	**(13)**	(4)
Investment and other income	**240**	64	341	**N/M**	N/M
Total fee revenue	**12,842**	12,162	11,998	**6**	1
Net securities (losses) gains	**(48)**	3	75	**N/M**	N/M
Total fee and other revenue	**$ 12,794**	$ 12,165	$ 12,073	**5 %**	1%
Fee revenue as a percentage of total revenue	**78%**	78%	79%		
AUC/A at period end *(in trillions) (b)*	**$ 33.1**	$ 33.3	$ 29.9	**(1)%**	11%
AUM at period end *(in billions) (c)*	**$ 1,722**	$ 1,893	$ 1,648	**(9)%**	15%

(a) Asset servicing fees include securities lending revenue of $220 million in 2018, $195 million in 2017 and $207 million in 2016.
(b) Includes the AUC/A of CIBC Mellon of $1.2 trillion at Dec. 31, 2018, $1.3 trillion at Dec. 31, 2017 and $1.2 trillion at Dec. 31, 2016.
(c) Excludes securities lending cash management assets and assets managed in the Investment Services business.

Fee and other revenue increased 5% compared with 2017. The increase primarily reflects higher asset servicing fees, investment and other income, issuer servicing fees and investment management and performance fees, partially offset by net securities losses.

Investment services fees

Investment services fees increased 5% compared with 2017 reflecting the following:

- Asset servicing fees increased 5%, primarily reflecting growth in collateral management, higher equity market values and securities lending volumes.
- Clearing services fees increased 2%, primarily driven by higher equity market values and average long-term mutual funds balances, partially offset by the previously disclosed lost business.
- Issuer services fees increased 12%, primarily reflecting higher Depositary Receipts revenue and higher volumes in Corporate Trust.
- Treasury services fees decreased 1%, primarily reflecting higher compensating balance credits provided to clients, which reduce fee revenue and increase net interest revenue, partially offset by higher volumes.

See the "Investment Services business" in "Review of businesses" for additional details.

Investment management and performance fees

Investment management and performance fees increased 3% compared with 2017, primarily reflecting higher market values, performance fees and the favorable impact of a weaker U.S. dollar (principally versus the British pound), partially offset by the impact of net outflows. On a constant currency basis (Non-GAAP), investment management and performance fees increased 2% compared with 2017. Performance fees were $144 million in 2018, $94 million in 2017 and $60 million in 2016.

AUM was $1.7 trillion at Dec. 31, 2018, a decrease of 9% compared with $1.9 trillion at Dec. 31, 2017. The decrease primarily reflects the unfavorable impact of a stronger U.S. dollar (principally versus the British pound) on a spot basis, lower market values, net outflows, the divestiture of CenterSquare and other changes.

See the "Investment Management business" in "Review of businesses" for additional details regarding the drivers of investment management and performance fees, AUM and AUM flows.

Foreign exchange and other trading revenue

Foreign exchange and other trading revenue *(in millions)*	**2018**	2017	2016
Foreign exchange	**$ 663**	$ 638	$ 687
Other trading revenue	**69**	30	14
Total foreign exchange and other trading revenue	**$ 732**	$ 668	$ 701

Foreign exchange and other trading revenue increased 10% compared with 2017.

Foreign exchange revenue is primarily driven by the volume of client transactions and the spread realized on these transactions, both of which are impacted by market volatility, and the impact of foreign currency hedging activities. In 2018, foreign exchange revenue totaled $663 million, an increase of 4% compared with 2017, primarily reflecting higher volumes, partially offset by foreign currency hedging. Foreign exchange revenue is primarily reported in the Investment Services business and, to a lesser extent, the Investment Management business and the Other segment.

Total other trading revenue was $69 million in 2018, compared with $30 million in 2017. The increase primarily reflects gains on Investment Management hedging activities. Other trading revenue is reported in all three business segments.

Financing-related fees

Financing-related fees, which are primarily reported in the Investment Services business and the Other segment, include capital markets fees, loan commitment fees and credit-related fees. Financing-related fees totaled $207 million in 2018 compared with $216 million in 2017, primarily reflecting lower fees on standby letters of credit and underwriting.

Distribution and servicing fees

Distribution and servicing fees earned from mutual funds are primarily based on average assets in the funds and the sales of funds that we manage or administer and are primarily reported in the Investment Management business. These fees, which include 12b-1 fees, fluctuate with the overall level of net sales, the relative mix of sales between share classes, the funds' market values and money market fee waivers.

Distribution and servicing fees were $139 million in 2018 compared with $160 million in 2017. The decrease primarily reflects the impact of lower fees from mutual funds.

Investment and other income

The following table provides the components of investment and other income.

Investment and other income *(in millions)*	**2018**	2017	2016
Corporate/bank-owned life insurance	**$ 145**	$ 153	$ 149
Expense reimbursements from joint venture	**71**	64	67
Asset-related gains (losses)	**70**	(1)	10
Equity investment income (loss)	**4**	37	(10)
Seed capital gains *(a)*	**3**	32	44
Lease-related gains	**1**	56	38
Other (loss) income	**(54)**	(277)	43
Total investment and other income	**$ 240**	$ 64	$ 341

(a) Excludes seed capital gains related to consolidated investment management funds, which are reflected in operations of consolidated investment management funds.

Investment and other income includes corporate and bank-owned life insurance contracts, expense reimbursements from our CIBC Mellon joint venture, gains or losses from asset-related activity, equity investments, seed capital, lease-related activity and other (loss) income. Expense reimbursements from our CIBC Mellon joint venture relate to expenses incurred by BNY Mellon on behalf of the CIBC Mellon joint venture. Asset-related gains (losses) include real estate, loan and other asset dispositions. Other (loss) income primarily includes foreign currency remeasurement gain (loss), other investments, including renewable energy, and various miscellaneous revenues. Investments in renewable energy generate losses in other income that are more than offset by benefits and credits recorded to the provision for income taxes.

Investment and other income was $240 million in 2018 compared with $64 million in 2017. The increase primarily reflects the impact of U.S. tax legislation on our renewable energy investments recorded in 2017.

Net securities losses

Net securities losses were $48 million in 2018, primarily reflecting the sale of debt securities.

2017 compared with 2016

Fee and other revenue totaled $12.2 billion in 2017 compared with $12.1 billion in 2016. The increase primarily reflects higher investment services fees and investment management and performance fees, partially offset by lower investment and other income and net securities gains.

The increase in investment services fees primarily reflects higher money market fees, higher equity market values and net new business, including growth in collateral management, partially offset by previously disclosed lost business in Pershing and lower volumes in certain Depositary Receipts programs.

The increase in investment management and performance fees primarily reflects higher market values, money market fees and performance fees, partially offset by the unfavorable impact of a stronger U.S. dollar on an average basis (principally versus the British pound).

The decrease in investment and other income primarily reflects the impact of U.S. tax legislation on our renewable energy investments.

Net interest revenue

Net interest revenue *(dollars in millions)*	**2018**	2017	2016	**2018 vs. 2017**	2017 vs. 2016
Net interest revenue	**$ 3,611**	$ 3,308	$ 3,138	**9%**	**5%**
Add: Tax equivalent adjustment	**20**	47	51	**N/M**	**N/M**
Net interest revenue on a fully taxable equivalent basis ("FTE") – Non-GAAP *(a)*	**$ 3,631**	$ 3,355	$ 3,189	**8%**	**5%**
Average interest-earning assets	**$289,916**	$ 290,522	$ 303,379	**—%**	**(4)%**
Net interest margin	**1.25%**	1.14%	1.03%	**11 bps**	**11 bps**
Net interest margin (FTE) – Non-GAAP *(a)*	**1.25%**	1.15%	1.05%	**10 bps**	**10 bps**

(a) Net interest revenue (FTE) – Non-GAAP and net interest margin (FTE) – Non-GAAP include the tax equivalent adjustments on tax-exempt income which allows for comparisons of amounts arising from both taxable and tax-exempt sources and is consistent with industry practice. The adjustment to an FTE basis has no impact on net income.

Net interest revenue increased 9% compared with 2017, primarily reflecting higher interest rates.

Net interest margin increased 11 basis points compared with 2017, primarily reflecting higher yields on interest-earning assets, partially offset by higher interest rates paid on interest-bearing liabilities.

Average interest-earning assets were $290 billion in 2018 compared with $291 billion in 2017. The decrease primarily reflects lower loans and interest-bearing deposits with the Federal Reserve and other central banks, partially offset by higher trading securities.

Average non-U.S. dollar deposits comprised approximately 30% of our average total deposits in 2018 and 2017. Approximately 45% of the average non-U.S. dollar deposits in 2018 and 2017 were euro-denominated.

2017 compared with 2016

Net interest revenue increased 5% compared with 2016, primarily driven by higher interest rates, partially offset by lower interest-earning assets driven by lower average deposits. The 11 basis points increase in the net interest margin primarily reflects higher yields on interest-earning assets, partially offset by higher interest rates paid on interest-bearing liabilities.

Average balances and interest rates	**2018**		
(dollar amounts in millions, presented on an FTE basis)	**Average balance**	**Interest**	**Average rates**
Assets			
Interest-earning assets:			
Interest-bearing deposits with banks (primarily foreign banks)	$ 14,740	$ 219	1.48%
Interest-bearing deposits with the Federal Reserve and other central banks	68,408	531	0.78
Federal funds sold and securities purchased under resale agreements *(a)*	27,883	1,116	4.00
Margin loans	14,397	510	3.54
Non-margin loans:			
Domestic offices:			
Consumer	9,789	319	3.26
Commercial	19,853	701	3.53
Foreign offices	11,771	336	2.85
Total non-margin loans	41,413	1,356 *(b)*	3.27
Securities:			
U.S. government obligations	23,908	486	2.03
U.S. government agency obligations	63,902	1,518	2.37
State and political subdivisions	2,565	69	2.69
Other securities:			
Domestic offices	8,186	341	4.17
Foreign offices	19,848	179	0.90
Total other securities	28,034	520	1.85
Trading securities (primarily domestic)	4,666	127	2.74
Total securities	123,075	2,720	2.21
Total interest-earning assets	$ 289,916	$ 6,452	2.23%
Noninterest-earning assets	53,858		
Total assets	$ 343,774		
Liabilities			
Interest-bearing liabilities:			
Interest-bearing deposits:			
Domestic offices	$ 59,226	$ 537	0.91%
Foreign offices	95,475	340	0.36
Total interest-bearing deposits	154,701	877	0.57
Federal funds purchased and securities sold under repurchase agreements *(a)*	15,546	758	4.88
Trading liabilities	1,310	29	2.21
Other borrowed funds:			
Domestic offices	2,122	55	2.57
Foreign offices	423	3	0.73
Total other borrowed funds	2,545	58	2.26
Commercial paper	2,607	51	1.97
Payables to customers and broker-dealers	16,353	191	1.17
Long-term debt	28,257	857	3.03
Total interest-bearing liabilities	$ 221,319	$ 2,821	1.27%
Total noninterest-bearing deposits	63,814		
Other noninterest-bearing liabilities	16,952		
Total liabilities	302,085		
Temporary equity			
Redeemable noncontrolling interests	187		
Permanent equity			
Total The Bank of New York Mellon Corporation shareholders' equity	41,360		
Noncontrolling interests	142		
Total permanent equity	41,502		
Total liabilities, temporary equity and permanent equity	$ 343,774		
Net interest revenue (FTE) – Non-GAAP		$ 3,631	
Net interest margin (FTE) – Non-GAAP			1.25%
Less: Tax equivalent adjustment *(c)*		20	
Net interest revenue - GAAP		$ 3,611	
Net interest margin- GAAP			1.25%
Percentage of assets attributable to foreign offices *(d)*	31%		
Percentage of liabilities attributable to foreign offices *(d)*	34		

Note: Interest and average rates were calculated on a taxable equivalent basis using dollar amounts in thousands and actual number of days in the year.

(a) Includes the average impact of offsetting under enforceable netting agreements of approximately $25 billion in 2018.

(b) Includes fees of $7 million in 2018. Non-accrual loans are included in average loans; the associated income, which was recognized on a cash basis, is included in interest income.

(c) The tax equivalent adjustment relates to tax-exempt securities, primarily state and political subdivisions, and is based on the U.S. federal statutory tax rate of 21%, adjusted for applicable state income taxes, net of the related federal tax benefit.

(d) Includes the Cayman Islands branch office.

Average balances and interest rates (continued)	2017			2016		
(dollar amounts in millions, presented on an FTE basis)	Average balance	Interest	Average rates	Average balance	Interest	Average rates
Assets						
Interest-earning assets:						
Interest-bearing deposits with banks (primarily foreign banks)	$ 14,879	$ 120	0.80%	$ 14,704	$ 104	0.70%
Interest-bearing deposits with the Federal Reserve and other central banks	70,213	319	0.45	80,593	198	0.25
Federal funds sold and securities purchased under resale agreements *(a)*	27,192	423	1.55	25,767	233	0.91
Margin loans	14,500	343	2.36	18,201	265	1.46
Non-margin loans:						
Domestic offices:						
Consumer	9,548	298	3.12	8,483	259	3.05
Commercial	20,976	521	2.49	21,820	417	1.91
Foreign offices	12,915	258	2.00	13,177	197	1.50
Total non-margin loans	43,439	1,077 *(b)*	2.48	43,480	873 *(b)*	2.01
Securities:						
U.S. government obligations	25,674	425	1.66	25,074	378	1.51
U.S. government agency obligations	60,268	1,195	1.98	56,384	986	1.75
State and political subdivisions	3,226	100	3.09	3,703	110	2.96
Other securities:						
Domestic offices	9,141	215	2.35	12,326	210	1.71
Foreign offices	19,541	150	0.77	20,664	206	1.00
Total other securities	28,682	365	1.27	32,990	416	1.26
Trading securities (primarily domestic)	2,449	62	2.54	2,483	63	2.56
Total securities	120,299	2,147	1.79	120,634	1,953	1.62
Total interest-earning assets	$ 290,522	$ 4,429	1.52%	$ 303,379	$ 3,626	1.20%
Noninterest-earning assets	53,326			55,098		
Total assets	$ 343,848			$ 358,477		
Liabilities						
Interest-bearing liabilities:						
Interest-bearing deposits:						
Domestic offices:	$ 46,908	$ 107	0.23%	$ 54,547	$ 41	0.08%
Foreign offices	96,215	55	0.06	102,399	(25)	(0.02)
Total interest-bearing deposits	143,123	162	0.11	156,946	16	0.01
Federal funds purchased and securities sold under repurchase agreements *(a)*	19,653	225	1.14	14,489	36	0.25
Trading liabilities	1,243	7	0.57	711	6	0.89
Other borrowed funds:						
Domestic offices	1,113	21	1.86	93	4	4.15
Foreign offices	803	5	0.67	753	4	0.51
Total other borrowed funds	1,916	26	1.36	846	8	0.91
Commercial paper	2,630	29	1.08	1,337	5	0.37
Payables to customers and broker-dealers	18,984	64	0.34	16,925	12	0.07
Long-term debt	27,424	561	2.05	23,334	354	1.52
Total interest-bearing liabilities	$ 214,973	$ 1,074	0.50%	$ 214,588	$ 437	0.20%
Total noninterest-bearing deposits	71,664			82,712		
Other noninterest-bearing liabilities	16,932			21,928		
Total liabilities	303,569			319,228		
Temporary equity						
Redeemable noncontrolling interests	180			182		
Permanent equity						
Total The Bank of New York Mellon Corporation shareholders' equity	39,687			38,489		
Noncontrolling interests	412			578		
Total permanent equity	40,099			39,067		
Total liabilities, temporary equity and permanent equity	$ 343,848			$ 358,477		
Net interest revenue (FTE) – Non-GAAP		$ 3,355			$ 3,189	
Net interest margin (FTE) – Non-GAAP			1.15%			1.05%
Less: Tax equivalent adjustment *(c)*		47			51	
Net interest revenue - GAAP		$ 3,308			$ 3,138	
Net interest margin - GAAP			1.14%			1.03%
Percentage of assets attributable to foreign offices *(d)*	30%			29%		
Percentage of liabilities attributable to foreign offices *(d)*	35			36		

Note: Interest and average rates were calculated on a taxable equivalent basis using dollar amounts in thousands and actual number of days in the year.

(a) Includes the average impact of offsetting under enforceable netting agreements of approximately $6 billion in 2017 and less than $350 million in 2016.

(b) Includes fees of $9 million in 2017 and $10 million in 2016. Non-accrual loans are included in the average loans; the associated income, which was recognized on a cash basis, is included in interest income.

(c) The tax equivalent adjustment relates to tax-exempt securities, primarily state and political subdivisions, and is based on the U.S. federal statutory tax rate of 35%, adjusted for applicable state income taxes, net of the related federal tax benefit.

(d) Includes the Cayman Islands branch office.

Noninterest expense

Noninterest expense *(dollars in millions)*	**2018**	2017	2016	**2018 vs. 2017**	2017 vs. 2016
Staff *(a)*	**$ 6,145**	$ 6,033	$ 5,809	**2 %**	**4%**
Professional, legal and other purchased services	**1,334**	1,276	1,186	**5**	**8**
Software	**772**	744	647	**4**	**15**
Net occupancy	**630**	570	592	**11**	**(4)**
Sub-custodian and clearing *(b)*	**450**	414	400	**9**	**4**
Distribution and servicing	**406**	419	405	**(3)**	**3**
Furniture and equipment	**290**	241	247	**20**	**(2)**
Business development	**228**	229	245	**—**	**(7)**
Bank assessment charges	**170**	220	219	**(23)**	**—**
Amortization of intangible assets	**180**	209	237	**(14)**	**(12)**
Other *(a)(b)(c)*	**606**	602	536	**1**	**12**
Total noninterest expense	**$ 11,211**	$ 10,957	$ 10,523	**2 %**	**4%**
Full-time employees at period end	51,300	52,500	52,000	**(2)%**	**1%**

(a) *In 2018, we adopted new accounting guidance included in ASU 2017-07, Compensation-Retirement Benefits: Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost, which required the reclassification of the components of pension and other postretirement costs, other than the service cost component. As a result, staff expense increased and other expense decreased. Prior periods have been reclassified. See Note 2 of the Notes to Consolidated Financial Statements for additional information.*

(b) *Beginning in 2018, clearing expense, which was previously included in other expense, was included with sub-custodian expense. Prior periods have been reclassified.*

(c) *Beginning in 2018, merger and integration ("M&I"), litigation and restructuring charges are no longer separately disclosed. Expenses previously reported in this line have been reclassified to existing expense categories, primarily other expense.*

Total noninterest expense increased 2% compared with 2017. The increase primarily reflects investments in technology, expenses associated with consolidating our real estate and the unfavorable impact of a weaker U.S. dollar, partially offset by lower bank assessment charges. The investments in technology are included in staff, professional, legal and other purchased services, software and furniture and equipment expenses.

Our investments in technology infrastructure and platforms increased throughout 2018 and are expected to continue at recent levels. As a result, we expect to incur higher technology-related expenses in 2019 than in 2018. This increase is expected to be mostly offset by decreases in other expenses as we continue to manage overall expenses.

2017 compared with 2016

Total noninterest expense increased 4% compared with 2016. The increase primarily reflects higher staff, software and professional, legal and other purchased services expenses. The increase in staff expense primarily reflects higher incentive expense, driven by stronger performance, the annual employee merit increase and higher severance expense, partially offset by the favorable impact of a stronger U.S. dollar. The increase in software expense primarily reflects asset impairments and increased amortization. The increase in professional, legal and other purchased services expense primarily reflects higher consulting and purchased services expenses.

Income taxes

BNY Mellon recorded an income tax provision of $938 million (18.1% effective tax rate) in 2018, including the impact of adjusting provisional estimates related to U.S. tax legislation and the tax impact of severance, expenses associated with consolidating real estate and litigation expense. The income tax provision was $496 million (10.8% effective tax rate) in 2017, including the estimated tax benefit related to U.S. tax legislation. The income tax provision was $1.2 billion (24.9% effective tax rate) in 2016. For additional information, see Note 11 of the Notes to Consolidated Financial Statements.

Review of businesses

We have an internal information system that produces performance data along product and service lines for our two principal businesses, Investment Services and Investment Management, and the Other segment.

Business accounting principles

Our business data has been determined on an internal management basis of accounting, rather than the generally accepted accounting principles used for consolidated financial reporting. These measurement principles are designed so that reported results of the businesses will track their economic performance.

For information on the accounting principles of our businesses, the primary products and services in each line of business, the primary types of revenue by business and how our businesses are presented and analyzed, see Note 23 of the Notes to Consolidated Financial Statements.

Business results are subject to reclassification when organizational changes are made. There were no significant organizational changes in 2018. The results are also subject to refinements in revenue and expense allocation methodologies, which are typically reflected on a prospective basis.

The results of our businesses may be influenced by client and other activities that vary by quarter. In the first quarter, incentive expense typically increases reflecting the vesting of long-term stock awards for retirement-eligible employees. In the third quarter, Depositary Receipts revenue is typically higher due to an increased level of client dividend payments. Also in the third quarter, volume-related fees may decline due to reduced client activity. In the third quarter, staff expense typically increases reflecting the annual employee merit increase. In the fourth quarter, we typically incur higher business development and marketing expenses. In our Investment Management business, performance fees are typically higher in the fourth quarter, as the fourth quarter represents the end of the measurement period for many of the performance fee-eligible relationships.

The results of our businesses may also be impacted by the translation of financial results denominated in foreign currencies to the U.S. dollar. We are primarily impacted by activities denominated in the British pound and the euro. On a consolidated basis and in our Investment Services business, we typically have more foreign currency-denominated expenses than revenues. However, our Investment Management business typically has more foreign currency-denominated revenues than expenses. Overall, currency fluctuations impact the year-over-year growth rate in the Investment Management business more than the Investment Services business. However, currency fluctuations, in isolation, are not expected to significantly impact net income on a consolidated basis.

Fee revenue in Investment Management, and to a lesser extent in Investment Services, is impacted by the value of market indices. At Dec. 31, 2018, we estimate that a 5% change in global equity markets, spread evenly throughout the year, would impact fee revenue by less than 1% and diluted earnings per common share by $0.03 to $0.05.

See Note 23 of the Notes to Consolidated Financial Statements for the consolidating schedules which show the contribution of our businesses to our overall profitability.

Investment Services business

(dollars in millions unless otherwise noted)	**2018**	2017	2016	**2018 vs. 2017**	2017 vs. 2016
Revenue:					
Investment services fees:					
Asset servicing	**$ 4,520**	$ 4,286	$ 4,141	**5 %**	**4 %**
Clearing services	**1,577**	1,549	1,399	**2**	**11**
Issuer services	**1,099**	975	1,024	**13**	**(5)**
Treasury services	**553**	555	541	**—**	**3**
Total investment services fees	**7,749**	7,365	7,105	**5**	**4**
Foreign exchange and other trading revenue	**665**	620	663	**7**	**(6)**
Other *(a)*	**512**	542	531	**(6)**	**2**
Total fee and other revenue	**8,926**	8,527	8,299	**5**	**3**
Net interest revenue	**3,372**	3,058	2,797	**10**	**9**
Total revenue	**12,298**	11,585	11,096	**6**	**4**
Provision for credit losses	**1**	(7)	8	**N/M**	**N/M**
Noninterest expense (excluding amortization of intangible assets)	**7,929**	7,598	7,187	**4**	**6**
Amortization of intangible assets	**129**	149	155	**(13)**	**(4)**
Total noninterest expense	**8,058**	7,747	7,342	**4**	**6**
Income before taxes	**$ 4,239**	$ 3,845	$ 3,746	**10 %**	**3 %**
Pre-tax operating margin	**34%**	33%	34%		
Securities lending revenue	**$ 198**	$ 168	$ 170	**18 %**	**(1)%**
Total revenue by line of business:					
Asset Servicing	**$ 5,932**	$ 5,603	$ 5,504	**6 %**	**2 %**
Pershing	**2,255**	2,180	1,979	**3**	**10**
Issuer Services	**1,743**	1,588	1,585	**10**	**—**
Treasury Services	**1,302**	1,251	1,136	**4**	**10**
Clearance and Collateral Management	**1,066**	963	892	**11**	**8**
Total revenue by line of business	**$ 12,298**	$ 11,585	$ 11,096	**6 %**	**4 %**
Metrics:					
Average loans	**$ 36,931**	$ 40,142	$ 44,740	**(8)%**	**(10)%**
Average deposits	**$ 203,279**	$ 200,235	$ 217,882	**2 %**	**(8)%**
AUC/A at period end *(in trillions) (b)*	**$ 33.1**	$ 33.3	$ 29.9	**(1)%**	**11 %**
Market value of securities on loan at period end *(in billions) (c)*	**$ 373**	$ 408	$ 296	**(9)%**	**38 %**
Pershing:					
Average active clearing accounts (U.S. platform) *(in thousands)*	**6,097**	6,137	5,949	**(1)%**	**3 %**
Average long-term mutual fund assets (U.S. platform)	**$ 511,004**	$ 487,845	$ 431,937	**5 %**	**13 %**
Average investor margin loans (U.S. platform)	**$ 10,829**	$ 9,810	$ 10,772	**10 %**	**(9)%**
Clearance and Collateral Management:					
Average tri-party collateral management balances *(in billions)*	**$ 2,918**	$ 2,502	$ 2,183	**17 %**	**15 %**

(a) Other revenue includes investment management fees, financing-related fees, distribution and servicing revenue and investment and other income.

(b) Includes the AUC/A of CIBC Mellon of $1.2 trillion at Dec. 31, 2018, $1.3 trillion at Dec. 31, 2017 and $1.2 trillion at Dec. 31, 2016.

(c) Represents the total amount of securities on loan in our agency securities lending program managed by the Investment Services business. Excludes securities for which BNY Mellon acts as agent on behalf of CIBC Mellon clients, which totaled $58 billion at Dec. 31, 2018, $71 billion at Dec. 31, 2017 and $63 billion at Dec. 31, 2016.

Business description

BNY Mellon Investment Services provides business services and technology solutions to entities including financial institutions, corporations, foundations and endowments, public funds and government agencies. Our lines of business include: Asset Servicing, Pershing, Issuer Services, Treasury Services and Clearance and Collateral Management.

We are one of the leading global investment services providers with $33.1 trillion of AUC/A at Dec. 31, 2018.

- We are the primary provider of U.S. government securities clearance and a provider of non-U.S. government securities clearance.
- We are a leading provider of tri-party collateral management services with an average of $2.9 trillion serviced globally including approximately $2.0 trillion of the U.S. tri-party repo market.
- Our agency securities lending program is one of the largest lenders of U.S. and non-U.S. securities, servicing a lendable asset pool of approximately $3.4 trillion in 34 separate markets.

The Asset Servicing business provides a comprehensive suite of solutions. As one of the largest global custody and fund accounting providers and a trusted partner, we offer services for the safekeeping of assets in capital markets globally as well as alternative investment and structured product strategies. We provide custody and foreign exchange services, support exchange-traded funds and unit investment trusts and provide our clients outsourcing capabilities. We deliver securities lending and financing solutions on both an agency and principal basis. Our market leading liquidity services portal enables cash investments for institutional clients and includes fund research and analytics.

Pershing provides clearing, custody, business and technology solutions, delivering dependable operational support to financial organizations globally.

The Issuer Services business includes Corporate Trust and Depositary Receipts. Our Corporate Trust business delivers a full range of issuer and related investor services, including trustee, paying agency, fiduciary, escrow and other financial services. We are a leading provider to the debt capital markets, providing customized and market-driven solutions to investors, bondholders and lenders. Our Depositary Receipts business drives global investing by providing servicing and value-added solutions that enable, facilitate and enhance cross-border trading, clearing, settlement and ownership. We are one of the largest providers of depositary receipts services in the world, partnering with leading companies from more than 50 countries.

Our Treasury Services business includes global payments, liquidity management, payables/receivables and trade finance services for financial institutions, corporations and the public sector.

Our Clearance and Collateral Management business clears and settles equity and fixed-income transactions globally and serves as custodian for tri-party repo collateral worldwide. Our collateral services include collateral management, administration and segregation. We offer innovative solutions and industry expertise which help financial institutions and institutional investors with their liquidity, financing, risk and balance sheet challenges.

Review of financial results

AUC/A decreased 1% compared with Dec. 31, 2017 to $33.1 trillion, primarily reflecting lower market values and the unfavorable impact of a stronger U.S. dollar on a spot basis, partially offset by net new business. AUC/A consisted of 33% equity securities and 67% fixed-income securities at Dec. 31, 2018 and 37% equity securities and 63% fixed-income securities at Dec. 31, 2017.

Total revenue of $12.3 billion increased 6% compared with 2017. Net interest revenue increased compared with 2017 in all businesses, primarily driven by higher interest rates. The drivers of fee revenue by line of business are indicated below.

Asset Servicing revenue of $5.9 billion increased 6% compared with 2017. The increase primarily reflects higher net interest revenue, higher foreign exchange and securities lending volumes, higher equity market values and the favorable impact of a weaker U.S. dollar.

Pershing revenue of $2.3 billion increased 3% compared with 2017. The increase primarily reflects higher net interest revenue and higher fees due to growth in average long-term mutual fund balances and higher clearance volumes, partially offset by the previously disclosed lost business.

Issuer Services revenue of $1.7 billion increased 10% compared with 2017. The increase primarily reflects higher Depositary Receipts revenue driven by corporate actions and higher volumes, higher net interest revenue and increased volumes in Corporate Trust.

Treasury Services revenue of $1.3 billion increased 4% compared with 2017. The increase primarily reflects higher net interest revenue and higher payment volumes.

Clearance and Collateral Management revenue of $1.1 billion increased 11% compared with 2017. The increase primarily reflects growth in collateral management, clearance volumes and net interest revenue.

Market and regulatory trends are driving investable assets toward lower fee asset management products at reduced margins for our clients. These dynamics are also negatively impacting our investment services fees. However, at the same time, these trends are providing additional outsourcing opportunities as clients and other market participants seek to comply with new regulations and reduce their operating costs.

Noninterest expense of $8.1 billion increased 4% compared with 2017. The increase was primarily driven by investments in technology, higher volume-related expenses and the unfavorable impact of a weaker U.S. dollar.

2017 compared with 2016

Total revenue of $11.6 billion increased 4% compared with 2016. Net interest revenue increased in most lines of business, primarily driven by higher interest rates. Asset Servicing revenue increased primarily reflecting higher net interest revenue, equity market values and money market fees, partially offset by the downsizing of the UK transfer agency business. Pershing revenue increased primarily reflecting higher net interest revenue, higher money market fees and growth in long-term mutual fund assets. Issuer Services revenue increased slightly primarily reflecting higher net interest revenue partially offset by lost business and lower volumes from weaker cross-border settlement activity in Depositary Receipts. Treasury Services revenue increased primarily reflecting higher net interest revenue and higher payment volumes. Clearance and Collateral Management revenue increased primarily reflecting growth in collateral management and higher clearance volumes, partially offset by lower net interest revenue.

Noninterest expense of $7.7 billion increased 6% compared with 2016 primarily reflecting higher staff expense, including severance, higher litigation expense, additional technology-related costs and asset impairments.

Investment Management business

(dollars in millions)	**2018**	2017	2016	**2018 vs. 2017**	2017 vs. 2016
Revenue:					
Investment management fees *(a)*	**$ 3,488**	$ 3,428	$ 3,232	**2%**	6 %
Performance fees	**144**	94	60	**53**	57
Investment management and performance fees *(b)*	**3,632**	3,522	3,292	**3**	7
Distribution and servicing	**190**	207	192	**(8)**	8
Other *(a)*	**(41)**	(61)	(60)	**N/M**	N/M
Total fee and other revenue *(a)*	**3,781**	3,668	3,424	**3**	7
Net interest revenue	**303**	329	327	**(8)**	1
Total revenue	**4,084**	3,997	3,751	**2**	7
Provision for credit losses	**3**	2	6	**N/M**	N/M
Noninterest expense (excluding amortization of intangible assets)	**2,767**	2,794	2,696	**(1)**	4
Amortization of intangible assets	**51**	60	82	**(15)**	(27)
Total noninterest expense	**2,818**	2,854	2,778	**(1)**	3
Income before taxes	**$ 1,263**	$ 1,141	$ 967	**11%**	18 %
Pre-tax operating margin	**31%**	29%	26%		
Adjusted pre-tax operating margin – Non-GAAP *(c)*	**34%**	32%	29%		
Total revenue by line of business:					
Asset Management	**$ 2,836**	$ 2,775	$ 2,615	**2%**	6 %
Wealth Management	**1,248**	1,222	1,136	**2**	8
Total revenue by line of business	**$ 4,084**	$ 3,997	$ 3,751	**2%**	7 %
Average balances:					
Average loans	**$ 16,774**	$ 16,565	$ 15,015	**1%**	10 %
Average deposits	**$ 14,291**	$ 13,615	$ 15,650	**5%**	(13)%

(a) *Total fee and other revenue includes the impact of the consolidated investment management funds, net of noncontrolling interests. Additionally, other revenue includes asset servicing, foreign exchange and other trading revenue, treasury services and investment and other income.*

(b) *On a constant currency basis, investment management and performance fees increased 2% (Non-GAAP) compared with 2017. See "Supplemental information – Explanation of GAAP and Non-GAAP financial measures" beginning on page 105 for the reconciliation of this Non-GAAP measure.*

(c) *Net of distribution and servicing expense. See "Supplemental information – Explanation of GAAP and Non-GAAP financial measures" beginning on page 105 for the reconciliation of this Non-GAAP measure. In 2018, the adjusted pre-tax margin – Non-GAAP for prior periods was restated to include amortization of intangible assets and the provision for credit losses.*

AUM trends *(dollars in billions)*	**2018**		2017	2016
AUM at period end, by product type: *(a)*				
Equity	**$ 135**		$ 161	$ 153
Fixed income	**200**		206	186
Index	**301**		350	312
Liability-driven investments	**659**		667	554
Multi-asset and alternative investments	**167**		214	181
Cash	**260**		295	262
Total AUM by product type	**$ 1,722**		$ 1,893	$ 1,648
Changes in AUM: *(a)*				
Beginning balance of AUM	**$ 1,893**		$ 1,648	$ 1,625
Net (outflows) inflows:				
Long-term strategies:				
Equity	**(13)**		(14)	(15)
Fixed income	**4**		6	(5)
Liability-driven investments	**45**		50	26
Multi-asset and alternative investments	**(6)**		8	12
Total long-term active strategies inflows	**30**		50	18
Index	**(34)**		(17)	(32)
Total long-term strategies (outflows) inflows	**(4)**		33	(14)
Short-term strategies:				
Cash	**(35)**		30	(9)
Total net (outflows) inflows	**(39)**		63	(23)
Net market impact	**(48)**		106	181
Net currency impact	**(53)**		76	(137)
Acquisition/divestiture/ other	**(31)**	*(b)*	—	2
Ending balance of AUM	**$ 1,722**		$ 1,893	$ 1,648
Wealth Management client assets *(c)*	**$ 239**		$ 262	$ 240

(a) Excludes securities lending cash management assets and assets managed in the Investment Services business.
(b) Primarily reflects a change in methodology beginning in 2018 to exclude AUM related to equity method investments as well as the CenterSquare divestiture.
(c) Includes AUM and AUC/A in the Wealth Management business. Prior period amounts were revised to include additional AUC/A.

Business description

Our Investment Management business consists of two lines of business, Asset Management and Wealth Management. With AUM of $1.7 trillion, our Investment Management business is the seventh largest global asset manager and includes our investment specialists and Wealth Management business.

Our investment specialists deliver a highly diversified portfolio of investment strategies independently, and through our global distribution network, to institutional and retail clients globally. The investment specialists offer a broad range of actively managed equity, fixed income, alternative and liability-driven investments, along with passive products and cash management. Each investment specialist follows its own investment approach to innovate and develop investment solutions designed to deliver performance returns and outcomes that meet the investing goals of an increasingly sophisticated client base. Our multi-boutique model of investment specialists is designed to provide the best elements of investment focus and infrastructure at scale for the benefit of clients.

In the third quarter of 2018, BNY Mellon announced the wind-down of EACM Advisors and, effective Jan. 2, 2019, Mellon Investments Corporation (“Mellon”) as the new name of our specialized multi-asset investment manager formed from the consolidation of Mellon Capital Management, Standish Mellon Asset Management, and The Boston Company Asset Management.

In addition to the investment specialists, Investment Management has multiple global distribution entities which are responsible for distributing investment products developed and managed by the investment specialists, as well as responsibility for management and distribution of our U.S. mutual funds and certain offshore money market funds.

BNY Mellon Wealth Management provides investment management, custody, wealth and estate planning and private banking services, and conducts business globally. BNY Mellon Wealth Management has $239 billion in Wealth Management client assets as of Dec. 31, 2018, and an extensive network of offices in the U.S. and internationally.

The results of the Investment Management business are driven by the period end, average and mix of AUM, as well as the level of activity in client accounts. The overall level of AUM for a given period is determined by:

- the beginning level of AUM;
- the net flows of new assets during the period resulting from new business wins and existing client enrichments, reduced by the loss of clients and withdrawals; and

- the impact of market price appreciation or depreciation, acquisitions or divestitures and foreign exchange rates.

The mix of AUM is determined principally by client asset allocation decisions among equity, fixed income, passive products, cash, liability-driven investments and multi-asset and alternative investments.

Managed equity assets typically generate higher percentage fees than liability-driven investments and fixed-income assets. Also, actively managed assets typically generate higher management fees than indexed or passively managed assets of the same type.

Investment management fees are dependent on the overall level and mix of AUM and the management fees expressed in basis points (one-hundredth of one percent) charged for managing those assets. Management fees are typically subject to fee schedules based on the overall level of assets managed for a single client or by individual asset class and style. This is most common for institutional clients where we typically manage substantial assets for individual accounts.

Performance fees are generally calculated as a percentage of a portfolio's performance in excess of a benchmark index or a peer group's performance.

A key driver of organic growth in investment management and performance fees is the amount of net new AUM flows. Overall market conditions are also key drivers, with a significant long-term economic driver being growth of global financial assets.

Net interest revenue is determined by loan and deposit volumes and the interest rate spread between customer rates and internal funds transfer rates on loans and deposits. Expenses in the Investment Management business are mainly driven by staffing costs, incentives and distribution and servicing expense.

Review of financial results

AUM decreased 9% compared with Dec. 31, 2017 primarily reflecting the unfavorable impact of a stronger U.S. dollar (principally versus the British pound) on a spot basis, lower market values, net outflows and the divestiture of CenterSquare and other changes. Net long-term outflows of $4 billion in 2018 were a result of $34 billion of outflows from index funds and $30 billion of inflows from actively managed strategies, primarily liability-driven investments.

Total revenue of $4.1 billion increased 2% compared with 2017.

Asset Management revenue of $2.8 billion increased 2% compared with the 2017, primarily reflecting higher market values, performance fees and the favorable impact of a weaker U.S. dollar (principally versus the British pound), partially offset by the impact of net outflows. Market and regulatory trends have resulted in increased demand for lower fee asset management products, and for performance-based fees.

Wealth Management revenue of $1.2 billion increased 2% compared with 2017, primarily reflecting higher equity market values and net new business, partially offset by lower net interest revenue.

Revenue generated in the Investment Management business included 42% from non-U.S. sources in 2018, compared with 41% in 2017.

Noninterest expense of $2.8 billion decreased 1% compared with 2017, primarily reflecting the divestiture of CenterSquare.

2017 compared with 2016

Total revenue of $4.0 billion increased 7% compared with 2016. Asset Management revenue increased primarily reflecting higher equity market values, money market fees and performance fees, partially offset by the unfavorable impact of a stronger U.S. dollar (principally versus the British pound). Wealth management revenue increased primarily reflecting higher equity market values and net interest revenue.

Noninterest expense of $2.9 billion increased 3% primarily reflecting higher incentive, distribution and servicing and severance expenses, partially offset by the favorable impact of a stronger U.S. dollar.

Other segment

(in millions)		**2018**		2017		2016
Fee revenue	**$**	**133**	$	4	$	291
Net securities (losses) gains		**(48)**		3		75
Total fee and other revenue		**85**		7		366
Net interest (expense) revenue		**(64)**		(79)		14
Total revenue (loss)		**21**		(72)		380
Provision for credit losses		**(15)**		(19)		(25)
Noninterest expense		**334**		347		394
(Loss) income before taxes	**$**	**(298)**	$	(400)	$	11
Average loans and leases	**$**	**2,105**	$	1,232	$	1,926

Description of segment

The Other segment primarily includes:

- the leasing portfolio;
- corporate treasury activities, including our securities portfolio;
- derivatives and other trading activity;
- corporate and bank-owned life insurance;
- renewable energy investments; and
- business exits.

Revenue primarily reflects:

- net interest revenue and lease-related gains (losses) from leasing operations;
- net interest revenue from corporate treasury activity;
- fee and other revenue from corporate and bank-owned life insurance and business exits; and
- gains (losses) associated with investment securities and other assets, including renewable energy.

Expenses include:

- direct expenses supporting leasing, investing, and funding activities; and
- expenses not directly attributable to Investment Services and Investment Management operations.

Review of financial results

Loss before taxes was $298 million in 2018 compared with $400 million in 2017.

Fee revenue increased $129 million compared with 2017, primarily reflecting the impact of U.S. tax legislation on our renewable energy investments recorded in 2017.

Net securities losses of $48 million in 2018 primarily related to the sale of debt securities.

Net interest expense decreased $15 million compared with 2017, primarily resulting from lease-related adjustments recorded in 2017.

Noninterest expense decreased $13 million compared with 2017, primarily reflecting lower pension expense and a methodological change in 2017 for allocating employee benefits expense to the business segments with no impact to consolidated results, partially offset by expenses associated with relocating our corporate headquarters.

2017 compared with 2016

Loss before taxes was $400 million in 2017 compared with income before taxes of $11 million in 2016. Total fee and other revenue decreased primarily reflecting the impact of U.S. tax legislation on our investments in renewable energy investments and lower net securities gains. Net interest expense increased primarily reflecting the impact of interest rate hedging activities and lease-related adjustments, partially offset by higher interest rates. Noninterest expense decreased primarily reflecting lower staff and other expense.

International operations

Our primary international activities consist of asset servicing and global payment services in our Investment Services business and asset management in our Investment Management business.

Our clients include central banks and sovereigns, financial institutions, asset managers, insurance companies, corporations, local authorities and high net worth individuals and family offices. Through our global network of offices, we have developed a deep understanding of local requirements and cultural needs, and we pride ourselves on providing dedicated service through our multilingual sales, marketing and client service teams.

At Dec. 31, 2018, we had approximately 9,100 employees in Europe, the Middle East and Africa (“EMEA”), approximately 14,500 employees in the Asia-Pacific region (“APAC”) and approximately 700 employees in other global locations, primarily Brazil.

We are the seventh largest global asset manager. At Dec. 31, 2018, our international operations managed 55% of BNY Mellon’s AUM, compared with 51% at Dec. 31, 2017. The proportionate increase in international AUM primarily resulted from the reduction in domestic AUM and net inflows, partially offset by the unfavorable impact of a stronger U.S. dollar (principally versus the British pound).

In Europe, we maintain a presence in Undertakings for Collective Investment in Transferable Securities Directives (“UCITS”). In Ireland, BNY Mellon provides fund administration services across domiciled and non-domiciled funds. We offer a full range of tailored solutions for investment companies, financial institutions and institutional investors in Germany.

We are a provider of non-U.S. government securities, fixed income and equities clearance, settling securities transactions directly in 8 different markets in Europe while for other markets using a high quality and established network of local agents.

We have extensive experience providing trade and cash services to financial institutions and central banks outside of the U.S. In addition, we offer a broad range of servicing and fiduciary products to financial institutions, corporations and central banks depending on the state of market development. In emerging markets, we lead with global payments and issuer services, introducing other products as the markets mature. For more established markets, our focus is on global investment services.

We are also a full-service global provider of foreign exchange services, actively trading in over 100 of the world’s currencies. We serve clients from trading desks located in Europe, Asia and North America.

Our financial results, as well as our levels of AUC/A and AUM, are impacted by translation from foreign currencies to the U.S. dollar. We are primarily impacted by activities denominated in the British pound and the euro. If the U.S. dollar depreciates against these currencies, the translation impact is a higher level of fee revenue, net interest revenue, noninterest expense and AUC/A and AUM. Conversely, if the U.S. dollar appreciates, the translated levels of fee revenue, net interest revenue, noninterest expense and AUC/A and AUM will be lower.

Foreign exchange rates vs. U.S. dollar	**2018**	2017	2016
Spot rate (at Dec. 31):			
British pound	**$ 1.2801**	$ 1.3532	$ 1.2323
Euro	**1.1455**	1.2009	1.0538
Yearly average rate:			
British pound	**$ 1.3349**	$ 1.2885	$ 1.3548
Euro	**1.1808**	1.1390	1.1065

International clients accounted for 37% of revenues in 2018, compared with 36% in 2017 and 34% in 2016. Net income from international operations was $2.2 billion in 2018, compared with $1.8 billion in 2017 and $1.6 billion in 2016.

In 2018, revenues from EMEA were $4.3 billion, compared with $4.0 billion in 2017 and $3.7 billion 2016. Revenues from EMEA increased 7% in 2018 compared with 2017, primarily reflecting higher revenue in the Investment Services business, driven by higher net interest revenue, the favorable impact of a weaker U.S. dollar, growth in collateral management and higher clearance volumes. Revenues from EMEA also reflect higher revenue in the Investment Management business, driven by the favorable impact of a weaker U.S. dollar and higher performance fees, partially offset by net outflows. Our Investment Services and Investment Management businesses generated 68% and 32% of EMEA revenues, respectively. Net income from EMEA was $1.3 billion in 2018, compared with $1.2 billion in 2017 and $1.0 billion in 2016.

Revenues from APAC were $1.1 billion in 2018, compared with $997 million in 2017 and $922 million in 2016. Revenues from APAC increased 11% in 2018 compared with 2017, primarily reflecting higher net interest revenue, securities lending volumes and growth in collateral management, as well as higher revenue in the Investment Management business, driven by new business and higher equity market values. Our Investment Services and Investment Management businesses generated 80% and 20% of APAC revenues, respectively. Net income from APAC was $448 million in 2018, compared with $426 million in 2017 and $389 million in 2016.

For additional information regarding our international operations, including certain key subjective assumptions used in determining the results, see Note 24 of the Notes to Consolidated Financial Statements.

Country risk exposure

The following table presents BNY Mellon's top 10 exposures by country (excluding the U.S.) as of Dec. 31, 2018, as well as certain countries with higher risk profiles, and is presented on an internal risk management basis. We monitor our exposure to these and other countries as part of our internal country risk management process.

The country risk exposure below reflects the Company's risk to an immediate default of the counterparty or obligor based on the country of residence of the entity which incurs the liability. If there is credit risk mitigation, the country of residence of the entity providing the risk mitigation is the country of risk. The country of risk for investment securities is generally based on the domicile of the issuer of the security.

Country risk exposure	Interest-bearing deposits					
(in billions)	Central banks	Banks	Lending *(a)*	Investment securities *(b)*	Other *(c)*	Total exposure
Top 10 country exposure:						
UK	$ 15.9	$ 0.6	$ 1.9	$ 2.9	$ 2.1	$ 23.4
Germany	18.1	0.5	0.9	2.4	0.3	22.2
Japan	8.8	1.2	0.1	—	0.2	10.3
Canada	—	1.8	0.3	2.2	0.9	5.2
Luxembourg	2.9	0.2	0.2	—	1.8	5.1
China	—	2.3	0.8	—	0.3	3.4
Belgium	2.4	0.3	0.1	0.3	—	3.1
France	—	0.2	—	2.3	0.6	3.1
Ireland	—	0.1	0.5	0.6	1.1	2.3
Netherlands	—	—	0.3	1.7	0.1	2.1
Total Top 10 country exposure	$ 48.1	$ 7.2	$ 5.1	$ 12.4	$ 7.4	$ 80.2 *(d)*
Select country exposure:						
Spain	$ —	$ 0.3	$ —	$ 1.4	$ —	$ 1.7
Brazil	—	—	1.3	0.1	—	1.4
Italy	—	0.2	—	0.9	—	1.1
Turkey	—	—	0.2	—	—	0.2
Total other country exposure	$ —	$ 0.5	$ 1.5	$ 2.4	$ —	$ 4.4

(a) Lending includes loans, acceptances, issued letters of credit, net of participations, and lending-related commitments.
(b) Investment securities include both the available-for-sale and held-to-maturity portfolios.
(c) Other exposures include securities financing and over-the-counter ("OTC") derivative transactions, net of collateral.
(d) The top 10 country exposures comprise approximately 80% of our total non-U.S. exposure.

Our largest country risk exposure, based on our internal country risk management process at Dec. 31, 2018, was to the UK, which is planning to withdraw from the EU. For additional information, see "United Kingdom's Withdrawal from the European Union ("Brexit")" in Supervision and Regulation and "The United Kingdom's referendum decision to leave the EU has had and may continue to have negative effects on global economic conditions, global financial markets, and our business and results of operations" in Risk Factors.

Select country exposure

Events in recent years have resulted in increased focus on Spain, Brazil, Italy and Turkey. The country risk exposure to Spain and Italy primarily consisted of investment grade sovereign debt. The country risk exposure to Brazil is primarily short-term trade finance loans extended to large financial institutions. We also have operations in Brazil providing investment services and investment management services. The country risk exposure to Turkey consists primarily of syndicated credit facilities. We mainly provide treasury and issuer services as well as foreign exchange products primarily to the top 10 largest financial institutions in Turkey.

Cross-border outstandings

Cross-border outstandings are based on the Federal Financial Institutions Examination Council's ("FFIEC") regulatory guidelines for reporting cross-border risk and provides information on the distribution, by country and sector, of claims on foreign residents held by U.S. banks. Under the FFIEC guidelines, cross-border outstandings are reported based on the domicile of the counterparty, issuer of collateral or guarantor. Cross-border outstandings in the table below include claims of U.S. domiciled offices on foreign counterparties as well as claims of foreign offices on counterparties located outside those foreign jurisdictions. The guidelines to determine the cross-border outstandings in the table below are different than how we determine and manage our country risk exposure. For example, unfunded loan commitments as well as central bank deposits made by our foreign bank subsidiaries in their local jurisdiction are not considered cross-border outstandings. As a result, the cross-border outstandings in the table below are not comparable to the country risk exposure in the previous section.

Foreign assets are subject to the general risks attendant on the conduct of business in each foreign country, including economic uncertainties and each foreign government's regulations. In addition, our foreign assets may be affected by changes in demand or pricing resulting from fluctuations in currency exchange rates or other factors.

The table below shows our cross-border outstandings at Dec. 31 of each of the last three years where cross-border exposure exceeds 1.00% of total assets (denoted with "*") or exceeds 0.75% but less than or equal to 1.00% of total assets (denoted with "**").

Cross-border outstandings *(in millions)*	**Banks and other financial institutions** *(a)*	**Public sector**	**Commercial, industrial and other**	**Total cross-border outstandings** *(b)*
2018:				
Canada*	**$ 1,888**	**$ 381**	**$ 2,263**	**$ 4,532**
Germany**	**1,655**	**736**	**1,079**	**3,470**
China**	**3,030**	**—**	**5**	**3,035**
2017:				
Germany**	$ 1,530	$ 1,344	$ 600	$ 3,474
Canada**	2,256	1	1,170	3,427
France**	295	2,519	130	2,944
2016:				
France*	$ 1,662	$ 2,559	$ 109	$ 4,330
Germany*	2,398	1,408	357	4,163
Canada*	2,199	1	1,211	3,411
United Kingdom**	1,325	1,584	405	3,314

(a) *Primarily short-term interest-bearing deposits with banks. Also includes global trade finance loans.*
(b) *Excludes assets of consolidated investment management funds.*

Emerging markets exposure

We determine our emerging markets exposures using the MSCI Emerging Markets (EM) IMI Index. Our emerging markets exposures totaled $11 billion at both Dec. 31, 2018 and Dec. 31, 2017, as higher interest-bearing deposits with banks in Mexico and China were offset by lower loans to banks in India and Turkey.

Critical accounting estimates

Our significant accounting policies are described in Note 1 of the Notes to Consolidated Financial Statements under "Summary of significant accounting and reporting policies." Our critical accounting estimates are those related to the allowance for loan losses and allowance for lending-related commitments, fair value of financial instruments and derivatives, goodwill and other intangibles, and litigation and regulatory contingencies. Further information on policies related to the allowance for loan losses and allowance for lending-related commitments can be found under "Summary of significant accounting and reporting policies" in Note 1 of the Notes to Consolidated Financial Statements. Additionally, further information can be found in the Notes to Consolidated Financial Statements related to the following: the valuation of derivatives and securities can be found under "Fair value measurement" in Note 19; and policies related to goodwill and intangible assets can be found in "Goodwill and intangible assets" in Note 6.

Allowance for loan losses and allowance for lending-related commitments

The allowance for loan losses and allowance for lending-related commitments represent management's estimate of losses inherent in our credit portfolio. This evaluation process is subject to numerous estimates and judgments.

We utilize a quantitative methodology and qualitative framework for determining the allowance for loan losses and the allowance for lending-related commitments. Within this qualitative framework, management applies judgment when assessing internal risk factors and environmental factors to compute an additional allowance for each component of the loan portfolio.

The components of the allowance for loan losses and the allowance for lending-related commitments are inclusive of the qualitative allowance framework and consist of the following three elements:

- an allowance for impaired credits of $1 million or greater;
- an allowance for higher risk-rated credits and pass-rated credits; and
- an allowance for residential mortgage loans.

Our lending is primarily to institutional customers. As a result, our loans are generally larger than $1 million. Therefore, the first element, impaired credits, is based on individual analysis of all impaired loans of $1 million or greater. The allowance is measured by the difference between the recorded value of impaired loans and their impaired value. Impaired value is either the present value of the expected future cash flows from the borrower, the market value of the loan, or the fair value of the collateral, if the loan is collateral dependent.

The second element, higher risk-rated credits and pass-rated credits, is based on our incurred loss model. Individual credit analyses are performed on such loans before being assigned a credit rating. All borrowers are collectively evaluated based on their credit rating. The loss inherent in each loan incorporates the borrower's credit rating, facility rating and maturity. The loss given default, derived from the facility rating, incorporates a recovery expectation and an estimate of the use of the facility at default (usage given default). The borrower's probability of default is derived from the associated credit rating. Borrower ratings are reviewed at least annually and are periodically mapped to third-party databases, including rating agency and default and recovery databases, for ongoing consistency and validity. Higher risk-rated credits are reviewed quarterly.

The third element, the allowance for residential mortgage loans, is determined by segregating six mortgage pools into delinquency periods, ranging from current through foreclosure. Each of these delinquency periods is assigned a probability of default. A specific loss given default is assigned for each mortgage pool. BNY Mellon assigns all residential mortgage pools, except home equity lines of credit, a probability of default and loss given default based on default and loss data derived from internal historical data related to our residential mortgage portfolio. The resulting incurred loss factor (the probability of default multiplied by the loss given default) is applied against the loan balance to determine the allowance held for each pool. For home equity lines of credit, probability of default and loss given default are based on external data from third-party databases due to the small size of the portfolio and insufficient internal data.

The qualitative framework is used to determine an additional allowance for each portfolio based on the factors below:

Internal risk factors:

- Ratio of nonperforming loans to total non-margin loans;
- Ratio of criticized assets to total loans and lending-related commitments;
- Borrower concentration; and
- Significant concentrations in high-risk industries and countries.

Environmental risk factors:

- U.S. non-investment grade default rate;
- Unemployment rate; and
- Change in real gross domestic product.

The objective of the qualitative framework is to capture incurred losses that may not have been fully captured in the quantitative reserve, which is based primarily on historical data. Management determines the qualitative allowance each period based on judgment informed by consideration of internal and external risk factors and other considerations that may be deemed relevant during the period. Once determined in the aggregate, our qualitative allowance is then allocated to each of our loan classes based on the respective classes' quantitative allowance balances with the allocations adjusted, when necessary, for class specific risk factors.

For each risk factor, we calculate the minimum and maximum values, and percentiles in-between, to evaluate the distribution of our historical experience. The distribution of historical experience is compared to the risk factor's current quarter observed experience to assess the current risk inherent in the portfolio and overall direction/trend of a risk factor relative to our historical experience.

Based on this analysis, we assign a risk level–no impact, low, moderate, high and elevated–to each risk factor for the current quarter. Management assesses the impact of each risk factor to determine an aggregate risk level. We do not quantify the impact of any particular risk factor. Management's assessment of the risk factors, as well as the trend in the quantitative allowance, supports management's judgment for the overall required qualitative allowance. A smaller qualitative allowance may be required when our quantitative allowance has reflected incurred losses associated with the aggregate risk level. A greater qualitative allowance may be required if our quantitative allowance does not yet reflect the incurred losses associated with the aggregate risk level.

To the extent actual results differ from forecasts or management's judgment, the allowance for credit losses may be greater or less than future charge-offs.

The credit rating assigned to each credit is a significant variable in determining the allowance. If each credit were rated one grade better, the allowance would have decreased by $62 million, while if each credit were rated one grade worse, the allowance would have increased by $99 million. Similarly, if the loss given default were one rating worse, the allowance would have increased by $40 million, while if the loss given default were one rating better, the allowance would have decreased by $31 million. For impaired credits, if the net carrying value of the loans was 10% higher or lower, the allowance would have decreased or increased by less than $1 million, respectively.

Fair value of financial instruments and derivatives

The guidance included in Accounting Standards Codification ("ASC") 820, *Fair Value Measurement*, defines fair value, establishes a framework for measuring fair value, and expands disclosures about assets and liabilities measured at fair value. The standard also established a three-level hierarchy for fair value measurements based upon the transparency of inputs to the valuation of an asset or liability as of the measurement date.

Fair value - Securities

<u>*Level 1 - Securities*</u>: Securities where valuations are based on recent quoted prices for identical securities in actively traded markets.

<u>*Level 2 - Securities*</u>: For securities where quotes from recent transactions are not available for identical securities, we determine fair value primarily based on pricing sources with reasonable levels of price transparency. The pricing sources employ financial models or obtain comparisons to similar instruments to arrive at "consensus" prices.

Specifically, the pricing sources obtain recent transactions for similar types of securities (e.g., vintage or position in the securitization structure) and ascertain variables such as discount rate and speed of prepayment for the type of transaction and apply such variables to similar types of bonds. We view these as observable transactions in the current market place and classify such securities as Level 2.

In addition, we have significant investments in more actively traded agency residential mortgage-backed securities ("RMBS") and other types of securities such as sovereign debt. The pricing sources derive the prices for these securities largely from quotes they obtain from three major inter-dealer brokers. The pricing sources receive their daily observed trade price and other information feeds from the inter-dealer brokers.

We obtain prices for our Level 1 and Level 2 securities from multiple pricing sources. We have designed controls to develop an understanding of the pricing sources' securities pricing methodology and have implemented specific internal controls over the valuation of securities.

As appropriate, we review the quality control procedures and pricing methodologies used by the pricing sources, including the process for obtaining prices provided by the pricing sources, their valuation methodology and controls for each class of security.

Prices received from pricing sources are subject to validation checks that help determine the completeness and accuracy of the prices. These validation checks are reviewed by management and, based on the results, may be subject to additional review and investigation. We also review securities with no price changes (stale prices) and securities with zero values.

We have a surveillance process in place to monitor the reasonableness of prices provided by the pricing sources. We utilize a hierarchy that compares security prices obtained from multiple pricing sources against established thresholds. Discrepancies that fall outside of these thresholds are challenged with the pricing services and adjusted if necessary.

If further research is required, we review and validate these prices with the pricing sources. We also validate prices from pricing sources by comparing prices received to actual observed prices from actions such as purchases and sales, when possible.

At Dec. 31, 2018, approximately 99% of our securities were valued by pricing sources with reasonable levels of price transparency.

<u>*Level 3 - Securities*</u>: Where we have used our own cash flow models, which included a significant input into the model that was deemed unobservable, to estimate the value of securities, we classify them as Level 3. At both Dec. 31, 2018 and Dec. 31, 2017, we have no securities included in Level 3 of the fair value hierarchy.

See Note 19 of the Notes to Consolidated Financial Statements for details of our securities by ASC 820, *Fair Value Measurement*, hierarchy level.

Fair value - Derivative financial instruments

<u>*Level 1 - Derivative financial instruments*</u>: Includes derivative financial instruments that are actively traded on exchanges, principally listed equity options.

<u>*Level 2 - Derivative financial instruments*</u>: Includes OTC derivative financial instruments. Derivatives classified as Level 2 are valued utilizing discounted cash flow analysis and financial models for which the valuation inputs are observable or can be corroborated, directly or indirectly, for substantially the full term of the instrument. Valuation inputs include interest rate yield curves, foreign exchange rates, equity prices, credit curves, option volatilities and other factors.

Where appropriate, valuation adjustments are made to account for various factors such as creditworthiness of the counterparty, creditworthiness of the Company and model and liquidity risks.

<u>*Level 3 - Derivative financial instruments*</u>: Level 3 derivatives include derivatives for which valuations are based on inputs that are unobservable and significant to the overall fair value measurement, and may include certain long-dated or highly structured contracts. At both Dec. 31, 2018 and Dec. 31, 2017, we have no derivatives included in Level 3 of the fair value hierarchy.

For details of our derivative financial instruments by level of the valuation hierarchy, see Note 19 of the Notes to Consolidated Financial Statements.

Fair value option

ASC 825, *Financial Instruments*, provides the option to elect fair value as an alternative measurement basis for selected financial assets and financial liabilities which are not subject to fair value under other accounting standards. The changes in fair value are recognized in income. See Note 20 of the Notes to Consolidated Financial Statements for additional disclosure regarding the fair value option.

Fair value - Judgments

In times of illiquid markets and financial stress, actual prices and valuations may significantly diverge from results predicted by models. In addition, other factors can affect our estimate of fair value, including market dislocations and unexpected correlations. The use of different methodologies or different assumptions to value certain financial instruments could result in a different estimate of fair value. See Note 1 of the Notes to Consolidated Financial Statements.

Goodwill and other intangibles

We initially record all assets and liabilities acquired in purchase acquisitions, including goodwill, indefinite-lived intangibles and other intangibles, in accordance with ASC 805, *Business Combinations*. Goodwill, indefinite-lived intangibles and other intangibles are subsequently accounted for in accordance with ASC 350, *Intangibles - Goodwill and Other.* The initial measurement of goodwill and intangibles requires judgment concerning estimates of the fair value of the acquired assets and liabilities. Goodwill ($17.4 billion at Dec. 31, 2018) and indefinite-lived intangible assets ($2.6 billion at Dec. 31, 2018) are not amortized but are subject to tests for impairment annually or more often if events or circumstances indicate it is more likely than not they may be impaired. Other intangible assets are amortized over their estimated useful lives and are subject to impairment if events or circumstances indicate a possible inability to realize the carrying value.

BNY Mellon's three business segments include seven reporting units for which annual goodwill impairment testing is performed in accordance with ASC 350, *Intangibles - Goodwill and Other*. The Investment Management segment is comprised of two reporting units; the Investment Services segment is comprised of four reporting units and one reporting unit is included in the Other segment.

The goodwill impairment test compares the estimated fair value of the reporting unit with its carrying amount, including goodwill. If the estimated fair value of the reporting unit exceeds its carrying amount, goodwill of the reporting unit is considered not impaired. However, if the carrying amount of the reporting unit were to exceed its estimated fair value, an impairment loss would be recorded. A substantial goodwill impairment charge would not have a significant impact on our financial condition or our regulatory capital ratios, but could have an adverse impact on our results of operations. In addition, due to regulatory restrictions, the Company's subsidiary banks could be restricted from distributing available cash to the Parent, resulting in the Parent needing to issue additional long-term debt.

In the second quarter of 2018, we performed our annual goodwill test on all seven reporting units using an income approach to estimate the fair values of each reporting unit. Estimated cash flows used in the income approach were based on management's projections as of March 31, 2018. The discount rate applied to these cash flows ranged from 10.0% to 10.25% and incorporated a 6.0% market equity risk premium. Estimated cash flows extend many years into the future, and, by their nature, are difficult to estimate over such an extended time frame.

As a result of the annual goodwill impairment test of the seven reporting units, no goodwill impairment was recognized. The fair value of the Asset Management reporting unit, which is one of the two reporting units in the Investment Management segment, exceeded its carrying value by 34%. The Asset Management reporting unit had $7.4 billion of allocated goodwill. For the Asset Management reporting unit, in the future, changes in the assumptions, such as changes in the level of AUM and operating margin, could produce a non-cash goodwill impairment.

Key judgments in accounting for intangibles include useful life and classification between goodwill and indefinite-lived intangibles or other intangibles requiring amortization.

Indefinite-lived intangible assets are evaluated for impairment at least annually by comparing their fair values, estimated using discounted cash flow analyses, to their carrying values. Other amortizing intangible assets ($600 million at Dec. 31, 2018) are evaluated for impairment if events and circumstances indicate a possible impairment. Such evaluation of other intangible assets would be initially based on undiscounted cash flow projections.

See Notes 1 and 6 of the Notes to Consolidated Financial Statements for additional information regarding goodwill, intangible assets and the annual and interim impairment testing.

Litigation and regulatory contingencies

Significant estimates and judgments are required in establishing an accrued liability for litigation and regulatory contingencies. For additional information on our policy, see "Legal proceedings" in Note 21 of the Notes to Consolidated Financial Statements.

Consolidated balance sheet review

One of our key risk management objectives is to maintain a balance sheet that remains strong throughout market cycles to meet the expectations of our major stakeholders, including our shareholders, clients, creditors and regulators.

We also seek to verify that the overall liquidity risk, including intraday liquidity risk, that we undertake stays within our risk appetite. The objective of our balance sheet management strategy is to maintain a balance sheet that is characterized by strong liquidity and asset quality, ready access to external funding sources at competitive rates and a strong capital structure that supports our risk-taking activities and is adequate to absorb potential losses. In managing the balance sheet, appropriate consideration is given to balancing the competing needs of maintaining sufficient levels of liquidity and complying with applicable regulations and supervisory expectations while optimizing profitability.

In 2018, we continued to maintain sufficient liquidity and comply with applicable regulations. Our overall liquidity position remained strong and is managed in accordance with the nature of our balance sheet and business model. Our liquidity coverage ratio ("LCR") averaged 118% in the fourth quarter and the SLR was 6.0% at Dec. 31, 2018.

At Dec. 31, 2018, total assets were $363 billion, compared with $372 billion at Dec. 31, 2017. The decrease in total assets was primarily driven by lower interest-bearing deposits with the Federal Reserve and other central banks and loans, partially offset by higher federal funds sold and securities purchased under resale agreements. Deposits totaled $239 billion at Dec. 31, 2018, compared with $244 billion at Dec. 31, 2017. The decrease primarily reflects lower interest-bearing deposits in non-U.S. offices and noninterest-bearing deposits principally in U.S. offices, partially offset by higher interest-bearing deposits in U.S. offices. At Dec. 31, 2018, total interest-bearing deposits were 54% of total interest-earning assets, compared with 51% at Dec. 31, 2017.

At Dec. 31, 2018, we had $61 billion of liquid funds (which include interest-bearing deposits with banks and federal funds sold and securities purchased under resale agreements) and $74 billion of cash (including $68 billion of overnight deposits with the Federal Reserve and other central banks) for a total of $135 billion of available funds. This compares with available funds of $137 billion at Dec. 31, 2017. Total available funds as a percentage of total assets were 37% at both Dec. 31, 2018 and Dec. 31, 2017. For additional information on our liquid funds and available funds, see "Liquidity and dividends."

Securities were $119.8 billion, or 33% of total assets, at Dec. 31, 2018, compared with $120.4 billion, or 32% of total assets, at Dec. 31, 2017. The decrease primarily reflects lower investment in sovereign debt/ sovereign guaranteed securities and additional unrealized losses on the portfolio, partially offset by additional investments in agency commercial mortgage-backed securities ("MBS"), supranational securities and agency RMBS. For additional information on our securities portfolio, see "Securities" and Note 4 of the Notes to Consolidated Financial Statements.

Loans were $57 billion, or 16% of total assets, at Dec. 31, 2018, compared with $62 billion, or 17% of total assets, at Dec. 31, 2017. The decrease was primarily driven by lower margin loans and loans to financial institutions. For additional information on our loan portfolio, see "Loans" and Note 5 of the Notes to Consolidated Financial Statements.

Long-term debt totaled $29 billion at Dec. 31, 2018 and $28 billion at Dec. 31, 2017. The balance reflects issuances of $5.2 billion, offset by maturities of $3.7 billion and a decrease in the fair value of hedged long-term debt. For additional information on long-term debt, see "Liquidity and dividends."

The Bank of New York Mellon Corporation total shareholders' equity decreased to $40.6 billion from $41.3 billion at Dec. 31, 2017. For additional information on our capital, see "Capital" and Note 14 of the Notes to Consolidated Financial Statements.

Securities

In the discussion of our securities portfolio, we have included certain credit ratings information because the information can indicate the degree of credit risk to which we are exposed. Significant changes in ratings classifications for our securities portfolio could indicate increased credit risk for us and could be accompanied by a reduction in the fair value of our securities portfolio.

The following table shows the distribution of our total securities portfolio.

Securities portfolio	Dec. 31, 2017	2018 change in	**Dec. 31, 2018**		Fair value as a % of		Ratings *(b)*				
(dollars in millions)	Fair value	unrealized gain (loss)	Amortized cost	Fair value	amortized cost *(a)*	Unrealized gain (loss)	AAA/ AA-	A+/ A-	BBB+/ BBB-	BB+ and lower	Not rated
Agency RMBS	$ 49,746	$ (423)	$ **51,101**	$ **50,214**	98 %	$ (887)	100 %	— %	— %	— %	— %
U.S. Treasury	24,848	(22)	**24,917**	**24,792**	99	(125)	100	—	—	—	—
Sovereign debt/sovereign guaranteed *(c)*	14,128	(49)	**11,496**	**11,577**	101	81	74	5	20	1	—
Agency commercial MBS	10,083	(50)	**11,031**	**10,947**	99	(84)	100	—	—	—	—
CLOs	2,909	(57)	**3,410**	**3,364**	99	(46)	98	—	—	1	1
U.S. government agencies	2,603	(49)	**3,173**	**3,157**	99	(16)	100	—	—	—	—
Supranational	2,108	—	**3,011**	**3,006**	100	(5)	100	—	—	—	—
Foreign covered bonds *(d)*	2,615	(22)	**2,970**	**2,959**	100	(11)	100	—	—	—	—
State and political subdivisions	2,973	(11)	**2,268**	**2,264**	100	(4)	78	21	—	—	1
Other asset-backed securities (“ABS”)	1,043	(6)	**1,776**	**1,773**	100	(3)	99	—	1	—	—
Non-agency commercial MBS	1,368	(23)	**1,491**	**1,470**	99	(21)	96	4	—	—	—
Non-agency RMBS *(e)*	1,854	(83)	**1,195**	**1,427**	119	232	12	12	5	47	24
Corporate bonds	1,255	(26)	**1,074**	**1,054**	98	(20)	14	68	18	—	—
Other *(f)*	2,375	(1)	**1,236**	**1,238**	100	2	94	—	—	—	6
Total securities	$ 119,908 *(g)*	**$ (822)**	**$ 120,149**	**$ 119,242** *(g)*	**99%**	**$ (907)** *(g)(h)*	**95%**	**2%**	**2%**	**1%**	**—%**

(a) Amortized cost reflects historical impairments.
(b) Represents ratings by Standard & Poor's (“S&P”) or the equivalent.
(c) Primarily consists of exposure to UK, France, Germany, Spain, Italy and the Netherlands.
(d) Primarily consists of exposure to Canada, UK, Australia and Sweden.
(e) Includes RMBS that were included in the former Grantor Trust of $1,091 million at Dec. 31, 2017 and $832 million at Dec. 31, 2018.
(f) Includes commercial paper with a fair value of $700 million and money market funds with a fair value of $963 million at Dec. 31, 2017. There was no commercial paper or money market funds at Dec. 31, 2018. In the first quarter of 2018, we adopted the new accounting guidance included in ASU 2016-01, Financial Instruments-Overall: Recognition and Measurement of Financial Assets and Financial Liabilities. As a result, the money market fund investments were reclassified to trading assets, primarily from available-for-sale securities.
(g) Includes net unrealized losses on derivatives hedging securities available-for-sale of $147 million at Dec. 31, 2017 and net unrealized gains of $131 million at Dec. 31, 2018.
(h) Unrealized losses of $227 million at Dec. 31, 2018 related to available-for-sale securities, net of hedges.

The fair value of our securities portfolio, including related hedges, was $119.2 billion at Dec. 31, 2018, compared with $119.9 billion at Dec. 31, 2017. The decrease primarily reflects lower investment in sovereign debt/sovereign guaranteed securities and additional unrealized losses on the portfolio, partially offset by additional investments in agency commercial MBS, supranational securities and agency RMBS.

At Dec. 31, 2018, the total securities portfolio had a net unrealized loss of $907 million, compared with a net unrealized loss of $85 million at Dec. 31, 2017, including the impact of related hedges. The increase in the net unrealized pre-tax loss was primarily driven by higher market interest rates.

The unrealized loss, net of tax, on our available-for-sale securities portfolio included in accumulated other comprehensive income (“OCI”) was $167 million at Dec. 31, 2018, compared with an unrealized gain of $184 million at Dec. 31, 2017.

At Dec. 31, 2018, 95% of the securities in our portfolio were rated AAA/AA-, compared with 93% at Dec. 31, 2017.

The following table presents the amortizable purchase premium (net of discount) related to the securities portfolio and accretable discount related to the 2009 restructuring of the securities portfolio.

Net premium amortization and discount accretion of securities *(a)* *(dollars in millions)*	**2018**	2017	2016
Amortizable purchase premium (net of discount) relating to securities:			
Balance at period end	**$ 1,429**	$ 1,987	$ 2,188
Estimated average life remaining at period end *(in years)*	**5.0**	5.0	4.9
Amortization	**$ 437**	$ 547	$ 641
Accretable discount related to the prior restructuring of the securities portfolio:			
Balance at period end	**$ 207**	$ 274	$ 315
Estimated average life remaining at period end *(in years)*	**6.3**	6.3	6.2
Accretion	**$ 86**	$ 100	$ 102

(a) Amortization of purchase premium decreases net interest revenue while accretion of discount increases net interest revenue. Both were recorded on a level yield basis.

See Note 4 of the Notes to Consolidated Financial Statements for the pre-tax net securities gains (losses) by security type. See Note 19 of the Notes to Consolidated Financial Statements for details of securities by level in the fair value hierarchy.

Equity investments

We have several equity investments recorded in other assets. These include equity method investments, including renewable energy, and investments in qualified affordable housing projects, Federal Reserve Bank stock, seed capital, private equity and other investments. The following table presents the carrying values at Dec. 31, 2018 and 2017.

Equity investments *(in millions)*	Dec. 31, **2018**	 2017
Renewable energy investments	**$ 1,264**	$ 1,368
Equity in a joint venture and other investments:		
CIBC Mellon	**548**	580
Siguler Guff	**244**	246
Other equity investments	**272**	257
Total equity in a joint venture and other investments	**$ 1,064**	$ 1,083
Qualified affordable housing project investments	**999**	1,014
Federal Reserve Bank stock	**484**	477
Seed capital	**224**	288
Federal Home Loan Bank stock	**111**	82
Private equity investments *(a)*	**74**	55
Total equity investments	**$ 4,220**	$ 4,367

(a) Represents investments in small business investment companies ("SBICs"), which are compliant with the Volcker Rule.

Renewable energy investments

We invest in renewable energy projects to receive an expected after-tax return, which consists of allocated renewable energy tax credits, tax deductions and cash distributions based on the operations of the project. The pre-tax losses on these investments are recorded in investment and other income on the consolidated income statement. The corresponding tax benefits and credits are recorded to the provision for income taxes on the consolidated income statement.

For additional information on the fair value of certain seed capital investments and our private equity investments, see Note 7 of the Notes to Consolidated Financial Statements.

Loans

Total exposure – consolidated *(in billions)*	**Dec. 31, 2018** Loans	Unfunded commitments	Total exposure	Dec. 31, 2017 Loans	Unfunded commitments	Total exposure
Non-margin loans:						
Financial institutions	**$ 11.6**	**$ 34.0**	**$ 45.6**	$ 13.1	$ 32.5	$ 45.6
Commercial	**2.1**	**15.2**	**17.3**	2.9	18.0	20.9
Subtotal institutional	**13.7**	**49.2**	**62.9**	16.0	50.5	66.5
Wealth management loans and mortgages	**16.0**	**0.8**	**16.8**	16.5	1.1	17.6
Commercial real estate	**4.8**	**3.5**	**8.3**	4.9	3.5	8.4
Lease financings	**1.3**	**—**	**1.3**	1.3	—	1.3
Other residential mortgages	**0.6**	**—**	**0.6**	0.7	—	0.7
Overdrafts	**5.5**	**—**	**5.5**	5.1	—	5.1
Other	**1.2**	**—**	**1.2**	1.2	—	1.2
Subtotal non-margin loans	**43.1**	**53.5**	**96.6**	45.7	55.1	100.8
Margin loans	**13.5**	**0.1**	**13.6**	15.8	—	15.8
Total	**$ 56.6**	**$ 53.6**	**$ 110.2**	$ 61.5	$ 55.1	$ 116.6

At Dec. 31, 2018, total exposures of $110.2 billion decreased 5% compared with Dec. 31, 2017, primarily reflecting lower exposure in the commercial and margin loan portfolios.

Our financial institutions and commercial portfolios comprise our largest concentrated risk. These portfolios comprised 57% of our total exposure at both Dec. 31, 2018 and Dec. 31, 2017. Additionally, most of our overdrafts relate to financial institutions.

Financial institutions

The financial institutions portfolio is shown below.

Financial institutions portfolio exposure *(dollars in billions)*	**Dec. 31, 2018** Loans	Unfunded commitments	Total exposure	% Inv. grade	% due <1 yr.	Dec. 31, 2017 Loans	Unfunded commitments	Total exposure
Securities industry	**$ 3.1**	**$ 22.5**	**$ 25.6**	**99%**	**99%**	$ 3.6	$ 19.2	$ 22.8
Banks	**6.3**	**1.6**	**7.9**	**77**	**94**	7.0	1.2	8.2
Asset managers	**1.3**	**6.1**	**7.4**	**98**	**85**	1.4	6.4	7.8
Insurance	**0.1**	**2.5**	**2.6**	**100**	**8**	0.1	3.5	3.6
Government	**0.1**	**0.5**	**0.6**	**100**	**38**	0.1	0.9	1.0
Other	**0.7**	**0.8**	**1.5**	**96**	**48**	0.9	1.3	2.2
Total	**$ 11.6**	**$ 34.0**	**$ 45.6**	**95%**	**88%**	$ 13.1	$ 32.5	$ 45.6

The financial institutions portfolio exposure was $45.6 billion at Dec. 31, 2018, unchanged from Dec. 31, 2017, primarily reflecting an increase in securities industry exposure, offset by lower exposure in all other portfolios.

Financial institution exposures are high-quality, with 95% of the exposures meeting the investment grade equivalent criteria of our internal credit rating classification at Dec. 31, 2018. Each customer is assigned an internal credit rating, which is mapped to an equivalent external rating agency grade based upon a number of dimensions, which are continually evaluated and may change over time. The exposure to financial institutions is generally short-term. Of these exposures, 88% expire within one year and 20% expire within 90 days. In addition, 81% of the financial institutions exposure is secured. For example, securities industry clients and asset managers often borrow against marketable securities held in custody.

For ratings of non-U.S. counterparties, our internal credit rating is generally capped at a rating equivalent to the sovereign rating of the country where the counterparty resides, regardless of the internal credit rating assigned to the counterparty or the underlying collateral.

At Dec. 31, 2018, the secured intraday credit provided to dealers in connection with their tri-party repo activity totaled $20.6 billion and was primarily included in the securities industry portfolio. Dealers secure the outstanding intraday credit with high-quality liquid collateral having a market value in excess of the amount of the outstanding credit.

Our bank exposure primarily relates to our global trade finance. These exposures are short-term in nature, with 94% due in less than one year. The investment grade percentage of our bank exposure was 77% at Dec. 31, 2018, compared with 68% at Dec. 31, 2017. Our non-investment grade exposures are primarily in Brazil. These loans are primarily trade finance loans.

The asset manager portfolio exposure was high-quality, with 98% of the exposures meeting our investment grade equivalent ratings criteria as of Dec. 31, 2018. These exposures are generally short-term liquidity facilities, with the majority to regulated mutual funds.

Commercial

The commercial portfolio is presented below.

Commercial portfolio exposure	**Dec. 31, 2018**					Dec. 31, 2017		
(dollars in billions)	**Loans**	**Unfunded commitments**	**Total exposure**	**% Inv. grade**	**% due <1 yr.**	Loans	Unfunded commitments	Total exposure
Manufacturing	**$ 0.8**	**$ 5.1**	**$ 5.9**	**95%**	**8%**	$ 1.3	$ 6.1	$ 7.4
Services and other	**0.7**	**4.8**	**5.5**	**96**	**25**	0.9	6.0	6.9
Energy and utilities	**0.5**	**4.1**	**4.6**	**95**	**12**	0.7	4.4	5.1
Media and telecom	**0.1**	**1.2**	**1.3**	**94**	**12**	—	1.5	1.5
Total	**$ 2.1**	**$ 15.2**	**$ 17.3**	**95%**	**15%**	$ 2.9	$ 18.0	$ 20.9

The commercial portfolio exposure was $17.3 billion at Dec. 31, 2018, a 17% decrease compared with $20.9 billion at Dec. 31, 2017, primarily reflecting lower exposure in the manufacturing and services and other portfolios.

Utilities-related exposure represents approximately 76% of the energy and utilities portfolio at Dec. 31, 2018. Included in this portfolio is unsecured funded exposure of approximately $160 million to a California utility company that filed for bankruptcy in the first quarter of 2019. As of Feb. 27, 2019, we expect our exposure to this California utility company to decrease by approximately $60 million as a result of current sales. Our nonperforming assets are expected to increase in the first quarter 2019 as a result of the bankruptcy. Based on current market conditions and facts and circumstances which may change, we also expect to record an additional provision for credit losses relating to this exposure of $20 million - $30 million in the first quarter of 2019.

The remaining exposure in the energy and utilities portfolio, which includes exposure to refining, exploration and production companies, integrated companies and pipelines, was 88% investment grade at Dec. 31, 2018, and 77% at Dec. 31, 2017.

Our credit strategy is to focus on investment grade clients that are active users of our non-credit services. The following table summarizes the percentage of the financial institutions and commercial portfolio exposures that are investment grade.

Percentage of the portfolios that are investment grade	Dec. 31, **2018**	2017	2016
Financial institutions	**95%**	93%	92%
Commercial	**95%**	95%	94%

Wealth management loans and mortgages

Our wealth management exposure was $16.8 billion at Dec. 31, 2018, compared with $17.6 billion at Dec. 31, 2017. Wealth management loans and mortgages primarily consist of loans to high-net-worth individuals, which are secured by marketable securities and/or residential property. Wealth management mortgages are primarily interest-only, adjustable-rate mortgages with a weighted-average loan-to-value ratio of 62% at origination. Less than 1% of the mortgages were past due at Dec. 31, 2018.

At Dec. 31, 2018, the wealth management mortgage portfolio consisted of the following geographic concentrations: California - 24%; New York - 18%; Massachusetts - 10%; Florida - 8%; and other - 40%.

Commercial real estate

Our commercial real estate exposure totaled $8.3 billion at Dec. 31, 2018, compared with $8.4 billion at Dec. 31, 2017. Our income-producing commercial real estate facilities are focused on experienced owners and are structured with moderate leverage based on existing cash flows. Our commercial real estate lending activities also include construction and renovation facilities. Our client base consists of experienced developers and long-term holders of real estate assets. Loans are approved on the basis of existing or projected cash flows and supported by appraisals and knowledge of local market conditions. Development loans are structured with moderate leverage, and in many instances, involve some level of recourse to the developer.

At Dec. 31, 2018, 61% of our commercial real estate portfolio was secured. The secured portfolio is diverse by project type, with 43% secured by residential buildings, 36% secured by office buildings, 11% secured by retail properties and 10% secured by other categories. Approximately 97% of the unsecured portfolio consists of real estate investment trusts ("REITs") and real estate operating companies, which are both predominantly investment grade.

At Dec. 31, 2018, our commercial real estate portfolio consisted of the following concentrations: REITs and real estate operating companies - 38%; New York metro - 42%; and other - 20%.

Lease financings

The leasing portfolio exposure totaled $1.3 billion at both Dec. 31, 2018 and Dec. 31, 2017. At Dec. 31, 2018, the lease financings portfolio consisted of exposures backed by well-diversified assets, including large-ticket transportation equipment, the largest consisting of both passenger and freight train cars. Assets are both domestic and foreign-based, with primary concentrations in the United States and Germany. Approximately 48% of the portfolio is additionally secured by highly rated securities and/or secured by letters of credit from investment grade issuers. Counterparty rating equivalents at Dec. 31, 2018 were as follows:

- 55% of the counterparties were A or better;
- 42% were BBB; and
- 3% were non-investment grade.

Other residential mortgages

The other residential mortgages portfolio primarily consists of 1-4 family residential mortgage loans and totaled $594 million at Dec. 31, 2018 and $708 million at Dec. 31, 2017. Included in this portfolio at Dec. 31, 2018 were $128 million of mortgage loans purchased in 2005, 2006 and the first quarter of 2007, of which 11% of the serviced loan balance was at least 60 days delinquent.

Overdrafts

Overdrafts primarily relate to custody and securities clearance clients. Overdrafts occur on a daily basis primarily in the custody and securities clearance business and are generally repaid within two business days.

Other loans

Other loans primarily include loans to consumers that are fully collateralized with equities, mutual funds and fixed-income securities.

Margin loans

Margin loans are collateralized with marketable securities, and borrowers are required to maintain a daily collateral margin in excess of 100% of the value of the loan. Margin loans included $2.6 billion at Dec. 31, 2018 and $4.2 billion at Dec. 31, 2017 related to a term loan program that offers fully collateralized loans to broker-dealers.

Loans by category

The following table shows loans outstanding at year-end over the last five years.

Loans by category *(in millions)*	Dec. 31, **2018**	2017	2016	2015	2014
Domestic:					
Commercial	**$ 1,949**	$ 2,744	$ 2,286	$ 2,115	$ 1,390
Commercial real estate	**4,787**	4,900	4,639	3,899	2,524
Financial institutions	**5,091**	5,568	6,342	6,640	5,603
Lease financings	**706**	772	989	1,007	1,282
Wealth management loans and mortgages	**15,843**	16,420	15,555	13,247	11,095
Other residential mortgages	**594**	708	854	1,055	1,222
Overdrafts	**1,550**	963	1,055	911	1,348
Other	**1,181**	1,131	1,202	1,137	1,113
Margin loans	**13,343**	15,689	17,503	19,340	20,034
Total domestic	**45,044**	48,895	50,425	49,351	45,611
Foreign:					
Commercial	**183**	167	331	227	252
Commercial real estate	**—**	—	15	46	6
Financial institutions	**6,492**	7,483	8,347	9,259	7,716
Lease financings	**551**	527	736	850	889
Wealth management loans and mortgages	**122**	108	99	100	89
Other (primarily overdrafts)	**4,031**	4,264	4,418	3,637	4,569
Margin loans	**141**	96	87	233	—
Total foreign	**11,520**	12,645	14,033	14,352	13,521
Total loans *(a)*	**$ 56,564**	$ 61,540	$ 64,458	$ 63,703	$ 59,132

(a) Net of unearned income of $358 million at Dec. 31, 2018, $394 million at Dec. 31, 2017, $527 million at Dec. 31, 2016, $674 million at Dec. 31, 2015 and $866 million at Dec. 31, 2014, primarily on domestic and foreign lease financings.

Foreign loans

We have credit relationships in foreign markets, particularly in areas associated with our securities servicing and trade finance activities. Excluding lease financings, these activities resulted in outstanding foreign loans of $11.0 billion at Dec. 31, 2018 and $12.1 billion at Dec. 31, 2017. The decrease primarily resulted from lower loans to financial institutions and lower overdrafts.

Maturity of loan portfolio

The following table shows the maturity structure of our loan portfolio at Dec. 31, 2018.

Maturity of loan portfolio at Dec. 31, 2018 *(a)* *(in millions)*	Within 1 year	Between 1 and 5 years	After 5 years	Total
Domestic:				
Commercial	$ 463	$ 1,371	$ 115	$ 1,949
Commercial real estate	702	2,384	1,701	4,787
Financial institutions	4,119	940	32	5,091
Overdrafts	1,550	—	—	1,550
Other	1,181	—	—	1,181
Margin loans	12,843	500	—	13,343
Subtotal	20,858	5,195	1,848	27,901
Foreign	10,283	524	40	10,847
Total	$ 31,141	$ 5,719 *(b)*	$ 1,888 *(b)*	$38,748

(a) Excludes loans collateralized by residential properties, lease financings and wealth management loans and mortgages.

(b) Variable rate loans due after one year totaled $7.6 billion and fixed rate loans totaled $35 million.

Asset quality and allowance for credit losses

Our credit strategy is to focus on investment grade clients who are active users of our non-credit services. Our primary exposure to the credit risk of a customer consists of funded loans, unfunded contractual commitments to lend, standby letters of credit ("SBLC") and overdrafts associated with our custody and securities clearance businesses.

The following table details changes in our allowance for credit losses.

Allowance for credit losses activity *(dollar amounts in millions)*	**2018**	2017	2016	2015	2014
Non-margin loans	**$ 43,080**	$ 45,755	$ 46,868	$ 43,708	$ 39,077
Margin loans	**13,484**	15,785	17,590	19,573	20,034
Total loans	**$ 56,564**	$ 61,540	$ 64,458	$ 63,281	$ 59,111
Average loans outstanding	**55,810**	57,939	61,681	60,672	54,210
Balance, Jan. 1					
Domestic	**$ 226**	$ 245	$ 240	$ 236	$ 288
Foreign	**35**	36	35	44	56
Total allowance at Jan. 1	**261**	281	275	280	344
Charge-offs:					
Commercial	**—**	—	—	—	(12)
Commercial real estate	**—**	—	—	—	(2)
Financial institutions	**—**	—	—	(170)	—
Wealth management loans and mortgages	**—**	—	—	—	(1)
Other residential mortgages	**(1)**	(1)	(2)	(2)	(2)
Foreign	**—**	—	—	—	(3)
Total charge-offs	**(1)**	(1)	(2)	(172)	(20)
Recoveries:					
Commercial	**—**	—	—	—	1
Financial institutions	**—**	—	13	1	1
Other residential mortgages	**2**	5	5	6	2
Foreign	**1**	—	1	—	—
Total recoveries	**3**	5	19	7	4
Net recoveries (charge-offs)	**2**	4	17	(165)	(16)
Provision for credit losses	**(11)**	(24)	(11)	160	(48)
Balance, Dec. 31,					
Domestic	**220**	226	245	240	236
Foreign	**32**	35	36	35	44
Total allowance, Dec. 31,	**$ 252**	$ 261	$ 281	$ 275	$ 280
Allowance for loan losses	**$ 146**	$ 159	$ 169	$ 157	$ 191
Allowance for lending-related commitments	**106**	102	112	118	89
Net (recoveries) charge-offs to average loans outstanding	**— %**	(0.01)%	(0.03)%	0.27%	0.03%
Net (recoveries) charge-offs to total allowance for credit losses	**(0.79)**	(1.53)	(6.05)	60.00	5.71
Allowance for loan losses as a percentage of total loans	**0.26**	0.26	0.26	0.25	0.32
Allowance for loan losses as a percentage of non-margin loans	**0.34**	0.35	0.36	0.36	0.49
Total allowance for credit losses as a percentage of total loans	**0.45**	0.42	0.44	0.43	0.47
Total allowance for credit losses as a percentage of non-margin loans	**0.58**	0.57	0.60	0.63	0.72

The allowance for credit losses decreased $9 million compared with Dec. 31, 2017, driven by the credit to provision for credit losses, partially offset by the impact of an update to the usage given default parameter in 2018. The usage given default parameter associated with the estimate of the probability of drawdown at default was updated in 2018, resulting in an $11 million increase to the allowance for lending-related commitments.

The provision for credit losses was a credit of $11 million in 2018, a credit of $24 million in 2017 and a credit of $11 million in 2016.

We had $13.5 billion of secured margin loans on our balance sheet at Dec. 31, 2018 compared with $15.8 billion at Dec. 31, 2017 and $17.6 billion at Dec. 31, 2016. We have rarely suffered a loss on these types of loans and do not allocate any of our allowance for credit losses to them. As a result, we believe that the ratio of total allowance for credit losses as a percentage of non-margin loans is a more appropriate metric to measure the adequacy of the reserve.

The allowance for loan losses and allowance for lending-related commitments represent management's estimate of losses inherent in our credit portfolio. This evaluation process is subject to numerous estimates and judgments. To the extent actual results differ from forecasts or management's judgment, the allowance for credit losses may be greater or less than future charge-offs.

Based on an evaluation of the allowance for credit losses as discussed in "Critical accounting estimates" and Note 1 of the Notes to Consolidated Financial Statements, we have allocated our allowance for credit losses as follows.

Allocation of allowance	Dec. 31,				
	2018	2017	2016	2015	2014
Commercial	**32%**	30%	29%	30%	21%
Commercial real estate	**30**	29	26	22	18
Foreign	**13**	13	13	13	16
Financial institutions	**9**	9	9	11	11
Wealth management *(a)*	**8**	8	8	7	8
Other residential mortgages	**6**	8	10	12	14
Lease financing	**2**	3	5	5	12
Total	**100%**	100%	100%	100%	100%

(a) Includes the allowance for wealth management mortgages.

The allocation of the allowance for credit losses is inherently judgmental, and the entire allowance for credit losses is available to absorb credit losses regardless of the nature of the losses.

Nonperforming assets

Nonperforming assets	Dec. 31,				
(dollars in millions)	**2018**	2017	2016	2015	2014
Nonperforming loans:					
Other residential mortgages	**$ 67**	$ 78	$ 91	$ 102	$ 112
Wealth management loans and mortgages	**9**	7	8	11	12
Commercial real estate	**—**	1	—	2	1
Lease financings	**—**	—	4	—	—
Financial institutions	**—**	—	—	171	—
Total nonperforming loans	**76**	86	103	286	125
Other assets owned	**3**	4	4	6	3
Total nonperforming assets *(a)*	**$ 79**	$ 90	$ 107	$ 292	$ 128
Nonperforming assets ratio	**0.14%**	0.15%	0.17%	0.46%	0.22%
Nonperforming assets ratio, excluding margin loans	**0.18**	0.20	0.23	0.67	0.33
Allowance for loan losses/nonperforming loans	**192.1**	184.9	164.1	54.9	152.8
Allowance for loan losses/nonperforming assets	**184.8**	176.7	157.9	53.8	149.2
Total allowance for credit losses/nonperforming loans	**331.6**	303.5	272.8	96.2	224.0
Total allowance for credit losses/nonperforming assets	**319.0**	290.0	262.6	94.2	218.8

(a) Loans of consolidated investment management funds are not part of BNY Mellon's loan portfolio and are excluded from the nonperforming assets table above. Included in the loans of consolidated investment management funds are nonperforming loans of $53 million at Dec. 31, 2014 which are recorded at fair value and therefore do not impact the provision for credit losses and allowance for loan losses. In the second quarter of 2015, BNY Mellon adopted the accounting guidance included in ASU 2015-02, Consolidations. As a result, we deconsolidated substantially all of the loans of consolidated investment management funds retrospectively to Jan. 1, 2015.

Nonperforming assets activity		
(in millions)	**2018**	2017
Balance at beginning of year	**$ 90**	$ 107
Additions	**10**	12
Return to accrual status	**(2)**	(5)
Charge-offs	**(1)**	(1)
Paydowns/sales	**(18)**	(23)
Balance at end of year	**$ 79**	$ 90

Nonperforming assets decreased $11 million compared with Dec. 31, 2017, primarily reflecting lower other residential mortgage loans driven by paydowns and sales.

As noted earlier, our nonperforming assets are expected to increase in the first quarter of 2019 as a result of the bankruptcy of a Californian utility company.

The following table presents loans that are past due 90 days or more and still accruing interest.

Past due loans ≥ 90 days still accruing interest at year-end					
(in millions)	**2018**	2017	2016	2015	2014
Domestic:					
Consumer	**$ 12**	$ 5	$ 7	$ 5	$ 6
Commercial	**—**	—	—	—	—
Total domestic	**12**	5	7	5	6
Foreign	**—**	—	—	—	—
Total past due loans	**$ 12**	$ 5	$ 7	$ 5	$ 6

Loans past due 90 days or more at Dec. 31, 2018 primarily consisted of other residential mortgage loans and wealth management loans and mortgages. See Note 5 of the Notes to Consolidated Financial Statements for additional information on our past due loans. See "Nonperforming assets" in Note 1 of the Notes to Consolidated Financial Statements for our policy for placing loans on nonaccrual status.

Deposits

We receive client deposits through a variety of Investment Services and Investment Management businesses and we rely on those deposits as a low-cost and stable source of funding.

Total deposits were $238.8 billion at Dec. 31, 2018, a decrease of 2% compared with $244.3 billion at Dec. 31, 2017. The decrease primarily reflects lower interest-bearing deposits in non-U.S. offices and noninterest-bearing deposits principally in U.S. offices, partially offset by higher interest-bearing deposits in U.S. offices.

Noninterest-bearing deposits were $70.8 billion at Dec. 31, 2018 compared with $82.7 billion at Dec. 31, 2017. Interest-bearing deposits were $168.0 billion at Dec. 31, 2018 compared with $161.6 billion at Dec. 31, 2017.

The aggregate amount of deposits by foreign customers in domestic offices was $36.4 billion and $39.9 billion at Dec. 31, 2018 and Dec. 31, 2017, respectively.

Deposits in foreign offices totaled $99.2 billion at Dec. 31, 2018 and $114.8 billion at Dec. 31, 2017. The majority of these deposits were in amounts in excess of $100,000 and were primarily overnight foreign deposits.

The following table shows the maturity breakdown of domestic time deposits of $100,000 or more at Dec. 31, 2018.

Domestic time deposits ≥ $100,000 at Dec. 31, 2018			
(in millions)	Certificates of deposit	Other time deposits	Total
3 months or less	**$ 77**	**$ 32,247**	**$ 32,324**
Between 3 and 6 months	**36**	**—**	**36**
Between 6 and 12 months	**88**	**—**	**88**
Over 12 months	**2**	**—**	**2**
Total	**$ 203**	**$ 32,247**	**$ 32,450**

Short-term borrowings

We fund ourselves primarily through deposits and, to a lesser extent, other short-term borrowings and long-term debt. Short-term borrowings consist of federal funds purchased and securities sold under repurchase agreements, payables to customers and broker-dealers, commercial paper and other borrowed funds. Certain other borrowings, for example, securities sold under repurchase agreements, require the delivery of securities as collateral.

See "Liquidity and dividends" for a discussion of long-term debt and liquidity metrics that we monitor.

Information related to federal funds purchased and securities sold under repurchase agreements is presented below.

Federal funds purchased and securities sold under repurchase agreements			
(dollars in millions)	**2018**	2017	2016
Maximum month-end balance during the year	**$ 21,600**	$ 21,850	$ 25,995
Average daily balance *(a)*	**$ 15,546**	$ 19,653	$ 14,489
Weighted-average rate during the year *(a)*	**4.88%**	1.14%	0.25%
Ending balance *(b)*	**$ 14,243**	$ 15,163	$ 9,989
Weighted-average rate at Dec. 31 *(b)*	**12.99%**	2.33%	0.38%

(a) Includes the impact of offsetting under enforceable netting agreements of $25,203 million for 2018, $5,657 million for 2017 and less than $350 million for 2016.
(b) Includes the impact of offsetting under enforceable netting agreements of $76,040 million at Dec. 31, 2018, $25,848 million at Dec. 31, 2017 and $481 million at Dec. 31, 2016.

Federal funds purchased and securities sold under repurchase agreements	Quarter ended		
(dollars in millions)	**Dec. 31, 2018**	Sept. 30, 2018	Dec. 31, 2017
Maximum month-end balance during the quarter	**$ 14,243**	$ 13,020	$ 20,098
Average daily balance *(a)*	**$ 10,980**	$ 14,199	$ 20,211
Weighted-average rate during the quarter *(a)*	**10.95%**	5.33%	1.83%
Ending balance *(b)*	**$ 14,243**	$ 10,158	$ 15,163
Weighted-average rate at period end *(b)*	**12.99%**	7.33%	2.33%

(a) Includes the impact of offsetting under enforceable netting agreements of $42,721 million for the fourth quarter of 2018, $25,922 million for the third quarter of 2018 and $14,128 million for the fourth quarter of 2017.

(b) Includes the impact of offsetting under enforceable netting agreements of $76,040 million at Dec. 31, 2018, $58,540 million at Sept. 30, 2018 and $25,848 million at Dec. 31, 2017.

Fluctuations of federal funds purchased and securities sold under repurchase agreements between periods reflect changes in overnight borrowing opportunities. The increase in the weighted-average rates, compared with both Sept. 30, 2018 and Dec. 31, 2017, primarily reflects the increase in repurchase agreement activity with the Fixed Income Clearing Corporation ("FICC"), where we record interest expense gross, but the average balances are reduced as a result of the impact of offsetting under enforceable netting agreements. The increased activity primarily relates to government securities collateralized resale and repurchase agreements executed with clients that are novated to and settle with the FICC.

Information related to payables to customers and broker-dealers is presented below.

Payables to customers and broker-dealers			
(dollars in millions)	**2018**	2017	2016
Maximum month-end balance during the year	**$ 20,905**	$ 21,621	$ 22,327
Average daily balance *(a)*	**$ 19,450**	$ 21,142	$ 21,149
Weighted-average rate during the year *(a)*	**1.17%**	0.34%	0.07%
Ending balance at Dec. 31	**$ 19,731**	$ 20,184	$ 20,987
Weighted-average rate at Dec. 31	**1.62%**	0.56%	0.09%

(a) The weighted-average rate is calculated based on, and is applied to, the average interest-bearing payables to customers and broker-dealers, which were $16,353 million in 2018, $18,984 million in 2017 and $16,925 million in 2016.

Payables to customers and broker-dealers	Quarter ended		
(dollars in millions)	**Dec. 31, 2018**	Sept. 30, 2018	Dec. 31, 2017
Maximum month-end balance during the quarter	**$ 19,731**	$ 19,232	$ 21,380
Average daily balance *(a)*	**$ 18,955**	$ 19,073	$ 21,130
Weighted-average rate during the quarter *(a)*	**1.61%**	1.23%	0.49%
Ending balance	**$ 19,731**	$ 18,683	$ 20,184
Weighted-average rate at period end	**1.62%**	1.30%	0.56%

(a) The weighted-average rate is calculated based on, and is applied to, the average interest-bearing payables to customers and broker-dealers, which were $15,727 million in the fourth quarter of 2018, $16,252 million in the third quarter of 2018 and $17,868 million in the fourth quarter of 2017.

Payables to customers and broker-dealers represent funds awaiting re-investment and short sale proceeds payable on demand. Payables to customers and broker-dealers are driven by customer trading activity levels and market volatility.

Information related to commercial paper is presented below.

Commercial paper			
(dollars in millions)	**2018**	2017	2016
Maximum month-end balance during the year	**$ 4,470**	$ 4,714	$ 4,950
Average daily balance	**$ 2,607**	$ 2,630	$ 1,337
Weighted-average rate during the year	**1.97%**	1.08%	0.37%
Ending balance at Dec. 31	**$ 1,939**	$ 3,075	$ —
Weighted-average rate at Dec. 31	**2.34%**	1.27%	—%

Commercial paper	Quarter ended		
(dollars in millions)	**Dec. 31, 2018**	Sept. 30, 2018	Dec. 31, 2017
Maximum month-end balance during the quarter	**$ 1,939**	$ 4,422	$ 4,714
Average daily balance	**$ 353**	$ 3,102	$ 3,391
Weighted-average rate during the quarter	**2.41%**	2.10%	1.23%
Ending balance	**$ 1,939**	$ 735	$ 3,075
Weighted-average rate at period end	**2.34%**	2.06%	1.27%

The Bank of New York Mellon, our largest bank subsidiary, issues commercial paper that matures within 397 days from date of issue and is not redeemable prior to maturity or subject to voluntary prepayment. The fluctuations in the commercial paper balances, compared with prior periods, primarily reflects management of overall liquidity. The increase in weighted-average rates, compared with prior periods, primarily reflects increases in the Fed Funds effective rate and the issuance of higher-yielding term commercial paper.

Information related to other borrowed funds is presented below.

Other borrowed funds *(dollars in millions)*	**2018**	2017	2016
Maximum month-end balance during the year	**$ 3,269**	$ 3,955	$ 1,280
Average daily balance	**$ 2,545**	$ 1,916	$ 846
Weighted-average rate during the year	**2.26%**	1.36%	0.91%
Ending balance at Dec. 31	**$ 3,227**	$ 3,028	$ 754
Weighted-average rate at Dec. 31	**2.64%**	1.48%	0.89%

Other borrowed funds	Quarter ended		
(dollars in millions)	**Dec. 31, 2018**	Sept. 30, 2018	Dec. 31, 2017
Maximum month-end balance during the quarter	**$ 3,227**	$ 3,269	$ 3,955
Average daily balance	**$ 2,903**	$ 2,747	$ 3,421
Weighted-average rate during the quarter	**2.44%**	2.33%	1.46%
Ending balance	**$ 3,227**	$ 2,934	$ 3,028
Weighted-average rate at period end	**2.64%**	2.48%	1.48%

Other borrowed funds primarily include borrowings from the Federal Home Loan Bank (“FHLB”), overdrafts of sub-custodian account balances in our Investment Services businesses, capital lease obligations and borrowings under lines of credit by our Pershing subsidiaries. Overdrafts typically relate to timing differences for settlements. The increase in other borrowed funds, compared with prior periods primarily reflects an increase in borrowings from the FHLB partially offset by a decline in overdrafts and lower capital lease obligations due to the purchase of the leased asset.

Liquidity and dividends

BNY Mellon defines liquidity as the ability of the Parent and its subsidiaries to access funding or convert assets to cash quickly and efficiently, or to roll over or issue new debt, especially during periods of market stress, at a reasonable cost and in order to meet its short-term (up to one year) obligations. Funding liquidity risk is the risk that BNY Mellon cannot meet its cash and collateral obligations at a reasonable cost for both expected and unexpected cash flow and collateral needs without adversely affecting daily operations or our financial condition. Funding liquidity risk can arise from funding mismatches, market constraints from the inability to convert assets to cash, the inability to hold or raise cash, low overnight deposits, deposit run-off or contingent liquidity events.

We also manage liquidity risks on an intraday basis. Intraday liquidity risk is the risk that BNY Mellon cannot access funds during the business day to make payments or settle immediate obligations, usually in real time. Intraday liquidity risk can arise from timing mismatches, market constraints from the inability to convert assets to cash, the inability to raise cash intraday, low overnight deposits and/or adverse stress events.

Changes in economic conditions or exposure to credit, market, operational, legal and reputational risks also can affect BNY Mellon’s liquidity risk profile and are considered in our liquidity risk framework.

For additional information on our liquidity policy, see “Risk Management - Liquidity risk.”

We monitor and control liquidity exposures and funding needs within and across significant legal entities, branches, currencies and business lines, taking into account, among other factors, any applicable restrictions on the transfer of liquidity among entities.

BNY Mellon also manages potential intraday liquidity risks. We monitor and manage intraday liquidity against existing and expected intraday liquid resources (such as cash balances, remaining intraday credit capacity, intraday contingency funding and available collateral) to enable BNY Mellon to meet its intraday obligations under normal and reasonably severe stressed conditions.

The Parent’s policy is to have access to sufficient unencumbered cash and cash equivalents at each quarter-end to cover forecasted debt redemptions, net interest payments and net tax payments for the following 18-month period, and to provide sufficient collateral to satisfy transactions subject to Section 23A of the Federal Reserve Act. As of Dec. 31, 2018, the Parent was in compliance with this policy.

We define available funds for internal liquidity management purposes as liquid funds (which include interest-bearing deposits with banks and federal funds sold and securities purchased under resale agreements), cash and due from banks and interest-bearing deposits with the Federal Reserve and other central banks. The following table presents our total available funds, including liquid funds, at period end and on an average basis.

Available and liquid funds *(in millions)*	**Dec. 31, 2018**	Dec. 31, 2017	Average **2018**	Average 2017	Average 2016
Available funds:					
Liquid funds:					
Interest-bearing deposits with banks	**$ 14,148**	$ 11,979	**$ 14,740**	$ 14,879	$ 14,704
Federal funds sold and securities purchased under resale agreements	**46,795**	28,135	**27,883**	27,192	25,767
Total liquid funds	**60,943**	40,114	**42,623**	42,071	40,471
Cash and due from banks	**5,864**	5,382	**5,014**	5,039	4,308
Interest-bearing deposits with the Federal Reserve and other central banks	**67,988**	91,510	**68,408**	70,213	80,593
Total available funds	**$ 134,795**	$ 137,006	**$ 116,045**	$ 117,323	$ 125,372
Total available funds as a percentage of total assets	**37%**	37%	**34%**	34%	35%

We had $60.9 billion of liquid funds at Dec. 31, 2018 and $40.1 billion at Dec. 31, 2017. Of the $60.9 billion in liquid funds held at Dec. 31, 2018, $14.1 billion was placed in interest-bearing deposits with large, highly-rated global financial institutions with a weighted-average life to maturity of approximately 13 days. Of the $14.1 billion, $1.1 billion was placed with banks in the Eurozone.

Total available funds were $134.8 billion at Dec. 31, 2018, compared with $137.0 billion at Dec. 31, 2017. The decrease was primarily due to lower interest-bearing deposits with the Federal Reserve and other central banks, partially offset by higher federal funds sold and securities purchased under resale agreements.

Average non-core sources of funds, such as federal funds purchased and securities sold under repurchase agreements, trading liabilities, commercial paper and other borrowed funds, were $22.0 billion for 2018 and $25.4 billion for 2017. The decrease primarily reflects a decrease in federal funds purchased and securities sold under repurchase agreements.

Average foreign deposits, primarily from our European-based Investment Services business, were $95.5 billion for 2018, compared with $96.2 billion for 2017. Average interest-bearing domestic deposits were $59.2 billion for 2018 and $46.9 billion for 2017. The increase primarily reflects an increase in demand deposits.

Average payables to customers and broker-dealers were $16.4 billion for 2018 and $19.0 billion for 2017. Payables to customers and broker-dealers are driven by customer trading activity and market volatility.

Average long-term debt was $28.3 billion for 2018 and $27.4 billion for 2017. The increase reflects issuances, partially offset by the maturities of long-term debt.

Average noninterest-bearing deposits decreased to $63.8 billion for 2018 from $71.7 billion for 2017, reflecting lower client deposits.

A significant reduction in our Investment Services business would reduce our access to deposits. See "Asset/liability management" for additional factors that could impact our deposit balances.

Sources of liquidity

The Parent's three major sources of liquidity are access to the debt and equity markets, dividends from its subsidiaries, and cash on hand and cash otherwise made available in business-as-usual circumstances to the Parent through a committed credit facility with our intermediate holding company ("IHC").

Our ability to access the capital markets on favorable terms, or at all, is partially dependent on our credit ratings, which are as follows:

Credit ratings at Dec. 31, 2018	Moody's		S&P	Fitch		DBRS
Parent:						
Long-term senior debt	A1		A	AA-		AA (low)
Subordinated debt	A2		A-	A+		A (high)
Preferred stock	Baa1		BBB	BBB		A (low)
Outlook - Parent:	Stable		Stable	Stable		Stable
The Bank of New York Mellon:						
Long-term senior debt	Aa2		AA-	AA		AA
Subordinated debt	NR		A	NR		NR
Long-term deposits	Aa1		AA-	AA+		AA
Short-term deposits	P1		A-1+	F1+		R-1 (high)
Commercial paper	P1		A-1+	F1+		R-1 (high)
BNY Mellon, N.A.:						
Long-term senior debt	Aa2	*(a)*	AA-	AA	*(a)*	AA
Long-term deposits	Aa1		AA-	AA+		AA
Short-term deposits	P1		A-1+	F1+		R-1 (high)
Outlook - Banks:	Stable		Stable	Stable		Stable

(a) Represents senior debt issuer default rating.
NR - Not rated.

Long-term debt totaled $29.2 billion at Dec. 31, 2018 and $28.0 billion at Dec. 31, 2017. The balance reflects issuances of $5.2 billion, offset by maturities of $3.7 billion and a decrease in the fair value of hedged long-term debt. The Parent has $4.3 billion of long-term debt that will mature in 2019.

The following table presents the long-term debt issued in 2018.

Debt issuances *(in millions)*	**2018**
Senior notes:	
3-month LIBOR + 30bps senior notes due 2020	**$ 1,000**
2.95% senior notes due 2023	**1,000**
3.50% senior notes due 2023	**750**
3.45% senior notes due 2023	**750**
3.40% senior notes due 2028	**750**
3.85% senior notes due 2028	**900**
Total debt issuances	**$ 5,150**

In the second quarter of 2018, BNY Mellon established programs for the issuance of notes and certificates of deposit ("CDs") issued by The Bank of New York Mellon, our largest bank subsidiary. These programs are designed to improve the diversity of our funding sources and provide additional flexibility in our liquidity planning. In December 2018, we issued $1 billion of senior bank notes maturing in 2020 at an annual interest rate of LIBOR plus 30 basis points. At Dec. 31, 2018, $2.8 billion of CDs were outstanding.

The Bank of New York Mellon, our largest bank subsidiary, issues commercial paper that matures within 397 days from date of issue and is not redeemable prior to maturity or subject to voluntary prepayment. The average commercial paper borrowings were $2.6 billion for both 2018 and 2017. Commercial paper outstanding was $1.9 billion at Dec. 31, 2018 and $3.1 billion at Dec. 31, 2017.

Subsequent to Dec. 31, 2018, our U.S. bank subsidiaries could declare dividends to the Parent of approximately $3.7 billion, without the need for a regulatory waiver. In addition, at Dec. 31, 2018, non-bank subsidiaries of the Parent had liquid assets of approximately $1.7 billion. Restrictions on our ability to obtain funds from our subsidiaries are discussed in more detail in "Supervision and Regulation - Capital Planning and Stress Testing - Payment of Dividends, Stock Repurchases and Other Capital Distributions" and in Note 18 of the Notes to Consolidated Financial Statements.

Pershing LLC has uncommitted lines of credit in place for liquidity purposes which are guaranteed by the Parent. Pershing LLC has three separate uncommitted lines of credit amounting to $750 million in aggregate. There were no borrowings under these lines in 2018. Pershing Limited, an indirect UK-based subsidiary of BNY Mellon, has two separate uncommitted lines of credit amounting to $250 million in aggregate. Average borrowings under these lines were $1 million, in aggregate, in 2018.

The double leverage ratio is the ratio of our equity investment in subsidiaries divided by our consolidated parent company equity, which includes our noncumulative perpetual preferred stock. In short, the double leverage ratio measures the extent to which equity in subsidiaries is financed by Parent company debt. As the double leverage ratio increases, this can reflect greater demands on a company's cash flows in order to service interest payments and debt maturities. BNY Mellon's double leverage ratio is managed in a range considering the high level of unencumbered available liquid assets held in its principal subsidiaries (such as central bank deposit placements and government securities), the Company's cash generating fee-based business model, with fee revenue representing 78% of total revenue in 2018, and the dividend capacity of our banking subsidiaries. Our double leverage ratio was 117.7% at Dec. 31, 2018 and 122.5% at Dec. 31, 2017, and within the range targeted by management.

Uses of funds

The Parent's major uses of funds are payment of dividends, repurchases of common stock, principal and interest payments on its borrowings, acquisitions and additional investments in its subsidiaries.

In 2018, we paid $1.2 billion in dividends on our common and preferred stock. Our common stock dividend payout ratio was 26% for 2018.

In 2018, we repurchased 63.7 million common shares at an average price of $51.29 per common share for a total cost of $3.3 billion.

Liquidity coverage ratio

U.S. regulators have established an LCR that requires certain banking organizations, including BNY Mellon, to maintain a minimum amount of unencumbered high-quality liquid assets ("HQLA") sufficient to withstand the net cash outflow under a hypothetical standardized acute liquidity stress scenario for a 30-day time horizon.

The following table presents the consolidated HQLA at Dec. 31, 2018, and the average HQLA and average LCR for the fourth quarter of 2018.

Consolidated HQLA and LCR *(dollars in billions)*		**Dec. 31, 2018**
Securities *(a)*	**$**	**121**
Cash *(b)*		**61**
Total consolidated HQLA *(c)*	**$**	**182**
Total consolidated HQLA - average *(c)*	**$**	**164**
Average LCR		**118%**

(a) *Primarily includes securities of U.S. government-sponsored enterprises, U.S. Treasury, sovereign securities, U.S. agency and investment-grade corporate debt.*
(b) *Primarily includes cash on deposit with central banks.*
(c) *Consolidated HQLA presented before adjustments. After haircuts and the impact of trapped liquidity, consolidated HQLA totaled $133 billion at Dec. 31, 2018 and averaged $121 billion for the fourth quarter of 2018.*

The U.S. LCR rule requires BNY Mellon and each of our affected domestic bank subsidiaries to meet an LCR of at least 100%. BNY Mellon and each of our affected domestic bank subsidiaries were compliant with the U.S. LCR requirements throughout 2018.

Statement of cash flows

The following summarizes the activity reflected on the consolidated statement of cash flows. While this information may be helpful to highlight certain macro trends and business strategies, the cash flow analysis may not be as relevant when analyzing changes in our net earnings and net assets. We believe that in addition to the traditional cash flow analysis, the discussion related to liquidity and dividends and asset/liability management herein may provide more useful context in evaluating our liquidity position and related activity.

Net cash provided by operating activities was $6.0 billion in 2018, compared with $4.7 billion in 2017 and $6.3 billion in 2016. In 2018, 2017 and 2016, cash flows provided by operations were principally the result of earnings. In 2018, cash flows provided by operations was also the result of changes in accruals and other balances, partially offset by changes in trading assets and liabilities. In 2017, cash flows provided by operations were partially offset by changes in trading assets and liabilities. In 2016, cash flows provided by operations also reflect changes in trading assets and liabilities, partially offset by changes in accruals and other balances.

Net cash provided by investing activities was $3.3 billion in 2018, compared with net cash used for investing activities of $32.7 billion in 2017 and net cash provided by investing activities of $50.3 billion in 2016. In 2018, 2017 and 2016, net cash provided by or used for investing activities primarily reflects changes in interest-bearing deposits with the Federal Reserve and other central banks and the net impact of securities activity. In 2018, net cash provided by investing activities was partially offset by changes in federal funds sold and securities purchased under resale agreements.

Net cash used for financing activities was $8.1 billion in 2018, compared with net cash provided by financing activities of $26.8 billion in 2017 and net cash used for financing activities of $59.1 billion in 2016. In 2018, net cash used for financing activities primarily reflects repayments of long-term debt, common stock repurchases and changes in deposits, partially offset by proceeds from the issuance of long-term debt. In 2017 and 2016, net cash provided by, or used for, financing activities primarily reflects changes in deposits and changes in federal funds purchased and securities sold under repurchase agreements. In 2017, net cash provided by financing activities also reflects net proceeds from the issuance of long-term debt, changes in commercial paper and other borrowed funds, partially offset by common stock repurchases. In 2016, net cash used for financing activities also reflects repayment of long-term debt and common stock repurchases, partially offset by the net proceeds from the issuance of long-term debt.

Commitments and obligations

We have contractual obligations to make fixed and determinable payments to third parties as indicated in the table below. The table excludes certain obligations such as trade payables and trading liabilities, where the obligation is short-term or subject to valuation based on market factors. In addition to the amounts shown in the table below, at Dec. 31, 2018, $103 million of unrecognized tax benefits have been recorded as liabilities in accordance with ASC 740, *Income Taxes*. Related to these unrecognized tax benefits, we have also recorded a liability for potential interest of $22 million. At this point, it is not possible to determine when these amounts will be settled or resolved.

Contractual obligations at Dec. 31, 2018		Payments due by period			
(in millions)	Total	Less than 1 year	1-3 years	3-5 years	Over 5 years
Deposits without a stated maturity	**$ 128,032**	$ 128,032	$ —	$ —	$ —
Term deposits	**40,592**	40,543	48	—	1
Federal funds purchased and securities sold under repurchase agreements	**14,243**	14,243	—	—	—
Payables to customers and broker-dealers	**19,731**	19,731	—	—	—
Other borrowed funds *(a)*	**3,227**	3,227	—	—	—
Long-term debt *(b)*	**33,614**	5,080	10,883	7,650	10,001
Unfunded pension and post-retirement benefits	**256**	27	58	53	118
Investment commitments *(c)*	**479**	201	230	30	18
Total contractual obligations	**$ 240,174**	$ 211,084	$ 11,219	$ 7,733	$ 10,138

(a) Includes capital leases.
(b) Includes interest.
(c) Includes Community Reinvestment Act commitments.

We have entered into fixed and determinable commitments as indicated in the table below:

Other commitments at Dec. 31, 2018		Amount of commitment expiration per period			
(in millions)	Total	Less than 1 year	1-3 years	3-5 years	Over 5 years
Securities lending indemnifications *(a)*	**$ 401,504**	$ 401,504	$ —	$ —	$ —
Lending commitments	**50,631**	29,766	6,985	13,310	570
Standby letters of credit	**2,817**	1,972	496	349	—
Operating leases	**1,459**	264	455	308	432
Purchase obligations *(b)*	**1,374**	722	465	148	39
Commercial letters of credit	**165**	165	—	—	—
Private equity commitments *(c)*	**41**	17	13	11	—
Total commitments	**$ 457,991**	$ 434,410	$ 8,414	$ 14,126	$ 1,041

(a) Excludes the indemnifications for securities booked at BNY Mellon resulting from the CIBC Mellon joint venture, which totaled $56 billion at Dec. 31, 2018.
(b) Purchase obligations are defined as agreements to purchase goods or services that are enforceable and legally binding and specify all significant terms.
(c) Relates to SBIC investments, which are compliant with the Volcker Rule.

See “Liquidity and dividends” and Note 21 of the Notes to Consolidated Financial Statements for a further discussion of the source of funds for our commitments and obligations.

Off-balance sheet arrangements

Off-balance sheet arrangements discussed in this section are limited to guarantees, retained or contingent interests and obligations arising out of unconsolidated variable interest entities (“VIEs”). For BNY Mellon, these items include certain guarantees. Guarantees include SBLCs issued as part of our corporate banking business and securities lending indemnifications issued as part of our Investment Services business. See Note 21 of the Notes to Consolidated Financial Statements for a further discussion of our off-balance sheet arrangements.

Capital

Capital data *(dollars in millions except per share amounts; common shares in thousands)*	**2018**	2017
At period end:		
BNY Mellon shareholders' equity to total assets ratio	**11.2%**	11.1%
BNY Mellon common shareholders' equity to total assets ratio	**10.2%**	10.1%
Total BNY Mellon shareholders' equity	**$ 40,638**	$ 41,251
Total BNY Mellon common shareholders' equity *(a)*	**$ 37,096**	$ 37,709
BNY Mellon tangible common shareholders' equity – Non-GAAP *(a)*	**$ 18,290**	$ 18,486
Book value per common share *(a)*	**$ 38.63**	$ 37.21
Tangible book value per common share – Non-GAAP *(a)*	**$ 19.04**	$ 18.24
Closing stock price per common share	**$ 47.07**	$ 53.86
Market capitalization	**$ 45,207**	$ 54,584
Common shares outstanding	**960,426**	1,013,442
Full-year:		
Average common equity to average assets	**11.0%**	10.5%
Cash dividends per common share	**$ 1.04**	$ 0.86
Common dividend payout ratio	**26%**	23%
Common dividend yield	**2.2%**	1.6%

(a) See "Supplemental information – Explanation of GAAP and Non-GAAP financial measures" beginning on page 105 for a reconciliation of GAAP to Non-GAAP.

The Bank of New York Mellon Corporation total shareholders' equity decreased to $40.6 billion at Dec. 31, 2018 from $41.3 billion at Dec. 31, 2017. The decrease primarily reflects common stock repurchases, dividend payments and unrealized losses on securities available-for-sale, partially offset by earnings and the impact of stock awards and option exercises.

We repurchased 63.7 million common shares at an average price of $51.29 per common share for a total of $3.3 billion in 2018 including the additional share repurchases approved in December 2018. We expect to continue to repurchase shares in the first half of 2019 under the 2018 capital plan.

The unrealized loss, net of tax, on our available-for-sale securities portfolio included in accumulated OCI was $167 million at Dec. 31, 2018, compared with a net unrealized gain of $184 million at Dec. 31, 2017. The decrease in the unrealized gain, net of tax, was primarily driven by higher interest rates.

Capital adequacy

Regulators establish certain levels of capital for bank holding companies ("BHCs") and banks, including BNY Mellon and our bank subsidiaries, in accordance with established quantitative measurements. For the Parent to maintain its status as a financial holding company, our U.S. bank subsidiaries and BNY Mellon must, among other things, qualify as "well capitalized." As of Dec. 31, 2018 and Dec. 31, 2017, BNY Mellon and our U.S. bank subsidiaries were "well capitalized."

Failure to satisfy regulatory standards, including "well capitalized" status or capital adequacy rules more generally, could result in limitations on our activities and adversely affect our financial condition. See the discussion of these matters in "Supervision and Regulation - Regulated Entities of BNY Mellon and Ancillary Regulatory Requirements" and "Risk Factors - Operational Risk - Failure to satisfy regulatory standards, including "well capitalized" and "well managed" status or capital adequacy and liquidity rules more generally, could result in limitations on our activities and adversely affect our business and financial condition."

The U.S. banking agencies' capital rules are based on the framework adopted by the Basel Committee on Banking Supervision ("BCBS"), as amended from time to time. For additional information on these capital requirements, see "Supervision and Regulation." BNY Mellon is subject to the U.S. capital rules, which were gradually phased-in over a multi-year period through Jan. 1, 2019. The phase-in requirements for consolidated capital were completed on Jan. 1, 2018.

Our risk-based capital adequacy is determined using the higher of RWAs determined using the Advanced Approach and Standardized Approach.

The table below presents our consolidated and largest bank subsidiary regulatory capital ratios.

Consolidated and largest bank subsidiary regulatory capital ratios	Dec. 31, 2018			Dec. 31, 2017	
	Well capitalized	Minimum required *(a)*	Capital ratios	Fully phased-in	Transitional *(b)*
Consolidated regulatory capital ratios: *(c)(d)*					
Advanced Approach:					
CET1 ratio	N/A *(e)*	7.5%	**10.7%**	10.3%	10.7%
Tier 1 capital ratio	6%	9	**12.8**	12.3	12.7
Total capital ratio	10%	11	**13.6**	13.0	13.4
Standardized Approach:					
CET1 ratio	N/A *(e)*	7.5%	**11.7%**	11.5%	11.9%
Tier 1 capital ratio	6%	9	**14.1**	13.7	14.2
Total capital ratio	10%	11	**15.1**	14.7	15.1
Tier 1 leverage ratio	N/A *(e)*	4	**6.6**	6.4	6.6
SLR *(f)*	N/A *(e)*	5	**6.0**	5.9	6.1
The Bank of New York Mellon regulatory capital ratios: *(c)*					
Advanced Approach:					
CET1 ratio	6.5%	6.375%	**14.0%**	N/A	14.1%
Tier 1 capital ratio	8	7.875	**14.3**	N/A	14.4
Total capital ratio	10	9.875	**14.7**	N/A	14.7
Tier 1 leverage ratio	5	4	**7.6**	N/A	7.6
SLR *(f)*	6	3	**6.8**	6.7	6.9

(a) Minimum requirements for Dec. 31, 2018 include minimum thresholds plus currently applicable buffers.
(b) Reflects transitional adjustments to CET1, Tier 1 capital and Tier 2 capital required in 2017 under the U.S. capital rules.
(c) For our CET1, Tier 1 capital and Total capital ratios, our effective capital ratios under U.S. capital rules are the lower of the ratios as calculated under the Standardized and Advanced Approaches. The Tier 1 leverage ratio is based on Tier 1 capital and quarterly average total assets.
(d) See page 48 for the capital ratio requirements with the phase-in of the capital conservation buffer and the U.S. Global Systemically Important Bank ("G-SIB") surcharge, as well as the introduction of the SLR buffer.
(e) The Federal Reserve's regulations do not establish well capitalized thresholds for these measures for BHCs.
(f) SLR became a binding measure on Jan. 1, 2018. The SLR is based on Tier 1 capital and total leverage exposure, which includes certain off-balance sheet exposures.

Our CET1 ratio determined under the Advanced Approach was 10.7% at Dec. 31, 2018 and 10.7%, on a transitional basis, at Dec. 31, 2017. The ratio was unchanged compared to Dec. 31, 2017, reflecting capital deployed through common stock repurchases and dividend payments, and the final phase-in requirements under U.S. capital rules, offset by capital generated through earnings and lower RWAs.

Our SLR was 6.0% at Dec. 31, 2018 and 6.1%, on a transitional basis, at Dec. 31, 2017.

The Advanced Approach capital ratios are significantly impacted by RWAs for operational risk. Our operational loss risk model is informed by external losses, including fines and penalties levied against institutions in the financial services industry, particularly those that relate to businesses in which we operate, and as a result external losses have impacted and could in the future impact the amount of capital that we are required to hold.

Our capital ratios are necessarily subject to, among other things, anticipated compliance with all necessary enhancements to model calibration, approval by regulators of certain models used as part of RWA calculations, other refinements, further implementation guidance from regulators, market practices and standards and any changes BNY Mellon may make to its businesses. As a consequence of these factors, our capital ratios may materially change, and may be volatile over time and from period to period.

The following table presents our capital components and RWAs.

Capital components and risk-weighted assets *(in millions)*	**Dec. 31, 2018**	Dec. 31, 2017 Fully phased-in	Dec. 31, 2017 Transitional Approach *(a)*
CET1:			
Common shareholders' equity	**$ 37,096**	$ 37,709	$ 37,859
Adjustments for:			
Goodwill and intangible assets *(b)*	**(18,806)**	(19,223)	(18,684)
Net pension fund assets	**(320)**	(211)	(169)
Equity method investments	**(361)**	(387)	(372)
Deferred tax assets	**(42)**	(41)	(33)
Other	**—**	(9)	(8)
Total CET1	**17,567**	17,838	18,593
Other Tier 1 capital:			
Preferred stock	**3,542**	3,542	3,542
Deferred tax assets	**—**	—	(8)
Net pension fund assets	**—**	—	(42)
Other	**(65)**	(41)	(41)
Total Tier 1 capital	**$ 21,044**	$ 21,339	$ 22,044
Tier 2 capital:			
Subordinated debt	**$ 1,250**	$ 1,250	$ 1,250
Allowance for credit losses	**252**	261	261
Other	**(10)**	(12)	(12)
Total Tier 2 capital – Standardized Approach	**1,492**	1,499	1,499
Excess of expected credit losses	**65**	31	31
Less: Allowance for credit losses	**252**	261	261
Total Tier 2 capital – Advanced Approach	**$ 1,305**	$ 1,269	$ 1,269
Total capital:			
Standardized Approach	**$ 22,536**	$ 22,838	$ 23,543
Advanced Approach	**$ 22,349**	$ 22,608	$ 23,313
Risk-weighted assets:			
Standardized Approach	**$ 149,618**	$ 155,324	$ 155,621
Advanced Approach:			
Credit Risk	**$ 92,917**	$ 101,366	$ 101,681
Market Risk	**3,454**	3,657	3,657
Operational Risk	**68,300**	68,688	68,688
Total Advanced Approach	**$ 164,671**	$ 173,711	$ 174,026
Average assets for Tier 1 leverage ratio	**$ 319,007**	$ 330,894	$ 331,600
Total leverage exposure for SLR	**$ 347,943**	$ 360,543	$ 361,249

(a) Reflects transitional adjustments to CET1, Tier 1 capital and Tier 2 capital required in 2017 under the U.S. capital rules.
(b) Reduced by deferred tax liabilities associated with intangible assets and tax deductible goodwill.

The table below presents the factors that impacted the CET1 capital.

CET1 generation *(in millions)*	**Dec. 31, 2018**
CET1 – Beginning of period	**$ 17,838**
Net income applicable to common shareholders of The Bank of New York Mellon Corporation	**4,097**
Goodwill and intangible assets, net of related deferred tax liabilities	**417**
Gross CET1 generated	**4,514**
Capital deployed:	
Common stock dividends	**(1,052)**
Common stock repurchased	**(3,269)**
Total capital deployed	**(4,321)**
Other comprehensive income:	
Foreign currency translation	**(302)**
Unrealized loss on assets available-for-sale	**(380)**
Defined benefit plans	**(120)**
Unrealized gain on cash flow hedges	**(10)**
Other	**(2)**
Total other comprehensive income	**(814)**
Additional paid-in capital *(a)*	**453**
Other (deductions) additions:	
Net pension fund assets	**(109)**
Deferred tax assets	**(1)**
Embedded goodwill	**26**
Other	**(19)**
Total other deductions	**(103)**
Net CET1 deployed	**(271)**
CET1 – End of period	**$ 17,567**

(a) Primarily related to stock awards, the exercise of stock options and stock issued for employee benefit plans.

Minimum capital ratios and capital buffers

The U.S. capital rules include a series of buffers and surcharges over required minimums that apply to BHCs, including BNY Mellon, which are being phased-in over time. Banking organizations with a risk-based ratio or SLR above the minimum required level, but with a risk-based ratio or SLR below the minimum level with buffers, will face constraints on dividends, equity repurchases and discretionary executive compensation based on the amount of the shortfall. Different regulatory capital buffers apply to our banking subsidiaries.

The following table presents the principal minimum capital ratio requirements with buffers and surcharges, as phased-in, applicable to the Parent and our U.S. insured depository institutions. This table does not include the imposition of a countercyclical capital buffer. Buffers and surcharges are not applicable to the Tier 1 leverage ratio. The SLR buffer was fully implemented on Jan. 1, 2018 and the other buffers and surcharge were fully implemented on Jan. 1, 2019.

Capital ratio requirements	Well capitalized	Minimum ratios	Minimum ratios with buffers, as phased-in *(a)* 2018	2019
Capital conservation buffer (CET1)			1.875%	2.5%
U.S. G-SIB surcharge (CET1) *(b)(c)*			1.125%	1.5%
Consolidated:				
CET1 ratio	N/A	4.5%	7.5%	8.5%
Tier 1 capital ratio	6.0%	6.0%	9.0%	10.0%
Total capital ratio	10.0%	8.0%	11.0%	12.0%
Enhanced SLR buffer (Tier 1 capital)	N/A		2.0%	2.0%
SLR	N/A	3.0%	5.0%	5.0%
U.S. insured depository institutions: *(c)*				
CET1 ratio	6.5%	4.5%	6.375%	7.0%
Tier 1 capital ratio	8.0%	6.0%	7.875%	8.5%
Total capital ratio	10.0%	8.0%	9.875%	10.5%
SLR	6.0%	3.0%	6.0% *(d)*	6.0% *(d)*

(a) Countercyclical capital buffer currently set to 0%.
(b) The fully phased-in U.S. G-SIB surcharge of 1.5% applicable to BNY Mellon is subject to change.
(c) The U.S. G-SIB surcharge is not applicable to the regulatory capital ratios of the bank subsidiaries.
(d) Well capitalized threshold.

The following table shows the impact on the consolidated capital ratios at Dec. 31, 2018 of a $100 million increase or decrease in common equity, or a $1 billion increase or decrease in RWAs, quarterly average assets or total leverage exposure.

Sensitivity of consolidated capital ratios at Dec. 31, 2018	**Increase or decrease of**	
(in basis points)	**$100 million in common equity**	**$1 billion in RWA, quarterly average assets or total leverage exposure**
CET1:		
Standardized Approach	7 bps	8 bps
Advanced Approach	6	7
Tier 1 capital:		
Standardized Approach	7	9
Advanced Approach	6	8
Total capital:		
Standardized Approach	7	10
Advanced Approach	6	8
Tier 1 leverage	3	2
SLR	3	2

Capital ratios vary depending on the size of the balance sheet at year-end and the levels and types of investments in assets. The balance sheet size fluctuates from year to year based on levels of customer and market activity. In general, when servicing clients are more actively trading securities, deposit balances and the balance sheet as a whole are higher. In addition, when markets experience significant volatility or stress, our balance sheet size may increase considerably as client deposit levels increase.

Issuer purchases of equity securities

Share repurchases - fourth quarter of 2018 *(dollars in millions, except per share information; common shares in thousands)*	Total shares repurchased	Average price per share	Total shares repurchased as part of a publicly announced plan or program	Maximum approximate dollar value of shares that may yet be purchased under the publicly announced plans or programs at Dec. 31, 2018
October 2018	7,763	$ 47.30	7,763	$ 1,432
November 2018	1,479	51.14	1,479	1,356
December 2018	19,702	47.15	19,702	1,257
Fourth quarter of 2018 *(a)*	**28,944**	**$ 47.40**	**28,944**	**$ 1,257** *(b)*

(a) *Includes 14 thousand shares repurchased at a purchase price of $1 million from employees, primarily in connection with the employees' payment of taxes upon the vesting of restricted stock. The average price per share of open market purchases was $47.39.*

(b) *Represents the maximum value of the shares authorized to be repurchased through the second quarter of 2019, including employee benefit plan repurchases.*

In June 2018, in connection with the Federal Reserve's non-objection to our 2018 capital plan, BNY Mellon announced a share repurchase plan providing for the repurchase of up to $2.4 billion of common stock starting in the third quarter of 2018 and continuing through the second quarter of 2019. This new share repurchase plan replaces all previously authorized share repurchase plans.

In December 2018, the Federal Reserve approved the repurchase of up to $830 million of additional common stock under our repurchase program. Our Board of Directors approved the additional share repurchases, all of which were repurchased in the fourth quarter of 2018. These repurchases were in addition to the Company's repurchase of $2.4 billion of common stock previously approved by the Board and announced in June 2018.

Share repurchases may be executed through open market repurchases, in privately negotiated transactions or by other means, including through repurchase plans designed to comply with Rule 10b5-1 and other derivative, accelerated share repurchase and other structured transactions. The timing and exact amount of any common stock repurchases will depend on various factors, including market conditions and the common stock trading price; the Company's capital position, liquidity and financial performance; alternative uses of capital; and legal and regulatory considerations.

Trading activities and risk management

Our trading activities are focused on acting as a market-maker for our customers, facilitating customer trades and risk mitigating hedging in compliance with the Volcker Rule. The risk from market-making activities for customers is managed by our traders and limited in total exposure through a system of position limits, value-at-risk ("VaR") methodology and other market sensitivity measures. VaR is the potential loss in value due to adverse market movements over a defined time horizon with a specified confidence level. The calculation of our VaR used by management and presented below assumes a one-day holding period, utilizes a 99% confidence level, and incorporates non-linear product characteristics. VaR facilitates comparisons across portfolios of different risk characteristics. VaR also captures the diversification of aggregated risk at the firm-wide level.

VaR represents a key risk management measure and it is important to note the inherent limitations to VaR, which include:

- VaR does not estimate potential losses over longer time horizons where moves may be extreme;
- VaR does not take account of potential variability of market liquidity; and
- Previous moves in market risk factors may not produce accurate predictions of all future market moves.

See Note 22 of the Notes to Consolidated Financial Statements for additional information on the VaR methodology.

The following tables indicate the calculated VaR amounts for the trading portfolio for the designated periods using the historical simulation VaR model.

VaR *(a)* *(in millions)*	**2018** Average	**2018** Minimum	**2018** Maximum	**Dec. 31, 2018**
Interest rate	**$ 4.1**	**$ 3.0**	**$ 5.5**	**$ 4.3**
Foreign exchange	**4.3**	**2.9**	**8.3**	**4.1**
Equity	**0.7**	**—**	**1.2**	**0.8**
Credit	**0.9**	**0.6**	**2.6**	**0.6**
Diversification	**(4.2)**	**N/M**	**N/M**	**(3.2)**
Overall portfolio	**5.8**	**3.6**	**10.4**	**6.6**

VaR *(a)* *(in millions)*	2017 Average	2017 Minimum	2017 Maximum	Dec. 31, 2017
Interest rate	$ 3.6	$ 2.4	$ 4.9	$ 4.4
Foreign exchange	4.1	2.6	8.6	8.6
Equity	0.5	0.1	1.1	0.8
Credit	1.1	0.5	1.7	1.3
Diversification	(5.0)	N/M	N/M	(5.2)
Overall portfolio	4.3	3.2	9.9	9.9

(a) VaR exposure does not include the impact of the Company's consolidated investment management funds and seed capital investments.

N/M - Because the minimum and maximum may occur on different days for different risk components, it is not meaningful to compute a minimum and maximum portfolio diversification effect.

The interest rate component of VaR represents instruments whose values predominantly vary with the level or volatility of interest rates. These instruments include, but are not limited to: sovereign debt, swaps, swaptions, forward rate agreements, exchange-traded futures and options, and other interest rate derivative products.

The foreign exchange component of VaR represents instruments whose values predominantly vary with the level or volatility of currency exchange rates or interest rates. These instruments include, but are not limited to: currency balances, spot and forward transactions, currency options, exchange-traded futures and options, and other currency derivative products.

The equity component of VaR consists of instruments that represent an ownership interest in the form of domestic and foreign common stock or other equity-linked instruments. These instruments include, but are not limited to: common stock, exchange-traded funds, preferred stock, listed equity options (puts and calls), OTC equity options, equity total return swaps, equity index futures and other equity derivative products.

The credit component of VaR represents instruments whose values predominantly vary with the credit worthiness of counterparties. These instruments include, but are not limited to, credit derivatives (credit default swaps and exchange-traded credit index instruments) and exposures from corporate credit spreads, and mortgage prepayments. Credit derivatives are used to hedge various credit exposures.

The diversification component of VaR is the risk reduction benefit that occurs when combining portfolios and offsetting positions, and from the correlated behavior of risk factor movements.

During 2018, interest rate risk generated 41% of average gross VaR, foreign exchange risk generated 43% of average gross VaR, equity risk accounted for 7% of average gross VaR and credit risk generated 9% of average gross VaR. During 2018, our daily trading loss exceeded our calculated VaR amount of the overall portfolio on one occasion.

The following table of total daily trading revenue or loss illustrates the number of trading days in which our trading revenue or loss fell within particular ranges during the past five quarters.

Distribution of trading revenue (loss) *(a)*	Quarter ended				
(dollars in millions)	**Dec. 31, 2018**	Sept. 30, 2018	June 30, 2018	March 31, 2018	Dec. 31, 2017
Revenue range:	Number of days				
Less than $(2.5)	**1**	—	1	—	2
$(2.5) – $0	**7**	6	3	2	4
$0 – $2.5	**17**	30	21	18	23
$2.5 – $5.0	**24**	20	30	32	22
More than $5.0	**13**	7	9	10	11

(a) *Trading revenue (loss) includes realized and unrealized gains and losses primarily related to spot and forward foreign exchange transactions, derivatives and securities trades for our customers and excludes any associated commissions, underwriting fees and net interest revenue.*

Trading assets include debt and equity instruments and derivative assets, primarily interest rate and foreign exchange contracts, not designated as hedging instruments. Trading assets were $7.0 billion at Dec. 31, 2018 and $6.0 billion at Dec. 31, 2017. The increase was impacted by the reclassification of money market fund investments of approximately $1 billion primarily from available-for-sale securities.

Trading liabilities include debt and equity instruments and derivative liabilities, primarily interest rate and foreign exchange contracts, not designated as hedging instruments. Trading liabilities were $3.5 billion at Dec. 31, 2018 and $4.0 billion at Dec. 31, 2017.

Under our fair value methodology for derivative contracts, an initial "risk-neutral" valuation is performed on each position assuming time-discounting based on a AA credit curve. In addition, we consider credit risk in arriving at the fair value of our derivatives.

We reflect external credit ratings as well as observable credit default swap spreads for both ourselves and our counterparties when measuring the fair value of our derivative positions. Accordingly, the valuation of our derivative positions is sensitive to the current changes in our own credit spreads, as well as those of our counterparties.

At Dec. 31, 2018, our OTC derivative assets, including those in hedging relationships, of $2.8 billion included a credit valuation adjustment ("CVA") deduction of $22 million. Our OTC derivative liabilities, including those in hedging relationships, of $2.4 billion included a debit valuation adjustment ("DVA") of $1 million related to our own credit spread. Net of hedges, the CVA decreased by $4 million and the DVA increased by less than $1 million in 2018. The net impact of these adjustments increased foreign exchange and other trading revenue by $5 million in 2018. During 2018, no realized loss was charged off against CVA reserves.

At Dec. 31, 2017, our OTC derivative assets, including those in hedging relationships, of $3.1 billion included a CVA deduction of $27 million. Our OTC derivative liabilities, including those in hedging relationships, of $3.6 billion included a DVA of $1 million related to our own credit spread. Net of hedges, the CVA decreased by $9 million and the DVA decreased by $1 million in 2017. The net impact of these adjustments increased foreign exchange and other trading revenue by $8 million in 2017. During 2017, no realized loss was charged off against CVA reserves.

The table below summarizes the risk ratings for our foreign exchange and interest rate derivative counterparty credit exposure during the past five quarters. This information indicates the degree of risk to which we are exposed. Significant changes in ratings classifications for our foreign exchange and other trading activity could result in increased risk for us.

Foreign exchange and other trading counterparty risk rating profile *(a)*	Quarter ended				
	Dec. 31, 2018	Sept. 30, 2018	June 30, 2018	March 31, 2018	Dec. 31, 2017
Rating:					
AAA to AA-	**50%**	48%	37%	48%	44%
A+ to A-	**28**	30	41	27	31
BBB+ to BBB-	**18**	19	18	20	20
Non-investment grade (BB+ and lower)	**4**	3	4	5	5
Total	**100%**	100%	100%	100%	100%

(a) Represents credit rating agency equivalent of internal credit ratings.

Asset/liability management

Our diversified business activities include processing securities, accepting deposits, investing in securities, lending, raising money as needed to fund assets and other transactions. The market risks from these activities include interest rate risk and foreign exchange risk. Our primary market risk is exposure to movements in U.S. dollar interest rates and certain foreign currency interest rates. We actively manage interest rate sensitivity and use earnings simulation and discounted cash flow models to identify interest rate exposures.

An earnings simulation model is the primary tool used to assess changes in pre-tax net interest revenue. The model incorporates management's assumptions regarding interest rates, market spreads, changes in the prepayment behavior of loans and securities and the impact of derivative financial instruments used for interest rate risk management purposes. These assumptions have been developed through a combination of historical analysis and future expected pricing behavior and are inherently uncertain. Actual results may differ materially from projected results due to timing, magnitude and frequency of interest rate changes, and changes in market conditions and management's strategies, among other factors.

In the table below, we use the earnings simulation model to run various interest rate ramp scenarios from a baseline scenario. The interest rate ramp scenarios examine the impact of large interest rate movements. In each scenario, all currencies' interest rates are shifted higher or lower. The baseline scenario is based on our quarter-end balance sheet and the spot yield curve. The 100 basis point ramp scenario assumes rates change 25 basis points above or below the yield curve in each of the next four quarters and the 200 basis point ramp scenario assumes a 50 basis point per quarter change. Interest rate sensitivity is quantified by calculating the change in pre-tax net interest revenue between the scenarios over a 12-month measurement period.

The following table shows net interest revenue sensitivity for BNY Mellon.

Estimated changes in net interest revenue *(in millions)*	**Dec. 31, 2018**	Sept. 30, 2018	Dec. 31, 2017
Up 200 bps parallel rate ramp vs. baseline *(a)*	**$ 411**	$ 362	$ 280
Up 100 bps parallel rate ramp vs. baseline *(a)*	**198**	180	148
Down 100 bps parallel rate ramp vs. baseline *(a)*	**(163)**	(140)	(225)
Long-term up 50 bps, short-term unchanged *(b)*	**82**	83	105
Long-term down 50 bps, short-term unchanged *(b)*	**(98)**	(96)	(122)

(a) In the parallel rate ramp, both short-term and long-term rates move in four equal quarterly increments.
(b) Long-term is equal to or greater than one year.

Sensitivities in the 200 bps and 100 bps parallel rate ramp scenarios increased in the fourth quarter of 2018 from the third quarter of 2018 primarily driven by a favorable asset and liability mix change. In the first quarter of 2018, we changed the net interest revenue sensitivity methodology to assume static deposit levels. Previously, our sensitivities included assumptions about deposit runoff which were difficult to predict. Prior period results have been restated to conform to the current methodology.

To illustrate the net interest revenue sensitivity to deposit runoff, we note that a $5 billion reduction of U.S. dollar denominated non-interest bearing deposits would reduce the net interest revenue sensitivity results in the ramp up 100 basis point and 200 basis point scenarios in the table above by approximately $150 million and approximately $185 million, respectively. The impact would be smaller if the runoff was assumed to be a mixture of interest-bearing and noninterest-bearing deposits.

For a discussion of factors impacting the growth or contraction of deposits, see "Risk Factors - Our business, financial condition and results of operations could be adversely affected if we do not effectively manage our liquidity."

We also project future cash flows from our assets and liabilities over a long-term horizon and then discount these cash flows using instantaneous parallel shocks to prevailing interest rates. This measure reflects the structural balance sheet interest rate sensitivity by discounting all future cash flows. The aggregation of these discounted cash flows is the economic value of equity ("EVE"). The following table shows how the EVE would change in response to changes in interest rates.

Estimated changes in EVE	**Dec. 31, 2018**
Rate change:	
Up 200 bps vs. baseline	**0.8%**
Up 100 bps vs. baseline	**0.8%**

The asymmetrical accounting treatment of the impact of a change in interest rates on our balance sheet may create a situation in which an increase in interest rates can adversely affect reported equity and regulatory capital, even though economically there may be no impact on our economic capital position. For example, an increase in rates will result in a decline in the value of our available-for-sale securities portfolio. In this example, there is no corresponding change on our fixed liabilities, even though economically these liabilities are more valuable as rates rise.

These results do not reflect strategies that management could employ to limit the impact as interest rate expectations change.

To manage foreign exchange risk, we fund foreign currency-denominated assets with liability instruments denominated in the same currency. We utilize various foreign exchange contracts if a liability denominated in the same currency is not available or desired, and to minimize the earnings impact of translation gains or losses created by investments in foreign markets. We use forward foreign exchange contracts to protect the value of our net investment in foreign operations. At Dec. 31, 2018, net investments in foreign operations totaled $13 billion and were spread across 15 foreign currencies.

Risk management overview

Governance

BNY Mellon's management is responsible for execution of the Company's risk appetite and the risk management and compliance framework and the governance structure that supports it, with oversight provided by BNY Mellon's Board of Directors and two key Board committees: the Risk Committee and the Audit Committee.

The Risk Committee is comprised entirely of independent directors and meets on a regular basis to review and assess the control processes with respect to the Company's inherent risks. It also reviews and assesses the risk management activities of the Company and the Company's risk policies and activities. Policy formulation and day-to-day oversight of the Company's risk management framework is delegated to the Chief Risk Officer, who, together with the Chief Auditor and Chief Compliance Officer, helps ensure an effective risk management governance structure. The roles and responsibilities of the Risk Committee are described in more detail in its charter, a copy of which is available on our website, www.bnymellon.com.

The Audit Committee is also comprised entirely of independent directors. The Audit Committee meets on a regular basis to perform an oversight review of the integrity of the financial statements and financial reporting process, compliance with legal and regulatory requirements, our independent registered public accountant's qualifications and independence, and the performance of our registered public accountant and internal audit function. The Audit Committee also reviews management's assessment of the adequacy of internal controls. The functions of the Audit Committee are described in more detail in its charter, a copy of which is available on our website, www.bnymellon.com.

The Senior Risk and Control Committee ("SRCC") is the most senior management body responsible for ensuring that emerging risks are weighed against the corporate risk appetite. The SRCC also reviews any material breaches to our risk appetite and approves action plans required to remediate the issue. SRCC provides oversight for the risk management, compliance and ethics framework. The Chief Executive Officer, Chief Risk Officer and Chief Financial Officer are among SRCC's members.

Primary risk types

The understanding, identification and management of risk are essential elements for the successful management of BNY Mellon. Our primary risk categories are:

Type of risk	Description
Operational	The risk of loss resulting from inadequate or failed internal processes, human factors and systems, breaches of technology and information systems, or from external events. Also includes fiduciary risk, reputational risk, and litigation risk.
Market	The risk of loss due to adverse changes in the financial markets. Our market risks are primarily interest rate, foreign exchange, and equity risk. Market risk particularly impacts our exposures that are fair valued such as the securities portfolio, trading book, and equity investments.
Credit	The risk of loss if any of our borrowers or other counterparties were to default on their obligations to us. Credit risk is resident in the majority of our assets, but primarily concentrated in the loan and securities books, as well as off-balance sheet exposures such as lending commitments, letters of credit, and securities lending indemnifications.
Liquidity	The risk that BNY Mellon cannot meet its cash and collateral obligations at a reasonable cost for both expected and unexpected cash flows, without adversely affecting daily operations or financial conditions. Liquidity risk can arise from cash flow mismatches, market constraints from the inability to convert assets to cash, the inability to raise cash in the markets, deposit run-off, or contingent liquidity events.
Strategic	The risk that BNY Mellon doesn't effectively manage and protect the firm's market positioning and stability. This includes risks associated with the inability to maintain a strong understanding of clients' needs, provide suitable product offerings that are financially viable and fit within the firm's operating model and adapt to transformational change in the industry.

The following table presents the primary types of risk typically embedded in our balance sheet and our off-balance sheet instruments.

On- and off-balance sheet risks	
Assets:	
Interest-bearing deposits with banks	credit
Federal funds sold and securities purchased under resale agreements	market, credit
Securities	market, credit, liquidity
Trading assets	market, credit, liquidity
Loans	credit, liquidity
Goodwill	operational, market
Intangible assets	operational, market
Liabilities:	
Deposits	liquidity
Federal funds purchased and securities sold under repurchase agreements	market, liquidity
Trading liabilities	market, liquidity
Payables to customers and broker-dealers	liquidity
Off-balance sheet instruments:	
Lending commitments	credit, liquidity
Standby letters of credit	credit, liquidity
Commercial letters of credit	credit, liquidity
Securities lending indemnifications	market, credit

Operational risk

In providing a comprehensive array of products and services, we may be exposed to operational risk. Operational risk may result from, but is not limited to, errors related to transaction processing, breaches of internal control systems and compliance requirements, fraud by employees or persons outside BNY Mellon or business interruption due to system failures or other events. Operational risk may also include breaches of our technology and information systems resulting from unauthorized access to confidential information or from internal or external threats, such as cyberattacks. Operational risk also includes potential legal or regulatory actions that could arise as a result of noncompliance with applicable laws and/or regulatory requirements. In the case of an operational event, we could suffer financial losses as well as reputational damage.

To address these risks, we maintain comprehensive policies and procedures and an internal control framework designed to provide a sound operational environment. These controls have been designed to manage operational risk at appropriate levels given our financial strength, the business environment and markets in which we operate, and the nature of our businesses, and considering factors such as competition and regulation. Our internal auditors and internal control group monitor and test the overall effectiveness of our internal controls and financial reporting systems on an ongoing basis.

We have also established procedures that are designed to ensure compliance with generally accepted conduct, ethics and business practices which are defined in our corporate policies. These include training programs, such as for our “Code of Conduct” and “Know Your Customer” programs, and compliance training programs, such as those regarding information protection and suspicious activity reporting.

We have established operational risk management as an independent risk discipline. The organizational framework for operational risk is based upon a strong risk culture that incorporates both governance and risk management activities comprising:

- Board Oversight and Governance – The Risk Committee of the Board oversees our operational risk management strategy in addition to overseeing our strategic management of credit and market risk. The Risk Committee meets regularly to review operational risk management initiatives, discuss key risk issues and review the effectiveness of the risk management systems.
- Accountability of Businesses – Business managers are responsible for maintaining an effective system of internal controls commensurate with their risk profiles and in accordance with BNY Mellon policies and procedures.
- Corporate Operational Risk Management is responsible for developing risk management policies and tools for assessing, measuring, monitoring and managing operational risk for BNY Mellon. The primary objectives of Corporate Operational Risk Management are to promote effective risk management, identify emerging risks, create incentives for generating continuous improvement in controls and to optimize capital.
- Technology Risk is a subset of operational risk. Technology Risk Management is under the leadership of the Global Chief Technology Risk Officer (“CTRO”) and drives the development of global technology policies, controls and methods for assessing, measuring and monitoring information and technology risk for BNY Mellon.

Technology Risk Management partners with the businesses to drive better understanding and a more accurate assessment of operational risks that can occur from technology operations.

Market risk

Our business activity tends to minimize outright or direct exposure to market risk, with such risk primarily limited to market volatility from trading activity in support of clients. More significant direct market risk is assumed in the form of interest rate and credit spread risk within the investment portfolio both as a means for forward asset/liability management and net interest revenue generation.

The Company has indirect market risk exposure associated with the change in the value of financial collateral underlying securities financing and derivatives positions. The Collateral Margin Review Committee reviews and approves the standards for collateral received or paid in respect of collateralized derivative agreements and securities financing transactions.

In addition to the Risk Committee, oversight of market risk is performed by the SRCC and Balance Sheet Risk Committee ("BSRC") and through executive review meetings. Detailed reviews of stress tests results are conducted during the Markets Weekly Risk Review. Senior managers from Risk Management, Finance and Sales and Trading attend the review. Regarding the Corporate Treasury function, oversight is provided by the Treasury Risk Committee, biweekly Portfolio Management Group risk meetings, Business Risk Committee and numerous portfolio reviews.

The Business Risk Committee for the Markets business also provides a forum for market risk oversight. The goal of the Business Risk Committee meeting, which is held monthly, is to review key risk and control issues and related initiatives facing all Markets lines of business. Also addressed during the Business Risk Committee meetings are trading VaR and trading stressed VaR exposures against limits.

Finally, the Risk Quantification Review Group reviews back-testing results for the Company's VaR model.

Credit risk

The extension of credit is not considered a discrete product and is not, typically, attributable to a specific business, but instead is used as a means of supporting our clients and our business activity more holistically. Specifically, we extend direct credit in order to foster client relationships and as a method by which to generate interest income from the deposits that result from business activity. We extend and incur intraday credit exposure in order to facilitate our various processing activities.

To balance the value of our activities with the credit risk incurred in pursuing them, we set and monitor internal credit limits for activities that entail credit risk, most often on the size of the exposure and the quality of the counterparty. For credit exposures driven by changing market rates and prices, exposure measures include an add-on for such potential changes.

We manage credit risk at both the individual exposure level as well as the portfolio level. Credit risk at the individual exposure level is managed through our credit approval system and involves four approval levels up to and including the Chief Risk Officer of the Company. The requisite approvals are based upon the size and relative risk of the aggregate exposure under consideration. The Credit Risk Group is responsible for approving the size, terms and maturity of all credit exposures as well as the ongoing monitoring of the creditworthiness of the counterparty. In addition, they are responsible for assigning and maintaining the internal risk ratings on each exposure.

Credit risk management at the portfolio level is supported by the Enterprise Capital Adequacy Group, within Risk Management and Compliance. The Enterprise Capital Adequacy Group is responsible for calculating two fundamental credit measures. First, we project a statistically probable credit loss, used to help determine the appropriate loan loss reserve and to measure customer profitability. Credit loss considers three basic components: the estimated size of the exposure whenever default might occur, the probability of default before maturity and the severity of the loss we would incur, commonly called "loss given default." For institutional lending, where most of our credit risk is created, unfunded commitments are assigned a usage given default percentage. Borrowers/counterparties are assigned ratings by

Credit Portfolio Managers on an 18-grade scale, which translate to a scaled probability of default. Additionally, transactions are assigned loss-given-default ratings (on a 7-grade scale) that reflect the transactions' structures including the effects of guarantees, collateral and relative seniority of position.

The second fundamental measurement of credit risk calculated by the Enterprise Capital Adequacy Group is called economic capital. Our economic capital model estimates the capital required to support the overall credit risk portfolio. Using a Monte Carlo simulation engine and measures of correlation among borrower defaults, the economic capital model examines extreme and highly unlikely scenarios of portfolio credit loss in order to estimate credit-related capital, and then allocates that capital to individual borrowers and exposures.

The Enterprise Capital Adequacy Group is responsible for the calculation methodologies and the estimates of the inputs used in those methodologies for the determination of expected loss and economic capital. These methodologies and input estimates are regularly evaluated to ensure their appropriateness and accuracy. As new techniques and data become available, the Enterprise Capital Adequacy Group attempts to incorporate, where appropriate, those techniques or data.

BNY Mellon seeks to limit both on- and off-balance sheet credit risk through prudent underwriting and the use of capital only where risk-adjusted returns warrant. We seek to manage risk and improve our portfolio diversification through syndications, asset sales, credit enhancements and active collateralization and netting agreements. In addition, we have a separate Credit Risk Review Group, which is part of Internal Audit, made up of experienced loan review officers who perform timely reviews of the loan files and credit ratings assigned to the loans.

Liquidity risk

Access to global capital markets and financial market utilities are fundamental to both our operating model and overall strategy. Without such access, it would be difficult, if not impossible, to process payments as well as settle and clear transactions on behalf of clients. Deterioration in our liquidity position, whether actual or perceived, can impact our market access by affecting participants' willingness to transact with us. Changes to our liquidity can be caused by various factors, such as funding mismatches, market constraints limiting the ability to liquidate assets, inability to issue debt, run-off of core deposits and contingent liquidity events, such as additional collateral posting. Changes in economic conditions or exposure to credit, market, operational, legal and reputational risks can also affect our liquidity. Our liquidity risk management practices are designed to maintain a strong liquidity profile, by actively managing both the quality of the investment portfolio and intraday liquidity positions, and by having sufficient deposits and other funding to meet timely payment and settlement obligations under both normal and stressed conditions.

Our overall approach to liquidity management is to have sources of liquidity that are sufficient in amount and diversity such that changes in funding requirements at the Parent and at our bank and broker-dealer subsidiaries can be accommodated routinely without material adverse impact on earnings, capital, daily operations or our financial condition.

The Board of Directors has the responsibility for oversight of liquidity risk management for the Company and approves the liquidity risk tolerances. The Asset Liability Committee ("ALCO") is the senior management committee responsible for the oversight of liquidity management. ALCO is responsible for appropriately executing Board-approved strategies, policies and procedures for managing liquidity. Senior management is responsible for regularly reporting the liquidity position of the Company to the Board of Directors. The BSRC provides governance over independent Risk oversight of liquidity risks associated with assets and liabilities, liquidity risk limits calibration, and the adequacy of related control procedures. The Treasury Risk Committee, which is chaired by independent risk management, is responsible for reviewing liquidity stress tests and various liquidity metrics, including contractual cash flow gaps for liquidity, liquidity stress metrics and ratios, LCR, net stable funding ratio ("NSFR") and client deposit concentration. The Treasury Risk Committee validates and approves stress test methodologies and assumptions, and an independent liquidity Risk function provides ongoing review and oversight of liquidity risk management.

BNY Mellon seeks to maintain an adequate liquidity cushion in both normal and stressed environments and seeks to diversify funding sources by line of business, customer and market segment. Additionally, we seek to maintain liquidity ratios within approved limits and liquidity risk tolerance, maintain a liquid asset buffer that can be liquidated, financed and/or pledged as necessary, and control the levels and sources of wholesale funds.

Potential uses of liquidity include withdrawals of customer deposits and client drawdowns on unfunded credit or liquidity facilities. We actively monitor unfunded lending-related commitments, thereby reducing unanticipated funding requirements.

When monitoring liquidity, we evaluate multiple metrics in order to have sufficient liquidity for expected and unexpected events. Metrics include cash flow mismatches, asset maturities, debt spreads, peer ratios, liquid assets, unencumbered collateral, funding sources and balance sheet liquidity ratios. We monitor the LCR, as well as various internal liquidity limits as part of our standard analysis to monitor depositor and market funding concentration, liability maturity profile and potential liquidity draws due to off-balance sheet exposure.

We also perform liquidity stress tests ("LSTs") to evaluate whether the Company and certain domestic bank subsidiaries maintain sufficient liquidity resources under multiple stress scenarios. LSTs are based on scenarios that measure liquidity risks under unlikely but plausible conditions. We perform these tests under various time horizons ranging from one day to one year in a base case, as well as supplemental tests to determine whether the Company and certain domestic subsidiaries' liquidity is sufficient for severe market events and firm-specific events. The Parent's LST framework includes the Resolution Liquidity Adequacy and Positioning ("RLAP") test. The RLAP test is designed to ensure that the liquidity needs of certain key subsidiaries in a stress environment can be met by available resources held directly within the entity itself or at the Parent or IHC, as applicable. Our results indicate that we have sufficient RLAP liquidity.

Strategic Risk

Our strategy includes expanding our client base, increasing product offerings and better aligning certain business activities with market demand. Successful realization of our strategy requires that we provide expertise and insight through market-leading solutions that drive economies of scale while developing highly talented people and protecting our financial strength and stability. We understand and meet market and client expectations with suitable products and offerings that are financially viable and leverageable and that integrate into our business model.

Markets, and the manner in which our clients interact and transact within markets, can evolve quickly, such as when new or disruptive technologies are introduced. Failure to either anticipate or participate in transformational change within a given market could result in poor strategic positioning and potential negative financial impact.

Stress Testing

It is the policy of the Company to perform Enterprise-wide Stress Testing at regular intervals as part of its Internal Capital Adequacy Assessment Process ("ICAAP"). Additionally, the Company performs an analysis of capital adequacy in a stressed environment in its Enterprise-Wide Stress Test Framework, as required by the enhanced prudential standards issued pursuant to the Dodd-Frank Act.

Enterprise-Wide Stress Testing performs analyses across the Company's lines of business, products, geographic areas, and risk types incorporating the results from the different underlying models and projections given alternative stress test scenarios. It is an important component of assessing the adequacy of capital as well as identifying any high risk touch points in business activities. Furthermore, by integrating enterprise-wide stress testing into the Company's capital planning process, the results provide a forward-looking evaluation of the ability to complete planned capital actions in a more-adverse-than-anticipated economic environment.

Global compliance

Our global compliance function provides leadership, guidance and oversight to help our businesses identify applicable laws and regulations and implement effective measures to meet the specific requirements. Compliance takes a proactive approach by anticipating evolving regulatory standards and remaining aware of industry best practices, legislative initiatives, competitive issues, and public expectations and perceptions. The function uses its global reach to disseminate information about compliance-related matters throughout BNY Mellon. The Chief Compliance and Ethics Officer reports to the Chief Risk Officer, is a member of key committees of BNY Mellon and provides regular updates to the Risk Committee of the Board of Directors.

Internal audit

Internal Audit is an independent, objective assurance function that reports directly to the Audit Committee of the Company's Board of Directors. It assists the Company in accomplishing its objectives by bringing a systematic, disciplined, risk-based approach to evaluate and improve the effectiveness of the Company's risk management, control and governance processes. The scope of Internal Audit's work includes the review and evaluation of the adequacy, effectiveness and sustainability of risk management procedures, internal control systems, information systems and governance processes.

Evolving Regulatory Environment

BNY Mellon engages in banking, investment advisory and other financial activities in the U.S. and 34 other countries, and is subject to extensive regulation in the jurisdictions in which it operates. Global supervisory authorities generally are charged with ensuring the safety and soundness of financial institutions, protecting the interests of customers, including depositors in banking entities and investors in mutual funds and other pooled vehicles, safeguarding the integrity of securities and other financial markets and promoting systemic resiliency and financial stability in the relevant country. They are not, however, generally charged with protecting the interests of our shareholders or non-deposit creditors. This discussion outlines the material elements of selected laws and regulations applicable to us. The impact of certain other laws and regulations, such as tax law, is discussed elsewhere in the Annual Report. Changes in these standards, or in their application, cannot be predicted, but may have a material effect on our businesses and results of operations.

The financial services industry has been the subject of enhanced regulatory oversight in the past decade globally, and this trend may continue in the future. Our businesses have been subject to a significant number of global reform measures. In particular, the Dodd-Frank Act and its implementing regulations have significantly restructured the financial regulatory regime in the U.S. and enhanced supervision and prudential standards for large and internationally active BHCs like BNY Mellon. The implications of the Dodd-Frank Act for our businesses depend to a large extent on the manner in which implementing regulations continue to be established and interpreted by the primary U.S. financial regulatory agencies - the Federal Reserve, the Federal Deposit Insurance Corporation ("FDIC"), the Office of the Comptroller of the Currency ("OCC"), the Securities and Exchange Commission ("SEC") and the Commodity Futures Trading Commission ("CFTC"). The implications are also dependent on continuing changes in market practices and structures in response to the requirements of the Dodd-Frank Act and financial reforms in other jurisdictions. Certain aspects of the Dodd-Frank Act remain subject to further rulemaking, take effect over various transition periods, or contain other elements that make it difficult to precisely anticipate their full impact. In addition, other national and global non-U.S. reform measures adopted or under consideration by various policy makers that are being considered may materially adversely impact us.

Political developments may result in legislative and regulatory changes to key aspects of the Dodd-Frank Act, its implementing regulations, and related laws, including the recently enacted Economic Growth, Regulatory Relief, and Consumer Protection Act (the "Reform Act"), discussed later in this section. In addition, the UK referendum vote to withdraw from the European Union, discussed below, and the implementation of that decision have resulted in uncertainty as to the implementation, scope and timing of regulatory reforms affecting our UK and EU operations and contingency planning for our EU operating model.

United Kingdom's Withdrawal from the European Union ("Brexit")

The United Kingdom is scheduled to withdraw from the European Union on March 29, 2019. In anticipation of this event, BNY Mellon has assessed the impact of this withdrawal on our businesses. Our program currently assumes that the UK will leave the EU without an agreement in place, meaning that, among other things, UK firms will lose the benefit of transacting within the EU by relying on their existing "passport" on March 29, 2019.

BNY Mellon maintains a presence in the UK through the London branch of The Bank of New York Mellon, The Bank of New York Mellon (International) Limited and a number of its investment management subsidiaries, and in the remaining EU member states, through The Bank of New York Mellon SA/NV ("BNY Mellon SA/NV") and through certain of its investment management subsidiaries. We have undertaken, and continue to undertake, adjustments to the operations of BNY Mellon SA/NV so that it may provide a wider range of services to clients domiciled in the EU.

Enhanced Prudential Standards

The Federal Reserve has adopted rules ("Final SIFI Rules") to implement liquidity requirements, stress testing of capital and overall risk management requirements affecting U.S. SIFIs. BNY Mellon must comply with enhanced liquidity and overall risk management standards, which include maintenance of a buffer of highly liquid assets based on projected funding needs for 30 days. The liquidity buffer is in addition to the U.S. banking agencies' rules regarding the LCR, discussed below, and is described by the Federal Reserve as being "complementary" to those liquidity standards.

Financial Services Regulatory Reform Legislation

The Reform Act became law in May 2018. Provisions of the Reform Act that may impact BNY Mellon include the elimination of the Dodd-Frank company-run stress test requirements for BHCs, banks, and other financial companies with less than $250 billion in assets, including BNY Mellon, N.A.; the elimination of the "adverse scenario" as a required stress scenario, reducing the minimum number of supervisory scenarios from three (baseline, adverse, and severely adverse) to two (baseline and severely adverse); and its direction to U.S. banking agencies to exclude certain central bank deposit placements from the total leverage exposure (the SLR denominator) of custody banks, including BNY Mellon and The Bank of New York Mellon, to the extent of the value of client deposits at the custody bank that are linked to fiduciary, custody or safekeeping accounts. See "*Regulatory Stress-Testing Requirements*" and "*Leverage Ratios*" below.

Single Counterparty Credit Limits

On June 14, 2018, the Federal Reserve approved a final rule imposing single-counterparty credit limits ("SCCLs") on, among other organizations, domestic BHCs, including BNY Mellon, that are G-SIBs or that have $250 billion or more in total consolidated assets. The SCCLs apply to the credit exposure of a covered firm and all of its subsidiaries to a single counterparty and all of its affiliates and connected entities. The final rule introduces new definitions of "subsidiary" and "affiliate" under a financial consolidation standard that is consistent with accounting standards. The final rule will apply to BNY Mellon beginning Jan. 1, 2020.

The final rule establishes two primary credit exposure limits: (1) a covered domestic BHC may not have aggregate net credit exposure to any unaffiliated counterparty in excess of 25% of its tier 1 capital, and (2) a U.S. G-SIB is further prohibited from having aggregate net credit exposure in excess of 15% of its tier 1 capital to any "major counterparty" (defined as a G-SIB or a nonbank SIFI). The final rule adopts a risk-sensitive exposure measurement methodology for securities financing transactions ("SFTs") that permits the use of any method authorized under the Federal Reserve's capital rules, including internal models.

BNY Mellon is still evaluating the impact that the final rule will have, which will depend on various factors including, for example, the Federal Reserve's interpretation of the final rule, whether interpretive guidance is published and the impact of the final rule on other covered firms.

Capital Planning and Stress Testing

Payment of Dividends, Stock Repurchases and Other Capital Distributions

The Parent is a legal entity separate and distinct from its banks and other subsidiaries. Therefore, the Parent primarily relies on dividends, interest, distributions, and other payments from its subsidiaries, including extensions of credit from the IHC, to meet its obligations, including its obligations with respect to its securities, and to provide funds for share repurchases and payment of common and preferred dividends to its stockholders, to the extent declared by the Board of Directors. Various federal and state laws and regulations limit the amount of dividends that may be paid to the Parent by our bank subsidiaries without regulatory consent. If, in the opinion of the applicable federal regulatory agency, a depository institution under its jurisdiction is engaged in or is about to engage in an unsafe or unsound practice (which, depending on the financial condition of the bank, could include the payment of dividends), the regulator may require, after notice and hearing, that the bank cease and desist from such practice. The OCC, the Federal Reserve and the FDIC have indicated that the payment of dividends would constitute an unsafe and unsound practice if the payment would reduce a depository institution's capital to an inadequate level. Moreover, under the Federal Deposit Insurance Act, as amended (the "FDI Act"), an insured depository institution ("IDI") may not pay any dividends if the institution is undercapitalized or if the payment of the dividend would cause the institution to become undercapitalized. In addition, the federal bank regulatory agencies have issued policy statements which provide that FDIC-insured depository institutions and their holding companies should generally pay dividends only out of their current operating earnings.

In general, the amount of dividends that may be paid by our U.S. banking subsidiaries, including to the Parent, is limited to the lesser of the amounts calculated under a "recent earnings" test and an "undivided profits" test. Under the recent earnings test, a dividend may not be paid if the total of all dividends declared and paid by the entity in any calendar year exceeds the current year's net income combined with the retained net income of the two preceding years, unless the entity obtains prior regulatory approval. Under the undivided profits test, a dividend may not be paid in excess of the entity's "undivided profits" (generally, accumulated net profits that have not been paid out as dividends or transferred to surplus). The ability of our bank subsidiaries to pay dividends to the Parent may also be affected by the capital adequacy standards applicable to those subsidiaries, which include minimum requirements and buffers.

There are also limitations specific to the IHC's ability to make distributions or extend credit to the Parent. The IHC is not permitted to pay dividends to the Parent if certain key capital, liquidity and operational risk indicators are breached. Additionally, if our projected financial resources deteriorate so severely that resolution of the Parent becomes imminent, the committed lines of credit provided by the IHC to the Parent will automatically terminate, with all outstanding amounts becoming due.

BNY Mellon's capital distributions are subject to Federal Reserve oversight. The major component of that oversight is the Federal Reserve's Comprehensive Capital Analysis and Review ("CCAR"), implementing its capital plan rule. That rule requires BNY Mellon to submit an annual capital plan to the Federal Reserve. We are also required to collect and report certain related data on a quarterly basis to allow the Federal Reserve to monitor progress against the annual capital plans. Generally, BNY Mellon and other affected BHCs may pay dividends, repurchase stock and make other capital distributions only in accordance with a capital plan that has been reviewed by the Federal Reserve and as to which the Federal Reserve has not objected. The Federal Reserve may object to our capital plan for quantitative or qualitative reasons, including if the plan does not show that the covered BHC will meet, for each quarter throughout the nine-quarter planning horizon covered by the capital plan, all minimum regulatory capital ratios under applicable capital rules as in effect for that quarter on a *pro forma* basis under the base case and stressed scenarios (including a severely adverse scenario provided by the Federal Reserve). The capital plan rule also stipulates that we may not make a capital distribution unless after giving effect to the distribution it will meet all minimum regulatory capital ratios.

The purpose of CCAR is to ensure that these BHCs have robust, forward-looking capital planning processes that account for their unique risks and that permit continued operations during times of economic and financial stress. The 2018 CCAR instructions, consistent with prior Federal Reserve guidance, provide that capital plans contemplating dividend payout ratios exceeding 30% of projected after-tax net income will receive particularly close scrutiny. BNY Mellon's common stock dividend payout ratio was 26% for 2018. See "Capital" for information about our 2018 capital plan.

Regulatory Stress-Testing Requirements

In addition to the CCAR stress testing requirements, Federal Reserve regulations also include complementary Dodd-Frank Act Stress Tests ("DFAST"). The CCAR and DFAST requirements substantially overlap, and the Federal Reserve implements them at the BHC level on a coordinated basis. Under these DFAST regulations, we are required to undergo regulatory stress tests conducted by the Federal Reserve annually, and to conduct our own internal stress tests pursuant to regulatory requirements twice annually. In addition, The Bank of New York Mellon is required to conduct its own annual internal stress test (although the bank is permitted to combine certain reporting and disclosure of its stress test results with the results of BNY Mellon). The Reform Act revised the Dodd-Frank company-run stress test requirements for BHCs subject to enhanced prudential standards, such as BNY Mellon, to require periodic, rather than semi-annual, company-run stress tests. Proposed Federal Reserve regulations would require BNY Mellon and other affected BHCs to conduct an annual, but not a mid-cycle, company-run stress test effective beginning with the 2020 cycle. The Reform Act also eliminated the Dodd-Frank company-run stress test requirements for BHCs, banks, and other financial companies with less than $250 billion in assets, including BNY Mellon, N.A. Results from our annual company-run stress tests are reported to the appropriate regulators and published. The Federal Reserve published the results of its most recent annual 2018 DFAST stress-test on June 21, 2018. We published the results of our most recent company-run annual stress test on June 21, 2018, and the results of our company-run mid-year stress test on Oct. 12, 2018.

Capital Requirements - Generally

As a BHC, we are subject to U.S. capital rules, administered by the Federal Reserve. Our bank subsidiaries are subject to similar capital requirements administered by the Federal Reserve in the case of The Bank of New York Mellon and by the OCC in the case of our national bank subsidiaries, BNY Mellon, N.A. and The Bank of New York Mellon Trust Company, National Association. These requirements are intended to ensure that banking organizations have adequate capital given the risk levels of their assets and off-balance sheet exposures.

Notwithstanding the detailed U.S. capital rules, the federal banking agencies retain significant discretion to set higher capital requirements for categories of BHCs or banks or for an individual BHC or bank as situations warrant.

U.S. Capital Rules - Minimum Risk-Based Capital Ratios and Capital Buffers

Consistent with the terms of the Basel III framework and the Dodd-Frank Act, as amended by the Reform Act, the U.S. capital rules require Advanced Approaches banking organizations, such as BNY Mellon, to satisfy minimum risk-based capital ratios using both the U.S. capital rules' standardized approach risk-weightings framework (the "Standardized Approach") and the advanced approaches risk-weighting framework (the "Advanced Approaches"). See "Capital" for details on these requirements. In addition, these minimum ratios are supplemented by a capital conservation buffer required threshold that began being phased in on Jan. 1, 2016, in increments of 0.625% per year until it reached 2.5% on Jan. 1, 2019. The capital conservation buffer can only be satisfied with CET1 capital.

When systemic vulnerabilities are meaningfully above normal, the capital conservation buffer may be expanded up to an additional 2.5% through the imposition of a countercyclical capital buffer. For internationally active banks such as BNY Mellon, the countercyclical capital buffer required threshold is a weighted average of the countercyclical capital buffers deployed in each of the jurisdictions in which the bank has private sector credit exposures. The Federal Reserve, in consultation with the OCC and FDIC, has affirmed the current countercyclical capital buffer level for U.S. exposures of 0% and noted that any future modifications to the buffer would generally be subject to a 12-month phase-in period. Any countercyclical capital buffer required threshold arising from exposures outside the United States will also generally be subject to a 12-month phase-in period.

The U.S. capital rules' buffers are also supplemented by a risk-based capital surcharge on G-SIBs which requires G-SIBs to calculate their surcharges under two methods (referred to as "method 1" and "method 2") and use the higher of the two surcharges. The first method is based on the BCBS's framework and considers a G-SIB's size, interconnectedness, cross-jurisdictional activity, substitutability and complexity. The second method uses similar inputs, but is calibrated to result in significantly higher surcharges and replaces substitutability with a measure of reliance on short-term wholesale funding. Consistent with the phase-in of the capital conservation buffer, the G-SIB capital surcharge began to be phased-in beginning on Jan. 1, 2016 and became fully effective on Jan. 1, 2019. The G-SIB surcharge applicable to BNY Mellon is 1.5% on a fully phased-in basis.

U.S. Capital Rules - Deductions from and Adjustments to Capital Elements

The U.S. capital rules provide for a number of deductions from and adjustments to CET1 capital. These include, for example, providing that unrealized gains and losses on all available-for-sale debt securities may not be filtered out for regulatory capital purposes, and the requirement that mortgage servicing rights, deferred tax assets dependent upon future taxable income and significant investments in non-consolidated financial entities be deducted from CET1 to the extent that any one such category exceeds 10% of CET1 or all such categories in the aggregate exceed 15% of CET1.

U.S. Capital Rules - Advanced Approaches Risk-Based Capital Rules

Under the U.S. capital rules' Advanced Approaches framework, credit risk risk-weightings are generally based on risk-sensitive approaches that largely rely on the use of internal credit models and parameters, whereas under the Standardized Approach credit risk risk-weightings are generally based on supervisory risk-weightings which vary primarily by counterparty type and asset class. BNY Mellon is required to comply with Advanced Approaches reporting and public disclosures. Under the U.S. capital rules, this means, among other things, for purposes of determining whether we meet minimum risk-based capital requirements, our CET1 ratio, Tier 1 capital ratio, and total capital ratio is the lower of that calculated under the Standardized Approach and under the Advanced Approaches framework.

U.S. Capital Rules - Generally Applicable Risk-Based Capital Rules: Standardized Approach

The agencies' generally applicable risk-based capital rules (i.e., the Standardized Approach) calculate risk-weighted assets in the denominator of capital ratios using a broad array of risk weighting categories that are intended to be risk sensitive. The risk-weights for the Standardized Approach generally range from 0% to 1,250%. Higher risk-weights under the Standardized Approach apply to a variety of exposures, including certain securitization exposures, equity exposures, claims on securities firms and exposures to counterparties on OTC derivatives.

Concerning securities finance transactions, including transactions in which we serve as agent and provide securities replacement indemnification to a securities lender, the U.S. capital rules do not permit a banking organization to use a simple VaR approach to calculate exposure amounts for repo-style transactions or to use internal models to calculate the exposure amount for the counterparty credit exposure for repo-style transactions under the Standardized Approach (although these methodologies are allowed in the Advanced Approaches). Under the Standardized Approach, a banking organization may use a collateral haircut approach to recognize the credit risk mitigation benefits of financial collateral that secures a repo-style transaction, including an agented securities lending transaction, among other transactions. To apply the collateral haircut approach, a banking organization must determine the exposure amount and the relevant risk weight for the counterparty and collateral posted.

Federal Reserve Proposed Changes to CCAR and its Capital Rules

On April 10, 2018, the Federal Reserve issued a proposed rule that would integrate its regulatory capital, capital planning, and stress test rules, as well as the CCAR process. The proposal would introduce a stress capital buffer ("SCB") that would be part of the firm's quarterly capital requirements. The proposal would replace the current static 2.5% capital conservation buffer with an SCB requirement for Standardized Approach capital ratios that would, among other things, be tied to the projected decrease in a firm's common equity Tier 1 capital ratio in the Federal Reserve's supervisory severely adverse scenario. The proposed rule would introduce a new requirement that firms reduce their planned capital distributions if those distributions would not be consistent with the applicable buffer constraints based on the firms' own baseline scenario projections. In addition, the proposed rule would introduce a stress leverage buffer ("SLB") that is analogous to the SCB and applies to firms' Tier 1 leverage ratios. Under the proposal, a firm's first SCB and SLB would become effective on Oct. 1, 2019.

Leverage Ratios

The U.S. capital rules require a minimum 4% leverage ratio for all banking organizations, as well as a 3% Basel III-based SLR for Advanced Approaches banking organizations, including BNY Mellon, which became effective Jan. 1, 2018. Unlike the Tier 1 leverage ratio, the SLR includes certain off-balance sheet exposures in the denominator, including the potential future credit exposure of derivative contracts and 10% of the notional amount of unconditionally cancelable commitments.

The Reform Act directed the U.S. banking agencies to exclude certain central bank deposit placements from the total leverage exposure (the SLR denominator) of custody banks, including BNY Mellon and The Bank of New York Mellon. The U.S. banking agencies have not yet proposed rules implementing this provision. See "*Federal Reserve and OCC Proposed Amendments to the Enhanced Supplementary Leverage Ratio Requirements for U.S. G-SIBs*" below for a discussion of additional proposed amendments to applicable SLR requirements.

The U.S. G-SIBs (including BNY Mellon) are subject to an enhanced SLR, which requires us to maintain an SLR of greater than 5% (composed of the current minimum requirement of 3% plus a greater than 2% buffer) and requires bank subsidiaries of those BHCs to maintain at least a 6% SLR in order to qualify as "well capitalized" under the prompt corrective action regulations discussed below. The final enhanced SLR rule for U.S. G-SIBs, like the SLR more generally applicable to all Advanced Approaches banking organizations, became effective on Jan. 1, 2018. At Dec. 31, 2018, our SLR was 6.0% and the SLR for our primary banking subsidiary, The Bank of New York Mellon, was 6.8%.

Federal Reserve and OCC Proposed Amendments to the Enhanced Supplementary Leverage Ratio Requirements for U.S. G-SIBs

On April 11, 2018, the Federal Reserve and the OCC issued a joint notice of proposed rule-making that would recalibrate the enhanced SLR standards that apply to U.S. G-SIBs and certain of their IDI subsidiaries. The proposed rule would replace the 2% SLR buffer that currently applies to all U.S. G-SIBs with a buffer equal to 50% of the firm's risk-based G-SIB surcharge.

For IDI subsidiaries of U.S. G-SIBs regulated by the Federal Reserve or the OCC, the proposal would replace the current 6% SLR threshold requirement for those institutions to be considered "well capitalized" under the agencies' prompt corrective action framework with an SLR of at least 3% plus 50% of the G-SIB surcharge applicable to their top-tier holding companies. The proposed rule would also make corresponding changes to the total loss-absorbing capacity ("TLAC") SLR buffer and long-term debt requirements for U.S. G-SIBs, as well as technical changes to the Federal Reserve's TLAC rule. The Federal Reserve and OCC have not yet issued a final rule.

These proposed amendments are separate from the Reform Act's change to the SLR denominator of custody banks discussed above under the heading "*Leverage Ratios.*"

BCBS Revisions to Components of Basel III

In December 2017 the BCBS released revisions to Basel III intended to reduce variability of RWA and improve the comparability of banks' risk-based capital ratios. Among other measures, the final revisions: (1) establish a revised Standardized Approach for credit risk that enhances the Standardized Approach's granularity and risk sensitivity; (2) adjust the internal ratings-based approaches for credit risk by removing the use of the advanced internal ratings-based approach for certain asset classes and establishing input floors for the calculation of RWA; (3) replace the advanced measurement approach for operational risk with a revised Standardized Approach for operational risk based on measures of a bank's income and historical losses; (4) revise the leverage ratio exposure measure, establish a "leverage ratio buffer" for G-SIBs, set at 50% of a G-SIB's risk-based capital surcharge, and allow national discretion to exclude central bank placements in limited circumstances (see "*Federal Reserve and OCC Proposed Amendments to the Enhanced Supplementary Leverage Ratio Requirements for U.S. G-SIBs*" above); and (5) introduce a new 72.5% output floor based on the Standardized Approach. The revised standards are effective Jan. 1, 2022, with the output floor phasing in from 2022 to 2027.

In January 2019, the BCBS released revised minimum capital requirements for market risk. The revised standards also come into effect Jan. 1, 2022. There is continuing uncertainty regarding whether and how the U.S. regulators will implement these revised Basel standards.

Standardized Approach for Measuring Counterparty Credit Risk Exposures

On Oct. 30, 2018, the Federal Reserve, FDIC and OCC jointly issued a Notice of Proposed Rulemaking ("NPR"), which would amend the U.S. capital rules to implement a new approach for calculating the exposure amount for derivative contracts, which is called the Standardized Approach for Counterparty Credit Risk ("SA-CCR"). The NPR also incorporates SA-CCR into the determination of exposure amount of derivatives for total leverage exposure under the SLR and the cleared transaction framework under the U.S. capital rules. Further, the NPR would make technical amendments to the capital rule with respect to cleared transactions. The effective date of the proposed SA-CCR rule for the Advanced Approaches Banks would be July 1, 2020. BNY Mellon is evaluating what effect such amendments to the U.S. capital rules, if implemented, would have on our financial condition or results of operations.

Total Loss-Absorbing Capacity

On Dec. 15, 2016, the Federal Reserve issued a final rule (the "TLAC Rule") establishing external TLAC and related requirements for U.S. G-SIBs, including BNY Mellon, at the top-tier holding company level. The rule became effective on Jan. 1, 2019, and at Dec. 31, 2018, we had sufficient TLAC to be compliant with the requirement.

Under the TLAC Rule, U.S. G-SIBs are required to maintain a minimum eligible external TLAC equal to the greater of (a) 18% of RWAs plus a buffer (to be met using only CET1) equal to the sum of 2.5% of RWAs, the G-SIB surcharge calculated under method 1 and any applicable countercyclical buffer; and (b) 7.5% of their total leverage exposure (the denominator of the SLR) plus a buffer (to be met using only Tier 1 Capital) equal to 2%.

U.S. G-SIBs are also required to maintain minimum external eligible long-term debt ("LTD") equal to the greater of (a) 6% of RWAs plus the G-SIB surcharge (calculated using the greater of method 1 and method 2), and (b) 4.5% of total leverage exposure. In order to be deemed eligible LTD, debt instruments must, among other requirements, be unsecured, not be structured notes, be governed by U.S. law, and have a maturity of at least one year from the date of issuance. In addition, the TLAC Rule requires that LTD issued on or after Dec. 31, 2016 (i) not have acceleration rights, other than in the event of non-payment or the bankruptcy or insolvency of the issuer and (ii) be governed by U.S. law. However, debt issued by a U.S. G-SIB prior to Dec. 31, 2016 is permanently grandfathered to the extent these securities would be ineligible only due to containing impermissible acceleration rights or being governed by foreign law.

Further, the top-tier holding companies of U.S. G-SIBs are not permitted to issue certain guarantees of subsidiary liabilities, incur liabilities guaranteed by subsidiaries, issue short-term debt to third parties, or enter into derivatives and certain other financial contracts with external counterparties. Certain liabilities are capped at 5% of the value of the U.S. G-SIB's eligible external TLAC instruments. The Federal Reserve considered requiring internal TLAC at domestic subsidiaries of U.S. G-SIBs, but has not proposed rules regarding these instruments.

Foreign jurisdictions may impose internal TLAC requirements on the foreign subsidiaries of U.S. G-SIBs. The draft Capital Requirements Regulation II in the European Union would require EU material subsidiaries of non-EU G-SIBs (including BNY Mellon) to maintain a minimum level of internal loss absorbing capacity, broadly in line with the Financial Stability Board ("FSB") TLAC term sheet, promulgated by the Financial Stability Board in November 2015. The Bank of New York Mellon SA/NV is likely to be considered an EU material subsidiary for purposes of this regulation.

Prompt Corrective Action

The FDI Act, as amended by the Federal Deposit Insurance Corporation Improvement Act of 1991 ("FDICIA"), requires the federal banking agencies to take "prompt corrective action" in respect of depository institutions that do not meet specified capital requirements. FDICIA establishes five capital categories for FDIC-insured banks: "well capitalized," "adequately capitalized," "undercapitalized," "significantly undercapitalized," and "critically undercapitalized." The FDI Act imposes progressively more restrictive constraints on operations, management and capital distributions the less capital the institution holds. While these regulations apply only to banks, such as The Bank of New York Mellon and BNY Mellon, N.A., the Federal Reserve is authorized to take appropriate action against the parent bank holding company, such as the Parent, based on the under-capitalized status of any banking subsidiary. In certain circumstances, the Parent would be required to guarantee the performance of the capital restoration plan if one of our banking subsidiaries were undercapitalized.

The federal banking agencies' prompt corrective action framework ("PCA rules") contain "well capitalized" thresholds for IDIs. Under these rules, an IDI is deemed to be "well capitalized" if it has capital ratios as detailed in the "Capital" disclosure.

The PCA rules require an Advanced Approaches banking organization to maintain an SLR of at least 3% to qualify for the "adequately capitalized" status. In addition, the U.S. federal banking agencies' revisions to the enhanced SLR establish a SLR "well capitalized" threshold of 6% for certain IDIs of U.S. G-SIBs, including The Bank of New York Mellon and BNY Mellon N.A.

Current Expected Credit Losses Accounting Standard

In June 2016, the Financial Accounting Standards Board issued an update to the accounting standards for credit losses that included the "Current Expected Credit Losses" ("CECL") methodology, which replaces the existing incurred loss methodology for certain financial assets. Upon adopting CECL, a company will record a one-time adjustment to its credit loss allowances as of the beginning of its fiscal year of adoption equal to the difference between the amounts of its credit loss allowances under the incurred loss methodology and CECL.

On Dec. 21, 2018 the Federal Reserve, the OCC and the FDIC approved a final rule modifying their regulatory capital rules and providing an option to phase in over a period of three years the regulatory capital effects of adopting the CECL methodology. During the phase in, the agencies will continue to monitor the impact of CECL adoption. The final rule will take effect April 1, 2019. The Federal Reserve also indicated that it would maintain the current framework for calculating credit loss allowances in CCAR, and would not incorporate CECL into supervisory stress testing, through the 2021 stress test cycle.

Liquidity Standards - Basel III and U.S. Rules and Proposals

BNY Mellon is subject to the Final U.S. LCR Rule, which is designed to ensure that BNY Mellon and certain domestic bank subsidiaries maintain an adequate level of unencumbered HQLA equal to their expected net cash outflow for a 30-day time horizon under an acute liquidity stress scenario. As of Dec. 31, 2018, the Parent and its domestic bank subsidiaries were in compliance with applicable LCR requirements.

The BCBS issued the final NSFR document in October 2014 which contemplates an additional liquidity measure, referred to as NSFR, which is designed to promote more medium- and long-term funding of the assets and activities of banking entities over a one-year time horizon. In May 2016, the Federal Reserve, FDIC and OCC proposed an NSFR rule that would implement a quantitative long-term liquidity requirement applicable to large and internationally active banking organizations, including BNY Mellon. The proposed NSFR rule would implement a test similar to the Basel III framework's test for medium- and long-term funding of the assets and activities of banking entities over a one-year time horizon. Under the proposed rule, BNY Mellon's NSFR would be expressed as a ratio of its available stable funding to its required stable funding amount, and BNY Mellon would be required to maintain an NSFR of 1.0. BNY Mellon continues to evaluate the potential effects of this proposal on its operations. The proposed NSFR rule would have been effective Jan. 1, 2018 had it been finalized as proposed; however, final rules have not been issued.

Separately, as noted above, the Final SIFI Rules address liquidity requirements for BHCs with $100 billion or more in total assets, including BNY Mellon. These enhanced liquidity requirements include an independent review of liquidity risk management; establishment of cash flow projections; a contingency funding plan, and liquidity risk limits; liquidity stress testing under multiple stress scenarios and time horizons tailored to the specific products and profile of the company; and maintenance of a liquidity buffer of unencumbered highly liquid assets sufficient to meet projected net cash outflows over 30 days under a range of stress scenarios.

Volcker Rule

The Dodd-Frank Act imposed broad prohibitions and restrictions on proprietary trading and investments in or sponsorship of hedge funds and private equity funds by banking organizations and their affiliates, commonly referred to as the "Volcker Rule."

The Volcker Rule, subject to certain exceptions, prohibits "banking entities," including BNY Mellon, from engaging in proprietary trading and limits our sponsorship of, and investments in, private equity and hedge funds ("covered funds"), including our ability to own or provide seed capital to covered funds. In addition, the Volcker Rule restricts us from engaging in certain transactions with covered funds (including, without limitation, certain U.S. funds for which BNY Mellon acts as both sponsor/manager and custodian).

The restrictions concerning proprietary trading do not contain a broad exemption for asset-liability management functions, but contain more limited exceptions for, among other things, bona fide liquidity risk management and risk-mitigating hedging activities, as well as certain classes of exempted instruments, including government securities. Ownership interests in covered funds that banking organizations organize and offer are generally limited to 3% of the total number or value of the outstanding ownership interests of any individual fund at any time more than one year after the date of its establishment, and with respect to the aggregate value of all such ownership interests in covered funds (when combined with ownership interests in covered funds held under the Volcker Rule's ABS issuer exemption and underwriting and market-making exemption), 3% of the banking organization's Tier 1 capital. Moreover, a banking entity relying on the Volcker Rule's exemption for sponsoring covered funds must deduct from its Tier 1 capital the value of related ownership interests.

The final Volcker Rule regulations also require us to develop and maintain an extensive compliance program, subject to CEO attestation, addressing proprietary trading and covered fund activities.

In June 2018, the Federal Reserve, OCC, FDIC, CFTC and SEC approved a proposal to modify the current regulations implementing the Volcker Rule. The proposal would establish three categories of institutions based on trading activity, and the scope and scale of compliance requirements would vary based on such categories.

In addition, the proposal would revise the definitions applicable to the prohibition on proprietary trading so that all financial instruments accounted for at fair value on a recurring basis would be subject to the prohibition, unless an exception or exemption applies. The proposal would also revise certain of the exceptions and exemptions. It remains uncertain whether or when the proposal will be finalized.

Derivatives

Title VII of the Dodd-Frank Act imposes a comprehensive regulatory structure on the OTC derivatives markets in which BNY Mellon operates, including requirements relating to the business conduct of dealers, trade reporting, margin and recordkeeping. Title VII also requires persons acting as swap dealers, including The Bank of New York Mellon, to register with the CFTC and become subject to the CFTC's supervisory, examination and enforcement powers.

In addition, because BNY Mellon is subject to supervision by the Federal Reserve, we must comply with the U.S. prudential margin rules with respect to its OTC swap transactions. The variation margin requirements of these rules already apply, and the initial margin requirements are expected to become applicable in September 2019. Furthermore, various BNY Mellon subsidiaries are also subject to OTC derivatives regulation by local authorities in Europe and Asia.

EU Money Market Fund Reforms

The European Union's Money Market Funds Regulation ("MMFR") has applied since July 21, 2018 for new MMFs and Jan. 21, 2019 for existing MMFs. MMFR is a significant change for the money market fund sector in the EU and aims to ensure that MMFs can better withstand redemption pressure in stressed market conditions by enhancing their liquidity profile and stability. In particular, constant net asset value ("CNAV") MMFs as they currently exist will need to convert into variable net asset value MMFs, low volatility net asset value MMFs or public debt CNAV MMFs. Other significant restrictions would apply, such as (i) the need for MMFs to apply liquidity fees and redemption gates and diversify asset portfolios, (ii) extensive valuation and reporting requirements and (iii) prohibitions on external support.

SEC Rules on Mutual Funds

On Oct. 13, 2016, the SEC adopted regulations that impose new requirements on mutual funds, exchange-traded funds and other registered investment companies. The new rules will require mutual funds (other than money market funds) to provide portfolio-wide and position-level holdings data to the SEC on a monthly basis. This data would include the pricing of portfolio securities, information regarding repurchase and securities lending activities, and the terms of derivatives contracts. Information contained in reports for the last month of each fund's fiscal quarter would be made available to the public within 60 days of the end of the relevant quarter.

The rules also impose liquidity risk management requirements that are intended to reduce the risk that funds will not be able to meet shareholder redemptions and to minimize the impact of redemptions on remaining shareholders. Each fund will be required to establish a liquidity risk management program; classify the investments in its portfolio into one of four liquidity categories; maintain a highly liquid investment minimum; and limit illiquid investments to 15% of net assets. The rules also permit funds to use swing pricing in certain circumstances although the SEC has delayed the effective date of these swing pricing provisions. The compliance dates for the reporting requirements depend on the applicable reporting form. Most funds were required to comply with the liquidity risk management requirements by Dec. 1, 2018. BNY Mellon is still evaluating the cost of compliance and the impact of the new regulations on its activities.

Recovery and Resolution

As required by the Dodd-Frank Act, the Federal Reserve and FDIC have jointly issued a final rule requiring large financial institutions, such as BNY Mellon, to submit periodically to the Federal Reserve and the FDIC a plan - referred to as the 165(d) resolution plan - for its rapid and orderly resolution in the event of material financial distress or failure. In addition, the FDIC requires certain large IDIs, such as The Bank of New York Mellon, to submit periodically to the FDIC a plan for resolution in the event of the institution's failure. The public portions of our resolution plans are available on the Federal Reserve's and FDIC's websites.

If the Federal Reserve and FDIC jointly determine that our future submissions are not credible and the covered BHC fails to address the deficiencies in a timely manner, the FDIC and the Federal Reserve may jointly impose more stringent capital, leverage or liquidity requirements or restrictions on our growth, activities or operations. If we continue to fail to adequately remedy any deficiencies, we could be required to divest assets or operations that the regulators determine necessary to facilitate our orderly resolution.

In connection with our single point of entry resolution strategy, we have established the IHC to facilitate the provision of capital and liquidity resources to certain key subsidiaries in the event of material financial distress or failure. In 2017, we entered into a binding support agreement that requires the IHC to provide that support. The support agreement required the Parent to transfer its intercompany loans and most of its cash to the IHC, and requires the Parent to continue to transfer cash and other liquid financial assets to the IHC.

BNY Mellon and the other U.S. G-SIBs are subject to heightened supervisory expectations for recovery and resolution preparedness under Federal Reserve rules and guidance. These expectations relate to capabilities critical to operational resilience and contingency planning, including: effective processes for managing, identifying and valuing collateral; a comprehensive understanding of obligations and exposures associated with payment, clearing and settlement activities; the ability to analyze liquidity and funding sources, uses and risks; demonstrated management information systems capabilities on a legal entity basis; and robust arrangements for the continued provision of shared and outsourced services. The Federal Reserve incorporates reviews of these key capabilities as part of its ongoing supervision of BNY Mellon.

The European Union Bank Recovery and Resolution Directive ("BRRD") applies to various subsidiaries and branches of BNY Mellon. BRRD provides for recovery and resolution planning and a set of harmonized powers to resolve or implement recovery of relevant institutions, including branches of non-European Economic Area ("EEA") banks operating within the EEA. BRRD includes rules regarding the preparation of recovery and resolution plans, giving relevant EEA regulators powers to impose requirements on an institution before resolution actions become necessary; a set of resolution tools and powers to facilitate the resolution of failing entities, such as the power to "bail-in" the debt of an institution (including certain deposit obligations); and the power to require a firm to change its structure to remove impediments to resolvability. Certain BRRD-related requirements are currently subject to review under the EU Banking Reform Package, referred to below, and the European Commission is expected to commence a broader review of BRRD during 2019.

BRRD includes a minimum requirement for own funds, defined as regulatory capital, and eligible liabilities ("MREL") to ensure that institutions maintain enough capital capable of being written down and/or bailed-in. MREL will be set on a case-by-case basis for each institution subject to BRRD. MREL is the EU equivalent of TLAC, and is generally aligned with the FSB's TLAC proposals. In contrast with TLAC, MREL will apply to all EU-domiciled credit institutions and certain other firms subject to BRRD (not only G-SIBs).

In addition, BRRD requires such institutions and firms to prepare recovery plans or group recovery plans. Under BRRD, resolution authorities (rather than the institutions themselves) are responsible for drawing up resolution plans.

Final Rule on Resolution Stays for Qualified Financial Contracts

In 2017, the Federal Reserve, OCC and FDIC adopted final rules requiring U.S. G-SIBs (and their subsidiaries and controlled entities) and the U.S. operations of foreign G-SIBs to amend their covered qualified financial contracts (“QFCs”), thereby facilitating the application of U.S. special resolution regimes as necessary. QFCs generally include derivatives, repurchase agreements and securities lending arrangements, among others. The final rule includes two key requirements. First, the final rule requires that covered QFCs of such G-SIBs explicitly provide for the suspension or stay of transfer restriction rights with respect to such QFCs, allowing any resolution transfers under U.S. special resolution regimes to apply to such QFCs. Second, the final rule requires that covered QFCs of these G-SIBs be amended to stay the exercise of default or cross-default rights by relevant QFC counterparties. This stay would last for a period of up to 48 hours.

The final rule allows these G-SIBs to comply with the rule by amending covered QFCs (with the consent of relevant counterparties) using the International Swaps and Derivatives Association (“ISDA”) 2018 U.S. Resolution Stay Protocol (the “Protocol”), ISDA 2015 Universal Stay Protocol or by executing appropriate bilateral amendments to the covered QFCs. BNY Mellon entities which have been confirmed to engage in covered QFC activities have adhered to the Protocol in compliance with the final rule’s first phase implementation date of Jan. 1, 2019. BNY Mellon is evaluating the impact of the final rule on its activities, in particular regarding non G-SIB counterparty compliance by the second phase implementation date of July 1, 2019.

Cybersecurity Regulation

The New York State Department of Financial Services (“NYSDFS”) requires financial institutions regulated by NYSDFS, including BNY Mellon, to establish a cybersecurity program, adopt a written cybersecurity policy, designate a chief information security officer, and have policies and procedures in place to ensure the security of information systems and non-public information accessible to, or held by, third parties. The NYSDFS rule also includes a variety of other requirements to protect the confidentiality, integrity and availability of information systems, as well as the annual delivery of a certificate of compliance.

Insolvency of an Insured Depository Institution or a Bank Holding Company; Orderly Liquidation Authority

If the FDIC is appointed as conservator or receiver for an IDI such as The Bank of New York Mellon or BNY Mellon National Association (“BNY Mellon, N.A.”), upon its insolvency or in certain other circumstances, the FDIC has the power to:

- Transfer any of the depository institution’s assets and liabilities to a new obligor, including a newly formed “bridge” bank without the approval of the depository institution’s creditors;

- Enforce the terms of the depository institution’s contracts pursuant to their terms without regard to any provisions triggered by the appointment of the FDIC in that capacity; or

- Repudiate or disaffirm any contract or lease to which the depository institution is a party, the performance of which is determined by the FDIC to be burdensome and the disaffirmance or repudiation of which is determined by the FDIC to promote the orderly administration of the depository institution.

In addition, under federal law, the claims of holders of domestic deposit liabilities and certain claims for administrative expenses against an IDI would be afforded a priority over other general unsecured claims against such an institution, including claims of debt holders of the institution, in the “liquidation or other resolution” of such an institution by any receiver. As a result, whether or not the FDIC ever sought to repudiate any debt obligations of The Bank of New York Mellon or BNY Mellon, N.A., the debt holders would be treated differently from, and could receive, if anything, substantially less than, the depositors of the bank.

The Dodd-Frank Act created a new resolution regime (known as the “orderly liquidation authority”) for systemically important financial companies, including BHCs and their affiliates. Under the orderly liquidation authority, the FDIC may be appointed as receiver for the systemically important institution, and its failed nonbank subsidiaries, for purposes of liquidating the entity if, among other conditions, it is determined at the time of the institution's failure that it is in default or in danger of default and the failure poses a risk to the stability of the U.S. financial system.

If the FDIC is appointed as receiver under the orderly liquidation authority, then the powers of the receiver, and the rights and obligations of creditors and other parties who have dealt with the institution, would be determined under the Dodd-Frank Act's orderly liquidation authority provisions, and not under the insolvency law that would otherwise apply. The powers of the receiver under the orderly liquidation authority were based on the powers of the FDIC as receiver for depository institutions under the FDI Act. However, the provisions governing the rights of creditors under the orderly liquidation authority were modified in certain respects to reduce disparities with the treatment of creditors' claims under the U.S. Bankruptcy Code as compared to the treatment of those claims under the new authority. Nonetheless, substantial differences in the rights of creditors exist as between these two regimes, including the right of the FDIC to disregard the strict priority of creditor claims in some circumstances, the use of an administrative claims procedure to determine creditors' claims (as opposed to the judicial procedure utilized in bankruptcy proceedings), and the right of the FDIC to transfer assets or liabilities of the institution to a third party or a "bridge" entity.

Depositor Preference

Under U.S. federal law, claims of a receiver of an IDI for administrative expenses and claims of holders of U.S. deposit liabilities (including foreign deposits that are payable in the U.S. as well as in a foreign branch of the depository institution) are afforded priority over claims of other unsecured creditors of the institution, including depositors in non-U.S. branches. As a result, such depositors could receive, if anything, substantially less than the depositors in U.S. offices of the depository institution.

Transactions with Affiliates

Transactions between BNY Mellon's banking subsidiaries, on the one hand, and the Parent and its nonbank subsidiaries and affiliates, on the other, are subject to certain restrictions, limitations and requirements, which include limits on the types and amounts of transactions (including extensions of credit and asset purchases by our banking subsidiaries) that may take place and generally require those transactions to be on arm's-length terms. In general, extensions of credit by a BNY Mellon banking subsidiary to any nonbank affiliate, including the Parent, must be secured by designated amounts of specified collateral and are limited in the aggregate to 10% of the relevant bank's capital and surplus for transactions with a single affiliate and to 20% of the relevant bank's capital and surplus for transactions with all affiliates. There are also limitations on affiliate credit exposures arising from derivative transactions and securities lending and borrowing transactions.

Deposit Insurance

Our U.S. banking subsidiaries, including The Bank of New York Mellon and BNY Mellon, N.A., accept deposits, and those deposits have the benefit of FDIC insurance up to the applicable limit. The current limit for FDIC insurance for deposit accounts is $250,000 per depositor at each insured bank. Under the FDI Act, insurance of deposits may be terminated by the FDIC upon a finding that the IDI has engaged in unsafe and unsound practices, is in an unsafe or unsound condition to continue operations or has violated any applicable law, regulation, rule, order or condition imposed by a bank's federal regulatory agency.

The FDIC's Deposit Insurance Fund (the "DIF") is funded by assessments on IDIs. The FDIC assesses DIF premiums based on a bank's average consolidated total assets, less the average tangible equity of the IDI during the assessment period. For larger institutions, such as The Bank of New York Mellon and BNY Mellon, N.A., assessments are determined based on CAMELS ratings and forward-looking financial measures to calculate the assessment rate, which is subject to adjustments by the FDIC, and the assessment base.

Under the FDIC's regulations, a custody bank, including The Bank of New York Mellon and BNY Mellon, N.A., may deduct from its assessment base 100% of cash and balances due from depository institutions, securities, federal funds sold, and securities purchased under agreement to resell with a Standardized Approach risk-weight of 0% and may deduct 50% of such asset types with a Standardized Approach risk-weight of greater than 0% and up to and including 20%. This assessment base deduction may not exceed the average value of deposits that are classified as transaction accounts and are identified by the bank as being directly linked to a fiduciary or custodial and safekeeping account.

The Dodd-Frank Act requires the DIF reserve ratio to reach a minimum of 1.35% by Sept. 30, 2020, and authorizes the FDIC to implement special assessments on IDIs to reach the required ratio. On Sept. 30, 2018, the FDIC announced that the DIF reserve ratio had reached 1.36%.

Source of Strength and Liability of Commonly Controlled Depository Institutions

BHCs are required by law to act as a source of strength to their bank subsidiaries. Such support may be required by the Federal Reserve at times when we might otherwise determine not to provide it. In addition, any loans by BNY Mellon to its bank subsidiaries would be subordinate in right of payment to depositors and to certain other indebtedness of its banks. In the event of a BHC's bankruptcy, any commitment by the BHC to a federal bank regulator to maintain the capital of a subsidiary bank will be assumed by the bankruptcy trustee and entitled to a priority of payment. In addition, in certain circumstances, BNY Mellon's IDI subsidiaries could be held liable for losses incurred by another BNY Mellon IDI subsidiary. In the event of impairment of the capital stock of one of BNY Mellon's national bank subsidiaries or The Bank of New York Mellon, BNY Mellon, as the banks' stockholder, could be required to pay such deficiency.

Incentive Compensation Arrangements Proposal

Section 956 of the Dodd-Frank Act requires federal regulators to prescribe regulations or guidelines regarding incentive-based compensation practices at certain financial institutions, including BNY Mellon. In April 2016, a joint proposed rule was released, replacing a previous 2011 proposal, which each of six agencies must separately approve. The timeframe for final implementation is currently unknown.

Anti-Money Laundering and the USA PATRIOT Act

A major focus of governmental policy on financial institutions has been aimed at combating money laundering and terrorist financing. The USA PATRIOT Act of 2001 contains numerous anti-money laundering requirements for financial institutions that are applicable to BNY Mellon's bank, broker-dealer and investment adviser subsidiaries and mutual funds and private investment companies advised or sponsored by our subsidiaries. Those regulations impose obligations on financial institutions to maintain a broad anti-money laundering program that includes internal controls, independent testing, compliance management personnel, training, and customer due diligence processes, as well as appropriate policies, procedures and controls to detect, prevent and report money laundering, terrorist financing and other suspicious activity, and to verify the identity of their customers. Certain of those regulations impose specific due diligence requirements on financial institutions that maintain correspondent or private banking relationships with non-U.S. financial institutions or persons.

Financial Crimes Enforcement Network ("FinCEN") Final Customer Due Diligence Rule

Effective July 11, 2016, FinCEN issued final rules under the Bank Secrecy Act to clarify and strengthen customer due diligence ("CDD") requirements, including a new requirement to identify and verify the identity of beneficial owners of legal entity customers. Covered financial institutions, including The Bank of New York Mellon and BNY Mellon, N.A. must comply with these rules. The rule reaffirms four pillars of an effective anti-money laundering ("AML") program (development of internal policies, procedures and related controls; designation of a compliance officer; a thorough and ongoing training program; and independent review for compliance) and adds a fifth: CDD, wherein a covered financial institution is required to implement and maintain risk-based procedures for conducting CDD that include the identification and verification of any beneficial owner(s) of each legal entity customer at the time a new account is opened on or after May 11, 2018.

New York State Department of Financial Services Anti-Money Laundering and Anti-Terrorism Regulations

Effective Jan. 1, 2017, the NYSDFS issued regulations requiring regulated institutions, including The Bank of New York Mellon, to maintain a transaction monitoring program to monitor transactions for potential Bank Secrecy Act ("BSA") and AML violations and suspicious activity reporting, and a watch list filtering program to interdict transactions prohibited by applicable sanctions programs.

The final regulations require a regulated institution to maintain programs to monitor and filter transactions for potential BSA and AML violations and prevent transactions with sanctioned entities. The final regulation requires regulated institutions annually to submit a Board resolution or senior officer compliance finding confirming steps taken to ascertain compliance with the regulation.

Privacy and Data Protection

The privacy provisions of the Gramm-Leach-Bliley Act generally prohibit financial institutions, including BNY Mellon, from disclosing nonpublic personal financial information of consumer customers to third parties for certain purposes (primarily marketing) unless customers have the opportunity to "opt out" of the disclosure. The Fair Credit Reporting Act restricts information sharing among affiliates for marketing purposes.

In the EU, privacy law is primarily regulated by the General Data Protection Regulation ("GDPR"), which has been directly binding and applicable for each EU member state since May 25, 2018. The GDPR contains enhanced compliance obligations and increased penalties for non-compliance compared to prior EU data protection legislation.

Acquisitions/Transactions

Federal and state laws impose notice and approval requirements for mergers and acquisitions involving depository institutions or BHCs. The Bank Holding Company Act of 1956, as amended by the Gramm-Leach-Bliley Act and by the Dodd-Frank Act (the "BHC Act") requires the prior approval of the Federal Reserve for the direct or indirect acquisition by a BHC of more than 5% of any class of the voting shares or all or substantially all of the assets of a commercial bank, savings and loan association or BHC. In reviewing bank acquisition and merger applications, the bank regulatory authorities will consider, among other things, the competitive effect of the transaction, financial and managerial resources, including the capital position of the combined organization, convenience and needs of the community factors, including the applicant's record under the Community Reinvestment Act of 1977 (the "CRA"), the effectiveness of the subject organizations in combating money laundering activities and the risk to the stability of the U.S. banking or financial system. In addition, prior Federal Reserve approval would be required for BNY Mellon to acquire direct or indirect ownership or control of any voting shares of a company with assets of $10 billion or more that is engaged in activities that are "financial in nature."

New Rating System for the Supervision of Large Financial Institutions

On Nov. 2, 2018, the Federal Reserve issued a final rule (the "LFI Rule") that establishes a new rating system for the supervision of large financial institutions ("LFIs"), including BNY Mellon. The LFI rating system applies to, among other entities, all bank holding companies with total consolidated assets of $100 billion or more. The LFI Rule became effective on Feb. 1, 2019.

The LFI rating system includes a new four-level rating scale and three component ratings. The four levels are: Broadly Meets Expectations; Conditionally Meets Expectations; Deficient-1; and Deficient-2. The component ratings are assigned for: Capital Planning and Positions; Liquidity Risk Management and Positions; and Governance and Controls. A firm must be rated "Broadly Meets Expectations" or "Conditionally Meets Expectations" for each of its component ratings to be considered "well managed" in accordance with various statutes and regulations that permit additional activities, prescribe expedited procedures or provide other benefits for "well managed" firms.

The Federal Reserve is expected to assign initial ratings under the new rating system in 2019 for those bank holding companies that are subject to the Large Institution Supervision Coordinating Committee ("LISCC") framework, including BNY Mellon.

Regulated Entities of BNY Mellon and Ancillary Regulatory Requirements

BNY Mellon is registered as a financial holding company ("FHC") under the BHC Act. We are subject to supervision by the Federal Reserve. In general, the BHC Act limits an FHC's business activities to banking, managing or controlling banks, performing certain servicing activities for subsidiaries, engaging in activities incidental to banking, and engaging in any activity, or acquiring and retaining the shares of any company engaged in any activity, that is either financial in nature or complementary to a financial activity and does not pose a substantial risk to the safety and soundness of depository institutions or the financial system generally.

A BHC's ability to maintain FHC status is dependent on: (i) its U.S. depository institution subsidiaries qualifying on an ongoing basis as "well capitalized" and "well managed" under the prompt corrective regulations of the appropriate regulatory agency (discussed above under "Prompt Corrective Action"); (ii) the BHC itself qualifying on an ongoing basis as "well capitalized" and "well managed" under applicable Federal Reserve regulations; and (iii) its U.S. depository institution subsidiaries continuing to maintain at least a "satisfactory" rating under the CRA.

An FHC that does not continue to meet all the requirements for FHC status will, depending on which requirements it fails to meet, lose the ability to undertake new activities, or make acquisitions, that are not generally permissible for BHCs without FHC status. As of Dec. 31, 2018, BNY Mellon and our U.S. bank subsidiaries were "well capitalized" based on the ratios and rules applicable to them.

The Bank of New York Mellon, BNY Mellon's largest banking subsidiary, is a New York state-chartered bank, and a member of the Federal Reserve System and is subject to regulation, supervision and examination by the Federal Reserve, the FDIC and the NYSDFS. BNY Mellon's national bank subsidiaries, BNY Mellon, N.A. and The Bank of New York Mellon Trust Company, National Association, are chartered as national banking associations subject to primary regulation, supervision and examination by the OCC.

We operate a number of broker-dealers that engage in securities underwriting and other broker-dealer activities in the United States. These companies are SEC-registered broker-dealers and members of Financial Industry Regulatory Authority, Inc. ("FINRA"), a securities industry self-regulatory organization. BNY Mellon's nonbank subsidiaries engaged in securities-related activities are regulated by supervisory agencies in the countries in which they conduct business.

Certain of BNY Mellon's public finance and advisory activities are regulated by the Municipal Securities Rulemaking Board and are required under the SEC's Municipal Advisors Rule to register with the SEC if they provide advice to municipal entities or certain other persons on the issuance of municipal securities, or about certain investment strategies or municipal derivatives.

Certain of BNY Mellon's subsidiaries are registered with the CFTC as commodity pool operators, introducing brokers and/or commodity trading advisors and, as such, are subject to CFTC regulation. The Bank of New York Mellon is provisionally registered as a Swap Dealer (as defined in the Dodd-Frank Act) with the CFTC, and is a member of the National Futures Association ("NFA") in that same capacity. As a Swap Dealer, The Bank of New York Mellon is subject to regulation, supervision and examination by the CFTC and NFA.

Certain of our subsidiaries are registered investment advisors under the Investment Advisers Act of 1940, as amended, and as such are supervised by the SEC. They are also subject to various U.S. federal and state laws and regulations and to the laws and regulations of any countries in which they conduct business. Our subsidiaries advise both public investment companies which are registered with the SEC under the Investment Company Act of 1940 (the "'40 Act"), including the Dreyfus family of mutual funds, and private investment companies which are not registered under the '40 Act.

Certain of our investment management, trust and custody operations provide services to employee benefit plans that are subject to the Employee Retirement Income Security Act of 1974, as amended ("ERISA"), administered by the U.S. Department of Labor ("DOL"). ERISA imposes certain statutory duties, liabilities, disclosure obligations and restrictions on fiduciaries, as applicable, related to the services being performed and fees being paid.

SEC Proposal of Regulation Best Interest

The SEC proposed Regulation Best Interest in May of 2018, which would require a broker-dealer to act in the "best interest" of a retail customer when making a recommendation of any securities transaction or investment strategy to any such customer. Regulation Best Interest is designed to make it clear that a broker-dealer may not put its financial interests ahead of the interests of a retail customer in making recommendations. The SEC also proposed to help address investor confusion about the nature of their relationships with investment professionals through a new short-form disclosure document. Form CRS would provide retail investors with information about the nature of their relationship with their investment professional, and would supplement other more detailed disclosures. In addition, the SEC issued interpretive guidance for broker-dealers and investment advisers and an interpretation regarding the standard of conduct for investment advisers. Comments to these proposals were accepted through August 2018, and the SEC is expected to proceed to final rulemaking in 2019. BNY Mellon is considering Regulation Best Interest and these related developments and evaluating what material impact, if any, they may have on BNY Mellon.

Operations and Regulations Outside the United States

In Europe, branches of The Bank of New York Mellon are subject to regulation in the countries in which they are established, in addition to being subject to oversight by the U.S. regulators referred to above. BNY Mellon SA/NV is a public limited liability company incorporated under the laws of Belgium, holds a banking license issued by the National Bank of Belgium ("NBB") and is authorized to carry out all banking and savings activities as a credit institution. The European Central Bank ("ECB") has responsibility for the direct supervision of significant banks and banking groups in the euro area, including BNY Mellon SA/NV. The ECB's supervision is carried out in conjunction with the relevant national prudential regulator (NBB in BNY Mellon SA/NV's case), as part of the single supervisory mechanism ("SSM"). BNY Mellon SA/NV conducts its activities in Belgium as well as through its branch offices in the UK, Ireland, Italy, Luxembourg, the Netherlands, France and Germany.

Certain of our financial services operations in the UK are subject to regulation and supervision by the Financial Conduct Authority ("FCA") and the Prudential Regulation Authority ("PRA"). The PRA is responsible for the authorization and prudential regulation of firms that carry on PRA-regulated activities, including banks. PRA-authorized firms are also subject to regulation by the FCA for conduct purposes. In contrast, FCA-authorized firms (such as investment management firms) have the FCA as their sole regulator for both prudential and conduct purposes. As a result, FCA-authorized firms must comply with FCA prudential and conduct rules and the FCA's Principles for Businesses, while dual-regulated firms must comply with the FCA conduct rules and FCA Principles, as well as the applicable PRA prudential rules and the PRA's Principles for Businesses.

The PRA regulates The Bank of New York Mellon (International) Limited, our UK-incorporated bank, as well as the London branch of The Bank of New York Mellon. Certain of BNY Mellon's UK-incorporated subsidiaries are authorized to conduct investment business in the UK. Their investment management advisory activities and their sale and marketing of retail investment products are regulated by the FCA. Certain UK investment funds, including investment funds of BNY Mellon, are registered with the FCA and are offered for sale to retail investors in the UK.

Since the financial crisis, the European Union and its Member States have engaged in a significant overhaul of bank regulation and supervision. To increase the resilience of banks and to reduce the impact of potential bank failures, new rules on capital requirements for banks and bank recovery and resolution have been adopted.

Aspects of the European Union's Banking Union have entered into force in most EU jurisdictions. The UK is not participating in the Banking Union. The key components of the Banking Union include the single resolution mechanism ("SRM") and the SSM. The SRM approach endorses the bail-in rules established in the BRRD and is described in more detail above in the section addressing Recovery and Resolution.

In addition, the Capital Requirements Directive IV ("CRD IV") and Capital Requirements Regulation ("CRR") affect BNY Mellon's EU subsidiaries by implementing Basel III and other changes, including the enhancement of the quality of capital, and the strengthening of capital requirements for counterparty credit risk, resulting in higher capital requirements. In the EU Member States, CRD IV/CRR also introduces substantive parts of the new European supervisory architecture, including the development of a single set of harmonized prudential rules for financial services. This set of rules replaces existing separately implemented rules within EU Member States with a harmonized approach to implementation across the EU. Elements of CRD IV/CRR apply not only to BNY Mellon banking branches and subsidiaries but also to investment management and brokerage entities. CRD IV/CRR became effective on Jan. 1, 2014, with certain provisions to be phased in from 2014 to 2019.

In December 2017, the European Commission published legislative proposals for a new harmonized prudential regime for investment firms. Under these proposals, most EU investment firms would be subject to a more tailored, proportionate prudential regime that is separate from the CRD IV/CRR regime. If these proposals are implemented, certain of BNY Mellon's EU investment firms would be expected to become subject to this new prudential regime. The extent to which these proposals will be advanced and implemented is uncertain.

Our Investment Management and Investment Services businesses are subject to significant regulation in numerous jurisdictions around the world relating to, among other things, the safeguarding, administration and management of client assets and client funds.

Various new, revised and/or proposed European Union directives and regulations have or will have a significant impact on our provision of many of our products and services, including the Markets in Financial Instruments Directive II and Markets in Financial Instruments Regulations (collectively, "MiFID II"), the Alternative Investment Fund Managers Directive ("AIFMD"), the Directive on Undertakings for Collective Investments in Transferable Securities ("UCITS V"), the Central Securities Depositories Regulation ("CSDR"), the regulation on OTC derivatives, central counterparties and trade repositories (commonly known as "EMIR"), the Securities Financing Transactions Regulation ("SFTR"), the Payment Services Directive II ("PSD II") and the Benchmarks Regulation. These European Union directives and regulations may impact our operations and risk profile but may also provide new opportunities for the provision of BNY Mellon products and services. Several of these European directives and regulations are still subject to finalization by the legislature and/or substantial secondary legislation. This creates uncertainty as to business impact.

The types of activities in which the foreign branches of our banking subsidiaries and our international subsidiaries may engage are subject to various restrictions imposed by the Federal Reserve. Those foreign branches and international subsidiaries are also subject to the laws and regulatory authorities of the countries in which they operate and, in the case of banking subsidiaries, may be subject to regulatory capital requirements in the jurisdictions in which they operate.

EU Banking Reform Package

In November 2016, the European Commission published the so-called EU Banking Reform Package. This legislative package would amend CRD IV, CRR, BRRD and the Single Resolution Mechanism Regulation ("SRMR").

The proposed amendments to CRD IV include a proposal for non-EU G-SIBs (such as BNY Mellon) and certain other non-EU banking groups to have up to two "EU intermediate parent undertakings" ("EU IPUs"). All EU credit institutions and certain EU investment firms in such non-EU G-SIBs/banking groups would need to fall within a corporate structure headed by one of the EU IPUs. If this proposal is ultimately implemented, BNY Mellon would need to undertake some changes in its corporate structure.

The proposed amendments to CRR include provisions relating to the leverage ratio, NSFR, MREL (including closer alignment to the final FSB TLAC standard), a revised Basel market risk framework, counterparty credit risk, exposures to CCPs, exposures to collective investment undertakings, large exposures and reporting/disclosure requirements.

The EU Banking Reform Package is due to be finalized during 2019. The time frame for implementation of the various elements of the legislative package remains unclear at present.

European Deposit Insurance Scheme

The European Commission has proposed a European Deposit Insurance Scheme ("EDIS") for euro area member states. Under the EDIS proposal, existing national euro area deposit guarantee schemes would transition over a number of years to a mutualized deposit guarantee scheme applicable in the euro area. The EDIS proposal has stalled and it is unclear whether it will be implemented in its current form, or at all.

European Financial Markets and Market Infrastructure

The EU continues to develop proposals and regulations in relation to financial markets and market infrastructures. MiFID II took effect on Jan. 3, 2018. It affects EU Member States and those financial institutions conducting business in the EEA and has required significant change to comply with relevant regulatory requirements, including extensive transaction reporting and market transparency obligations and a heightened focus on how financial institutions conduct business with and disclose information to their clients.

Capital Markets Union

A key policy objective of the 2014-19 European Commission is to develop a Capital Markets Union ("CMU") in the EU. Related initiatives that have already been substantially progressed include a new Prospectus Regulation and a new Securitization Regulation. The Prospectus Regulation applies from July 21, 2019 (with certain elements subject to an earlier phase-in period). The Securitization Regulation has applied to securitization transactions from Jan. 1, 2019.

A number of CMU-related priorities remain to be addressed during 2019. The European Commission proposes to enhance the powers of the European Supervisory Agencies ("ESAs"), including the European Banking Authority ("EBA"), the European Securities and Markets Authority ("ESMA") and the European Insurance and Occupational Pensions Authority ("EIOPA"). In addition, the European Commission wishes to enhance cross-border funds distribution and to promote sustainable finance.

Investment Services and Investment Management in the European Union

The AIFMD has a direct effect on our alternative fund manager clients and our depository business and other products offered across Europe as well as upon our investment management business. AIFMD imposes heightened obligations upon depositories, which have operational effects.

Our businesses servicing regulated funds in Europe and our investment management businesses in Europe are also affected by the revised directive governing UCITS V.

On July 12, 2018, the European Commission adopted regulations for depositary safekeeping duties under AIFMD and UCITS V. The Commission recognized the use of omnibus account structures when accounting for assets in a chain of custody, but determined that depositaries and trustees must maintain their own books and records and will no longer be allowed to rely on a custodian's records. BNY Mellon has initiated a project to implement any changes necessary to comply with these regulations by the Commission's deadline of April 1, 2020.

The European Commission is expected to commence a review of AIFMD and UCITS V legislation during 2019, following the Commission's initiation of an industry survey on AIFMD conducted during 2018.

Making or continuing an investment in securities issued by us involves certain risks that you should carefully consider. The following discussion sets forth the most significant risk factors that could affect our business, financial condition or results of operations. Some of these risks are interrelated and the occurrence of one may exacerbate the effect of others. However, factors other than those discussed below or in other of our reports filed with or furnished to the SEC also could adversely affect our business, financial condition or results of operations. We cannot assure you that the risk factors described below or elsewhere in our reports address all potential risks that we may face. These risk factors also serve to describe factors which may cause our results to differ materially from those described in forward-looking statements included herein or in other documents or statements that make reference to this Annual Report. See "Forward-looking Statements."

Operational Risk

A communications or technology disruption or failure that results in a loss of information, delays our ability to access information or impacts our ability to provide services to our clients may materially adversely affect our business, financial condition and results of operations.

We use communications and information systems to conduct our business. Our businesses are highly dependent on our ability to process large volumes of data that require global capabilities and scale from our technology platforms. If our technology or communications fail, or those of industry utilities or our service providers fail, we could experience, and have in the past experienced, production and system outages or failures or other significant operational delays. Any such outage, failure or delay could adversely affect our ability to effect transactions or service our clients, which could expose us to liability for damages, result in the loss of business, damage our reputation, subject us to regulatory scrutiny or sanctions or expose us to litigation, any of which could have a material adverse effect on our business, financial condition and results of operations. Security or technology disruptions, failures or delays that impact our communications or information systems could also adversely affect our ability to manage our exposure to risk or expand our business.

Upgrading our computer systems, software and networks may also subject us to disruptions, failures or delays due to the complexity and interconnectedness of our systems, software and networks. The failure to upgrade or maintain these computer systems, software and networks could result in greater susceptibility to attacks, unauthorized access and misuse, and could also prevent us from achieving our business continuity and resiliency objectives. There can be no assurance that any such disruptions, failures or delays will not occur or, if they do occur, that they will be adequately addressed.

Third parties with which we do business or that facilitate our business activities, including exchanges, clearing houses, financial intermediaries or vendors that provide services or security solutions for our operations, could also be sources of technology risk to us, including from breakdowns, failures or delays of their own systems or capacity constraints or other services that impair our ability to process transactions and communicate with customers and counterparties. In addition, we are exposed to the risk that a technology disruption or other information security event at a vendor common to our third-party service providers could impede their ability to provide products or services to us. We may not be able to effectively monitor or mitigate operational risks relating to the use of common vendors by third-party service providers.

As our business areas evolve, whether due to the introduction of technology, new service offering requirements for our clients, or changes in regulation relative to these service offerings, unforeseen risks materially impacting our business operations could arise. The technology used can become increasingly complex and rely on the continued effectiveness of the programming code and integrity of the inputted data. Rapid technological changes and competitive pressures require us to make significant and ongoing investments in technology not only to develop competitive new products and services or adopt new technologies, but to sustain our current businesses. Our financial performance depends in part on our ability to develop and market these new products and services in a timely manner at a competitive price and adopt or develop new technologies that differentiate our products or provide cost efficiencies. The failure to ensure adequate review and consideration of critical business changes prior to and during introduction and deployment of key technological systems or failure to adequately align evolving client commitments and expectations with operational capabilities, may adversely impact our ability to service and retain customers and could have a negative impact on our operations. The costs we incur in enhancing our technology could be substantial and may not ultimately improve our competitiveness or profitability.

We continue to evaluate and strengthen our business continuity and operational resiliency capabilities and have increased our investments in technology to steadily enhance those capabilities, including our ability to resume and sustain our operations. There can be no guarantee, however, that a technology outage will not occur or that our business continuity and operational resiliency capabilities will enable us to maintain our operations and appropriately respond to events. For a discussion of operational risk, see "Risk Management - Operational Risk" and "Business Continuity."

As a result of financial entities, central agents, clearing agents and houses, exchanges and technology systems across the globe becoming more interdependent and complex, a technology failure that significantly degrades, deletes or compromises the systems or data of one or more financial entities or suppliers could have a material impact on counterparties or other market participants, including us. A disruptive event or, failure or delay experienced by one institution could disrupt the functioning of the overall financial system.

A cybersecurity incident, or a failure to protect our computer systems, networks and information and our clients' information against cybersecurity threats, could result in the theft, loss, unauthorized access to, disclosure, use or alteration of information, system or network failures, or loss of access to information. Any such incident or failure could adversely impact our ability to conduct our businesses, damage our reputation and cause losses.

Our businesses rely heavily on technology, and are vulnerable to cybersecurity threats and disruptions that are occurring globally with greater frequency. Cybersecurity threats, which can include, among other things, hacker attacks, computer viruses or other malicious software, denial of service efforts, limited availability of services, phishing attacks, cyberattacks on our service providers, and unauthorized access attempts, could adversely impact our business. These cybersecurity risks are expected to continue to increase and intensify. While we deploy a broad range of sophisticated defenses, it is possible we could suffer a material adverse impact or disruption.

Cybersecurity incidents may occur through intentional or unintentional acts by individuals or groups having authorized or unauthorized access to our systems or our clients' or counterparties' information, which may include confidential information. These individuals or groups include employees, vendors and customers, as well as others with malicious intent. Third parties may also attempt to place individuals within BNY Mellon or fraudulently induce employees, vendors, customers or other users of our systems to disclose sensitive information in order to gain access to our data or that of our clients. A cybersecurity incident that results in the theft, loss, unauthorized access to, disclosure, use or alteration of information, system or network failures, or loss of access to information, may require us to reconstruct lost data (which may not be possible), reimburse clients for data and credit monitoring services, result in loss of customer business, or damage to our computers or systems and those of our customers and counterparties. These impacts could be costly and time-consuming and materially negatively impact our business operations, financial condition and reputation.

While we seek to mitigate these risks to ensure the integrity of our systems and information and continuously evolve our cybersecurity capabilities, it is possible that we may not anticipate or implement effective preventive measures against all cybersecurity threats, or detect all such threats, especially because the techniques used change frequently or are not recognized until after they are launched. Moreover, attacks can originate from a wide variety of sources, including outside third parties who are involved with organized crime or who may be linked to terrorist organizations or hostile foreign governments, or from cross-contamination of legitimate parties (clients, utilities, peer institutions, etc).

The failure to maintain an adequate technology infrastructure and applications with effective cybersecurity controls relative to the type, size and complexity of operations, markets and products traded, access to trading venues and our market interconnectedness could impact operations and impede our productivity and growth, which could cause our earnings to decline or could impact our ability to comply with regulatory obligations leading to regulatory fines and sanctions. We may be required to expend significant additional resources to modify, investigate or remediate vulnerabilities or other exposures arising from cybersecurity threats.

A successful cyberattack could occur and persist for an extended period of time before being detected. In addition, because any investigation of a cybersecurity incident would be inherently unpredictable, the extent of a particular cybersecurity incident and the path of investigating the incident may not be immediately clear. It may take a significant amount of time before such an investigation can be completed and full and reliable information about the incident is known. While such an investigation is ongoing, we may not necessarily know the extent of the harm or how best to remediate it, certain errors or actions could be repeated or compounded before they are discovered and remediated, and communication to the public, regulators, clients and other stakeholders may be inaccurate, any or all of which could further increase the costs and consequences of a cybersecurity incident.

Our business may be materially adversely affected by operational risk.

We are required to accurately process large numbers of transactions each day on a timely basis. The transactions we process or execute are operationally complex and can involve numerous parties, jurisdictions, regulations and systems, and as such, are subject to execution and processing errors and failures. As our businesses evolve to even more complex and voluminous transactions, at ever increasing speeds, we must also evolve our processes, controls, workforce and technology, to accurately and timely execute those transactions, which may result in an increased risk of error or significant operational delay. When errors or delays do occur, they may be difficult to detect and fix in a timely manner.

As a result, operational errors or significant operational delays could materially negatively impact our ability to conduct our business or service our clients, which could adversely affect our results of operations due to potentially higher expenses and lower revenues, could lower our capital ratios, create liability for us or our clients or negatively impact our reputation. Recurring operational issues may raise concerns among regulators regarding our governance and control environment and culture.

Affiliates or third parties with which we do business or that facilitate our business activities could also be sources of execution and processing errors, failures or significant operational delays. In certain jurisdictions we may be deemed to be statutorily liable for operational errors, fraud, breakdowns or delays by these affiliates or third parties. Additionally, as a result of regulations, including the Alternative Investment Fund Managers Directive and the Undertakings for Collective Investment in Transferable Securities V, where, in the European Economic Area we act as depositary, the Company could be exposed to restitution risk for, among other things, errors or fraud perpetrated by a sub-custodian resulting in a loss or delay in return of client's securities. Where we are not acting as a European Economic Area depositary, but where we provide custody services to a European Economic Area depositary, we may accept similar liabilities to that depositary as a matter of contract.

We rely on a variety of measures to protect our intellectual property and proprietary information, including copyrights, trademarks, patents and controls on access and distribution. These measures may not prevent misappropriation or infringement of our intellectual property or proprietary information and a resulting loss of competitive advantage. Furthermore, if a third party were to assert a claim of infringement or misappropriation of its proprietary rights, obtained through patents or otherwise, against us, we could be required to spend significant amounts to defend such claims, develop alternative methods of operations, pay substantial money damages, obtain a license from the third party or possibly stop providing one or more products or services.

We are also subject to laws and regulations relating to the privacy of the information of clients, employees or others, and any failure to comply with these laws and regulations could expose us to liability and/or reputational damage. As privacy-related laws and regulations, such as the EU General Data Protection Regulation (or GDPR), the California Consumer Privacy Act of 2018, and the New York Department of Financial Services' cybersecurity regulation, are implemented, the time and resources needed for us to comply with such laws and regulations, as well as our potential liability for non-compliance and reporting obligations in the case of data breaches, may significantly increase. In addition, our businesses are increasingly subject to laws and regulations relating to privacy, surveillance, encryption and data use in the jurisdictions in which we operate. Compliance with these laws and regulations may require us to change our policies, procedures and technology for information security and segregation of data, which could, among other things, make us more vulnerable to operational failures, and to monetary penalties for breach of such laws and regulations.

Our risk management framework may not be effective in mitigating risk and reducing the potential for losses.

Our risk management framework seeks to mitigate risk and loss to us. We have established comprehensive policies and procedures and an internal control framework designed to provide a sound operational environment for the types of risk to which we are subject, including operational risk, credit risk, market risk, liquidity risk and strategic risk. We have also established frameworks to mitigate risk and loss to us as a result of the actions of affiliates or third parties with which we do business or that facilitate our business activities. However, as with any risk management framework, there are inherent limitations to our current and future risk management strategies, including risks that we have not appropriately anticipated or identified.

Our regulators remain focused on ensuring that financial institutions build and maintain robust risk management policies. If our regulators perceive the quality of our risk models and framework to be insufficient, it may negatively impact our regulators' evaluations of our capital plans and stress tests. Accurate and timely enterprise-wide risk information is necessary to enhance management's decision-making in times of crisis. If our risk management framework proves ineffective or if our enterprise-wide management information is incomplete or inaccurate, we could suffer unexpected losses, which could materially adversely affect our results of operations or financial condition.

In certain instances, we rely on models to measure, monitor and predict risks. However, these models are inherently limited because they involve techniques, including the use of historical data, trends, assumptions, and judgments that cannot anticipate every economic and financial outcome in the markets in which we operate, nor can they anticipate the specifics and timing of such outcomes, especially during severe market downturns or stress events. These models may not appropriately capture all relevant risks or accurately predict future events or exposures. The risk of the unsuccessful development or implementation of our models, systems or processes cannot be completely eliminated. The models that we use to assess and control our market risk exposures also reflect assumptions about the degree of correlation among prices of various asset classes or other market indicators. The 2008 financial crisis and resulting regulatory reform highlighted both the importance and some of the limitations of managing unanticipated risks. In times of market stress or other unforeseen circumstances, previously uncorrelated indicators may become correlated, or previously correlated indicators may move in different directions. These types of market movements have at times limited the effectiveness of our hedging strategies and have caused us to incur significant losses, and they may do so in the future.

In addition, our businesses and the markets in which we operate are continuously evolving. We may fail to fully understand the implications of changes in our businesses or the financial markets or fail to adequately or timely enhance our risk framework to address those changes. If our risk framework is ineffective, either because it fails to keep pace with changes in the financial markets, regulatory requirements, our businesses, our counterparties, clients or service providers or for other reasons, we could incur losses, suffer reputational damage or find ourselves out of compliance with applicable regulatory or contractual mandates or expectations.

An important aspect of our risk management framework is creating a risk culture that it is sustainable and appropriate to our role as a major financial institution in which all employees fully understand that there is risk in every aspect of our business and the importance of managing risk as it relates to their job functions. If we fail to create the appropriate environment that sensitizes all of our employees to managing risk, our business could be adversely impacted. For more information on how we monitor and manage our risk management framework, see "Risk Management - Risk management overview."

We are subject to extensive government rulemaking, policies, regulation and supervision. These rules and regulations have, and in the future may, compel us to change how we manage our businesses, which could have a material adverse effect on our business, financial condition and results of operations. In addition, these rules and regulations have increased our compliance and operational risk and costs.

As a large, internationally active financial services company, we operate in a highly regulated environment, and are subject to a comprehensive statutory and regulatory regime, including oversight by governmental agencies both inside and outside the U.S. Regulations and related regulatory guidance and supervisory oversight impact how we analyze certain business opportunities, our regulatory capital and liquidity requirements, the revenue profile of certain of our core activities and the products and services we provide. Any changes to the regulatory frameworks and environment in which we operate and the significant management attention and resources necessary to address those changes could materially adversely affect our business, financial condition and results of operations and have other negative consequences.

The evolving regulatory environment and uncertainty about the timing and scope of future regulations may contribute to decisions we may make to suspend, reduce or withdraw from existing businesses, activities or initiatives, which may result in potential lost revenue or significant restructuring or related costs or exposures.

The monetary, tax and other policies of various governments, agencies and regulatory authorities both in the U.S. and globally have a significant impact on interest rates, currencies, commodity pricing (including oil), the imposition of tariffs or other limitations on international trade and travel, and overall financial market performance, which can impact our business and results of operations. Changes in these policies are beyond our control and can be difficult to predict and we cannot determine the ultimate effect that any such changes would have upon our business, financial condition or results of operations.

Basel III and the Dodd-Frank Act have had a significant impact on the regulatory structure of the global financial markets and have imposed significant operational, compliance and risk management costs, both as an initial matter, as we have had to develop and integrate appropriate systems and procedures, and on a recurring basis, as we monitor, support and refine those systems and procedures. While U.S. regulators have finalized regulations implementing various provisions of the Dodd-Frank Act and Basel III, additional regulations or modifications to existing regulations are expected to continue to occur. In addition, there is uncertainty about the timing and scope of any changes to Basel III and Dodd-Frank Act and other regulations, as well as the cost of complying with any new regulatory regimes. The full impact of these standards on us, our business strategies and financial performance will remain uncertain as long as regulatory reforms continue to be adopted and market practices develop in response to such reforms, and regulatory changes could materially adversely impact us.

The regulatory and supervisory focus of U.S. banking agencies is primarily intended to protect the safety and soundness of the banking system and federally insured deposits, and not to protect investors in our securities. Regulatory and supervisory standards and expectations across jurisdictions may be divergent and otherwise may not conform and/or may be applied in a manner that is not harmonized within a jurisdiction (in relation to national versus non-national financial services providers) and/or across jurisdictions. Additionally, banking regulators have wide supervisory discretion in the ongoing examination and enforcement of applicable banking statutes, regulations, and guidelines, and may restrict our ability to engage in certain activities or acquisitions, or may require us to maintain more capital or highly liquid assets.

The U.S. capital rules subject us and our U.S. banking subsidiaries to more stringent capital requirements, which could restrict growth, activities or operations, trigger divestiture of assets or operations or limit our ability to return capital to shareholders. Failure to meet current or future capital requirements, either at the end of each fiscal quarter or under hypothetical stressed conditions during the annual CCAR exercise, could materially adversely affect our financial condition. Additional impacts relating to compliance with these rules could include, but are not limited to, potential dilution of existing shareholders and competitive disadvantage compared to financial institutions not under the same regulatory framework. In addition, the SLR subjects us to a more stringent leverage requirement, which could restrict growth, activities, operations or could result in certain restrictions on capital distributions and discretionary bonus payments.

The LCR requires us to maintain significant holdings of high quality and potentially lower-yielding liquid assets. In calculating the LCR, we must also determine which deposits should be considered to be stable deposits. Stable deposits must meet a series of requirements and typically receive favorable outflow treatment under the LCR. BNY Mellon uses qualitative and quantitative analysis to identify core stable deposits. It is possible that our LCR could fall below 100% as a consequence of the inherent uncertainties associated with this analysis (including as a result of additional guidance from our regulators). In addition to facing potential regulatory consequences (which could be significant), we may be required to remedy this shortfall by liquidating assets in our investment portfolio or raising additional debt, each of which could materially negatively impact our net interest revenue.

If and when the final rule regarding the NSFR is ultimately implemented in the U.S., those requirements could also require BNY Mellon to further increase its holdings of high quality, and potentially lower-yielding, liquid assets, and to reevaluate the composition of its liabilities structure to include more longer-dated debt.

Our global activities are also subject to extensive regulation by various non-U.S. regulators, including governments, securities exchanges, central banks and other regulatory bodies in the jurisdictions in which we operate, relating to, among other things, the safeguarding, administration and management of client assets and client funds.

Various new, revised and proposed European Union directives and regulations have an impact on our provision of many of our products and services. Implementation of, and revisions to, these directives and regulations have affected our operations and risk profile, including the Capital Requirements Directive/ Regulation, the Bank Recovery and Resolution Directive, the Deposit Guarantee Scheme Directive, MiFID II, AIFMD, UCITS V and PSD II.

In addition, we are subject in our global operations to rules and regulations relating to corrupt and illegal payments and money laundering, economic sanctions and embargo programs administered by the U.S. Office of Foreign Assets Control and similar bodies and governmental agencies worldwide, and laws relating to doing business with certain individuals, groups and countries, such as the U.S. Foreign Corrupt Practices Act, the USA PATRIOT Act, the Iran Threat Reduction and Syria Human Rights Act of 2012 and the UK Bribery Act. While we have invested and continue to invest significant resources in training and in compliance monitoring, the geographical diversity of our operations, employees, clients and customers, as well as the vendors and other third parties that we deal with, presents the risk that we may be found in violation of such rules, regulations or laws and any such violation could subject us to significant penalties or adversely affect our reputation. In addition, such rules could impact our ability to engage in business with certain individuals, entities, groups and countries, which could materially adversely affect certain of our businesses and results of operations.

Failure to comply with laws, regulations or policies applicable to our business could result in sanctions by regulatory or governmental authorities, civil money penalties and reputational damage, which could have a material adverse effect on our business, financial condition and results of operations. If violations do occur, they could damage our reputation, increase our legal and compliance costs, and ultimately adversely impact our results of operations. Laws, regulations or policies currently affecting us and our subsidiaries, or regulatory and governmental authorities' interpretation of these statutes and regulations may change at any time, which may adversely impact our business and results of operations.

See "Supervision and Regulation" for additional information regarding the potential impact of the regulatory environment on our business.

Regulatory or enforcement actions or litigation could materially adversely affect our results of operations or harm our businesses or reputation.

Like many major financial institutions, we and our affiliates are the subject of inquiries, investigations, lawsuits and proceedings by counterparties, clients, other third parties and regulatory and other governmental agencies in the U.S. and abroad, as well as the Department of Justice (the "DOJ") and state attorneys general. See "Legal proceedings" in Note 21 of the Notes to Consolidated Financial Statements for a discussion of material legal and regulatory proceedings in which we are involved. The number of these investigations and proceedings, as well as the amount of penalties and fines sought, has remained elevated for many firms in the financial services industry, including us. We may become subject to heightened regulatory scrutiny, inquiries or investigations, and potentially client-related inquiries or claims, relating to broad, industry-wide concerns that could lead to increased expenses or reputational damage. The current trend of large settlements by financial institutions with governmental entities may adversely affect the outcomes for other financial institutions in similar actions, especially where governmental officials have announced that the large settlements will be used as the basis or a template for other settlements. Separately, policy makers in Europe continue to focus on protection of client assets, as well as tax avoidance and evasion.

Regulatory authorities may compel companies to provide investigators with all relevant facts relating to the individuals substantially involved in or responsible for the alleged misconduct in order to qualify for any cooperation credit in criminal investigations of corporate wrongdoing, or maximum cooperation credit in civil investigations of corporate wrongdoing, resulting in increased fines and penalties.

The complexity of the federal and state regulatory and enforcement regimes in the U.S., coupled with the global scope of our operations and the increased aggressiveness of the regulatory environment worldwide, also means that a single event may give rise to a large number of overlapping investigations and regulatory proceedings, either by multiple federal and state agencies in the U.S. or by multiple regulators and other governmental entities in different jurisdictions. Responding to inquiries, investigations, lawsuits and proceedings, regardless of the ultimate outcome of the matter, is time-consuming and expensive and can divert the attention of our senior management from our business. The outcome of such proceedings may be difficult to predict or estimate until late in the proceedings, which may last a number of years.

Certain of our subsidiaries are subject to periodic examination, special inquiries and potential proceedings by regulatory authorities. If compliance failures or other violations are found during an examination, inquiry or proceeding, a regulatory agency could initiate actions and impose sanctions for violations, including, for example, regulatory agreements, cease and desist orders, civil monetary penalties or termination of a license and could lead to litigation by investors or clients, any of which could cause our earnings to decline.

Our businesses involve the risk that clients or others may sue us, claiming that we or third parties for whom they say we are responsible have failed to perform under a contract or otherwise failed to carry out a duty perceived to be owed to them, including perceived fiduciary or contractual duties. This risk may be heightened during periods when credit, equity or other financial markets are deteriorating in value or are particularly volatile, or when clients or investors are experiencing losses. As a publicly held company, we are also subject to the risk of claims under the federal securities laws. Volatility in our stock price increases this risk.

Actions brought against us may result in lawsuits, enforcement actions, injunctions, settlements, damages, fines or penalties, which could have a material adverse effect on our financial condition or results of operations or require changes to our business. Claims for significant monetary damages are asserted in many of these legal actions, while claims for disgorgement, penalties and/or other remedial sanctions may be sought in regulatory matters. Although we establish accruals for our litigation and regulatory matters in accordance with applicable accounting guidance when those matters proceed to a stage where they present loss contingencies that are both probable and reasonably estimable, there may be a material exposure to loss in excess of any amounts accrued, or in excess of any loss contingencies disclosed as reasonably possible. Such loss contingencies may not be probable and reasonably estimable until the proceedings have progressed significantly, which could take several years and occur close to resolution of the matter.

Each of the risks outlined above could result in increased regulatory supervision and affect our ability to attract and retain customers or maintain access to the capital markets.

Our businesses may be negatively affected by adverse events, publicity, government scrutiny or other reputational harm.

We are subject to reputational, legal and regulatory risk in the ordinary course of our business. The public perception of financial institutions remains negative. Harm to our reputation can result from numerous sources, including adverse publicity arising from events occurring at BNY Mellon or in the financial markets, our perceived failure to comply with legal and regulatory requirements or deliver appropriate standards of service and quality by either us or our vendors, or a failure to appropriately describe our products and services, the purported actions of our employees, alleged financial reporting irregularities involving ourselves or other large and well-known companies and perceived conflicts of interest. In particular, a cybersecurity event impacting us or our customers' data could have a negative impact on our reputation and customer confidence in BNY Mellon and its cybersecurity defenses and business continuity and resiliency capabilities. Our reputation could also be harmed by the failure of an affiliate, joint venture or a vendor or other third party with which we do business to comply with laws or regulations. Damage to our reputation could affect the confidence of clients, rating agencies, regulators, employees, stockholders and other stakeholders and could in turn have an impact on our business and results of operations.

Additionally, governmental scrutiny from regulators, legislative bodies and law enforcement agencies with respect to financial services companies has remained at elevated levels. Press coverage and other public statements that assert some form of wrongdoing (including, in some cases, press coverage and public statements that do not directly involve BNY Mellon) often result in some type of investigation or in lawsuits. Certain enforcement authorities have recently required admissions of wrongdoing, and in some cases, criminal pleas, as part of the resolution of matters brought by them against financial institutions. Any such resolution of a matter involving BNY Mellon could lead to increased exposure to civil litigation, could adversely affect our reputation and ability to do business in certain products and in certain jurisdictions and could have other negative effects.

Failure to satisfy regulatory standards, including "well capitalized" and "well managed" status or capital adequacy and liquidity rules more generally, could result in limitations on our activities and adversely affect our business and financial condition.

Under U.S. and international regulatory capital adequacy rules and other regulatory requirements, BNY Mellon and our subsidiary banks must meet thresholds that include quantitative measures of assets, liabilities and certain off-balance sheet items, subject to qualitative judgments by regulators about components, risk weightings and other factors. As discussed in "Supervision and Regulation," BNY Mellon is registered with the Federal Reserve as a BHC and an FHC. An FHC's ability to maintain its status as an FHC is dependent upon a number of factors, including its U.S. bank subsidiaries' qualifying on an ongoing basis as "well capitalized" and "well managed" under the banking agencies' prompt corrective action regulations as well as applicable Federal Reserve regulations. Failure by an FHC or one of its U.S. bank subsidiaries to qualify as "well capitalized" and "well managed", if unremedied over a period of time, would cause it to lose its status as an FHC and could affect the confidence of clients in it, compromising its competitive position. Additionally, an FHC that does not continue to meet all the requirements for FHC status could lose the ability to undertake new activities or make acquisitions that are not generally permissible without FHC status or to continue such activities.

The failure by one of our bank subsidiaries to maintain its status as "well capitalized" could lead to, among other things, higher FDIC assessments and could have reputational and associated business consequences.

If we or our subsidiary banks fail to meet U.S. and international minimum capital rules and other regulatory requirements, we may not be able to deploy capital in the operation of our business or distribute capital to stockholders, which may adversely affect our business.

Failure to meet any current or future capital or liquidity requirements, including those imposed by the U.S. capital rules, the LCR, or by regulators in implementing other portions of the Basel III framework, could materially adversely affect our financial condition. The current regulatory environment is fluid as requirements are introduced and amended. See "Supervision and Regulation." Compliance with U.S. and international regulatory capital and liquidity requirements may impact our ability to return capital to shareholders and may impact our operations by requiring us to liquidate assets, increase borrowings, issue additional equity or other securities, or cease or alter certain operations, which may adversely affect our results of operations.

Finally, our estimated regulatory capital ratios, liquidity metrics, and related components are based on our current interpretation, expectations and understanding of the applicable rules and are subject to, among other things, ongoing regulatory review, regulatory approval of certain statistical models, additional refinements, modifications or enhancements (whether required or otherwise) to our models, and further implementation guidance. Any modifications resulting from these ongoing reviews or the continued implementation of the U.S. capital rules, the LCR, the resolution planning process, and related amendments could result in changes in our risk-weighted assets, capital components, liquidity inflows and outflows, HQLA, or other elements involved in the calculation of these measures, which could impact these ratios. Further, because operational risk is currently measured based not only upon our historical operational loss experience but also upon ongoing events in the banking industry generally, our level of operational risk-weighted assets could significantly increase or otherwise remain elevated and may potentially be subject to significant volatility, negatively impacting our capital and liquidity ratios. The uncertainty caused by these factors could ultimately impact our ability to meet our goals, supervisory requirements, and regulatory standards.

A failure or circumvention of our controls and procedures could have a material adverse effect on our business, reputation, results of operations and financial condition.

Management regularly reviews and updates our internal controls, disclosure controls and procedures, and corporate governance policies and procedures. Any system of controls, however well designed and operated, is based in part on certain assumptions and can provide only reasonable, not absolute, assurances that the objectives of the system will be met. Any failure or circumvention of our controls and procedures or failure to comply with regulations related to controls and procedures could have a material adverse effect on our business, reputation, results of operations and financial condition. If we identify material weaknesses in our internal control over financial reporting or are otherwise required to restate our financial statements, we could be required to implement expensive and time-consuming remedial measures and could lose investor confidence in the accuracy and completeness of our financial reports. In addition, there are risks that individuals, either employees or contractors, may circumvent established control mechanisms in order to, for example, exceed exposure, liquidity, trading or investment management limitations, or commit fraud.

The application of our Title I preferred resolution strategy or resolution under the Title II orderly liquidation authority could adversely affect the Parent's liquidity and financial condition and the Parent's security holders.

In 2017, in connection with our single point of entry resolution strategy under Title I of the Dodd-Frank Act, the Parent entered into a binding support agreement with certain key subsidiaries to facilitate the provision of capital and liquidity resources to them in the event of material financial distress or failure. The support agreement requires the Parent to transfer significant excess liquid financial assets to the IHC on an ongoing basis, subject to certain amounts retained by the Parent to meet its near-term cash needs, in exchange for unsecured subordinated funding notes issued by the IHC as well as a committed line of credit to the Parent to service its near term obligations. The Parent's and the IHC's obligations under the support agreement are secured.

If our projected liquidity resources deteriorate so severely that resolution of the Parent becomes imminent, the committed line of credit the IHC provided to the Parent will automatically terminate, with all amounts outstanding becoming due and payable, and the support agreement will require the Parent to transfer most of its remaining assets (other than stock in subsidiaries and a cash reserve to fund bankruptcy expenses) to the IHC. As a result, during a period of severe financial stress the Parent could become unable to meet its debt and payment obligations (including with respect to its securities), causing the Parent to seek protection under bankruptcy laws earlier than it otherwise would have.

If the Parent were to become subject to a bankruptcy proceeding and our single point of entry strategy is successful, our material entities will not be subject to insolvency proceedings and their creditors would not be expected to suffer losses, while the Parent's security holders, including unsecured debt holders, could face significant losses, potentially including the loss of their entire investment. The single point of entry strategy - in which the Parent would be the only legal entity to enter resolution proceedings - is designed to result in greater risk of loss to holders of our unsecured senior debt securities and other securities than would be the case under a different resolution strategy.

Further, if the single point of entry strategy is not successful, our liquidity and financial condition would be adversely affected and all security holders may, as a consequence, be in a worse position than if the strategy had not been implemented.

In addition, Title II of the Dodd-Frank Act established an orderly liquidation process in the event of the failure of a large systemically important financial institution, such as BNY Mellon, in order to avoid or mitigate serious adverse effects on the U.S. financial system. Specifically, if BNY Mellon is in default or danger of default, and certain specified conditions are met, the FDIC may be appointed receiver under the orderly liquidation authority, and we would be resolved under that authority instead of the U.S. Bankruptcy Code.

U.S. supervisors have indicated that a single point of entry strategy may be a desirable strategy to resolve a large financial institution such as BNY Mellon under Title II in a manner that would, similar to our preferred strategy under our Title I resolution plan, impose losses on shareholders, unsecured debt holders and other unsecured creditors of the Parent, while permitting the holding company's subsidiaries to continue to operate and remain solvent. Under such a strategy, assuming the Parent entered resolution proceedings and its subsidiaries remained solvent, losses at the subsidiary level would be absorbed by the Parent and ultimately borne by the Parent's security holders (including holders of the Parent's unsecured debt securities), while third-party creditors of the Parent's subsidiaries would not be expected to suffer losses. Accordingly, the Parent's security holders (including holders of unsecured debt securities and other unsecured creditors) could face losses in excess of what otherwise would have been the case.

If our resolution plan is determined not to be credible or not to facilitate an orderly resolution under the U.S. Bankruptcy Code, our business, reputation, results of operations and financial condition could be materially negatively impacted.

We must develop and submit to the Federal Reserve and the FDIC for review plans for our rapid and orderly resolution in the event of material financial distress or failure. If the agencies determine that our future submissions are not credible or would not facilitate an orderly resolution under the U.S. Bankruptcy Code, and we fail to address any such deficiencies in a timely manner, the agencies may jointly impose more stringent capital, leverage or liquidity requirements or restrictions on our growth, activities or operations.

Acts of terrorism, impacts from climate change, natural disasters, pandemics, global conflicts and other geopolitical events may have a negative impact on our business and operations.

In conducting our business and maintaining and supporting our global operations, which includes vendors and other third parties, we are subject to risks of loss from the outbreak of hostilities, acts of terrorism, impacts from client change, natural disasters, pandemics, global conflicts or other similar catastrophic events that could have a negative impact on our business and operations. We may also be impacted by unfavorable political, economic, legal or other developments, including but not limited to social or political instability, changes in governmental policies or policies of central banks, sanctions, expropriation, nationalization, confiscation of assets, price, capital and exchange controls, the imposition of tariffs or other limitations on international trade and travel, and changes in laws and regulations.

While we have business continuity and disaster recovery plans in place, such events could still damage our facilities, disrupt or delay normal business operations (including communications and technology), result in harm or cause travel limitations on our employees, with a similar impact on our clients, suppliers and counterparties. Catastrophic events, including those caused by climate change, could also negatively impact the purchase of our products and services if those events result in reduced capital markets activity, lower asset price levels, or disruptions in general economic activity, or in financial market settlement functions, which could negatively impact our business and results of operation. In addition, catastrophic events, including those caused by climate change, war, terror attacks, political unrest, global conflicts, efforts to combat terrorism and other potential military activities and outbreaks of hostilities may lead, and in some cases have led, to an increase in delinquencies, bankruptcies or defaults that could result in our experiencing higher levels of non-performing assets, net charge-offs and provisions for credit losses, negatively impacting our business and operations.

Market Risk

We are dependent on fee-based business for a substantial majority of our revenue and our fee-based revenues could be adversely affected by slowing in market activity, weak financial markets, underperformance and/or negative trends in savings rates or in investment preferences.

Our principal operational focus is on fee-based business, which is distinct from commercial banking institutions that earn most of their revenues from loans and other traditional interest-generating products and services. In 2018, 78% of our total revenue was fee-based. Our fee-based businesses include investment management and performance fees, custody, corporate trust, depositary receipts, clearing, collateral management and treasury services, which are highly competitive businesses.

Fees for many of our products and services are based on the volume of transactions processed, the market value of assets managed and administered, securities lending volume and spreads, and fees for other services rendered. Corporate actions, cross-border investing, global mergers and acquisitions activity, new debt and equity issuances, and secondary trading volumes all affect the level of our revenues. If the volumes of these activities decrease due to weak financial markets or otherwise, our revenues will also decrease, which would negatively impact our results of operations.

Poor investment returns in our investment management business, due to either weak market conditions or underperformance (relative to our competitors or to benchmarks) by funds or accounts that we manage or investment products that we design or sell, could result in reduced market values of portfolios that we manage and/or administer and may affect our ability to retain existing assets and to attract new clients or additional assets from existing clients. Market and regulatory trends have resulted in increased demand for lower fee asset management products, and for performance-based fees. Significant declines in the volume of capital markets activity would reduce the number of transactions we process and the amount of securities we lend and therefore would also have an adverse effect on our results of operations.

Our business generally benefits when individuals invest their savings in mutual funds and other collective funds, unit investment trusts or exchange-traded funds, or contribute more to defined contribution plans. The current shift to lower fee investment products has adversely impacted our fees. When our investment management revenues decline, we may have, and in the past have had, declines in the fair value in our Asset Management reporting unit, one of the two reporting units in our Investment Management segment. If the fair value of the Asset Management reporting unit declines below its carrying value, we would be required to take an impairment charge.

Weakness and volatility in financial markets and the economy generally may materially adversely affect our business, results of operations and financial condition.

As a financial institution, our Investment Management, Depositary Receipts and Markets, including Securities Lending, businesses, are particularly sensitive to economic and market conditions, including in the capital and credit markets. When these markets are volatile or disruptive, we could experience a decline in our marked-to-market assets, including in our securities portfolio and our equity investments, including seed capital. Our results of operations may be materially affected by conditions in the financial markets and the economy generally, both in the U.S. and elsewhere around the world. A variety of factors impact global economies and financial markets, including interest rates and their associated yield curves, commodity pricing, such as a continued weakness in oil prices when compared to historic levels, certain market and political instabilities, volatile debt and equity market values, the strength of the U.S. dollar, the imposition of tariffs or other limitations on international trade or travel, high unemployment and governmental budget deficits (including, in the U.S., at the federal, state and municipal level), contagion risk from possible default by other countries on sovereign debt, declining business and consumer confidence and the risk of increased inflation. Any resulting economic pressure on consumers and lack of confidence in the financial markets may adversely affect certain portions of our business, financial condition and results of operations. In particular, we face the following risks in connection with these factors, some of which are discussed at greater length in separate risk factors:

- Geopolitical tension and economic instability in countries around the world can at times increase the demand for low-risk investments, particularly in U.S. Treasuries and the dollar. A "flight to safety" has historically increased BNY Mellon's balance sheet, which has negatively impacted, and could continue to negatively impact, our leverage-based regulatory capital measures. A sustained "flight to safety" has historically triggered a decline in trading, capital markets and cross-border activity which would likely decrease our revenue, negatively impacting our results of operations, financial condition and, if sustained in the long term, our business.
- The fees earned by our Investment Management business are higher as assets under management and/or investment performance increase. Those fees are also impacted by the composition of the assets under management, with higher fees for some asset categories as compared to others. Uncertain and volatile capital markets could result in reductions in assets under management

because of investors' decisions to withdraw assets or from simple declines in the value of assets under management as markets decline. At Dec. 31, 2018, we estimate that a 5% change in global equity markets, spread evenly throughout the year, would impact fee revenue by less than 1% and diluted earnings per common share by $0.03 to $0.05.

- Market conditions resulting in lower transaction volumes could have an adverse effect on the revenues and profitability of certain of our businesses such as clearing, settlement, payments and trading.
- Uncertain and volatile capital markets, particularly declines, could reduce the value of our investments in securities, including pension and other post-retirement plan assets and produce downward pressure on our stock price and credit availability without regard to our underlying financial strength.
- Derivative instruments we hold to hedge and manage exposure to market risks including interest rate risk, equity price risk, foreign currency risk and credit risk associated with our products and businesses might not perform as intended or expected, resulting in higher realized losses and unforeseen stresses on liquidity. Our derivative-based hedging strategies also rely on the performance of counterparties to such derivatives. These counterparties may fail to perform for various reasons resulting in losses on under-collateralized positions.
- A decline in oil prices may continue to negatively impact capital markets and may impact the ability of certain of our clients, including oil and gas exploration and production companies and sovereign funds in oil-exporting countries, to continue using our services or repay outstanding loans. Increased defaults among oil and gas exploration and production companies may also negatively impact the high-yield market and our high-yield funds.
- The process we use to estimate our projected credit losses and to ascertain the fair value of securities held by us is subject to uncertainty in that it requires use of statistical models and difficult, subjective and complex judgments, including forecasts of economic conditions and how these conditions might impair the ability of our borrowers and others to meet their obligations. In uncertain and volatile capital markets, our ability to estimate our projected credit losses may be impaired, which could adversely affect our overall profitability and results of operations.

Our international clients accounted for 37% of our revenue in 2018. Given the scope of our global operations, clients and counterparties, persistent disruptions in the global financial markets, or the attempt of a country to abandon the euro or persistent weakness in a leading global currency could have a material adverse impact on our business or results of operations.

For a discussion of our management of market risk, see "Risk Management - Market risk."

Transitions away from, or changes in the calculation of, LIBOR and other benchmark rates could adversely impact our business and results of operations.

In 2017, the UK Financial Conduct Authority announced that it will no longer persuade or compel contributing banks to submit rates for the calculation of LIBOR after 2021. As a result, a transition is underway to move away from LIBOR and other interbank offered rates ("IBORs") to transaction-based alternative risk-free rates. This transition is further supported by the requirements of the EU Benchmarks Regulation ("BMR"), where IBORs which are not anchored in transaction-based data and rely on quotes or estimates submitted by contributing banks would not satisfy the relevant BMR requirements and would either need to be reformed or discontinued after 2019. Any change to any alternative rate or benchmark as a result of the move away from LIBOR or other IBOR or any other proposals for reform or other initiatives or investigations, further uncertainty in the timing and manner of implementation of such changes, or a waning recognition of LIBOR or other IBOR as an acceptable benchmark may cause LIBOR, the applicable or alternative rates or benchmarks to perform differently, or have other consequences which cannot be predicted. In the event any such benchmark or other referenced financial metric is significantly changed or discontinued (for example, in the transition away from LIBOR and other IBORs), or ceases to be recognized as an acceptable benchmark, there may be uncertainty as to the calculation of the applicable interest rate or payment amount, depending on the terms of the governing instrument.

As a result of our business activities and our underlying operations, we may be adversely impacted by the changes involving LIBOR and other benchmark rates. We are responsible for the use of benchmark rates in a variety of agency, trustee and other fiduciary capacities, as well as in our operational functions and could be subject to claims alleging that notwithstanding any uncertainty around the rate environment, we did not correctly discharge our responsibilities.

Fluctuations in interest rates triggered by the transition away from LIBOR and other benchmark rates could adversely affect the availability or cost of floating-rate funding. We could experience losses on a product or have to pay more or receive less on securities that we own or have issued. Mismatches may arise between existing IBOR-based and proposed alternative benchmark rates, based on a number of factors, including differences in currency denominations as between these rates, differences in the extent to which transactions that serve as the basis for such alternative benchmark rates may be secured or unsecured, and differences in the tenor of transactions that serve as the basis for alternative benchmark rates. Divergences between existing IBOR-based and proposed alternative benchmark rates may result in our hedges being ineffective. In addition, uncertainty relating to LIBOR or another benchmark could result in pricing volatility, increased capital requirements, loss of market share in certain products, adverse tax or accounting consequences, higher compliance, legal and operational costs, and risks associated with client disclosures, discretionary actions taken or negotiation of fallback provisions, as well as business continuity and systems and model disruption, all of which may adversely impact our business and results of operations.

The United Kingdom's referendum decision to leave the EU has had and may continue to have negative effects on global economic conditions, global financial markets, and our business and results of operations.

On March 29, 2019, the UK is scheduled to withdraw from the EU. There is a substantial risk that the UK and EU will not have ratified any terms for the UK's withdrawal from the EU by the scheduled withdrawal date. Further, the UK's withdrawal from the EU, and in particular the countries' failure to agree to terms, has created an uncertain political and economic environment in the UK, and may create such environments in other EU member states.

In anticipation of the UK's withdrawal from the EU, we have executed plans adjusting our business and operations so we may continue providing our products and services to our UK and EU clients. Our plans have been, and continue to be, based on the UK exiting the EU on March 29, 2019 without an agreement between the UK and EU on the terms of the withdrawal and therefore with no transition period. Accordingly, our plans assume that our UK subsidiaries will, on March 29, 2019, lose their EU financial services passport and as a result will not be able to provide regulated services into the EU without needing to obtain local authorization. BNY Mellon maintains a presence in the UK through the London branch of The Bank of New York Mellon and through The Bank of New York Mellon (International) Limited, which is a credit institution incorporated and authorized in the UK. BNY Mellon maintains a presence in the EU through The Bank of New York Mellon SA/NV ("BNY Mellon SA/NV"), which is headquartered in Belgium and has a branch network in a number of other EU countries. BNY Mellon SA/NV benefits from a general banking license for the provision of banking and investments services. We have undertaken, and continue to undertake, adjustments to the operations of BNY Mellon SA/NV so that it may provide a wider range of services to clients domiciled in the EU.

If the UK leaves the EU without an agreement, we, including our European affiliates, may face additional operational, regulatory and compliance costs, including costs relating to the transfer of business operations and, potentially, personnel from our UK operations to BNY Mellon SA/NV. The outcome of the UK's decision to exit the EU has also created uncertainty with regard to divergent regulatory standards, which may affect operational capabilities such as the transfer of data between the UK and EU after the UK leaves the EU. The effects of the UK's exit from the EU, including those described above, could adversely affect our business, results of operations and financial condition.

Changes in interest rates and yield curves could have a material adverse effect on our profitability.

We earn revenue, known as "net interest revenue," on the difference between the interest income earned on our interest-earning assets, such as the loans we make and the securities we hold in our investment securities portfolio, and the interest expense incurred on our interest-bearing liabilities, such as deposits and borrowed money. Our net interest margin, which is the result of dividing net interest revenue by average interest-earning assets, and our cash flows, are sensitive to changes in the spread between short-term and long-term interest rates (the "yield curve"). Our net interest margin tends to increase in a positive yield curve environment and decrease when the yield curve flattens or inverts. A flattening of the yield curve, on its own or together with a low interest rate environment, may adversely impact our revenue and results of operations by compressing our net interest spreads, particularly if we are unable to replace our higher-yielding maturing assets with assets of comparable yields, which will constrain our ability to achieve desired net interest margins.

The 100 basis point rise in rates in the past year, or future rate rises, could trigger one or more of the following, which could adversely impact our business, results of operations and financial condition, including:

- less liquidity in bonds and fixed-income funds in the case of a sharp rise in interest rates resulting in lower performance, yield and fees;
- increased number of delinquencies, bankruptcies or defaults and more nonperforming assets and net charge-offs, as borrowers may have more difficulty making higher interest payments;
- difficulty in modeling predicted deposit levels and depositor behavior, which could impact our ability to manage liquidity and capital;
- decreases in deposit levels and higher redemptions from our fixed-income funds or separate accounts, as clients move funds into investments with higher rates of return;
- decreases in stable deposit levels, which may result in further pressure on our LCR measure;
- a decline in our risk-based capital ratios;
- reduction in accumulated other comprehensive income ("OCI") in our shareholders' equity and therefore our tangible common equity due to the impact of rising long term rates on our available-for-sale securities in our investment portfolio; or
- higher funding costs.

A declining short-term rate environment will likely adversely impact our revenue and results of operations by:

- continued compression of our net interest spreads, depending on our balance sheet position;
- constraining our ability to achieve a net interest margin consistent with historical averages;
- sustained weakness of our spread-based revenues, resulting in continued voluntary waiving of particular fees on certain money market mutual funds and related distribution fees by us in order to prevent the yields on such funds from becoming uneconomic; and
- adversely impacting the value of fixed-rate mortgage-backed securities we hold if there are increases in mortgage prepayment speeds, which can be caused by refinancing activity.

Additionally, low short-term rates may result in excess deposits with high potential runoff rates, which in turn would increase our assets and result in further pressure on our LCR measure.

A more detailed discussion of the interest rate and market risks we face is contained in "Risk Management."

We may experience write-downs of securities that we own and other losses related to volatile and illiquid market conditions, reducing our earnings and impacting our financial condition.

We maintain an investment securities portfolio of various holdings, types and maturities. At Dec. 31, 2018, these securities were primarily classified as available-for-sale, which are recorded on our balance sheet at fair value with unrealized gains or losses reported as a component of accumulated other comprehensive income, net of tax. The securities in our held-to-maturity portfolio, recorded on our balance sheet at amortized cost, were $34.0 billion and comprised approximately 28% of our investment securities portfolio at Dec. 31, 2018. To the extent unhedged, the accounting and regulatory treatment of our investment securities portfolio in an available-for-sale accounting environment may have more volatility than a more traditional held-for-investment loan portfolio, or a securities portfolio comprised exclusively of U.S. Treasury securities.

Our investment securities portfolio represents a greater proportion of our consolidated total assets (approximately 33% at Dec. 31, 2018), and our loans represent a smaller proportion of our consolidated total assets (approximately 16% at Dec. 31, 2018), in comparison to many other major U.S. financial institutions due to our custody and trust bank business model. As such, our capital levels and results of operations and financial condition are materially exposed to the risks associated with our investment portfolio.

If any of our available-for-sale securities experience an other-than-temporary impairment, it would negatively impact our earnings. If our held-to-maturity securities experience a loss in fair value, it would negatively impact the fair value of our securities portfolio, although it would not impact our earnings unless a credit event occurred. Many of these securities experienced significant liquidity, valuation and credit quality deterioration during the 2008 financial crisis and could experience a similar deterioration in another financial crisis. U.S. state and municipal bonds have been experiencing stress in light of fiscal concerns.

Under the U.S. capital rules, after-tax changes in the fair value of available-for-sale investment securities are included in CET1 capital. Since loans held for investment, or securities in a held-to-maturity accounting classification, are not subject to a fair-value accounting framework, changes in the fair value of these instruments (other than incurred credit losses) are not similarly included in the determination of CET1 capital. As a result, we may experience increased variability in our CET1 capital relative to those other major financial institutions who maintain a lower proportion of their consolidated total assets in an available-for-sale accounting classification.

Generally, the fair value of available-for-sale securities in the securities portfolio is determined based upon market values available from third-party sources. During periods of market disruption, it may be difficult to value certain of our investment securities if trading becomes less frequent and/or market data becomes less observable. As a result, valuations may include inputs and assumptions that are less observable or require greater estimation and judgment as well as valuation methods which are more complex. These values may not be ultimately realizable in a market transaction, and such values may change very rapidly as market conditions change and valuation assumptions are modified. Decreases in value may have a material adverse effect on our results of operations or financial condition. If any of our securities suffer credit losses, as we experienced with some of our investments in 2009, we may recognize the credit losses as an other-than-temporary impairment which could impact our revenue in the quarter in which we recognize the losses. The decision on whether to record an other-than-temporary impairment or write-down is determined in part by management's assessment of the financial condition and prospects of a particular issuer, projections of future cash flows and recoverability of the particular security. Management's conclusions on such assessments are highly judgmental and include assumptions and projections of future cash flows which may ultimately prove to be incorrect as assumptions, facts and circumstances change. On the other hand, securities held in a held-to-maturity accounting environment are limited in the actions we can take absent a significant deterioration in the issuer's creditworthiness. Therefore, we may be constrained in our ability to liquidate a held-to-maturity security that is deteriorating in value, which would negatively impact the fair value of our securities portfolio. If our determinations change about our intention or ability to not sell securities that have experienced a reduction in fair value below their amortized cost, we could be required to recognize an other-than-temporary loss in earnings for the entire difference between fair value and amortized cost.

For information regarding our investment securities portfolio, refer to "Consolidated balance sheet review - Investment securities" and for information regarding the sensitivity of and risks associated with the market value of portfolio investments and interest rates, refer to "Critical accounting estimates - Fair value - Securities."

Our FX revenue may be adversely affected by decreases in market volatility and the cross-border investment activity of our clients.

Our foreign exchange trading generates revenues which are primarily driven by the volume of client transactions and the spread realized on these transactions, both of which are impacted by market volatility and the impact of foreign exchange hedging activities. Our clients' cross-border investing activity could decrease in reaction to economic and political uncertainties, including changes in laws or regulations governing cross-border transactions, such as currency controls or tariffs. Uncertainties resulting from terrorist attacks, military actions and other events may also negatively affect cross-border investments activity, which could negatively impact revenue.

Volumes and/or spreads in some of our products tend to benefit from currency volatility and are likely to decrease during times of lower currency volatility. Our revenues also depend on our ability to manage the risk associated with the currency transactions we execute and program pricing.

Furthermore, a shift by custody clients from the standing instruction programs to other trading options combined with competitive market pressures on the foreign exchange business may negatively impact our FX revenue. Continued growth of electronic FX trading capabilities is resulting in a shift of volume to lower margin channels.

Credit and Liquidity Risk

The failure or perceived weakness of any of our significant counterparties, many of whom are major financial institutions and sovereign entities, and our assumption of credit and counterparty risk, could expose us to loss and adversely affect our business.

We have exposure to clients and counterparties in many different industries, particularly financial institutions, as a result of trading, clearing and financing, providing custody services, securities lending services or other relationships. We routinely execute transactions with global clients and counterparties in the financial industry as well as sovereigns and other governmental or quasi-governmental entities. Our direct exposure consists of the extension of secured and unsecured credit to clients and use of our balance sheet. In addition to traditional credit activities, we also extend intraday credit in order to facilitate our various processing, settlement and intermediation activities. Our ability to engage in funding or other transactions could be adversely affected by the actions and commercial soundness of other financial institutions or sovereign entities, as defaults or non-performance (or even uncertainty concerning such default or non-performance) by one or more financial institutions, or the financial services industry generally, have in the past led to market-wide liquidity problems and could lead to losses or defaults by us or by other institutions (including our counterparties and/or clients) in the future. The consolidation and failures of financial institutions during the 2008 financial crisis increased the concentration of our client and counterparty risk.

As a result of our membership in several industry clearing or settlement exchanges and central counterparty clearinghouses, we may be required to guarantee obligations and liabilities or provide financial support in the event that other members do not honor their obligations or default. These obligations may be limited to members that dealt with the defaulting member or to the amount (or a multiple of the amount) of our contribution to a clearing or settlement exchange guarantee fund, or, in a few cases, the obligation may be unlimited.

The degree of client demand for short-term credit also tends to increase during periods of market turbulence, exposing us to further credit-related risks. For example, investors in mutual funds for which we act as custodian may engage in significant redemption activity due to adverse market or economic conditions. We may then extend intraday credit to our fund clients in order to facilitate their ability to pay such redemptions. This may negatively impact our leverage-based capital ratios, and in times of sustained market volatility, may result in significant leverage-based ratio declines.

When we provide credit to clients in connection with providing cash management, clearing, custodial and other services, we are exposed to potential loss if the client experiences credit difficulties. We are also generally not able to net exposures across affiliated clients or counterparties and may not be able to net exposures to the same legal entity across multiple products. In addition, we may incur a loss in relation to one entity or product even though our exposure to one of the entities' affiliates is over-collateralized. Moreover, not all of our client or counterparty exposure is secured.

In our agency securities lending program, we act as lender's agent on behalf of our clients, the lenders of securities, in securities lending transactions with our clients' counterparties (including broker-dealers), acting as borrowers, wherein securities are lent by our clients and the securities loans are collateralized by cash or securities posted by such counterparties. Typically, in the case of cash collateral, our clients authorize us as their agent to invest the cash collateral in approved investments pursuant to each client's investment guidelines and instructions. Such approved investments may include reverse repurchase transactions with repo counterparties. In many cases, in the securities loans we enter into on behalf of our clients, we contractually agree to replace the client's loaned securities that the borrower failed to return due to certain defaults by the borrower, mainly the borrower's insolvency. Therefore, in situations where the market value of the loaned securities that the borrower failed to return to a client (which loaned securities we are obligated to replace and return to the client) exceeds the amount of proceeds resulting from the liquidation of the client's approved investments and cash and non-cash collateral of such client, we may be responsible for the shortfall amount necessary to purchase any replacement securities. In addition, in certain cases, we may also undertake the risk of loss in certain circumstances related to approved investments that are reverse repurchase transactions as described above. In these two scenarios, we, rather than our clients, are exposed to the risks of the defaulting counterparty in the securities lending transactions and, where applicable, in the reverse repurchase transactions. For further discussion on our securities lending indemnifications, see "Commitments and contingent liabilities - Off-balance sheet arrangements" in Note 21 of the Notes to Consolidated Financial Statements.

From time to time, we assume concentrated credit risk at the individual obligor, counterparty or group level, potentially exposing us to a single market or political event or a correlated set of events. For example, we may be exposed to defaults by companies located in countries with deteriorating economic conditions or by companies in certain industries. Such concentrations may be material. Our material counterparty exposures change daily, and the counterparties or groups of related counterparties to which our risk exposure is material also vary during any reported period; however, our largest exposures tend to be to other financial institutions, clearing organizations, and governmental entities, both inside and outside the U.S. Concentration of counterparty exposure presents significant risks to us and to our clients because the failure or perceived weakness of our counterparties (or in some cases of our clients' counterparties) has the potential to expose us to risk of financial loss. Changes in market perception of the financial strength of particular financial institutions or sovereign issuers can occur rapidly, are often based on a variety of factors and are difficult to predict.

Although our overall business is subject to these interdependencies, several of our businesses are particularly sensitive to them, including our currency and other trading activities, our securities lending and securities finance businesses and our investment management business. If we experience any of the losses described above, it may materially and adversely affect our results of operations.

We are also subject to the risk that our rights against third parties may not be enforceable in all circumstances. In addition, deterioration in the credit quality of third parties whose securities or obligations we hold, including a deterioration in the value of collateral posted by third parties to secure their obligations to us under derivatives contracts and other agreements, could result in losses and/or adversely affect our ability to rehypothecate or otherwise use those securities or obligations for liquidity purposes. Disputes with clients and counterparties as to the valuation of collateral can significantly increase in times of market stress and illiquidity. In addition, disruptions in the liquidity or transparency of the financial markets may result in our inability to sell, syndicate or realize the value of our positions, thereby leading to increased concentrations. An inability to reduce our positions may not only increase the market and credit risks associated with such positions, but may also increase the level of RWA on our balance sheet, thereby increasing our capital requirements and funding costs, all of which could adversely affect the operations and profitability of our businesses.

Under evolving regulatory restrictions on credit exposure, which include a broadening of the measure of credit exposure, we may be required to limit our exposures to specific obligors or groups, including financial institutions, to levels that we may currently exceed. These credit exposure restrictions under such evolving regulations may adversely affect our businesses and may require us to modify our operating models or the policies and practices we use.

Our business, financial condition and results of operations could be adversely affected if we do not effectively manage our liquidity.

BNY Mellon's operating model and overall strategy rely heavily on our access to financial market utilities and global capital markets. Without such access, it would be difficult to process payments and settle and clear transactions on behalf of our clients. Deterioration in our liquidity position, whether actual or perceived, can impact our market access by affecting participants' willingness to transact with us. Changes to our liquidity can be caused by various factors, such as funding mismatches, market constraints disabling asset to cash conversion, inability to issue debt, run-off of core deposits, and contingent liquidity events such as additional collateral posting. Changes in economic conditions or exposure to credit, market, operational, legal and reputational risks can also affect our liquidity.

Our business is dependent in part on our ability to meet our cash and collateral obligations at a reasonable cost for both expected and unexpected cash flows. We also must manage liquidity risks on an intraday basis, in a manner designed to ensure that we can access required funds during the business day to make payments or settle immediate obligations, often in real time. We receive client deposits through a variety of investment management and investment servicing businesses and we rely on those deposits as a low-cost and stable source of funding. Our ability to continue to receive those deposits, and other short-term funding sources, is subject to variability based on a number of factors, including volume and volatility in the global securities markets, the relative interest rates that we are prepared to pay for those deposits, and the perception of the safety of those deposits or other short-term obligations relative to alternative short-term investments available to our clients. We could lose deposits if we suffer a significant decline in the level of our business activity, our credit ratings are materially downgraded, interest rates rise, or we are subject to significant negative press or significant regulatory action or litigation, among other reasons. If we were to lose a significant amount of deposits we may need to replace such funding with more expensive funding and/or reduce assets, which would reduce our net interest revenue.

In addition, our access to the debt capital markets is a significant source of liquidity. Events or circumstances often outside of our control, such as market disruptions, government fiscal and monetary policies, or loss of confidence by securities purchasers or counterparties in us or in the funds markets, could limit our access to capital markets, increase our cost of borrowing, adversely affect our liquidity, or impair our ability to execute our business plan. In addition, clearing organizations, regulators, clients and financial institutions with which we interact may exercise the right to require additional collateral based on market perceptions or market conditions, which could further impair our access to and cost of funding. Market perception of sovereign default risks can also lead to inefficient money markets and capital markets, which could further impact BNY Mellon's funding availability and cost. Conversely, if we experience excess liquidity inflows, it could increase interest expense, limit our financial flexibility, and increase the size of our total assets in a manner that could have a negative impact on our capital ratios.

Under the U.S. capital rules, the size of the capital surcharge that applies to U.S. G-SIBs is based in part on its reliance on short-term wholesale funding, including certain types of deposit funding, which may increase the cost of such funding. Furthermore, certain non-U.S. authorities, including the European Commission, have proposed legislation or regulations requiring large banks to incorporate a separate subsidiary in countries in which they operate, and to maintain independent capital and liquidity at foreign subsidiaries. If adopted, these requirements could hinder our ability to efficiently manage our funding and liquidity in a centralized manner. There can be no assurances that these measures will be successful in limiting BNY Mellon's liquidity risk.

In addition, our cost of funding could be affected by actions that we may take in order to satisfy applicable LCR and NSFR requirements, to lower our G-SIB surcharge, to satisfy the amount of eligible long-term debt outstanding under the TLAC Rule, to address obligations under our resolution plan or to satisfy regulatory requirements in non-U.S. jurisdictions relating to the pre-positioning of liquidity in certain subsidiaries.

If we are unable to raise funds using the methods described above, we would likely need to finance or liquidate unencumbered assets, such as our central bank deposits and bank placements, or securities in our investment portfolio to meet funding needs. We may be unable to sell some of our assets, or we may have to sell assets at a discount from market value, either of which could adversely affect our financial condition and results of operations. Further, our ability to sell assets may be impaired if other market participants are seeking to sell similar assets at the same time, which could occur in a liquidity or other market crisis. Additionally, if we experience cash flow mismatches, deposit run-off or market constraints resulting from our inability to convert assets to cash or access capital markets, our liquidity could be severely impacted. During periods of market uncertainty, our level of client deposits has in recent years tended to increase; however, because these deposits have high potential run-off rates, we have historically deposited these so-called excess deposits with central banks and in other highly liquid and low-yielding instruments.

If we are unable to continue to fund our assets through deposits or access capital markets on favorable terms or if we suffer an increase in our borrowing costs or otherwise fail to manage our liquidity effectively, our liquidity, net interest margin, financial results and condition may be materially adversely affected. In certain cases, this could require us to raise additional capital through the issuance of preferred or common stock, which could dilute the ownership of existing stockholders, and/or reduce our common stock dividend to preserve capital.

For a further discussion of our liquidity, see "Liquidity and dividends."

We could incur losses if our allowance for credit losses, including loan and lending-related commitments reserves, is inadequate.

When we loan money, commit to loan money or provide credit or enter into another contract with a counterparty, we incur credit risk, or the risk of loss if our borrowers do not repay their loans or our counterparties fail to perform according to the terms of their agreements. Our revenues and profitability are adversely affected when our borrowers default, in whole or in part, on their loan obligations to us or when there is a significant deterioration in the credit quality of our loan portfolio. We reserve for potential future credit losses by recording a provision for credit losses through a charge to earnings. The allowance for loan losses and allowance for lending-related commitments represents management's estimate of probable losses inherent in our credit portfolio. We use a quantitative methodology and qualitative framework for determining the allowance for loan losses and the allowance for lending-related commitments. Within this qualitative framework, management applies judgment when assessing internal risk factors and environmental factors to compute an additional allowance for each component of the loan portfolio. As is the case with any such judgments, we could fail to identify these factors or accurately estimate their impact. We cannot provide any assurance as to whether charge-offs related to our credit exposure may occur in the future. Current and future market and economic developments may increase default and delinquency rates and negatively impact the quality of our credit portfolio, which may impact our charge-offs. Although our current estimates contemplate current conditions and how we expect them to change in the future, it is reasonably possible that actual conditions could be worse than anticipated in those estimates, which could materially affect our results of operations and financial condition. See "Critical accounting estimates."

Any material reduction in our credit ratings or the credit ratings of our principal bank subsidiaries, The Bank of New York Mellon or BNY Mellon, N.A., could increase the cost of funding and borrowing to us and our rated subsidiaries and have a material adverse effect on our results of operations and financial condition and on the value of the securities we issue.

Our debt and preferred stock and the debt and deposits of our principal bank subsidiaries, The Bank of New York Mellon and BNY Mellon, N.A., are currently rated investment grade by the major rating agencies. These rating agencies regularly evaluate us and our rated subsidiaries and their outlook on us and our rated subsidiaries. Their credit ratings are based on a number of factors, including our financial strength, performance, prospects and operations as well as factors not entirely within our control, including conditions affecting the financial services industry generally as well as the U.S. government. Rating agencies employ different models and formulas to assess the financial strength of a rated company, and from time to time rating agencies have, in their discretion, altered these models. Changes to rating agency models, general economic conditions, or other circumstances outside of our control could impact a rating agency's judgment of the rating or outlook it assigns us or our rated subsidiaries. There can be no assurance that we or our rated subsidiaries will maintain our respective credit ratings or outlook on our securities.

A material reduction in our credit ratings or the credit ratings of our rated subsidiaries, which can occur at any time without notice, could have a material adverse effect on our access to credit markets, the related cost of funding and borrowing, our credit spreads, our liquidity and on certain trading revenues, particularly in those businesses where counterparty creditworthiness is critical. In addition, in connection with certain over-the-counter derivatives contracts and other trading agreements, counterparties may require us or our rated subsidiaries to provide additional collateral or to terminate these contracts and agreements and collateral financing arrangements in the event of a credit ratings downgrade below certain ratings levels. The requirement to provide additional collateral or terminate these contracts and agreements could impair our liquidity by requiring us to find other sources of financing or to make significant cash payments or securities movements. A downgrade by any one rating agency, depending on the agency's relative ratings of the firm at the time of the downgrade, may have an impact comparable to the impact of a downgrade by all rating agencies. If a rating agency downgrade were to occur during broader market instability, our options for responding to events may be more limited and more expensive. An increase in the costs of our funding and borrowing, or an impairment of our liquidity, could have a material adverse effect on our results of operations and financial condition. A material reduction in our credit ratings also could decrease the number of investors and counterparties willing or permitted to do business with or lend to us and adversely affect the value of the securities we have issued or may issue in the future.

We cannot predict what actions rating agencies may take, or what actions we may elect or be required to take in response thereto, which may adversely affect us. For further discussion on the impact of a credit rating downgrade, see "Disclosure of contingent features in OTC derivative instruments" in Note 22 of the Notes to Consolidated Financial Statements.

Strategic Risk

New lines of business, new products and services or transformational or strategic project initiatives may subject us to additional risks, and the failure to implement these initiatives could affect our results of operations.

From time to time, we may launch new lines of business, offer new products and services within existing lines of business or undertake transformational or strategic projects. There are substantial risks and uncertainties associated with these efforts. We invest significant time and resources in developing and marketing new lines of business, products and services and executing on our transformational and strategic initiatives. For example, we have devoted considerable resources to developing new technology solutions for our clients. If these technology solutions are not successful, it could adversely impact our reputation, business and results of operations.

Regulatory requirements can affect whether initiatives are able to be brought to market in a manner that is timely and attractive to our customers. Initial timetables for the development and introduction of new lines of business or new products or services and price and profitability targets may not be met. Furthermore, our revenues and costs may fluctuate because new businesses or products and services generally require startup costs while revenues may take time to develop, which may adversely impact our results of operations.

From time to time we undertake transformational or strategic project initiatives. Significant effort and resources are necessary to manage and oversee the successful completion of these initiatives. These initiatives often place significant demands on management and a limited number of employees with subject matter expertise and may involve significant costs to implement as well as increase operational risk as employees learn to process transactions under new systems. The failure to properly execute on these transformational or strategic initiatives could adversely impact our business, reputation and results of operations.

Legal, regulatory and reputational risks may also exist in connection with dealing with new products or markets, or clients and customers whose businesses focus on such products or markets, where there is regulatory uncertainty or different or conflicting regulations depending on the regulator or the jurisdiction.

We are subject to competition in all aspects of our business, which could negatively affect our ability to maintain or increase our profitability.

Many businesses in which we operate are intensely competitive around the world. Competitors include other banks, trading firms, broker-dealers, investment banks, asset managers, insurance companies, financial technology firms and a variety of other financial services and advisory companies whose products and services span the markets in which we operate. We compete on the basis of a number of factors, including transaction execution, capital or access to capital, products and services, innovation, reputation, lending limits, rates and price. Larger and more geographically diverse companies, and financial technology firms that invest substantial resources in developing and designing new technology (in particular digital and mobile technology) and that are not subject to the same level of regulation, may be able to offer financial products and services at more competitive prices than we are able to offer. Pricing pressures, as a result of the willingness of competitors to offer comparable or improved products or services at a lower price, may result in a reduction in the price we can charge for our products and services, which could, and in some cases has, negatively affected our ability to maintain or increase our profitability. Low economic growth may result in clients exiting markets, which could lead to a loss of business for us.

In addition, technological advances have made it possible for other types of non-depository institutions, such as financial technology firms, outsourcing companies and data processing companies, to offer a variety of products and services competitive with certain areas of our business. In the future, financial technology firms may be able to provide additional traditional banking products and services by obtaining a bank-like charter, such as the OCC's fintech charter.

Markets, and the manner in which our clients interact and transact within markets, can evolve quickly, particularly if new or disruptive technologies are introduced. Our failure to either anticipate, or participate in, the transformational change within a given market could result in potential negative financial impact. Competitors may develop technological advances that could negatively impact our transaction execution or the pricing of our clearing, settlement, payments and trading activities. Increased competition in any of these areas may require us to make additional capital investments in our businesses in order to remain competitive. For example, along with other financial institutions, we are researching ways to adapt robotics and distributed ledger technology to bank services. If we are not able to adapt these technologies as successfully as our peers, we may become less competitive. In addition, even if successful from a competitive standpoint, the use and implementation of new and emerging technologies may increase the risk that we experience cybersecurity or other information technology events.

Furthermore, recently implemented and proposed regulations may impact our ability to conduct certain of our businesses in a cost-effective manner or at all. The more restrictive laws and regulations applicable to the largest U.S. financial services institutions, including the U.S. capital rules, can put us at a competitive disadvantage relative to both our non-U.S. competitors and certain U.S. competitors. See "Supervision and Regulation."

Our business may be adversely affected if we are unable to attract and retain employees.

Our success depends, in large part, on our ability to attract new employees, retain and motivate our existing employees, and continue to compensate our employees competitively amid heightened regulatory restrictions. Competition for the most skilled employees in most activities in which we engage can be intense, and we may not be able to recruit and retain key personnel.

We rely on certain employees with subject matter expertise to assist in the implementation of important initiatives. As technology and risk management increase in focus in the financial industry, competition for technologists and risk personnel has intensified, which could constrain our ability to execute on certain of our strategic initiatives.

Our ability to attract and retain key executives and other employees may be negatively affected by recent legislation and other existing restrictions applicable to incentive and other compensation programs, including limits on our ability to deduct for federal income tax purposes compensation in excess of $1 million paid to certain current and former executives, as well as deferral, clawback requirements and other limits on incentive compensation. Some of these restrictions may not apply to some of our competitors and to other institutions with which we compete for talent, in particular as we are more often competing for personnel with financial technology providers and other entities that are not regulated banking organizations that may not have the same limitations on compensation as we do.

The loss of employees' skills, knowledge of the market, industry experience, and the cost of finding replacements may hurt our business. If we are unable to continue to attract and retain highly qualified employees, our performance, including our competitive position, could be adversely affected.

Our strategic transactions present risks and uncertainties and could have an adverse effect on our business, results of operations and financial condition.

From time to time, to achieve our strategic objectives, we have acquired, disposed of, or invested in (including through joint venture relationships) companies and businesses, and may do so in the future. Our ability to pursue or complete strategic transactions is in certain instances subject to regulatory approval and we cannot be certain when or if, or on what terms and conditions, any required regulatory approvals would be granted. Moreover, to the extent we pursue a strategic transaction, there can be no guarantee that the transaction will close when anticipated, or at all. If a strategic transaction does not close, or if the strategic transaction fails to maximize shareholder value or required regulatory approval is not obtained, it could have an adverse effect on our business, results of operations and financial condition.

Each acquisition poses integration challenges, including successfully retaining and assimilating clients and key employees, capitalizing on certain revenue synergies and integrating the acquired company's culture, control functions, systems and technology. In some cases, acquisitions involve entry into new businesses or new geographic or other markets, and these situations also present risks and uncertainties in instances where we may be inexperienced in these new areas. We may be required to spend a significant amount of time and resources to integrate these acquisitions. The anticipated integration benefits may take longer to achieve than projected and the time and cost needed to consolidate control functions, platforms and systems may significantly exceed our estimates. If we fail to successfully integrate strategic acquisitions, including doing so in a timely and cost-effective manner, we may not realize the expected benefits, which could have an adverse impact on our business, financial condition and results of operations. In addition, we may incur expenses, costs, losses, penalties, taxes and other liabilities related to the conduct of the acquired businesses prior to the date of our ownership (including in connection with the defense and/or settlement of legal and regulatory claims, investigations and proceedings) which may not be recoverable through indemnification or otherwise. If the purchase price we pay in an acquisition exceeds the fair value of assets acquired less the liabilities we assume, then we may need to recognize goodwill on our consolidated balance sheet. Goodwill is an intangible asset that is not eligible for inclusion in regulatory capital under applicable requirements. Further, if the value of the acquisition declines, we may be required to record an impairment charge.

Each disposition also poses challenges, including separating the disposed businesses, products and systems in a way that is cost-effective and is not disruptive to us or our customers. In addition, the inherent uncertainty involved in the process of evaluating, negotiating or executing a potential sale of one of our companies or businesses may cause the loss of key clients, employees and business partners which could have an adverse impact on our business, financial condition and results of operations.

Joint ventures and non-controlling investments contain potentially increased financial, legal, reputational, operational, regulatory and/or compliance risks. We may be dependent on joint venture partners, controlling shareholders or management who may have business interests, strategies or goals that are inconsistent with ours. Business decisions or other actions or omissions of the joint venture partner, controlling shareholders or management may adversely affect the value of our investment, impacting our results of operations, result in litigation or regulatory action against us and otherwise damage our reputation and brand.

Other Risks

Tax law changes or challenges to our tax positions with respect to historical transactions may adversely affect our net income, effective tax rate and our overall results of operations and financial condition.

In 2017, U.S. tax legislation was signed into law, resulting in tax benefits to us. We continue to monitor the tax impacts of additional guidance provided by the Internal Revenue Service with respect to this and other tax laws. Future tax laws or the expiration of or changes in existing tax laws, or the interpretation of those laws worldwide, could also have a material impact on our business or net income. Our actions taken in response to, or reliance upon, such changes in the tax laws may impact our tax position in a manner that may result in lower earnings.

In the course of our business, we receive inquiries and challenges from both U.S. and non-U.S. tax authorities on the amount of taxes we owe. If we are not successful in defending these inquiries and challenges, we may be required to adjust the timing or amount of taxable income or deductions or the allocation of income among tax jurisdictions, all of which can require a greater provision for taxes or otherwise negatively affect earnings. Probabilities and outcomes are reviewed as events unfold, and adjustments to the reserves are made when necessary, but the reserves may prove inadequate because we cannot necessarily accurately predict the outcome of any challenge, settlement or litigation or the extent to which it will negatively affect us or our business. See Note 11 of the Notes to Consolidated Financial Statements for further information.

Our ability to return capital to shareholders is subject to the discretion of our Board of Directors and may be limited by U.S. banking laws and regulations, including those governing capital and the approval of our capital plan, applicable provisions of Delaware law or our failure to pay full and timely dividends on our preferred stock.

Holders of our common and preferred stock are only entitled to receive such dividends or other distributions of capital as our Board of Directors may declare out of funds legally available for such payments. Although we have historically declared cash dividends on our common and preferred stock, we are not required to do so. In addition to the Board of Directors' approval, our ability to take certain actions, including our ability to make certain acquisitions, declare dividends or repurchase our common stock, is dependent on, among other things, Federal Reserve non-objection under the annual regulatory review of the results of the CCAR process and the supervisory stress tests required under the Dodd-Frank Act. These evaluations, in turn, are dependent on, among other things, our successful demonstration that we can maintain capital levels above regulatory minimums in the event of a stressed market environment, as well as the Federal Reserve's qualitative assessment of the robustness of our capital adequacy process and the assumptions and analysis underlying the capital plan. There can be no assurance that the Federal Reserve will not object to our future capital plans or that we will perform adequately on our supervisory stress tests. If the Federal Reserve objects to our proposed capital actions or we underperform on our stress tests, we may be required to revise our stress-testing or capital management approaches, resubmit our capital plan or postpone, or cancel or alter our planned capital actions, and we would not be permitted to make any capital distributions other than those to which the Federal Reserve has indicated in writing its non-objection. In addition, if there have been or will be changes in our risk profile (including a material change in business strategy or risk exposure), financial condition or corporate structure, we may be required to resubmit our capital plan to the Federal Reserve.

Our ability to accurately predict or explain the outcome of the CCAR process is influenced by evolving supervisory criteria. The Federal Reserve's annual assessment of our capital adequacy and planning process involves not only a quantitative assessment through the Federal Reserve's proprietary stress test models but also a qualitative assessment. The qualitative assessment involves a number of factors and is expected to continue to evolve on an ongoing basis as a result of the Federal Reserve's horizontal review of capital plan submissions. Similarly, the Federal Reserve may, as part of its stated goal to continually evolve its annual stress testing requirements, adjust several parameters of the annual stress testing process, including the severity of the stress test scenario and the addition of components deemed important by the Federal Reserve (e.g., a counterparty failure). Further, because the Federal Reserve's proprietary stress test models and qualitative assessment may differ from the modeling techniques and capital planning practices employed by us, it is foreseeable that our stress test results (using our own models, estimation methodologies and processes) may not be consistent with those disclosed by the Federal Reserve. In addition, the Federal Reserve has proposed to replace the capital conservation buffer with a "stress capital buffer," which would result in the integration of the G-SIB surcharge with stress-based capital requirements.

The Federal Reserve's instructions for the 2018 CCAR provide that, for large BHCs like BNY Mellon, common stock dividend payout ratios exceeding 30% of after-tax net income available to common shareholders under certain baseline scenarios will receive particularly close scrutiny. A failure to increase dividends along with our competitors, or any reduction of, or elimination of, our common stock dividend would likely adversely affect the market price of our common stock, impact our return on equity and market perceptions of BNY Mellon.

Our ability to declare or pay dividends on, or purchase, redeem or otherwise acquire, shares of our common stock or any of our shares that rank junior to preferred stock as to the payment of dividends and/or the distribution of any assets on any liquidation, dissolution or winding-up of BNY Mellon will be prohibited, subject to certain exceptions, in the event that we do not declare and pay in full dividends for the then-current dividend period of our Series A preferred stock or the last preceding dividend period of our Series C, Series D, Series E or Series F preferred stock.

In addition, regulatory capital rules that are or will be applicable to us including the U.S. capital rules risk-based capital requirements, the SLR, enhanced SLR, the TLAC Rule and the U.S. G-SIB surcharge may limit or otherwise restrict how we utilize our capital, including common stock dividends and stock repurchases, and may require us to increase or alter the mix of our outstanding regulatory capital instruments.

Any requirement to increase our regulatory capital ratios or alter the composition of our capital could require us to liquidate assets or otherwise change our business and/or investment plans, which may negatively affect our financial results. Further, any requirement to maintain higher levels of capital may constrain our ability to return capital to shareholders either in the form of common stock dividends or stock repurchases.

The Parent is a non-operating holding company, and as a result, is dependent on dividends from its subsidiaries and extensions of credit from its IHC to meet its obligations, including with respect to its securities, and to provide funds for share repurchases and payment of dividends to its stockholders.

The Parent is a non-operating holding company, whose principal assets and sources of income are its principal U.S. bank subsidiaries - The Bank of New York Mellon and BNY Mellon, N.A. - and its other subsidiaries, including the IHC. The Parent is a legal entity separate and distinct from the IHC, as well as its banks and other subsidiaries. Therefore, the Parent primarily relies on dividends, interest, distributions, and other payments from its subsidiaries, including extensions of credit from the IHC, to meet its obligations, including its obligations with respect to its securities, and to provide funds for share repurchases and payment of common and preferred dividends to its stockholders, to the extent declared by the Board of Directors.

There are various limitations on the extent to which our bank and other subsidiaries can finance or otherwise supply funds to the Parent (by dividend or otherwise) and certain of our affiliates. Each of these restrictions can reduce the amount of funds available to meet the Parent's obligations. Many of our subsidiaries, including our bank subsidiaries, are subject to laws and regulations that restrict dividend payments or authorize regulatory bodies to block or reduce the flow of funds from those subsidiaries to the Parent or other subsidiaries. In addition, our bank subsidiaries would not be permitted to distribute a dividend if doing so would constitute an unsafe and unsound practice or if the payment would reduce their capital to an inadequate level. Our subsidiaries may also choose to restrict dividend payments to the Parent in order increase their own capital or liquidity levels. Our bank subsidiaries are also subject to restrictions on their ability to lend to or transact with non-bank affiliates, minimum regulatory capital and liquidity requirements, and restrictions on their ability to use funds deposited with them in bank or brokerage accounts to fund their businesses. See "Supervision and Regulation" and "Liquidity and dividends" and Note 18 of the Notes to Consolidated Financial Statements. Further, we evaluate and manage liquidity on a legal entity basis, which may place legal and other limitations on our ability to utilize liquidity from one legal entity to satisfy the liquidity requirements of another, including the Parent.

There are also limitations specific to the IHC's ability to make distributions or extend credit to the Parent. The IHC is not permitted to pay dividends to the Parent if certain key capital, liquidity and operational risk indicators are breached, and if the resolution of the Parent is imminent, the committed lines of credit provided by the IHC to the Parent will automatically terminate, with all outstanding amounts becoming due. See "The application of our Title I preferred resolution strategy or resolution under the Title II orderly liquidation authority could adversely affect the Parent's liquidity and financial condition and the Parent's security holders."

Because the Parent is a holding company, its rights and the rights of its creditors, including the holders of its securities, to a share of the assets of any subsidiary upon the liquidation or recapitalization of the subsidiary will be subject to the prior claims of the subsidiary's creditors (including, in the case of our banking subsidiaries, their depositors) except to the extent that the Parent may itself be a creditor with recognized claims against the subsidiary. The rights of holders of securities issued by the Parent to benefit from those distributions will also be junior to those prior claims. Consequently, securities issued by the Parent will be effectively subordinated to all existing and future liabilities of our subsidiaries.

Changes in accounting standards governing the preparation of our financial statements and future events could have a material impact on our reported financial condition, results of operations, cash flows and other financial data.

From time to time, the FASB, the SEC and bank regulators change the financial accounting and reporting standards governing the preparation of our financial statements or the interpretation of those standards. These changes are difficult to predict and can materially impact how we record and report our financial condition, results of operations, cash flows and other financial data. In some cases, we may be required to apply a new or revised standard retrospectively or to apply an existing standard differently, also retrospectively, in each case potentially resulting in the restatement of our prior period financial statements and our related disclosures.

Additionally, our accounting policies and methods are fundamental to how we record and report our financial condition and results of operations. The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates based upon assumptions about future economic and market conditions which affect reported amounts and related disclosures in our financial statements. Amounts subject to estimates are items such as the allowance for loan losses and lending-related commitments, the fair value of financial instruments and derivatives, goodwill and other intangibles and litigation and regulatory contingencies. Among other effects, such changes in estimates could result in future impairments of, goodwill and intangible assets and establishment of allowances for loan losses and lending-related commitments as well as litigation and regulatory contingencies. If subsequent events occur that are materially different than the assumptions and estimates we used, our reported financial condition, results of operation and cash flows may be materially negatively impacted. See "Recent Accounting Developments" for a discussion of recent developments to our accounting standards.

Recently issued accounting standards

The following ASUs issued by the Financial Accounting Standards Board ("FASB") have not yet been adopted.

ASU 2016-02, Leases

In February 2016, the FASB issued an ASU, *Leases*. The primary objective of this ASU is to increase transparency and comparability by recognizing lease assets and liabilities on the balance sheet and expand related disclosures. This ASU requires a "right-of-use" asset and a payment obligation liability on the balance sheet for most leases and subleases. Additionally, depending on the lease classification under the standard, it may result in different expense recognition patterns and classification than under existing accounting principles. For leases classified as finance leases, it will result in higher expense recognition in the earlier periods and lower expense in the later periods of the lease.

The Company adopted this guidance on Jan. 1, 2019 using the alternative transition method, which allows the adoption of the accounting standard prospectively without adjusting comparative prior period financial information. We recognized right-of-use assets of $1.3 billion and lease liabilities of $1.5 billion on the consolidated balance sheet, both based on the present value of the expected remaining lease payments.

ASU 2018-02, Income Statement—Reporting Comprehensive Income: Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income

In February 2018, the FASB issued an ASU, *Income Statement—Reporting Comprehensive Income: Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income.* This ASU permits a reclassification from accumulated other comprehensive income to retained earnings for the tax effects of items within accumulated other comprehensive income that do not reflect the lower statutory tax rate which was enacted by the U.S. tax legislation. BNY Mellon adopted this guidance in the first quarter of 2019, which resulted in a $90 million reclassification from accumulated other comprehensive income to retained earnings.

ASU 2016-13, Financial Instruments – Credit Losses: Measurement of Credit Losses on Financial Instruments

In June 2016, the FASB issued an ASU, *Financial Instruments – Credit Losses: Measurement of Credit Losses on Financial Instruments*. This ASU introduces a new current expected credit losses model, which will apply to financial assets subject to credit losses and measured at amortized cost, including held-to-maturity securities and certain off-balance sheet credit exposures. The guidance will also change current practice for the impairment model for available-for-sale debt securities. The available-for-sale debt securities model will require the use of an allowance to record estimated credit losses and subsequent recoveries.

The standard requires a cumulative effect of initial application to be recognized in retained earnings at the date of initial application. BNY Mellon has developed expected credit loss models and approaches that include forecasting and other methodologies, and our focus for the remainder of 2019 is on model validation as well as business process refinements and testing to ensure the expected credit losses are calculated in accordance with the standard. We are continuing to assess the impact of the standard on our consolidated financial statements, disclosures and internal control. The adoption impact will depend on several factors including the composition and remaining expected lives of financial instruments at the time of adoption, the establishment of an allowance for expected credit losses on held-to-maturity securities, and the macroeconomic conditions and forecasts that exist at that date. We plan to adopt the new standard on Jan. 1, 2020.

Business continuity and operational resiliency are priorities for the Company. Core elements of our business continuity and operational resiliency strategies include advance planning, maintaining multiple data centers, testing our capabilities, maintaining diversity of business operations and telecommunications infrastructure, and reviewing the business continuity and information security capabilities of our service providers. These capabilities are intended to enable the Company to maintain its operations and appropriately respond to events that could damage our physical facilities, cause delays or disruptions to operational functions (including telecommunications networks), or impair the ability of our employees to work, of our vendors to provide services to us, or of our clients and counterparties to communicate and transact with us. Those events include information security incidents, technology disruptions, acts of terrorism, natural disasters, pandemics and global conflicts.

We continue to evaluate and strengthen our business continuity and operational resiliency capabilities and have increased our investments in technology to steadily enhance those capabilities, including our ability to resume and sustain our operations.

Explanation of GAAP and Non-GAAP financial measures

BNY Mellon has included in this Annual Report certain Non-GAAP financial measures on a tangible basis, as a supplement to generally accepted accounting principles ("GAAP") information. Tangible common shareholders' equity excludes goodwill and intangible assets, net of deferred tax liabilities. BNY Mellon believes that the return on tangible common equity measure is an additional useful measure for investors because it presents a measure of those assets that can generate income. BNY Mellon has provided a measure of tangible book value per common share, which it believes provides additional useful information as to the level of tangible assets in relation to shares of common stock outstanding.

The presentation of the growth rates of investment management and performance fees on a constant currency basis permits investors to assess the significance of changes in foreign currency exchange rates. Growth rates on a constant currency basis were determined by applying the current period foreign currency exchange rates to the prior period revenue. BNY Mellon believes that this presentation, as a supplement to GAAP information, gives investors a clearer picture of the related revenue results without the variability caused by fluctuations in foreign currency exchange rates.

BNY Mellon has presented the operating margin for the Investment Management business net of distribution and servicing expense that was passed to third parties who distribute or service our managed funds. BNY Mellon believes that this measure is useful when evaluating the performance of the Investment Management business relative to industry competitors.

The following table presents the reconciliation of the return on common equity and tangible common equity.

Return on common equity and tangible common equity reconciliation *(dollars in millions)*	**2018**	2017	2016	2015	2014
Net income applicable to common shareholders of The Bank of New York Mellon Corporation – GAAP	**$ 4,097**	$ 3,915	$ 3,425	$ 3,053	$ 2,494
Add: Amortization of intangible assets	**180**	209	237	261	298
Less: Tax impact of amortization of intangible assets	**42**	72	81	89	104
Adjusted net income applicable to common shareholders of The Bank of New York Mellon Corporation, excluding amortization of intangible assets – Non-GAAP	**$ 4,235**	$ 4,052	$ 3,581	$ 3,225	$ 2,688
Average common shareholders' equity	**$ 37,818**	$ 36,145	$ 35,504	$ 35,564	$ 36,618
Less: Average goodwill	**17,458**	17,441	17,497	17,731	18,063
Average intangible assets	**3,314**	3,508	3,737	3,992	4,305
Add: Deferred tax liability – tax deductible goodwill *(a)*	**1,072**	1,034	1,497	1,401	1,340
Deferred tax liability – intangible assets *(a)*	**692**	718	1,105	1,148	1,216
Average tangible common shareholders' equity – Non-GAAP	**$ 18,810**	$ 16,948	$ 16,872	$ 16,390	$ 16,806
Return on common shareholders' equity – GAAP	**10.8%**	10.8%	9.6%	8.6%	6.8%
Return on tangible common shareholders' equity – Non-GAAP	**22.5%**	23.9%	21.2%	19.7%	16.0%

(a) Deferred tax liabilities are based on fully phased-in U.S. capital rules.

The following table presents the reconciliation of book value and tangible book value per common share.

Book value and tangible book value per common share reconciliation	Dec. 31,				
(dollars in millions, unless otherwise noted)	**2018**	2017	2016	2015	2014
BNY Mellon shareholders' equity at year end – GAAP	**$ 40,638**	$ 41,251	$ 38,811	$ 38,037	$ 37,441
Less: Preferred stock	**3,542**	3,542	3,542	2,552	1,562
BNY Mellon common shareholders' equity at year end – GAAP	**37,096**	37,709	35,269	35,485	35,879
Less: Goodwill	**17,350**	17,564	17,316	17,618	17,869
Intangible assets	**3,220**	3,411	3,598	3,842	4,127
Add: Deferred tax liability – tax deductible goodwill *(a)*	**1,072**	1,034	1,497	1,401	1,340
Deferred tax liability – intangible assets *(a)*	**692**	718	1,105	1,148	1,216
BNY Mellon tangible common shareholders' equity at year end – Non-GAAP	**$ 18,290**	$ 18,486	$ 16,957	$ 16,574	$ 16,439
Year-end common shares outstanding *(in thousands)*	**960,426**	1,013,442	1,047,488	1,085,343	1,118,228
Book value per common share – GAAP	**$ 38.63**	$ 37.21	$ 33.67	$ 32.69	$ 32.09
Tangible book value per common share – Non-GAAP	**$ 19.04**	$ 18.24	$ 16.19	$ 15.27	$ 14.70

(a) Deferred tax liabilities are based on fully phased-in U.S. capital rules.

The following table presents the impact of changes in foreign currency exchange rates on our consolidated investment management and performance fees.

Constant currency reconciliation – Consolidated			**2018 vs.**
(dollars in millions)	**2018**	2017	**2017**
Investment management and performance fees	**$ 3,685**	$ 3,584	**3%**
Impact of changes in foreign currency exchange rates	—	34	
Adjusted investment management and performance fees – Non-GAAP	**$ 3,685**	$ 3,618	**2%**

The following table presents the impact of changes in foreign currency exchange rates on investment management and performance fees reported in the Investment Management business.

Constant currency reconciliation - Investment Management business			**2018 vs.**
(dollars in millions)	**2018**	2017	**2017**
Investment management and performance fees	**$ 3,632**	$ 3,522	**3%**
Impact of changes in foreign currency exchange rates	—	34	
Adjusted investment management and performance fees – Non-GAAP	**$ 3,632**	$ 3,556	**2%**

The following table presents the reconciliation of the pre-tax operating margin for the Investment Management business.

Pre-tax operating margin reconciliation - Investment Management business			
(dollars in millions)	**2018**	2017	2016
Income before income taxes – GAAP	**$ 1,263**	$ 1,141	$ 967
Total revenue – GAAP	**$ 4,084**	$ 3,997	$ 3,751
Less: Distribution and servicing expense	**407**	422	404
Adjusted total revenue, net of distribution and servicing expense – Non-GAAP	**$ 3,677**	$ 3,575	$ 3,347
Pre-tax operating margin – GAAP *(a)*	**31%**	29%	26%
Adjusted pre-tax operating margin, net of distribution and servicing expense – Non-GAAP *(a)*	**34%**	32%	29%

(a) Income before taxes divided by total revenue.

Rate/volume analysis

Rate/volume analysis (a)	2018 over (under) 2017			2017 over (under) 2016		
	Due to change in			Due to change in		
(dollar amounts in millions, presented on an FTE basis)	Average balance	Average rate	Net change	Average balance	Average rate	Net change
Interest revenue						
Interest-earning assets:						
Interest-bearing deposits with banks (primarily foreign banks)	**$ (1)**	**$ 100**	**$ 99**	$ 1	$ 15	$ 16
Interest-bearing deposits with the Federal Reserve and other central banks	**(9)**	**221**	**212**	(28)	149	121
Federal funds sold and securities purchased under resale agreements	**11**	**682**	**693**	14	176	190
Margin loans	**(2)**	**169**	**167**	(62)	140	78
Non-margin loans:						
Domestic offices:						
Consumer	**8**	**13**	**21**	33	6	39
Commercial	**(29)**	**209**	**180**	(17)	121	104
Foreign offices	**(25)**	**103**	**78**	(4)	65	61
Total non-margin loans	**(46)**	**325**	**279**	12	192	204
Securities:						
U.S. government obligations	**(31)**	**92**	**61**	9	38	47
U.S. government agency obligations	**76**	**247**	**323**	71	138	209
State and political subdivisions - tax exempt	**(19)**	**(12)**	**(31)**	(15)	5	(10)
Other securities:						
Domestic offices	**(25)**	**151**	**126**	(62)	67	5
Foreign offices	**3**	**26**	**29**	(11)	(45)	(56)
Total other securities	**(22)**	**177**	**155**	(73)	22	(51)
Trading securities (primarily domestic)	**60**	**5**	**65**	(1)	—	(1)
Total securities	**64**	**509**	**573**	(9)	203	194
Total interest revenue	**$ 17**	**$ 2,006**	**$ 2,023**	$ (72)	$ 875	$ 803
Interest expense						
Interest-bearing liabilities:						
Interest-bearing deposits:						
Domestic offices	**$ 35**	**$ 395**	**$ 430**	$ (1)	$ 67	$ 66
Foreign offices	**—**	**285**	**285**	3	77	80
Total interest-bearing deposits	**35**	**680**	**715**	2	144	146
Federal funds purchased and securities sold under repurchase agreements	**(56)**	**589**	**533**	17	172	189
Trading liabilities	**—**	**22**	**22**	4	(3)	1
Other borrowed funds:						
Domestic offices	**24**	**10**	**34**	20	(3)	17
Foreign offices	**(2)**	**—**	**(2)**	—	1	1
Total other borrowed funds	**22**	**10**	**32**	20	(2)	18
Commercial paper	**—**	**22**	**22**	8	16	24
Payables to customers and broker-dealers	**(10)**	**137**	**127**	2	50	52
Long-term debt	**18**	**278**	**296**	69	138	207
Total interest expense	**$ 9**	**$ 1,738**	**$ 1,747**	$ 122	$ 515	$ 637
Changes in net interest revenue	**$ 8**	**$ 268**	**$ 276**	$ (194)	$ 360	$ 166

(a) Changes which are solely due to balance changes or rate changes are allocated to such categories on the basis of the respective percentage changes in average balances and average rates. Changes in interest revenue or interest expense arising from the combination of rate and volume variances are allocated proportionately to rate and volume based on their relative absolute magnitudes.

Selected Quarterly Data (dollar amounts in millions, except per share amounts)	Quarter ended 2018 Dec. 31	2018 Sept. 30	2018 June 30	2018 March 31	2017 Dec. 31	2017 Sept. 30	2017 June 30	2017 March 31
Consolidated income statement								
Fee and other revenue	**$ 3,146**	**$ 3,168**	**$ 3,210**	**$ 3,270**	$ 2,860	$ 3,167	$ 3,120	$ 3,018
(Loss) income from consolidated investment management funds	**(24)**	**10**	**12**	**(11)**	17	10	10	33
Net interest revenue	**885**	**891**	**916**	**919**	851	839	826	792
Total revenue	**4,007**	**4,069**	**4,138**	**4,178**	3,728	4,016	3,956	3,843
Provision for credit losses	**—**	**(3)**	**(3)**	**(5)**	(6)	(6)	(7)	(5)
Noninterest expense	**2,987**	**2,738**	**2,747**	**2,739**	3,006	2,654	2,655	2,642
Income before taxes	**1,020**	**1,334**	**1,394**	**1,444**	728	1,368	1,308	1,206
Provision (benefit) for income taxes	**150**	**220**	**286**	**282**	(453)	348	332	269
Net income	**870**	**1,114**	**1,108**	**1,162**	1,181	1,020	976	937
Net loss (income) attributable to noncontrolling interests	**11**	**(3)**	**(5)**	**9**	(6)	(2)	(1)	(15)
Net income applicable to shareholders of The Bank of New York Mellon Corporation	**881**	**1,111**	**1,103**	**1,171**	1,175	1,018	975	922
Preferred stock dividends	**(49)**	**(36)**	**(48)**	**(36)**	(49)	(35)	(49)	(42)
Net income applicable to common shareholders of The Bank of New York Mellon Corporation	**$ 832**	**$ 1,075**	**$ 1,055**	**$ 1,135**	$ 1,126	$ 983	$ 926	$ 880
Basic earnings per common share	**$ 0.84**	**$ 1.07**	**$ 1.04**	**$ 1.11**	$ 1.09	$ 0.94	$ 0.88	$ 0.83
Diluted earnings per common share	**0.84**	**1.06**	**1.03**	**1.10**	1.08	0.94	0.88	0.83
Average balances								
Interest-bearing deposits with banks	**$ 78,582**	**$ 75,907**	**$ 85,424**	**$ 92,918**	$ 89,029	$ 86,329	$ 84,148	$ 80,757
Securities	**118,904**	**118,505**	**117,761**	**118,459**	120,225	119,089	117,227	114,786
Trading securities	**5,543**	**4,261**	**3,784**	**4,183**	2,723	2,359	2,455	2,254
Loans	**53,834**	**53,807**	**57,066**	**58,606**	56,772	55,944	58,793	60,312
Total interest-earning assets	**285,706**	**279,218**	**292,086**	**302,069**	297,166	291,841	289,496	283,421
Total assets	**338,591**	**332,341**	**346,328**	**358,175**	350,786	345,709	342,515	336,200
Deposits	**220,635**	**209,313**	**217,567**	**226,709**	216,874	212,658	216,222	213,375
Long-term debt	**28,201**	**28,074**	**28,349**	**28,407**	28,245	28,138	27,398	25,882
Preferred stock	**3,542**	**3,542**	**3,542**	**3,542**	3,542	3,542	3,542	3,542
Total The Bank of New York Mellon Corporation common shareholders' equity	**37,886**	**38,036**	**37,750**	**37,593**	36,952	36,780	35,862	34,965
Net interest margin	**1.24%**	**1.27%**	**1.26%**	**1.22%**	1.14%	1.15%	1.14%	1.13%
Annualized return on common equity	**8.7%**	**11.2%**	**11.2%**	**12.2%**	12.1%	10.6%	10.4%	10.2%
Pre-tax operating margin	**25%**	**33%**	**34%**	**35%**	20%	34%	33%	31%
Common stock data *(a)*								
Closing price per share	**$ 47.07**	**$ 50.99**	**$ 53.93**	**$ 51.53**	$ 53.86	$ 53.02	$ 51.02	$ 47.23
Cash dividends per share	**0.28**	**0.28**	**0.24**	**0.24**	0.24	0.24	0.19	0.19
Market capitalization *(b)*	**45,207**	**50,418**	**53,927**	**52,080**	54,584	54,294	52,712	49,113

(a) At Dec. 31, 2018, there were 27,805 shareholders registered with our stock transfer agent, compared with 29,472 at Dec. 31, 2017 and 28,015 at Dec. 31, 2016. In addition, there were 45,395 of BNY Mellon's current and former employees at Dec. 31, 2018 who participate in BNY Mellon's 401(k) Retirement Savings Plan. All shares of BNY Mellon's common stock held by the Plan for its participants are registered in the name of The Bank of New York Mellon, as trustee.

(b) At period end.

Some statements in this document are forward-looking. These include all statements about the usefulness of Non-GAAP measures, the future results of BNY Mellon, our businesses, financial, liquidity and capital condition, results of operations, liquidity, risk and capital management and processes, goals, strategies, outlook, objectives, expectations (including those regarding our performance results, expenses, nonperforming assets, seasonality in our businesses, impacts of currency fluctuations, impacts of trends on our businesses, regulatory, technology, market, economic or accounting developments, legal proceedings and other contingencies), effective tax rate, estimates (including those regarding expenses, losses inherent in our credit portfolios, capital ratios and the tax benefit related to U.S. tax legislation), intentions (including those regarding our capital returns and investment in technology), targets, opportunities, growth and initiatives.

In this report, any other report, any press release or any written or oral statement that BNY Mellon or its executives may make, words, such as "estimate," "forecast," "project," "anticipate," "likely," "target," "expect," "intend," "continue," "seek," "believe," "plan," "goal," "could," "should," "would," "may," "might," "will," "strategy," "synergies," "opportunities," "trends," "future" and words of similar meaning, may signify forward-looking statements.

Actual results may differ materially from those expressed or implied as a result of a number of factors, including those discussed in "Risk Factors," such as:

- a communications or technology disruption or failure that results in a loss of information, delays our ability to access information or impacts our ability to provide services to our clients may materially adversely affect our business, financial condition and results of operations;
- a cybersecurity incident, or a failure to protect our computer systems, networks and information and our clients' information against cybersecurity threats, could result in the theft, loss, unauthorized access to, disclosure, use or alteration of information, system or network failures, or loss of access to information; any such incident or failure could adversely impact our ability to conduct our businesses, damage our reputation and cause losses;
- our business may be materially adversely affected by operational risk;
- our risk management framework may not be effective in mitigating risk and reducing the potential for losses;
- we are subject to extensive government rulemaking, regulation and supervision; these rules and regulations have, and in the future may, compel us to change how we manage our businesses, which could have a material adverse effect on our business, financial condition and results of operations; in addition, these rules and regulations have increased our compliance and operational risk and costs;
- regulatory or enforcement actions or litigation could materially adversely affect our results of operations or harm our businesses or reputation;
- our businesses may be negatively affected by adverse events, publicity, government scrutiny or other reputational harm;
- failure to satisfy regulatory standards, including "well capitalized" and "well managed" status or capital adequacy and liquidity rules more generally, could result in limitations on our activities and adversely affect our business and financial condition;
- a failure or circumvention of our controls and procedures could have a material adverse effect on our business, reputation, results of operations and financial condition;
- the application of our Title I preferred resolution strategy or resolution under the Title II orderly liquidation authority could adversely affect the Parent's liquidity and financial condition and the Parent's security holders;
- if our resolution plan is determined not to be credible or not to facilitate an orderly resolution under the U.S. Bankruptcy Code, our business, reputation, results of operations and financial condition could be materially negatively impacted;
- acts of terrorism, impacts from climate change, natural disasters, pandemics, global conflicts and other geopolitical events may have a negative impact on our business and operations;
- we are dependent on fee-based business for a substantial majority of our revenue and our fee-based revenues could be adversely affected by slowing in market activity, weak financial markets, underperformance and/or negative trends in savings rates or in investment preferences;

- weakness and volatility in financial markets and the economy generally may materially adversely affect our business, results of operations and financial condition;
- transitions away from, or changes in the calculation of, LIBOR and other benchmark rates could adversely impact our business and results of operations;
- the United Kingdom's referendum decision to leave the EU has had and may continue to have negative effects on global economic conditions, global financial markets, and our business and results of operations;
- changes in interest rates and yield curves could have a material adverse effect on our profitability;
- we may experience write-downs of securities that we own and other losses related to volatile and illiquid market conditions, reducing our earnings and impacting our financial condition;
- our FX revenue may be adversely affected by decreases in market volatility and the cross-border investment activity of our clients;
- the failure or perceived weakness of any of our significant counterparties, many of whom are major financial institutions and sovereign entities, and our assumption of credit and counterparty risk, could expose us to loss and adversely affect our business;
- our business, financial condition and results of operations could be adversely affected if we do not effectively manage our liquidity;
- we could incur losses if our allowance for credit losses, including loan and lending-related commitments reserves, is inadequate;
- any material reduction in our credit ratings or the credit ratings of our principal bank subsidiaries, The Bank of New York Mellon or BNY Mellon, N.A., could increase the cost of funding and borrowing to us and our rated subsidiaries and have a material adverse effect on our results of operations and financial condition and on the value of the securities we issue;
- new lines of business, new products and services or transformational or strategic project initiatives may subject us to additional risks, and the failure to implement these initiatives could affect our results of operations;
- we are subject to competition in all aspects of our business, which could negatively affect our ability to maintain or increase our profitability;
- our business may be adversely affected if we are unable to attract and retain employees;
- our strategic transactions present risks and uncertainties and could have an adverse effect on our business, results of operations and financial condition;
- tax law changes or challenges to our tax positions with respect to historical transactions may adversely affect our net income, effective tax rate and our overall results of operations and financial condition;
- our ability to return capital to shareholders is subject to the discretion of our Board of Directors and may be limited by U.S. banking laws and regulations, including those governing capital and the approval of our capital plan, applicable provisions of Delaware law or our failure to pay full and timely dividends on our preferred stock;
- the Parent is a non-operating holding company, and as a result, is dependent on dividends from its subsidiaries and extensions of credit from its IHC to meet its obligations, including with respect to its securities, and to provide funds for share repurchases and payment of dividends to its stockholders; and
- changes in accounting standards governing the preparation of our financial statements and future events could have a material impact on our reported financial condition, results of operations, cash flows and other financial data.

Investors should consider all risk factors discussed in our 2018 Annual Report and any subsequent reports filed with the SEC by BNY Mellon pursuant to the Securities Exchange Act of 1934, as amended (the "Exchange Act"). All forward-looking statements speak only as of the date on which such statements are made, and BNY Mellon undertakes no obligation to update any statement to reflect events or circumstances after the date on which such forward-looking statement is made or to reflect the occurrence of unanticipated events. The contents of BNY Mellon's website or any other websites referenced herein are not part of this report.

Acronyms

ABS	Asset-backed security
APAC	Asia-Pacific region
ASC	Accounting Standards Codification
ASU	Accounting Standards Update
AUC/A	Assets under custody and/or administration
AUM	Assets under management
BCBS	Basel Committee on Banking Supervision
BHCs	Bank holding companies
bps	basis points
CCAR	Comprehensive Capital Analysis and Review
CDs	Certificates of deposit
CET1	Common Equity Tier 1 capital
CFTC	Commodity Futures Trading Commission
CLO	Collateralized loan obligation
CVA	Credit valuation adjustment
DVA	Debit valuation adjustment
EMEA	Europe, the Middle East and Africa
ERISA	Employee Retirement Income Security Act of 1974
ESOP	Employee Stock Ownership Plan
EVE	Economic value of equity
FASB	Financial Accounting Standards Board
FCA	Financial Conduct Authority
FDIC	Federal Deposit Insurance Corporation
FHC	Financial holding company
FINRA	Financial Industry Regulatory Authority, Inc.
FTE	Fully taxable equivalent
FX	Foreign exchange
GAAP	Generally accepted accounting principles
G-SIBs	Global systemically important banks
HQLA	High-quality liquid assets
IDI	Insured depository institution
IHC	Intermediate holding company
LCR	Liquidity coverage ratio
LIBOR	London Interbank Offered Rate
LTD	External eligible long-term debt
M&I	Merger and integration
MBS	Mortgage-backed security
MMF	Money market funds
N/A	Not applicable or Not available
NAV	Net asset value
N/M	Not meaningful
NSFR	Net stable funding ratio
NYSE	New York Stock Exchange
OCC	Office of the Comptroller of the Currency
OCI	Other comprehensive income
OTC	Over-the-counter
OTTI	Other-than-temporary impairment
PRA	Prudential Regulation Authority
PSUs	Performance share units
REIT	Real estate investment trust
RMBS	Residential mortgage-backed security
RSUs	Restricted stock units
RWAs	Risk-weighted assets
S&P	Standard & Poor's
SBIC	Small business investment company
SBLC	Standby letters of credit
SEC	Securities and Exchange Commission
SIFIs	Systemically important financial institutions
SLR	Supplementary Leverage Ratio
TDR	Troubled debt restructuring
TLAC	Total loss-absorbing capacity
VaR	Value-at-risk
VIE	Variable interest entity
VME	Voting model entity

Accumulated benefit obligation - The actuarial present value of benefits (vested and non-vested) attributed to employee services rendered.

Alternative investments - Usually refers to investments in hedge funds, leveraged loans, subordinated and distressed debt, real estate and foreign currency overlay. Examples of alternative investment strategies are: long-short equity, event-driven, statistical arbitrage, fixed-income arbitrage, convertible arbitrage, short bias, global macro and equity market neutral.

Asset-backed security ("ABS") - A financial security backed by a loan, lease or receivables against assets other than real estate and mortgage-backed securities.

Assets under custody and/or administration ("AUC/A") - Assets that we hold directly or indirectly on behalf of clients under a safekeeping or custody arrangement or for which we provide administrative services for clients. The following types of assets under administration are not and historically have not been included in AUC/A: performance and risk analytics, transfer agency and asset aggregation services. To the extent that we provide more than one AUC/A service for a client's assets, the value of the asset is only counted once in the total amount of AUC/A.

Assets under management ("AUM") - Includes assets beneficially owned by our clients or customers which we hold in various capacities that are either actively or passively managed, as well as the value of hedges supporting customer liabilities. These assets and liabilities are not on our balance sheet.

Book value per share - The per share value of a company based on common shareholders' equity.

CAMELS - An international bank-rating system where bank supervisory authorities rate institutions according to six factors. The six factors are Capital adequacy, Asset quality, Management quality, Earnings, Liquidity and Sensitivity to Market Risk.

Collateral management - A comprehensive program designed to simplify collateralization and expedite securities transfers for buyers and sellers.

Collateralized loan obligation ("CLO") - A debt security backed by a pool of commercial loans.

Collective trust fund - An investment fund formed from the pooling of investments by investors.

Common Equity Tier 1 capital ("CET1") - The sum of surplus (net of treasury stock), retained earnings, accumulated other comprehensive income (loss), and common equity Tier 1 minority interest subject to certain limitations, minus certain regulatory adjustments and deductions.

Counterparty risk (default risk) - The risk that a counterparty will not pay as obligated on a contract, trade or transaction.

Credit derivatives - Contractual agreements that provide insurance against a credit event of one or more referenced credits. Such events include bankruptcy, insolvency and failure to meet payment obligations when due.

Credit risk - The risk of loss due to borrower or counterparty default.

Credit valuation adjustment ("CVA") - The market value of counterparty credit risk on OTC derivative transactions.

Currency swaps - An agreement to exchange stipulated amounts of one currency for another currency.

Debit valuation adjustment ("DVA") - The market value of our credit risk on OTC derivative transactions.

Depositary Receipts - A negotiable security that generally represents a non-U.S. company's publicly traded equity.

Derivative - A contract or agreement whose value is derived from changes in interest rates, foreign exchange rates, prices of securities or commodities, credit worthiness for credit default swaps or financial or commodity indices.

Earnings allocated to participating securities - Amount of undistributed earnings, after payment of taxes, preferred stock dividends and the required adjustment for common stock dividends declared, that is allocated to securities that are eligible to receive a portion of the Company's earnings.

Economic capital - The amount of capital required to absorb potential losses and reflects the probability of remaining solvent with a target debt rating over a one-year time horizon.

Economic value of equity ("EVE") - An aggregation of discounted future cash flows of assets and liabilities over a long-term horizon.

Eurozone - Formed by European Union Member States whose currency is the euro (€) and in which a single monetary policy is conducted under the responsibility of the Governing Council of the European Central Bank. The Eurozone currently includes Germany, France, Belgium, the Netherlands, Luxembourg, Austria, Finland, Italy, Ireland, Spain, Portugal, Greece, Estonia, Cyprus, Malta, Slovenia, Slovakia, Latvia and Lithuania.

Fiduciary risk - The risk arising from our role as trustee, executor, investment agent or guardian in accordance with governing documents, prudent person principles and applicable laws, rules and regulations.

Fixed Income Clearing Corporation ("FICC") - An agency that deals with the confirmation, settlement and delivery of fixed-income assets in the U.S. The agency ensures the systematic and efficient settlement of U.S. government securities and mortgage-backed security transactions in the market.

Foreign currency options - Similar to interest rate options except they are based on foreign exchange rates. Also, see interest rate options in this glossary.

Foreign currency swaps - An agreement to exchange stipulated amounts of one currency for another currency at one or more future dates.

Foreign exchange contracts - Contracts that provide for the future receipt or delivery of foreign currency at previously agreed-upon terms.

Forward rate agreements - Contracts to exchange payments on a specified future date, based on a market change in interest rates from trade date to contract settlement date.

Fully taxable equivalent ("FTE") - Basis for comparison of yields on assets having ordinary taxability with assets for which special tax exemptions apply. The FTE adjustment reflects an increase in the interest yield or return on a tax-exempt asset to a level that would be comparable had the asset been fully taxable.

Generally accepted accounting principles ("GAAP") - Accounting rules and conventions defining acceptable practices in preparing financial statements in the U.S. The FASB is the primary source of accounting rules.

Global systemically important bank ("G-SIB") - A financial institution whose distress or disorderly failure, because of its size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity.

Grantor Trust - A legal, passive entity through which pass-through securities are sold to investors.

Hedge fund - A fund which is allowed to use diverse strategies that are unavailable to mutual funds, including selling short, leverage, program trading, swaps, arbitrage and derivatives.

High-quality liquid assets ("HQLA") - Unencumbered assets of the types identified in the U.S. LCR rule, which the U.S. banking agencies describe as able to be convertible into cash with little or no expected loss of value during a period of liquidity stress.

Impairment - When an asset's market value is less than its carrying value.

Interest rate options - Contracts to modify interest rate risk in exchange for the payment of a premium when the contract is initiated. As a writer of interest rate options, we receive a premium in exchange for bearing the risk of unfavorable changes in interest rates. Conversely, as a purchaser of an option, we pay a premium for the right, but not the obligation, to buy or sell a financial instrument or currency at predetermined terms in the future.

Interest rate sensitivity - The exposure of net interest revenue to interest rate movements.

Interest rate swaps - Contracts in which a series of interest rate flows in a single currency are exchanged over a prescribed period. Interest rate swaps are the most common type of derivative contract that we use in our asset/liability management activities.

Investment grade - Represents Moody's long-term rating of Baa3 or better; and/or a Standard & Poor's, Fitch or DBRS long-term rating of BBB- or better; or if unrated, an equivalent rating using our internal risk ratings. Instruments that fall below these levels are considered to be non-investment grade.

Joint venture - A company or entity owned and operated by a group of companies for a specific business purpose, no one of which has a majority interest.

Liquidity coverage ratio ("LCR") - A Basel III framework requirement for banks and BHCs to measure liquidity. It is designed to ensure that certain banking organizations, including BNY Mellon, maintain a minimum amount of unencumbered HQLA sufficient to withstand the net cash outflow under a hypothetical standardized acute liquidity stress scenario for a 30-day time horizon.

Litigation risk - Arises when, in the ordinary course of business, we are named as defendants or made parties to legal actions.

Master netting agreement - An agreement between two counterparties that have multiple contracts with each other that provides for the net settlement of all contracts through a single payment in the event of default or termination of any one contract.

Mortgage-backed security ("MBS") - An asset-backed security whose cash flows are backed by the principal and interest payments of a set of mortgage loans.

Net interest margin - The result of dividing net interest revenue by average interest-earning assets.

Other-than-temporary impairment ("OTTI") - An impairment charge taken on a security whose fair value has fallen below the carrying value on the balance sheet and its value is not expected to recover through the holding period of the security.

Performance fees - Fees received by an investment advisor based upon the fund's performance for the period relative to various predetermined benchmarks.

Pre-tax operating margin - Income before taxes for a period divided by total revenue for that period.

Private equity/venture capital - Investment in start-up companies or those in the early processes of developing products and services with perceived, long-term growth potential.

Projected benefit obligation - The actuarial present value of all benefits accrued on employee service rendered prior to the calculation date, including allowance for future salary increases if the pension benefit is based on future compensation levels.

Rating agency - An independent agency that assesses the credit quality and likelihood of default of an issue or issuer and assigns a rating to that issue or issuer.

Real estate investment trust ("REIT") - An investor-owned corporation, trust or association that sells shares to investors and invests in income-producing property.

Repurchase agreement ("Repo") - An instrument used to raise short-term funds whereby securities are sold with an agreement for the seller to buy back the securities at a later date.

Reputational risk - Arises when events or actions that negatively impact our reputation lead to a loss of existing clients and could make it more challenging to acquire new business.

Residential mortgage-backed security ("RMBS") - An asset-backed security whose cash flows are backed by principal and interest payments of a set of residential mortgage loans.

Restricted cash and/or securities - Cash and/or securities that are segregated under federal and other regulatory requirements and consists of excess client funds held by our broker-dealer entities.

Return on average assets - Net income applicable to common shareholders divided by average assets.

Return on common equity - Net income applicable to common shareholders divided by average common shareholders' equity.

Return on tangible common equity - Net income applicable to common shareholders, excluding amortization of intangible assets, divided by average tangible common shareholders' equity.

Reverse repurchase agreement - The purchase of securities with the agreement to sell them at a higher price at a specific future date.

Securities lending transaction - A fully collateralized transaction in which the owner of a security agrees to lend the security typically through an agent (such as The Bank of New York Mellon) to a borrower, usually a broker-dealer or bank, on an open, overnight or term basis, under the terms of a prearranged contract.

Sub-custodian - A local provider (e.g., a bank) contracted to provide specific custodial-related services in a selected country or geographic area.

Supplementary Leverage Ratio ("SLR") - An Advanced Approach banking organization's Basel III SLR is the simple arithmetic mean of the ratio of its Tier 1 capital to total leverage exposure (which is broadly defined to capture both on- and off-balance sheet exposures).

Tangible book value per share - Amount per share that common shareholders can expect to receive if the company goes bankrupt and all of its tangible assets are liquidated at their book value.

Tangible common shareholders' equity - Common equity less goodwill and intangible assets adjusted for deferred tax liabilities associated with non-tax deductible intangible assets and tax deductible goodwill.

Tier 1 leverage ratio - Tier 1 capital divided by quarterly average total assets, as defined by the regulators.

Unfunded commitments - Legally binding agreements to provide a defined level of financing until a specified future date.

Value-at-risk ("VaR") - A measure of the dollar amount of potential loss in value due to adverse market movements over a defined time horizon with a specified confidence level.

Variable interest entity ("VIE") - An entity that: (1) lacks enough equity investment at risk to permit the entity to finance its activities without additional financial support from other parties; (2) has equity owners that lack the right to make significant decisions affecting the entity's operations; and/or (3) has equity owners that do not have an obligation to absorb, or the right to receive, the entity's losses or returns.

Management of BNY Mellon is responsible for establishing and maintaining adequate internal control over financial reporting for BNY Mellon, as such term is defined in Rule 13a-15(f) under the Exchange Act.

BNY Mellon's management, including its principal executive officer and principal financial officer, has assessed the effectiveness of BNY Mellon's internal control over financial reporting as of December 31, 2018. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control - Integrated Framework (2013). Based upon such assessment, management believes that, as of December 31, 2018, BNY Mellon's internal control over financial reporting is effective based upon those criteria.

KPMG LLP, the independent registered public accounting firm that audited BNY Mellon's 2018 financial statements included in this Annual Report under "Financial Statements" and "Notes to Consolidated Financial Statements," has issued a report with respect to the effectiveness of BNY Mellon's internal control over financial reporting. This report appears on page 117.

To the Stockholders and Board of Directors
The Bank of New York Mellon Corporation:

Opinion on Internal Control Over Financial Reporting

We have audited The Bank of New York Mellon Corporation and subsidiaries' (BNY Mellon) internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, BNY Mellon maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of BNY Mellon as of December 31, 2018 and 2017, the related consolidated statements of income, comprehensive income, changes in equity, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes (collectively, the consolidated financial statements), and our report dated February 27, 2019 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

BNY Mellon's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Report of Management on Internal Control over Financial Reporting. Our responsibility is to express an opinion on BNY Mellon's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to BNY Mellon in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

KPMG LLP

New York, New York
February 27, 2019

Consolidated Income Statement

	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Fee and other revenue			
Investment services fees:			
Asset servicing	**$ 4,608**	$ 4,383	$ 4,244
Clearing services	**1,578**	1,553	1,404
Issuer services	**1,099**	977	1,026
Treasury services	**554**	557	547
Total investment services fees	**7,839**	7,470	7,221
Investment management and performance fees	**3,685**	3,584	3,350
Foreign exchange and other trading revenue	**732**	668	701
Financing-related fees	**207**	216	219
Distribution and servicing	**139**	160	166
Investment and other income	**240**	64	341
Total fee revenue	**12,842**	12,162	11,998
Net securities (losses) gains — including other-than-temporary impairment	**(47)**	6	79
Noncredit-related portion of other-than-temporary impairment (recognized in other comprehensive income)	**1**	3	4
Net securities (losses) gains	**(48)**	3	75
Total fee and other revenue	**12,794**	12,165	12,073
Operations of consolidated investment management funds			
Investment (loss) income	**(12)**	74	35
Interest of investment management fund note holders	**1**	4	9
(Loss) income from consolidated investment management funds	**(13)**	70	26
Net interest revenue			
Interest revenue	**6,432**	4,382	3,575
Interest expense	**2,821**	1,074	437
Net interest revenue	**3,611**	3,308	3,138
Total revenue	**16,392**	15,543	15,237
Provision for credit losses	**(11)**	(24)	(11)
Noninterest expense			
Staff *(a)*	**6,145**	6,033	5,809
Professional, legal and other purchased services	**1,334**	1,276	1,186
Software	**772**	744	647
Net occupancy	**630**	570	592
Sub-custodian and clearing *(b)*	**450**	414	400
Distribution and servicing	**406**	419	405
Furniture and equipment	**290**	241	247
Business development	**228**	229	245
Bank assessment charges	**170**	220	219
Amortization of intangible assets	**180**	209	237
Other *(a)(b)(c)*	**606**	602	536
Total noninterest expense	**11,211**	10,957	10,523
Income			
Income before income taxes	**5,192**	4,610	4,725
Provision for income taxes	**938**	496	1,177
Net income	**4,254**	4,114	3,548
Net loss (income) attributable to noncontrolling interests (includes \$12, \$(33) and \$(10) related to consolidated investment management funds, respectively)	**12**	(24)	(1)
Net income applicable to shareholders of The Bank of New York Mellon Corporation	**4,266**	4,090	3,547
Preferred stock dividends	**(169)**	(175)	(122)
Net income applicable to common shareholders of The Bank of New York Mellon Corporation	**$ 4,097**	$ 3,915	$ 3,425

(a) *In 2018, we adopted new accounting guidance included in ASU 2017-07, Compensation-Retirement Benefits: Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost, which required the reclassification of the components of pension and other postretirement costs, other than the service cost component. As a result, staff expense increased and other expense decreased. Prior periods have been reclassified. See Note 2 of the Notes to Consolidated Financial Statements for additional information.*

(b) *Beginning in 2018, clearing expense, which was previously included in other expense, was included with sub-custodian expense. Prior periods have been reclassified.*

(c) *Beginning in 2018, M&I, litigation and restructuring charges are no longer separately disclosed. Expenses previously reported in this line have been reclassified to existing expense categories, primarily other expense.*

Consolidated Income Statement (continued)

Net income applicable to common shareholders of The Bank of New York Mellon Corporation used for the earnings per share calculation	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Net income applicable to common shareholders of The Bank of New York Mellon Corporation	**$ 4,097**	$ 3,915	$ 3,425
Less: Earnings allocated to participating securities	**27**	43	52
Net income applicable to common shareholders of The Bank of New York Mellon Corporation after required adjustment for the calculation of basic and diluted earnings per common share	**$ 4,070**	$ 3,872	$ 3,373

Average common shares and equivalents outstanding of The Bank of New York Mellon Corporation	Year ended Dec. 31,		
(in thousands)	**2018**	2017	2016
Basic	**1,002,922**	1,034,281	1,066,286
Common stock equivalents	**6,801**	13,030	15,672
Less: Participating securities	**(2,582)**	(7,021)	(9,945)
Diluted	**1,007,141**	1,040,290	1,072,013
Anti-dilutive securities *(a)*	**6,804**	12,383	31,695

Earnings per share applicable to common shareholders of The Bank of New York Mellon Corporation	Year ended Dec. 31,		
(in dollars)	**2018**	2017	2016
Basic	**$ 4.06**	$ 3.74	$ 3.16
Diluted	**$ 4.04**	$ 3.72	$ 3.15

(a) Represents stock options, restricted stock, restricted stock units and participating securities outstanding but not included in the computation of diluted average common shares because their effect would be anti-dilutive.

See accompanying Notes to Consolidated Financial Statements.

Consolidated Comprehensive Income Statement

	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Net income	**$ 4,254**	$ 4,114	$ 3,548
Other comprehensive income, net of tax:			
Foreign currency translation adjustments	**(313)**	853	(850)
Unrealized (loss) gain on assets available-for-sale:			
Unrealized (loss) gain arising during the period	**(416)**	153	(242)
Reclassification adjustment	**36**	(3)	(49)
Total unrealized (loss) gain on assets available-for-sale	**(380)**	150	(291)
Defined benefit plans:			
Net (loss) gain arising during the period	**(189)**	342	(108)
Foreign exchange adjustment	**—**	1	—
Amortization of prior service credit, net loss and initial obligation included in net periodic benefit cost	**69**	68	57
Total defined benefit plans	**(120)**	411	(51)
Net unrealized (loss) gain on cash flow hedges	**(10)**	9	(4)
Total other comprehensive (loss) income, net of tax *(a)*	**(823)**	1,423	(1,196)
Total comprehensive income	**3,431**	5,537	2,352
Net loss (income) attributable to noncontrolling interests	**12**	(24)	(1)
Other comprehensive loss (income) attributable to noncontrolling interests	**11**	(15)	31
Comprehensive income applicable to shareholders of The Bank of New York Mellon Corporation	**$ 3,454**	$ 5,498	$ 2,382

(a) Other comprehensive (loss) income attributable to The Bank of New York Mellon Corporation shareholders was $(812) million for the year ended Dec. 31, 2018, $1,408 million for the year ended Dec. 31, 2017 and $(1,165) million for the year ended Dec. 31, 2016.

See accompanying Notes to Consolidated Financial Statements.

Consolidated Balance Sheet

(dollars in millions, except per share amounts)	Dec. 31, 2018	2017
Assets		
Cash and due from:		
Banks	**$ 5,864**	$ 5,382
Interest-bearing deposits with the Federal Reserve and other central banks	**67,988**	91,510
Interest-bearing deposits with banks ($2,394 and $1,751 is restricted)	**14,148**	11,979
Federal funds sold and securities purchased under resale agreements	**46,795**	28,135
Securities:		
Held-to-maturity (fair value of $33,302 and $40,512)	**33,982**	40,827
Available-for-sale	**85,809**	79,543
Total securities	**119,791**	120,370
Trading assets	**7,035**	6,022
Loans	**56,564**	61,540
Allowance for loan losses	**(146)**	(159)
Net loans	**56,418**	61,381
Premises and equipment	**1,832**	1,634
Accrued interest receivable	**671**	610
Goodwill	**17,350**	17,564
Intangible assets	**3,220**	3,411
Other assets (includes $742 and $791, at fair value)	**21,298**	23,029
Subtotal assets of operations	**362,410**	371,027
Assets of consolidated investment management funds, at fair value	**463**	731
Total assets	**$ 362,873**	$ 371,758
Liabilities		
Deposits:		
Noninterest-bearing (principally U.S. offices)	**$ 70,783**	$ 82,716
Interest-bearing deposits in U.S. offices	**74,904**	52,294
Interest-bearing deposits in non-U.S. offices	**93,091**	109,312
Total deposits	**238,778**	244,322
Federal funds purchased and securities sold under repurchase agreements	**14,243**	15,163
Trading liabilities	**3,479**	3,984
Payables to customers and broker-dealers	**19,731**	20,184
Commercial paper	**1,939**	3,075
Other borrowed funds	**3,227**	3,028
Accrued taxes and other expenses	**5,669**	6,225
Other liabilities (including allowance for lending-related commitments of $106 and $102, also includes $88 and $800, at fair value)	**5,774**	6,050
Long-term debt (includes $371 and $367, at fair value)	**29,163**	27,979
Subtotal liabilities of operations	**322,003**	330,010
Liabilities of consolidated investment management funds, at fair value	**2**	2
Total liabilities	**322,005**	330,012
Temporary equity		
Redeemable noncontrolling interests	**129**	179
Permanent equity		
Preferred stock – par value $0.01 per share; authorized 100,000,000 shares; issued 35,826 and 35,826 shares	**3,542**	3,542
Common stock – par value $0.01 per share; authorized 3,500,000,000 shares; issued 1,364,877,915 and 1,354,163,581 shares	**14**	14
Additional paid-in capital	**27,118**	26,665
Retained earnings	**28,652**	25,635
Accumulated other comprehensive loss, net of tax	**(3,171)**	(2,357)
Less: Treasury stock of 404,452,246 and 340,721,136 common shares, at cost	**(15,517)**	(12,248)
Total The Bank of New York Mellon Corporation shareholders’ equity	**40,638**	41,251
Nonredeemable noncontrolling interests of consolidated investment management funds	**101**	316
Total permanent equity	**40,739**	41,567
Total liabilities, temporary equity and permanent equity	**$ 362,873**	$ 371,758

See accompanying Notes to Consolidated Financial Statements.

Consolidated Statement of Cash Flows

	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Operating activities			
Net income	**$ 4,254**	$ 4,114	$ 3,548
Net loss (income) attributable to noncontrolling interests	**12**	(24)	(1)
Net income applicable to shareholders of The Bank of New York Mellon Corporation	**4,266**	4,090	3,547
Adjustments to reconcile net income to net cash provided by operating activities:			
Provision for credit losses	**(11)**	(24)	(11)
Pension plan contributions	**(55)**	(114)	(108)
Depreciation and amortization	**1,339**	1,474	1,502
Deferred tax (benefit) expense	**(525)**	133	(126)
Net securities losses (gains)	**48**	(3)	(75)
Change in trading assets and liabilities	**(574)**	(694)	1,522
Originations of loans held-for-sale	**—**	—	(350)
Proceeds from the sales of loans originated for sale	**—**	—	831
Change in accruals and other, net *(a)*	**1,508**	(195)	(465)
Net cash provided by operating activities *(a)*	**5,996**	4,667	6,267
Investing activities			
Change in interest-bearing deposits with banks *(a)*	**(2,011)**	2,199	(1,225)
Change in interest-bearing deposits with the Federal Reserve and other central banks	**21,954**	(29,613)	53,347
Purchases of securities held-to-maturity	**(5,055)**	(8,329)	(6,673)
Paydowns of securities held-to-maturity	**4,346**	4,448	4,907
Maturities of securities held-to-maturity	**6,317**	3,992	3,738
Purchases of securities available-for-sale	**(32,404)**	(26,151)	(27,470)
Sales of securities available-for-sale	**8,247**	6,001	7,580
Paydowns of securities available-for-sale	**7,716**	9,129	8,826
Maturities of securities available-for-sale	**9,063**	6,319	11,347
Net change in loans	**4,620**	2,794	(1,483)
Sales of loans and other real estate	**263**	392	173
Change in federal funds sold and securities purchased under resale agreements *(a)*	**(18,662)**	(2,334)	(1,407)
Net change in seed capital investments	**59**	(124)	(114)
Purchases of premises and equipment/capitalized software	**(1,108)**	(1,197)	(825)
Proceeds from the sale of premises and equipment	**23**	—	65
Acquisitions, net of cash	**—**	—	(42)
Dispositions, net of cash	**84**	—	1
Other, net *(a)*	**(153)**	(231)	(461)
Net cash provided by (used for) investing activities *(a)*	**3,299**	(32,705)	50,284
Financing activities			
Change in deposits	**(2,874)**	17,069	(54,738)
Change in federal funds purchased and securities sold under repurchase agreements	**(920)**	5,174	(5,013)
Change in payables to customers and broker-dealers	**(433)**	(813)	(911)
Change in other borrowed funds	**164**	1,852	225
Change in commercial paper	**(1,136)**	3,075	—
Net proceeds from the issuance of long-term debt	**5,143**	4,738	6,229
Repayments of long-term debt	**(3,650)**	(1,046)	(2,953)
Proceeds from the exercise of stock options	**80**	431	438
Issuance of common stock	**40**	34	27
Issuance of preferred stock	**—**	—	990
Treasury stock acquired	**(3,269)**	(2,686)	(2,398)
Common cash dividends paid	**(1,052)**	(901)	(778)
Preferred cash dividends paid	**(169)**	(175)	(122)
Other, net	**(22)**	26	(46)
Net cash (used for) provided by financing activities	**(8,098)**	26,778	(59,050)
Effect of exchange rate changes on cash	**(72)**	189	(114)
Change in cash and due from banks and restricted cash *(a)*			
Change in cash and due from banks and restricted cash	**1,125**	(1,071)	(2,613)
Cash and due from banks and restricted cash at beginning of period	**7,133**	8,204	10,817
Cash and due from banks and restricted cash at end of period	**$ 8,258**	$ 7,133	$ 8,204
Cash and due from banks and restricted cash: *(a)*			
Cash and due from banks at end of period (unrestricted cash)	**$ 5,864**	$ 5,382	$ 4,822
Restricted cash at end of period	**2,394**	1,751	3,382
Cash and due from banks and restricted cash at end of period	**$ 8,258**	$ 7,133	$ 8,204
Supplemental disclosures			
Interest paid	**$ 2,711**	$ 1,033	$ 406
Income taxes paid	**983**	498	1,010
Income taxes refunded	**175**	20	307

(a) *Reflects the impact of adopting new accounting guidance included in ASU 2016-15 and ASU 2016-18. Prior periods have been restated. See Note 2 of the Notes to Consolidated Financial Statements for additional information.*

See accompanying Notes to Consolidated Financial Statements.

Consolidated Statement of Changes in Equity

	The Bank of New York Mellon Corporation shareholders								
(in millions, except per share amount)	Preferred stock	Common stock	Additional paid-in capital	Retained earnings	Accumulated other comprehensive (loss), net of tax	Treasury stock	Non-redeemable noncontrolling interests of consolidated investment management funds	Total permanent equity	Redeemable non-controlling interests/ temporary equity
Balance at Dec. 31, 2017	$ 3,542	$ 14	$ 26,665	$ 25,635	$ (2,357)	$(12,248)	$ 316	$ 41,567 *(a)*	$ 179
Adjustment for the cumulative effect of applying ASU 2014-09 for contract revenue	—	—	—	**(55)**	—	—	—	**(55)**	—
Adjustment for the cumulative effect of applying ASU 2017-12 for derivatives and hedging	—	—	—	**27**	**(2)**	—	—	**25**	—
Adjusted balance at Jan. 1, 2018	**3,542**	**14**	**26,665**	**25,607**	**(2,359)**	**(12,248)**	**316**	**41,537**	**179**
Shares issued to shareholders of noncontrolling interests	—	—	—	—	—	—	—	—	**61**
Redemption of subsidiary shares from noncontrolling interests	—	—	—	—	—	—	—	—	**(92)**
Other net changes in noncontrolling interests	—	—	**12**	—	—	—	**(203)**	**(191)**	**(8)**
Net income (loss)	—	—	—	**4,266**	—	—	**(12)**	**4,254**	—
Other comprehensive (loss)	—	—	—	—	**(812)**	—	—	**(812)**	**(11)**
Dividends:									
Common stock at $1.04 per share	—	—	—	**(1,052)**	—	—	—	**(1,052)**	—
Preferred stock	—	—	—	**(169)**	—	—	—	**(169)**	—
Repurchase of common stock	—	—	—	—	—	**(3,269)**	—	**(3,269)**	—
Common stock issued under:									
Employee benefit plans	—	—	**31**	—	—	—	—	**31**	—
Direct stock purchase and dividend reinvestment plan	—	—	**30**	—	—	—	—	**30**	—
Stock awards and options exercised	—	—	**380**	—	—	—	—	**380**	—
Balance at Dec. 31, 2018	**$ 3,542**	**$ 14**	**$ 27,118**	**$ 28,652**	**$ (3,171)**	**$(15,517)**	**$ 101**	**$ 40,739** *(a)*	**$ 129**

(a) Includes total The Bank of New York Mellon Corporation common shareholders' equity of $37,709 million at Dec. 31, 2017 and $37,096 million at Dec. 31, 2018.

Consolidated Statement of Changes in Equity (continued)

	The Bank of New York Mellon Corporation shareholders								
(in millions, except per share amount)	Preferred stock	Common stock	Additional paid-in capital	Retained earnings	Accumulated other comprehensive (loss) income, net of tax	Treasury stock	Non-redeemable noncontrolling interests of consolidated investment management funds	Total permanent equity	Redeemable non-controlling interests/ temporary equity
Balance at Dec. 31, 2016	$ 3,542	$ 13	$ 25,962	$ 22,621	$ (3,765)	$ (9,562)	$ 618	$ 39,429 (a)	$ 151
Shares issued to shareholders of noncontrolling interests	—	—	—	—	—	—	—	—	56
Redemption of subsidiary shares from noncontrolling interests	—	—	—	—	—	—	—	—	(70)
Other net changes in noncontrolling interests	—	—	(35)	—	—	—	(335)	(370)	36
Net income (loss)	—	—	—	4,090	—	—	33	4,123	(9)
Other comprehensive income	—	—	—	—	1,408	—	—	1,408	15
Dividends:									
Common stock at $0.86 per share	—	—	—	(901)	—	—	—	(901)	—
Preferred stock	—	—	—	(175)	—	—	—	(175)	—
Repurchase of common stock	—	—	—	—	—	(2,686)	—	(2,686)	—
Common stock issued under:									
Employee benefit plans	—	—	28	—	—	—	—	28	—
Direct stock purchase and dividend reinvestment plan	—	—	26	—	—	—	—	26	—
Stock awards and options exercised	—	1	684	—	—	—	—	685	—
Balance at Dec. 31, 2017	$ 3,542	$ 14	$ 26,665	$ 25,635	$ (2,357)	$(12,248)	$ 316	$ 41,567 (a)	$ 179

(a) *Includes total The Bank of New York Mellon Corporation common shareholders' equity of $35,269 million at Dec. 31, 2016 and $37,709 million at Dec. 31, 2017.*

	The Bank of New York Mellon Corporation shareholders								
(in millions, except per share amounts)	Preferred stock	Common stock	Additional paid-in capital	Retained earnings	Accumulated other comprehensive (loss) income, net of tax	Treasury stock	Non-redeemable noncontrolling interests of consolidated investment management funds	Total permanent equity	Redeemable non-controlling interests/ temporary equity
Balance at Dec. 31, 2015	$ 2,552	$ 13	$ 25,262	$ 19,974	$ (2,600)	$ (7,164)	$ 738	$ 38,775 (a)	$ 200
Shares issued to shareholders of noncontrolling interests	—	—	—	—	—	—	—	—	55
Redemption of subsidiary shares from noncontrolling interests	—	—	—	—	—	—	—	—	(102)
Other net changes in noncontrolling interests	—	—	(24)	—	—	—	(130)	(154)	38
Net income (loss)	—	—	—	3,547	—	—	10	3,557	(9)
Other comprehensive (loss)	—	—	—	—	(1,165)	—	—	(1,165)	(31)
Dividends:									
Common stock at $0.72 per share	—	—	—	(778)	—	—	—	(778)	—
Preferred stock	—	—	—	(122)	—	—	—	(122)	—
Repurchase of common stock	—	—	—	—	—	(2,398)	—	(2,398)	—
Common stock issued under:									
Employee benefit plans	—	—	27	—	—	—	—	27	—
Direct stock purchase and dividend reinvestment plan	—	—	21	—	—	—	—	21	—
Preferred stock issued	990	—	—	—	—	—	—	990	—
Stock awards and options exercised	—	—	676	—	—	—	—	676	—
Balance at Dec. 31, 2016	$ 3,542	$ 13	$ 25,962	$ 22,621	$ (3,765)	$ (9,562)	$ 618	$ 39,429 (a)	$ 151

(a) *Includes total The Bank of New York Mellon Corporation common shareholders' equity of $35,485 million at Dec. 31, 2015 and $35,269 million at Dec. 31, 2016.*

See accompanying unaudited Notes to Consolidated Financial Statements.

Note 1–Summary of significant accounting and reporting policies

Nature of operations

BNY Mellon is a global leader in providing a broad range of financial products and services in domestic and international markets. Through our two principal businesses, Investment Management and Investment Services, we serve the following major classes of customers - institutions, corporations and high net worth individuals. For institutions and corporations, we provide the following services:

- investment management;
- custody;
- foreign exchange;
- fund services;
- broker-dealer services;
- securities finance;
- collateral and liquidity services;
- clearing services;
- depositary receipts;
- corporate trust;
- global payments;
- trade finance; and
- cash management.

For individuals, we provide mutual funds, separate accounts, wealth management and private banking services. BNY Mellon's investment management businesses provide investment products in many asset classes and investment styles on a global basis.

Basis of presentation

The accounting and financial reporting policies of BNY Mellon, a global financial services company, conform to U.S. GAAP and prevailing industry practices.

In the opinion of management, all adjustments necessary for a fair presentation of financial position, results of operations and cash flows for the periods presented have been made. Certain immaterial reclassifications have been made to prior periods to place them on a basis comparable with current period presentation.

Use of estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates based upon assumptions about future economic and market conditions which affect reported amounts and related disclosures in our financial statements. Although our current estimates contemplate current conditions and how we expect them to change in the future, it is reasonably possible that actual conditions could be worse than anticipated in those estimates, which could materially affect our results of operations and financial condition. Amounts subject to estimates are items such as allowance for loan losses and lending-related commitments, fair value of financial instruments and derivatives, goodwill and other intangibles and litigation and regulatory contingencies. Among other effects, such changes in estimates could result in future impairments of investment securities, goodwill and intangible assets and establishment of allowances for loan losses and lending-related commitments as well as accruals for litigation and regulatory contingencies.

Changes in accounting

See Note 2 for the new accounting standards adopted in 2018.

Effective Oct. 1, 2016, we changed the accounting method for the amortization of premiums and accretion of discounts on mortgage-backed securities from the prepayment method (also referred to as the retrospective method) to the contractual method, which are both acceptable methods under ASC 310, *Receivables*. The calculation performed under the prepayment method was based on estimating principal prepayment assumptions, principally driven by interest rates, and estimating the remaining lives of securities. This method resulted in retrospective adjustments each period to reflect changes in those estimates as if the updated estimated lives had been applied since the acquisition of the securities. Under the contractual method, no assumption is made concerning prepayments. As principal prepayments occur, a portion of the unamortized premium or discount is recorded in interest revenue such that the effective yield of a security remains constant throughout the life of the security.

We have determined that the contractual method is the preferable method of accounting as it is more aligned with our approach to asset/liability management, it reduces reliance on complex estimates and judgments, and it is consistent with the method predominantly used by our peers. The impact of this change was not considered material to prior periods and, as a result, the cumulative effect of the change of approximately $15 million was reflected as a positive adjustment to net interest revenue in the fourth quarter of 2016. We estimate that net interest revenue for 2016 would have been higher had we continued to use the prepayment method, but have not specifically quantified the impact subsequent to the effective date, as the estimated amortization is also immaterial.

Parent financial statements

The Parent financial statements in Note 18 include the accounts of the Parent; those of a wholly owned financing subsidiary that functions as a financing entity for BNY Mellon and its subsidiaries; and MIPA, LLC, a single-member limited liability company, created to hold and administer corporate-owned life insurance. Financial data for the Parent, the financing subsidiary and the single-member limited liability company are combined for financial reporting purposes because of the limited function of these entities and the unconditional guarantee by BNY Mellon of their obligations.

Acquired businesses

The income statement and balance sheet include results of acquired businesses accounted for under the acquisition method of accounting pursuant to ASC 805, *Business Combinations* and equity investments from the dates of acquisition. Contingent purchase consideration was measured at its fair value and recorded on the purchase date. Any subsequent changes in the fair value of a contingent consideration liability are recorded through the income statement.

Equity method investments, including renewable energy investments

The consolidated financial statements include the accounts of BNY Mellon and its subsidiaries. Equity investments of less than a majority but at least 20% ownership are accounted for by the equity method and classified as other assets. Earnings on these investments are reflected in fee and other revenue as investment services fees, investment management and performance fees or investment and other income, as appropriate, in the period earned.

A loss in value of an equity investment that is determined to be other-than-temporary is recognized by reducing the carrying value of the equity investment down to its fair value.

Renewable energy investment projects through limited liability companies are accounted for using the equity method of accounting. The hypothetical liquidation at book value ("HLBV") methodology is used to determine the loss that is recognized in each quarter. HLBV estimates the liquidation value at the beginning and end of each quarter, with the difference recognized as the amount of loss under the equity method.

The pre-tax losses are reported in investment and other income section of the income statement. The corresponding tax benefits and credits are recorded as a reduction to provision for income taxes on the income statement. The pre-tax losses, tax benefits and credits are included in our projected annual effective tax rate.

See Note 7 for the amount of our renewable energy investments. Below are our most significant equity method investments, other than the investments in renewable energy.

Equity method investments at Dec. 31, 2018 *(dollars in millions)*	Percentage ownership	Book value
CIBC Mellon	**50.0%**	**$ 548**
Siguler Guff	**20.0%**	**$ 244**

Variable interest and voting model entities

We evaluate an entity for possible consolidation in accordance with ASC 810, *Consolidation*. We first determine whether or not we have variable interests in the entity, which are investments or other interests that absorb portions of an entity's expected losses or receive portions of the entity's expected returns. Our variable interests may include decision-maker or service provider fees, direct and indirect investments and investments made by related parties, including related parties under common control. If it is determined that we do not have a variable interest in the entity, no further analysis is required and the entity is not consolidated.

If we hold a variable interest in the entity, further analysis is performed to determine if the entity is a VIE or a voting model entity ("VME").

We consider the underlying facts and circumstances of individual entities when assessing whether or not an entity is a VIE. An entity is determined to be a VIE if the equity investors:

- do not have sufficient equity at risk for the entity to finance its activities without additional subordinated financial support; or
- lack one or more of the following characteristics of a controlling financial interest:
  - the power, through voting rights or similar rights, to direct the activities of an entity that most significantly impact the entity's economic performance;
  - the obligation to absorb the expected losses of the entity; and
  - the right to receive the expected residual returns of the entity.

We reconsider and reassess whether or not we are the primary beneficiary of a VIE when governing documents or contractual arrangements are changed that would reallocate the obligation to absorb expected losses or receive expected residual returns between BNY Mellon and the other investors. This could occur when BNY Mellon disposes of its variable interests in the fund, when additional variable interests are issued to other investors or when we acquire additional variable interests in the VIE.

We consolidate a VIE if it is determined that we have a controlling financial interest in the entity. We have a controlling financial interest in a VIE when we have both (1) the power to direct the activities of the VIE that most significantly impact the VIE's economic performance and (2) the obligation to absorb losses or the right to receive benefits of the VIE that could potentially be significant to that VIE.

For entities that do not meet the definition of a VIE, the entity is considered a VME. We consolidate these entities if we can exert control over the financial and operating policies of an investee, which can occur if we have a 50% or more voting interest in the entity.

Restricted cash and securities

Cash and securities may be segregated under federal and other regulatory requirements and consists of excess client funds held by our broker-dealer entities. Restricted cash is included in interest-bearing deposits with banks on the consolidated balance sheet and with cash and due from banks when reconciling the beginning and end-of-period balances on the consolidated statement of cash flows.

Securities purchased under resale agreements and securities sold under repurchase agreements

Securities purchased under resale agreements and securities sold under repurchase agreements are accounted for as collateralized financings. Generally, these agreements are recorded at the amounts at which the securities will be subsequently resold or repurchased, plus accrued interest.

Securities purchased under resale agreements are fully collateralized with high-quality liquid securities. Collateral requirements are monitored and additional collateral is received or provided, as required. As such, these transactions carry minimal credit risk and are not allocated an allowance for credit losses.

Where an enforceable netting agreement exists, resale and repurchase agreements executed with the same counterparty and the same maturity date are reported on a net basis.

Available-for-sale securities and held-to-maturity securities and trading securities

Securities are classified as trading, available-for-sale or held-to-maturity securities when they are purchased. Securities are classified as available-for-sale securities when we intend to hold the securities for an indefinite period of time or when the securities may be used for tactical asset/liability purposes and may be sold from time to time to effectively manage interest rate exposure, prepayment risk and liquidity needs. Securities are classified as held-to-maturity securities when we intend and have the ability to hold them until maturity. Securities are classified as trading securities when our intention is to resell the securities.

Trading securities are measured at fair value and included in trading assets on the balance sheet. Trading revenue includes both realized and unrealized gains and losses. The liability incurred on short-sale transactions, representing the obligation to deliver securities, is included in trading liabilities at fair value.

Available-for-sale securities are measured at fair value. The difference between fair value and amortized cost representing unrealized gains or losses on assets classified as available-for-sale, are recorded net of tax as an addition to or deduction from OCI, unless a security is deemed to have other-than-temporary impairment ("OTTI"). Gains and losses on sales of available-for-sale securities are reported in the income statement. The cost of debt and equity securities sold is determined on a specific identification and average cost method, respectively. Held-to-maturity securities are measured at amortized cost.

Income on securities purchased is adjusted for amortization of premium and accretion of discount on a level yield basis, generally over their contractual life.

We routinely conduct periodic reviews to identify and evaluate each security to determine whether OTTI has occurred. We examine various factors when determining whether an impairment, representing the fair value of a security being below its amortized cost, is other-than-temporary. The following are examples of factors that we consider:

- The length of time and the extent to which the fair value has been less than the amortized cost basis;
- Whether management has an intent to sell the security;
- Whether the decline in fair value is attributable to specific conditions, such as conditions in an industry or in a geographic area, affecting a particular investment;
- Whether a debt security has been downgraded by a rating agency;
- Whether a debt security exhibits cash flow deterioration; and
- For each non-agency RMBS, we compare the remaining credit enhancement that protects the individual security from losses against the projected losses of principal and/or interest expected to come from the underlying mortgage collateral, to determine whether such credit losses might directly impact the relevant security.

When we do not intend to sell the security and it is more likely than not that we will not be required to sell the security prior to recovery of its cost basis, the credit component of an OTTI of a debt security is recognized in earnings and the non-credit component is recognized in OCI.

The determination of whether a credit loss exists is based on the best estimate of the present value of cash flows to be collected from the debt security. Generally, cash flows are discounted at the effective interest rate implicit in the debt security at the time of acquisition. For debt securities that are beneficial interests in securitized financial assets and are not high credit quality, ASC 325, *Investments - Other,* provides that cash flows be discounted at the current yield used to accrete the beneficial interest.

If we intend to sell the security or it is more likely than not that we will be required to sell the security prior to recovery of its cost basis, the non-credit component of OTTI is recognized in earnings and subsequently accreted to interest income on an effective yield basis over the life of the security.

For held-to-maturity debt securities, the amount of OTTI recorded in OCI for the non-credit portion of a previous OTTI is amortized prospectively, as an increase to the carrying amount of the security, over the remaining life of the security on the basis of the timing of future estimated cash flows of the securities.

The accounting policy for the determination of the fair value of financial instruments has been identified as a "critical accounting estimate" as it requires us to make numerous assumptions based on available market data. See Note 4 for these disclosures.

Loans and leases

Loans are reported net of any unearned income and deferred fees and costs. Certain loan origination and upfront commitment fees, as well as certain direct loan origination and commitment costs, are deferred and amortized as a yield adjustment over the lives of the related loans. Loans held for sale are carried at the lower of cost or fair value.

Unearned revenue on direct financing leases is accreted over the lives of the leases in decreasing amounts to provide a constant rate of return on the net investment in the leases. Revenue on leveraged leases is recognized on a basis to achieve a constant yield on the outstanding investment in the lease, net of the related deferred tax liability, in the years in which the net investment is positive. Gains and losses on residual values of leased equipment sold are included in investment and other income. Impairment of leveraged lease residual values is reflected in net interest revenue. Considering the nature of these leases and the number of significant assumptions, there is risk associated with the income recognition on these leases should any of the assumptions change materially in future periods.

A modified loan is considered a troubled debt restructuring ("TDR") if the debtor is experiencing financial difficulties and the creditor grants a concession to the debtor that would not otherwise be considered. A TDR may include a transfer of real estate or other assets from the debtor to the creditor, or a modification of the term of the loan. TDRs are accounted for as impaired loans (see the Nonperforming assets policy).

Nonperforming assets

Commercial loans are placed on nonaccrual status when principal or interest is past due 90 days or more, or when there is reasonable doubt that interest or principal will be collected.

When a first lien residential mortgage loan reaches 90 days delinquent, it is subject to an impairment test and may be placed on nonaccrual status. At 180 days delinquent, the loan is subject to further impairment testing. The loan will remain on accrual status if the realizable value of the collateral exceeds the unpaid principal balance plus accrued interest. If the loan is impaired, a charge-off is taken and the loan is placed on nonaccrual status. At 270 days delinquent, all first lien mortgages are placed on nonaccrual status. Second lien mortgages are automatically placed on nonaccrual status when they reach 90 days delinquent.

When a loan is placed on nonaccrual status, previously accrued and uncollected interest is reversed against current period interest revenue. Interest receipts on nonaccrual and impaired loans are recognized as interest revenue or are applied to principal when we believe the ultimate collectability of principal is in doubt. Nonaccrual loans generally are restored to an accrual basis when principal and interest become current and remain current for a specified period.

A loan is considered to be impaired when it is probable that we will be unable to collect all principal and interest amounts due according to the contractual terms of the loan agreement. An impairment allowance is measured based upon the loan's market value, the present value of expected future cash flows, discounted at the loan's initial effective interest rate, or at fair value of the collateral if the loan is collateral dependent. If the loan valuation is less than the recorded value of the loan, an impairment allowance is established by a provision for credit loss. Impairment allowances are not needed when the recorded investment in an impaired loan is less than the loan valuation.

Allowance for loan losses and allowance for lending-related commitments

The allowance for loan losses, shown as a valuation allowance to loans, and the allowance for lending-related commitments recorded in other liabilities, are referred to as BNY Mellon's allowance for credit losses. The accounting policy for the determination of the adequacy of the allowances has been identified as a "critical accounting estimate" as it requires us to make numerous complex and subjective estimates and assumptions relating to amounts which are inherently uncertain.

The allowance for loan losses is maintained to absorb losses inherent in the loan portfolio as of the balance sheet date based on our judgment. The allowance determination methodology is designed to provide procedural discipline in assessing the appropriateness of the allowance. Credit losses are charged against the allowance. Recoveries are added to the allowance.

The methodology for determining the allowance for lending-related commitments considers the same factors as the allowance for loan losses, as well as an estimate of the probability of drawdown at default. We utilize a quantitative methodology and qualitative framework for determining the allowance for loan losses and the allowance for lending-related commitments. Within this qualitative framework, management applies judgment when assessing internal risk factors and environmental factors to compute an additional allowance for each component of the loan portfolio.

The components of the allowance for loan losses and the allowance for lending-related commitments are inclusive of the qualitative allowance framework and consist of the following three elements:

- an allowance for impaired credits of $1 million or greater;
- an allowance for higher risk-rated credits and pass-rated credits; and
- an allowance for residential mortgage loans.

Our lending is primarily to institutional customers. As a result, our loans are generally larger than $1 million. Therefore, the first element, impaired credits, is based on individual analysis of all impaired loans of $1 million and greater. The allowance is measured by the difference between the recorded value of impaired loans and their impaired value. Impaired value is either the present value of the expected future cash flows from the borrower, the market value of the loan, or the fair value of the collateral, if the loan is collateral dependent.

The second element, higher risk-rated credits and pass-rated credits, is based on our incurred loss model. Individual credit analyses are performed on such loans before being assigned a credit rating. All borrowers are collectively evaluated based on their credit rating. The loss inherent in each loan incorporates the borrower's credit rating, facility rating and maturity. The loss given default, derived from the facility rating, incorporates a recovery expectation and an estimate of the use of the facility at default (usage given default). The borrower's probability of default is derived from the associated credit rating. Borrower ratings are reviewed at least annually and are periodically mapped to third-party databases, including rating agency and default and recovery databases, to ensure ongoing consistency and validity. Higher risk-rated credits are reviewed quarterly.

The third element, the allowance for residential mortgage loans, is determined by segregating six mortgage pools into delinquency periods ranging from current through foreclosure. Each of these delinquency periods is assigned a probability of default. A specific loss given default is assigned for each mortgage pool. BNY Mellon assigns all residential mortgage pools, except home equity lines of credit, a probability of default and loss given default based on default and loss data derived from internal historical data related to our residential mortgage portfolio. The resulting incurred loss factor (the probability of default multiplied by the loss given default) is applied against the loan balance to determine the allowance held for each pool. For home equity lines of credit, probability of default and loss given default are based on external data from third-party databases due to the small size of the portfolio and insufficient internal data.

The qualitative framework is used to determine an additional allowance for each portfolio based on the factors below:

Internal risk factors:

- Ratio of nonperforming loans to total non-margin loans;
- Ratio of criticized assets to total loans and lending-related commitments;
- Borrower concentration; and
- Significant concentrations in high risk industries and countries.

Environmental risk factors:

- U.S. non-investment grade default rate;
- Unemployment rate; and
- Change in real gross domestic product.

The objective of the qualitative framework is to capture incurred losses that may not have been fully captured in the quantitative reserve, which is based primarily on historical data. Management determines the qualitative allowance for each period based on judgment informed by consideration of internal and external risk factors and other considerations that may be deemed relevant during the period. Once determined in the aggregate, our qualitative allowance is then allocated to each of our loan classes based on the respective classes' quantitative allowance balances with the allocations adjusted, when necessary, for class specific risk factors.

For each risk factor, we calculate the minimum and maximum values, and percentiles in-between, to evaluate the distribution of our historical experience. The distribution of historical experience is compared to the risk factor's current quarter observed experience to assess the current risk inherent in the portfolio and overall direction/trend of a risk factor relative to our historical experience.

Based on this analysis, we assign a risk level - no impact, low, moderate, high and elevated - to each risk factor for the current quarter. Management assesses the impact of each risk factor to determine an aggregate risk level. We do not quantify the impact of any particular risk factor. Management's assessment of the risk factors, as well as the trend in the quantitative allowance, supports management's judgment for the overall required qualitative allowance. A smaller qualitative allowance may be required when our quantitative allowance has reflected incurred losses associated with the aggregate risk level. A greater qualitative allowance may be required if our quantitative allowance does not yet reflect the incurred losses associated with the aggregate risk level.

The allocation of the allowance for credit losses is inherently judgmental, and the entire allowance for credit losses is available to absorb credit losses regardless of the nature of the loss.

Premises and equipment

Premises and equipment are carried at cost less accumulated depreciation and amortization. Depreciation and amortization is computed using the straight-line method over the estimated useful life of the owned asset and, for leasehold improvements, over the lesser of the remaining term of the leased facility or the estimated economic life of the improvement. For owned and capitalized assets, estimated useful lives range from 2 to 40 years. Maintenance and repairs are charged to expense as incurred, while major improvements are capitalized and amortized to operating expense over their identified useful lives.

Software

BNY Mellon capitalizes costs relating to acquired software and internal-use software development projects that provide new or significantly improved functionality. We capitalize projects that are expected to result in longer-term operational benefits, such as replacement systems or new applications that result in significantly increased operational efficiencies or functionality. All other costs incurred in connection with an internal-use software project are expensed as incurred. Capitalized software is recorded in other assets.

Identified intangible assets and goodwill

Identified intangible assets with estimable lives are amortized in a pattern consistent with the assets' identifiable cash flows or using a straight-line method over their remaining estimated benefit periods if the pattern of cash flows is not estimable. Intangible assets with estimable lives are reviewed for possible impairment when events or changed circumstances may affect the underlying basis of the asset. Goodwill and intangibles with indefinite lives are not amortized, but are assessed annually for impairment, or more often if events and circumstances indicate it is more likely than not they may be impaired and to determine if the lives are no longer indefinite and should be amortized. The amount of goodwill impairment is determined by the excess of the carrying value of the reporting unit over its fair value. The accounting policy for valuing and impairment testing of identified intangible assets and goodwill has been identified as a "critical accounting estimate" as it requires us to make numerous complex and subjective estimates. See Note 6 for additional disclosures related to goodwill and intangible assets.

Investments in qualified affordable housing projects

Investments in qualified affordable housing projects through a limited liability entity are accounted for utilizing the proportional amortization method. Under the proportional amortization method, the initial cost of the investment is amortized to the provision for income taxes in proportion to the tax credits and other tax benefits received. The net investment performance, including tax credits and other benefits received, is recognized in the income statement as a component of income tax expense. Additionally, the value of the commitments to fund qualified affordable housing projects is included in other assets on the balance sheet and a liability is recorded for the unfunded portion.

Seed capital

Seed capital investments are generally classified as other assets and carried at fair value. Unrealized gains and losses on seed capital investments are recorded in investment and other income. Certain risk retention investments in our collateralized loan obligations ("CLOs") are classified as available-for-sale securities. Any unrealized gains and losses are recorded net of tax as an addition to or deduction from other comprehensive income, unless the investment is deemed to have OTTI.

Noncontrolling interests

Noncontrolling interests included in permanent equity are adjusted for the income or (loss) attributable to the noncontrolling interest holders and any distributions to those shareholders. Redeemable noncontrolling interests are reported as temporary equity. BNY Mellon recognizes changes in the redemption value of the redeemable noncontrolling interests as they occur and adjusts the carrying value to be equal to the redemption value.

Fee revenue

Investment Services and Investment Management revenue is based on terms specified in a contract with a customer, and excludes any amounts collected on behalf of third parties. Revenue is recognized when, or as, a performance obligation is satisfied by transferring control of a good or service to a customer. A performance obligation may be satisfied over time or at a point in time. Revenue from a performance obligation satisfied over time is recognized by measuring our progress in satisfying the performance obligation in a manner that reflects the transfer of goods and services to the customer. Revenue from a performance obligation satisfied at a point in time is recognized at the point in time the customer obtains control of the promised good or service. The amount of revenue recognized reflects the consideration we expect to be entitled to in exchange for the promised goods and services. Taxes assessed by a governmental authority, that are both imposed on, and concurrent with, a specific revenue-producing transaction, are collected from a customer and are excluded from revenue.

Performance fees are recognized in the period in which the performance fees are earned and become determinable. Performance fees are constrained until all uncertainties are resolved and reversal of previously recorded amounts is not probable. Performance fees are generally calculated as a percentage of the applicable portfolio's performance in excess of a benchmark index or a peer group's performance. When a portfolio underperforms its benchmark or fails to generate positive performance, subsequent years' performance must generally exceed this shortfall prior to fees being earned. Amounts billable, which are subject to a clawback if future performance thresholds in current or future years are not met, are not recognized since the fees are potentially uncollectible. These fees are recognized when it is determined that they will be collected. When a multi-year performance contract provides that fees earned are billed ratably over the performance period, only the portion of the fees earned that are non-refundable are recognized.

Additionally, we recognize revenue from non-refundable, implementation fees under outsourcing contracts using a straight-line method, commencing in the period the ongoing services are performed through the expected term of the contractual relationship. Incremental direct set-up costs of implementation, up to the related customer margin or minimum fee revenue amount, are deferred and amortized over the same period that the related implementation fees are recognized. If a client terminates an outsourcing contract prematurely, the unamortized deferred incremental direct set-up costs and the unamortized deferred implementation fees related to that contract are recognized in the period the contract is terminated.

We record foreign exchange and other trading revenue, financing-related fees and other revenue when the services are provided and earned based on contractual terms, when amounts are determined and collectability is reasonably assured.

Net interest revenue

Revenue on interest-earning assets and expense on interest-bearing liabilities are recognized based on the effective yield of the related financial instrument. The amortization of premiums and accretion of discounts are included in interest revenue and are adjusted for prepayments when they occur, such that, the effective yield remains constant throughout the contractual life of the security. Negative interest incurred on assets or charged on liabilities is presented as contra interest income and contra expense, respectively.

Foreign currency translation

Assets and liabilities denominated in foreign currencies are translated to U.S. dollars at the rate of exchange on the balance sheet date. Transaction gains and losses are included in the income statement. Translation gains and losses on investments in foreign entities with functional currencies that are not the

U.S. dollar are recorded as foreign currency translation adjustments in OCI. Revenue and expense transactions are translated at the applicable daily rate or the weighted average monthly exchange rate when applying the daily rate is not practical.

Pension

The measurement date for BNY Mellon's pension plans is December 31. Plan assets are determined based on fair value generally representing observable market prices. The projected benefit obligation is determined based on the present value of projected benefit distributions at an assumed discount rate. The discount rate utilized is based on the yield curves of high-quality corporate bonds available in the marketplace. The net periodic pension expense or credit includes service costs (if applicable), interest costs based on an assumed discount rate, an expected return on plan assets based on an actuarially derived market-related value, amortization of prior service cost and amortization of prior years' actuarial gains and losses.

Actuarial gains and losses include gains or losses related to changes in the amount of the projected benefit obligation or plan assets resulting from demographic or investment experience different than assumed, changes in the discount rate or other assumptions. To the extent an actuarial gain or loss exceeds 10% of the greater of the projected benefit obligation or the market-related value of plan assets, the excess is generally recognized over the future service periods of active employees. Benefit accruals under the U.S. pension plans are frozen. Future unrecognized actuarial gains and losses for the U.S. plans that exceed a threshold amount are amortized over the average future life expectancy of plan participants with a maximum of 15 years.

Our expected long-term rate of return on plan assets is based on anticipated returns for each applicable asset class. Anticipated returns are weighted for the expected allocation for each asset class and are based on forecasts for prospective returns in the equity and fixed-income markets, which should track the long-term historical returns for these markets. We also consider the growth outlook for U.S. and global economies, as well as current and prospective interest rates.

The market-related value utilized to determine the expected return on plan assets is based on the fair value of plan assets adjusted for the difference between expected returns and actual performance of plan assets. The difference between actual experience and expected returns on plan assets is included as an adjustment in the market-related value over a five-year period.

See Note 17 for additional disclosures related to pensions.

Severance

BNY Mellon provides separation benefits for U.S.-based employees through The Bank of New York Mellon Corporation Supplemental Unemployment Benefit Plan. These benefits are provided to eligible employees separated from their jobs for business reasons not related to individual performance. Basic separation benefits are generally based on the employee's years of continuous benefited service. Severance for employees based outside of the U.S. is determined in accordance with local agreements and legal requirements. Severance expense is recorded when management commits to an action that will result in separation and the amount of the liability can be reasonably estimated.

Income taxes

We record current tax liabilities or assets through charges or credits to the current tax provision for the estimated taxes payable or refundable for the current year. Deferred tax assets and liabilities are recorded for future tax consequences attributable to differences between the financial statement carrying amounts of assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. A deferred tax valuation allowance is established if it is more likely than not that all or a portion of the deferred tax assets will not be realized. A tax position that fails to meet a more-likely-than-not recognition threshold will result in either reduction of current or deferred tax assets, and/or recording of current or deferred tax liabilities. Interest and penalties related to income taxes are recorded as income tax expense.

Derivative financial instruments

Derivatives are recorded on the balance sheet at fair value and include futures, forwards, interest rate swaps, foreign currency swaps and options and similar products. Derivatives in an unrealized gain position are recognized as assets while derivatives in unrealized loss position are recognized as liabilities. Derivatives are reported net by counterparty and after consideration of cash collateral, to the extent subject to legally enforceable netting agreements. Derivatives designated and effective in qualifying hedging relationships are classified in other assets or other liabilities on the balance sheet. All other derivatives are classified within trading assets or trading liabilities on the balance sheet. Gains and losses on trading derivatives are generally included in foreign exchange and other trading revenue.

We enter into various derivative financial instruments for non-trading purposes primarily as part of our asset/liability management process. These derivatives are designated as either fair value or cash flow hedges of certain assets and liabilities or forecasted transactions when we enter into the derivative contracts. Gains and losses associated with fair value hedges are recorded in income as well as any change in the value of the related hedged item associated with the designated risks being hedged. Gains and losses on cash flow hedges are recorded in OCI, until reclassified into earnings in the same period the hedged item impacts earnings. Foreign currency transaction gains and losses related to a hedged net investment in a foreign operation, net of their tax effect, are recorded with cumulative foreign currency translation adjustments within OCI.

To qualify for hedge accounting each hedge relationship is required to be highly effective at reducing the risk associated with the exposure being hedged, both prospectively and retrospectively. We formally document all relationships between hedging instruments and hedged items, as well as our risk-management objectives and strategy for undertaking various hedging transactions. At inception, the potential cause of ineffectiveness related to each of our hedges is assessed to determine if we can expect the hedge to be highly effective over the life of the transaction. At hedge inception, we document the methodology to be utilized for evaluating effectiveness on an ongoing basis, and we monitor ongoing hedge effectiveness at least quarterly.

For qualifying fair value hedges, changes in the fair value of the derivative, and changes in the value of the hedged item associated with the designated risks being hedged, are recognized in earnings. Certain amounts excluded from the assessment of effectiveness are recorded in OCI and recognized in earnings through an amortization approach over the life of the derivative. We discontinue hedge accounting prospectively when we determine that the hedge is no longer effective or the derivative expires, is sold, or management discontinues the derivative's hedge designation. Subsequent gains and losses on these derivatives are included in foreign exchange and other trading revenue. For discontinued fair value hedges, the accumulated gain or loss on the hedged item is amortized on a yield basis over the remaining life of the hedged item.

For qualifying cash flow hedges, changes in the fair value of the derivative are recorded in OCI, until reclassified into earnings in the same period the hedged item impacts earnings. If the hedge relationship is terminated, then the change in value will be reclassified from OCI to earnings when the cash flows that were previously hedged affect earnings. If cash flow hedge accounting is discontinued as a result of a forecasted transaction no longer being probable to occur, then the amount reported in OCI is immediately reclassified to current earnings.

Derivative amounts affecting earnings are recognized in the same income statement line as the hedged item affects earnings, principally interest income, interest expense and other revenue.

Foreign currency transaction gains and losses related to qualifying hedges of net investments in a foreign operation are recorded with cumulative foreign currency translation adjustments within OCI net of their tax effect. The Company evaluates effectiveness of its foreign currency derivatives designated as hedges of its net investments utilizing the forward rate method.

The determination of fair value of derivative financial instruments has been identified as a "critical accounting estimate." See Note 22 for additional disclosures related to derivative financial instruments.

Earnings per common share

Earnings per common share is calculated using the two-class method under which earnings are allocated to common shareholders and holders of participating securities. Unvested stock-based compensation awards that contain non-forfeitable rights to dividends or dividend equivalents are considered participating securities under the two-class method.

Basic earnings per share is calculated by dividing net income allocated to common shareholders of BNY Mellon by the average number of common shares outstanding and vested stock-based compensation awards where recipients have satisfied either the explicit vesting terms or retirement-eligibility requirements.

Diluted earnings per common share is computed under the more dilutive of either the treasury stock method or the two-class method. We increase the average number of shares of common stock outstanding by the assumed number of shares of common stock that would be issued assuming the exercise of stock options and the issuance of shares related to stock-based compensation awards using the treasury stock method, if dilutive. Diluted earnings per share is calculated by dividing net income allocated to common shareholders of BNY Mellon by the adjusted average number of common shares outstanding.

Statement of cash flows

We have defined cash as cash and due from banks. Cash flows from hedging activities are classified in the same category as the items hedged. Distributions received from equity method investees are classified as cash inflows from operating activities on the consolidated statement of cash flows. Excess returns on investments of equity method investments are classified as cash flows from investing activities on the consolidated statement of cash flows.

Stock-based compensation

Compensation expense relating to share-based payments is recognized in the income statement, on a straight-line basis, over the applicable vesting period.

Certain of our stock compensation grants vest when the employee retires. New grants with this feature are expensed by the first date the employee is eligible to retire. We estimate forfeitures when recording compensation cost related to share-based payment awards.

Note 2–Accounting changes and new accounting guidance

The following accounting changes and new accounting guidance were adopted in 2018.

ASU 2017-12, Derivatives and Hedging: Targeted Improvements to Accounting for Hedging Activities

In August 2017, the FASB issued an ASU, *Derivatives and Hedging: Targeted Improvements to Accounting for Hedging Activities*. The objective of this ASU is to improve the financial reporting of hedging relationships to better portray the economic results of an entity's risk management activities and to simplify the application of hedge accounting guidance.

The most significant impact of the new guidance to the Company relates to the new accounting alternatives for fair value hedges of interest rate risk, specifically, the ability to hedge only the benchmark component of the contractual cash flows and partial-term hedging. The guidance also changed presentation and disclosure requirements and made changes to how the shortcut method is applied, which resulted in the Company using that method going forward for certain hedging relationships.

BNY Mellon elected to early adopt this ASU on Jan. 31, 2018, which is the "as of" date for which the Company was permitted to make certain elections and the measurement date for recording the adoption impact for certain hedge modifications. As part of the adoption, we elected to reclassify approximately $1.1 billion of debt securities from held-to-maturity to available-for-sale which resulted in a decrease of $47 million pre-tax to accumulated other comprehensive income. The Company also elected to modify certain hedge relationships as of the adoption date primarily to utilize the benchmark component method of measuring hedge effectiveness, as such method is deemed to more closely match risk management objectives with accounting results. The Company recognized a $27 million after-tax increase in retained earnings as of Jan. 1, 2018 associated with the adoption impact of these hedge modifications.

ASU 2017-07, Compensation - Retirement Benefits: Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost

In March 2017, the FASB issued an ASU, *Compensation - Retirement Benefits: Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost*. This ASU requires the disaggregation of the service cost component from the other components of the net benefit cost in the consolidated income statement. This ASU also permits only the service cost component of net benefit cost to be eligible for capitalization. BNY Mellon adopted this ASU in the first quarter of 2018, and applied the guidance retrospectively for the presentation of the service cost component and the other components in the consolidated income statement, and prospectively for the capitalization of the service cost component in assets. The adoption of this standard increased staff expense and decreased other expense by $62 million in 2017 and $75 million in 2016.

ASU 2016-18, Statement of Cash Flows: Restricted Cash

In November 2016, the FASB issued an ASU, *Statement of Cash Flows: Restricted Cash*. This ASU provides guidance on the presentation of restricted cash or restricted cash equivalents in the consolidated statement of cash flows. Restricted cash consists of excess client funds held by our broker-dealer business and totaled $2.4 billion at Dec. 31, 2018 and $1.8 billion at Dec. 31, 2017. Restricted cash is included in interest-bearing deposits with banks on the consolidated balance sheet and with cash and due from banks when reconciling the beginning and end-of-period balances on the consolidated statement of cash flows.

We adopted the guidance in this ASU retrospectively. As a result, the change in interest-bearing deposits with banks, which is included in investing activities on the consolidated statement of cash flows, was restated to reflect the decrease in restricted cash of $1,631 million in 2017 and $898 million in 2016. The increase in restricted cash was $643 million in 2018.

ASU 2016-15, Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments

In August 2016, the FASB issued an ASU, *Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments*. This ASU provides guidance on eight specific cash flow presentation issues. The most significant impact for BNY Mellon relates to distributions received from equity method investees. For equity method investments, BNY Mellon elected to report distributions received from equity method investees using the cumulative earnings approach. Distributions received are considered returns on investment and classified as cash inflows from operating activities on the consolidated statement of cash flows. To the extent the returns on investment exceeded the cumulative equity in earnings recognized, the excess would be considered a return of investment and classified as cash inflows from investing activities on the consolidated statement of cash flows. We adopted the guidance in this ASU retrospectively. As a result, the change in accruals and other, net, which is included in operating activities on the consolidated statement of cash flows, was restated to reflect distributions received of $24 million in 2017 and $17 million in 2016. The distributions were previously included in other, net in investing activities on the consolidated statement of cash flows. Distributions received in 2018 were $24 million. The remaining seven specific cash flow presentation issues do not materially impact BNY Mellon.

ASU 2014-09, Revenue from Contracts with Customers

In May 2014, the FASB issued an ASU, *Revenue from Contracts with Customers*. This ASU, as amended, provides guidance on the recognition of revenue related to the transfer of promised goods or services to customers and guidance on accounting for certain contract costs. The standard provides a single revenue model to be applied by reporting companies under U.S. GAAP and supersedes most existing revenue recognition guidance.

The Company adopted the guidance on Jan. 1, 2018 using the cumulative effect transition method applied to contracts not completed as of Dec. 31, 2017, which resulted in a $55 million after-tax reduction to retained earnings. The comparative financial information for 2017 and 2016 has not been restated and continues to be reported under the accounting standards in effect for that period.

Although the impact of the adoption of this ASU was not material, the most significant changes and quantitative impact of the changes are disclosed below.

Payments to customers

The timing of recognizing the reduction in revenue for certain payments made to depositary receipts customers has changed. Prior to adoption, annual payments to customers were capitalized and amortized as contra revenue over the remaining contract period, subject to impairment reviews.

Under the new guidance, annual payments are recorded as a reduction in revenue in proportion to the expected annual revenue generated from the related customer contract.

Costs to obtain a customer contract

Prior to adoption, costs to obtain a customer contract, primarily sales incentives, were expensed as incurred. Under the new guidance, an asset is recognized for the incremental sales incentives that are considered costs of obtaining a contract with a customer, if those costs are expected to be recovered.

The table below presents the cumulative effect of the adoption of the new guidance on the consolidated balance sheet as of Dec. 31, 2017.

Impact on the consolidated balance sheet			
(in millions)	Dec. 31, 2017	Impact of adoption	Jan. 1, 2018
Assets			
Other assets	$ 23,029	$ (9)	$ 23,020
Liabilities			
Accrued tax and other expenses	$ 6,225	$ (18)	$ 6,207
Other liabilities	6,050	64	6,114
Equity			
Retained earnings	$ 25,635	$ (55)	$ 25,580

The impact of the new guidance on the consolidated income statement for 2018 and the consolidated balance sheet as of Dec. 31, 2018 was de minimis. See Note 9 for additional revenue and contract costs disclosures.

ASU 2016-01, Financial Instruments - Overall: Recognition and Measurement of Financial Assets and Financial Liabilities

In January 2016, the FASB issued an ASU, *Financial Instruments—Overall: Recognition and Measurement of Financial Assets and Financial Liabilities*. This ASU requires investments in equity securities that do not result in consolidation and are not accounted for under the equity method to be measured at fair value with changes in the fair value recognized through net income, unless one of two available exceptions applies. The first exception, a scope exception, allows Federal Reserve Bank stock, FHLB stock and exchange memberships to remain accounted for at cost, less impairment. The second practicability exception is an election available for equity investments that do not have readily determinable fair values. For certain investments where the Company has chosen the practicability exception, such investments are accounted for at cost adjusted for impairment, if any, plus or minus observable price changes.

The Company adopted this guidance in the first quarter of 2018 using the cumulative effect method of adoption, with a de minimis impact to retained earnings. As part of the adoption, we reclassified money market fund investments of approximately $1 billion to trading assets, primarily from available-for-sale securities.

We have non-readily marketable equity securities where we are utilizing the practicability exception of $55 million at Dec. 31, 2018. We recognized $27 million of net upward adjustments on these securities in 2018, driven by activity that resulted in observable price changes.

ASU 2018-13, Fair Value Measurement: Disclosure Framework - Changes to the Disclosure Requirements for Fair Value Measurement

In August 2018, the FASB issued an ASU, *Fair Value Measurement: Disclosure Framework - Changes to the Disclosure Requirements for Fair Value Measurement*. This ASU requires disclosure of the changes in unrealized gains or losses included in OCI for Level 3 assets or liabilities held at the end of the period and the range and weighted-average of the significant unobservable inputs used in determining the fair value of Level 3 assets and liabilities. This ASU removes the requirement to disclose the transfers between Level 1 and Level 2 of the fair value hierarchy and the valuation process for determining Level 3 fair value measurements. BNY Mellon adopted this ASU in the third quarter of 2018 and applied the guidance prospectively for the new disclosure requirements and retrospectively for disclosure requirements that have been removed.

ASU 2018-14, Compensation - Retirement Benefits - Defined Benefit Plans - General: Disclosure Framework - Changes to the Disclosure Requirements for Defined Benefit Plans

In August 2018, the FASB issued an ASU, *Compensation - Retirement Benefits - Defined Benefit Plans - General: Disclosure Framework - Changes to the Disclosure Requirements for Defined Benefit Plans*. This ASU added the requirement to disclose the weighted-average interest crediting rates for cash balance plans and an explanation of the reasons for significant gains and losses related to changes in the benefit obligation for the period. This ASU clarified the requirement to disclose the projected benefit obligation ("PBO") and fair value of plan assets for plans with PBOs in excess of plan assets, and the accumulated benefit obligation ("ABO") and fair value of plan assets for plans with ABOs in excess of plan assets. Additionally, this ASU removed the requirement to disclose the amounts in accumulated OCI expected to be recognized as components of net periodic benefit cost over the next year and the sensitivity analysis of changes in the assumed health care cost trend rate. BNY Mellon early adopted this ASU in the fourth quarter of 2018 and applied the guidance retrospectively.

Note 3–Acquisitions and dispositions

We sometimes structure our acquisitions with both an initial payment and later contingent payments tied to post-closing revenue or income growth. There were no contingent payments in 2018.

At Dec. 31, 2018, we are potentially obligated to pay additional consideration which, using reasonable assumptions, could range from $4 million to $21 million over the next three years, but could be higher as certain of the arrangements do not contain a contractual maximum.

The transactions described below did not have a material impact on BNY Mellon's results of operations.

Transactions in 2018

On Jan. 2, 2018, BNY Mellon completed the sale of CenterSquare, one of our Investment Management boutiques, and recorded a gain on this transaction. CenterSquare had approximately $10 billion in AUM in U.S. and global real estate and infrastructure investments. In addition, goodwill of $52 million was removed from the consolidated balance sheet as a result of this sale.

On June 29, 2018, BNY Mellon completed the exchange of its majority equity interest in Amherst Capital Management LLC for a minority equity stake in Amherst Holdings LLC. Goodwill of $13 million was removed from the consolidated balance sheet and a gain was recorded as a result of this sale.

Transactions in 2016

On April 1, 2016, BNY Mellon acquired the assets of Atherton Lane Advisers, LLC, a U.S.-based investment manager with approximately $2.45 billion in AUM and servicer for approximately 700 high-net-worth clients, for cash of $38 million, plus contingent payments measured at $22 million. Goodwill related to this acquisition totaled $29 million and is included in the Investment Management business. The customer relationship intangible asset related to this acquisition is included in the Investment Management business, with an estimated life of 14 years, and totaled $30 million at acquisition.

Note 4–Securities

The following tables present the amortized cost, the gross unrealized gains and losses and the fair value of securities at Dec. 31, 2018, Dec. 31, 2017 and Dec. 31, 2016, respectively.

Securities at Dec. 31, 2018 (in millions)	Amortized cost	Gross unrealized Gains	Gross unrealized Losses	Fair value
Available-for-sale:				
Agency RMBS	**$ 25,594**	**$ 83**	**$ 369**	**$ 25,308**
U.S. Treasury	**20,190**	**96**	**210**	**20,076**
Sovereign debt/sovereign guaranteed	**10,663**	**108**	**21**	**10,750**
Agency commercial MBS	**9,836**	**16**	**161**	**9,691**
CLOs	**3,410**	**—**	**46**	**3,364**
Supranational	**2,985**	**7**	**8**	**2,984**
Foreign covered bonds	**2,890**	**7**	**19**	**2,878**
State and political subdivisions	**2,251**	**18**	**22**	**2,247**
Other ABS	**1,776**	**1**	**4**	**1,773**
U.S. government agencies	**1,676**	**5**	**24**	**1,657**
Non-agency commercial MBS	**1,491**	**1**	**28**	**1,464**
Non-agency RMBS *(a)*	**1,095**	**241**	**11**	**1,325**
Corporate bonds	**1,074**	**6**	**26**	**1,054**
Other debt securities	**1,236**	**6**	**4**	**1,238**
Total securities available-for-sale *(b)*	**$ 86,167**	**$ 595**	**$ 953**	**$ 85,809**
Held-to-maturity:				
Agency RMBS	**$ 25,507**	**$ 32**	**$ 632**	**$ 24,907**
U.S. Treasury	**4,727**	**3**	**77**	**4,653**
U.S. government agencies	**1,497**	**—**	**10**	**1,487**
Agency commercial MBS	**1,195**	**—**	**26**	**1,169**
Sovereign debt/sovereign guaranteed	**833**	**26**	**—**	**859**
Non-agency RMBS	**100**	**4**	**2**	**102**
Foreign covered bonds	**80**	**1**	**—**	**81**
Supranational	**26**	**1**	**—**	**27**
State and political subdivisions	**17**	**—**	**—**	**17**
Total securities held-to-maturity	**$ 33,982**	**$ 67**	**$ 747**	**$ 33,302**
Total securities	**$ 120,149**	**$ 662**	**$1,700**	**$ 119,111**

(a) Includes $832 million that was included in the former Grantor Trust.

(b) Includes gross unrealized gains of $39 million and gross unrealized losses of $87 million recorded in accumulated other comprehensive income related to securities that were transferred from available-for-sale to held-to-maturity. The unrealized gains and losses are primarily related to Agency RMBS and will be amortized into net interest revenue over the contractual lives of the securities.

Securities at Dec. 31, 2017 (in millions)	Amortized cost	Gross unrealized Gains	Gross unrealized Losses	Fair value
Available-for-sale:				
Agency RMBS	$ 24,002	$ 108	$ 291	$ 23,819
U.S. Treasury	15,159	264	160	15,263
Sovereign debt/sovereign guaranteed	12,405	175	23	12,557
Agency commercial MBS	8,793	36	67	8,762
State and political subdivisions	2,949	31	23	2,957
CLOs	2,898	12	1	2,909
Foreign covered bonds	2,520	18	9	2,529
Supranational	2,085	5	11	2,079
Non-agency RMBS *(a)*	1,265	317	4	1,578
Non-agency commercial MBS	1,360	6	6	1,360
Corporate bonds	1,249	17	11	1,255
Other ABS	1,040	3	—	1,043
U.S. government agencies	917	1	10	908
Other RMBS	152	3	6	149
Other debt securities	1,409	4	1	1,412
Money market funds	963	—	—	963
Total securities available-for-sale *(b)*	$ 79,166	$1,000	$ 623	$ 79,543
Held-to-maturity:				
Agency RMBS	$ 26,208	$ 51	$ 332	$ 25,927
U.S. Treasury	9,792	6	56	9,742
U.S. government agencies	1,653	—	12	1,641
Sovereign debt/sovereign guaranteed	1,593	30	—	1,623
Agency commercial MBS	1,324	2	9	1,317
Foreign covered bonds	84	2	—	86
Other RMBS	65	—	1	64
Non-agency RMBS	57	5	—	62
Supranational	28	—	—	28
State and political subdivisions	17	—	1	16
Non-agency commercial MBS	6	—	—	6
Total securities held-to-maturity	$ 40,827	$ 96	$ 411	$ 40,512
Total securities	$ 119,993	$1,096	$1,034	$ 120,055

(a) Includes $1,091 million that was included in the former Grantor Trust.

(b) Includes gross unrealized gains of $50 million and gross unrealized losses of $144 million recorded in accumulated other comprehensive income related to securities that were transferred from available-for-sale to held-to-maturity. The unrealized gains and losses are primarily related to Agency RMBS and will be amortized into net interest revenue over the contractual lives of the securities.

Securities at Dec. 31, 2016 *(in millions)*	Amortized cost	Gross unrealized Gains	Gross unrealized Losses	Fair value
Available-for-sale:				
Agency RMBS	$ 22,929	$ 148	$ 341	$ 22,736
U.S. Treasury	14,373	115	181	14,307
Sovereign debt/sovereign guaranteed	12,248	261	20	12,489
Agency commercial MBS	6,505	28	84	6,449
State and political subdivisions	3,392	38	52	3,378
CLOs	2,593	6	1	2,598
Foreign covered bonds	2,126	24	9	2,141
Non-agency RMBS *(a)*	1,700	317	22	1,995
Other ABS	1,729	4	6	1,727
Corporate bonds	1,391	22	17	1,396
Non-agency commercial MBS	931	8	11	928
Other RMBS	517	4	8	513
U.S. government agencies	366	2	9	359
Other debt securities	1,952	19	10	1,961
Equity securities	2	1	—	3
Money market funds	842	—	—	842
Total securities available-for-sale *(b)*	$ 73,596	$ 997	$ 771	$ 73,822
Held-to-maturity:				
Agency RMBS	$ 25,221	$ 57	$ 299	$ 24,979
U.S. Treasury	11,117	22	41	11,098
Sovereign debt/sovereign guaranteed	1,911	42	—	1,953
U.S. government agencies	1,589	—	6	1,583
Agency commercial MBS	721	1	10	712
Other RMBS	142	—	4	138
Non-agency RMBS	78	4	2	80
Foreign covered bonds	74	1	—	75
State and political subdivisions	19	—	1	18
Non-agency commercial MBS	7	—	—	7
Other debt securities	26	—	—	26
Total securities held-to-maturity	$ 40,905	$ 127	$ 363	$ 40,669
Total securities	$ 114,501	$1,124	$1,134	$ 114,491

(a) Includes $1,357 million that was included in the former Grantor Trust.

(b) Includes gross unrealized gains of $62 million and gross unrealized losses of $190 million recorded in accumulated other comprehensive income related to investment securities that were transferred from available-for-sale to held-to-maturity. The unrealized gains and losses are primarily related to Agency RMBS and will be amortized into net interest revenue over the contractual lives of the securities.

The following table presents the realized gains, losses and impairments, on a gross basis.

Net securities (losses) gains *(in millions)*	**2018**	2017	2016
Realized gross gains	**$ 8**	$ 47	$ 86
Realized gross losses	**(55)**	(40)	(4)
Recognized gross impairments	**(1)**	(4)	(7)
Total net securities (losses) gains	**$ (48)**	$ 3	$ 75

In 2018, we adopted the new accounting guidance included in ASU 2016-01, *Financial Instruments—Overall: Recognition and Measurement of Financial Assets and Financial Liabilities*. As a result, money market fund investments were reclassified to trading assets, primarily from available-for-sale securities.

In 2018, certain debt securities with an aggregate amortized cost of $1,117 million and fair value of $1,070 million were transferred from held-to-maturity securities to available-for-sale securities as part of the adoption of ASU 2017-12, *Derivatives and Hedging: Targeted Improvements to Accounting for Hedging Activities*.

In 2017, other RMBS with an aggregate amortized cost of $74 million and fair value of $76 million were transferred from held-to-maturity securities to available-for-sale securities. Due to ratings downgrades, the Company no longer intends to hold these securities to maturity.

Temporarily impaired securities

At Dec. 31, 2018, the unrealized losses on the securities portfolio were primarily attributable to an increase in interest rates from date of purchase, and for certain securities that were transferred from available-for-sale to held-to-maturity, an increase in interest rates through the date they were transferred. Specifically, $87 million of the unrealized losses at Dec. 31, 2018 and $144 million at Dec. 31, 2017 reflected in the available-for-sale sections of the tables below relate to certain securities (primarily Agency RMBS) that were transferred in prior periods from available-for-sale to held-to-maturity. The unrealized losses will be amortized into net interest revenue over the contractual lives of the securities. The transfer created a new cost basis for the securities. As a result, if these securities have experienced unrealized losses since the date of transfer, the corresponding fair value and unrealized losses would be reflected in the held-to-maturity sections of the following tables. We do not intend to sell these securities, and it is not more likely than not that we will have to sell these securities.

The following tables show the aggregate fair value of securities with a continuous unrealized loss position for less than 12 months and those that have been in a continuous unrealized loss position for 12 months or more.

Temporarily impaired securities at Dec. 31, 2018	Less than 12 months		12 months or more		Total	
(in millions)	Fair value	Unrealized losses	Fair value	Unrealized losses	Fair value	Unrealized losses
Available-for-sale:						
Agency RMBS	**$ 6,678**	**$ 30**	**$ 9,250**	**$ 339**	**$ 15,928**	**$ 369**
U.S. Treasury	**6,126**	**23**	**6,880**	**187**	**13,006**	**210**
Sovereign debt/sovereign guaranteed	**2,185**	**8**	**988**	**13**	**3,173**	**21**
Agency commercial MBS	**4,505**	**50**	**3,082**	**111**	**7,587**	**161**
CLOs	**3,280**	**46**	**2**	**—**	**3,282**	**46**
Supranational	**974**	**2**	**481**	**6**	**1,455**	**8**
Foreign covered bonds	**1,058**	**7**	**736**	**12**	**1,794**	**19**
State and political subdivisions	**316**	**1**	**668**	**21**	**984**	**22**
Other ABS	**1,289**	**4**	**23**	**—**	**1,312**	**4**
U.S. government agencies	**513**	**4**	**673**	**20**	**1,186**	**24**
Non-agency commercial MBS	**1,015**	**14**	**362**	**14**	**1,377**	**28**
Non-agency RMBS *(a)*	**94**	**1**	**157**	**10**	**251**	**11**
Corporate bonds	**685**	**24**	**50**	**2**	**735**	**26**
Other debt securities	**397**	**1**	**256**	**3**	**653**	**4**
Total securities available-for-sale *(b)*	**$ 29,115**	**$ 215**	**$ 23,608**	**$ 738**	**$ 52,723**	**$ 953**
Held-to-maturity:						
Agency RMBS	**$ 4,602**	**$ 56**	**$ 17,107**	**$ 576**	**$ 21,709**	**$ 632**
U.S. Treasury	**157**	**2**	**4,343**	**75**	**4,500**	**77**
U.S. government agencies	**—**	**—**	**1,111**	**10**	**1,111**	**10**
Agency commercial MBS	**477**	**7**	**654**	**19**	**1,131**	**26**
Non-agency RMBS	**22**	**1**	**31**	**1**	**53**	**2**
Total securities held-to-maturity	**$ 5,258**	**$ 66**	**$ 23,246**	**$ 681**	**$ 28,504**	**$ 747**
Total temporarily impaired securities	**$ 34,373**	**$ 281**	**$ 46,854**	**$ 1,419**	**$ 81,227**	**$ 1,700**

(a) *Includes $22 million with an unrealized loss of less than $1 million for less than 12 months and $3 million with an unrealized loss of less than $1 million for 12 months or more that were included in the former Grantor Trust.*

(b) *Includes gross unrealized losses of $87 million for 12 months or more recorded in accumulated other comprehensive income related to securities that were transferred from available-for-sale to held-to-maturity. The unrealized losses are primarily related to Agency RMBS and will be amortized into net interest revenue over the contractual lives of the securities. There were no gross unrealized losses for less than 12 months.*

Temporarily impaired securities at Dec. 31, 2017	Less than 12 months		12 months or more		Total	
(in millions)	Fair value	Unrealized losses	Fair value	Unrealized losses	Fair value	Unrealized losses
Available-for-sale:						
Agency RMBS	$ 8,567	$ 66	$ 5,834	$ 225	$ 14,401	$ 291
U.S. Treasury	7,429	131	2,175	29	9,604	160
Sovereign debt/sovereign guaranteed	1,880	12	559	11	2,439	23
Agency commercial MBS	3,077	28	1,332	39	4,409	67
State and political subdivisions	732	3	518	20	1,250	23
CLOs	260	1	—	—	260	1
Foreign covered bonds	953	7	116	2	1,069	9
Supranational	700	6	333	5	1,033	11
Non-agency RMBS *(a)*	20	—	149	4	169	4
Non-agency commercial MBS	476	3	122	3	598	6
Corporate bonds	274	2	288	9	562	11
U.S. government agencies	588	6	160	4	748	10
Other RMBS	71	4	45	2	116	6
Other debt securities	1,155	1	35	—	1,190	1
Total securities available-for-sale *(b)*	$ 26,182	$ 270	$ 11,666	$ 353	$ 37,848	$ 623
Held-to-maturity:						
Agency RMBS	$ 9,458	$ 81	$ 12,305	$ 251	$ 21,763	$ 332
U.S. Treasury	6,389	41	2,909	15	9,298	56
U.S. government agencies	791	4	850	8	1,641	12
Agency commercial MBS	737	7	60	2	797	9
Other RMBS	—	—	50	1	50	1
State and political subdivisions	—	—	4	1	4	1
Total securities held-to-maturity	$ 17,375	$ 133	$ 16,178	$ 278	$ 33,553	$ 411
Total temporarily impaired securities	$ 43,557	$ 403	$ 27,844	$ 631	$ 71,401	$ 1,034

(a) Includes $7 million with an unrealized loss of less than $1 million for less than 12 months and $12 million with an unrealized loss of $1 million for 12 months or more that were included in the former Grantor Trust.

(b) Includes gross unrealized losses of $144 million for 12 months or more recorded in accumulated other comprehensive income related to securities that were transferred from available-for-sale to held-to-maturity. The unrealized losses are primarily related to Agency RMBS and will be amortized into net interest revenue over the contractual lives of the securities. There were no gross unrealized losses for less than 12 months.

The following table shows the maturity distribution by carrying amount and yield (on a tax equivalent basis) of our securities portfolio.

Maturity distribution and yields on securities at Dec. 31, 2018	U.S. Treasury		U.S. government agencies		State and political subdivisions		Other bonds, notes and debentures		Mortgage/ asset-backed		
(dollars in millions)	Amount	Yield *(a)*	Amount	Yield *(a)*	Amount	Yield *(a)*	Amount	Yield *(a)*	Amount	Yield *(a)*	Total
Securities available-for-sale:											
One year or less	$ 7,682	2.14%	$ 245	1.88%	$ 402	2.54%	$ 6,032	1.50%	$ —	—%	**$ 14,361**
Over 1 through 5 years	6,753	2.07	317	2.54	1,121	2.97	10,761	1.29	—	—	**18,952**
Over 5 through 10 years	2,460	2.25	1,095	2.78	531	2.23	1,930	0.88	—	—	**6,016**
Over 10 years	3,181	3.12	—	—	193	3.06	181	1.68	—	—	**3,555**
Mortgage-backed securities	—	—	—	—	—	—	—	—	37,788	3.23	**37,788**
Asset-backed securities	—	—	—	—	—	—	—	—	5,137	3.35	**5,137**
Total	$ 20,076	2.28%	$ 1,657	2.60%	$ 2,247	2.73%	$ 18,904	1.32%	$ 42,925	3.25%	**$ 85,809**
Securities held-to-maturity:											
One year or less	$ 936	1.41%	$ 597	1.26%	$ —	—%	$ 57	0.38%	$ —	—%	**$ 1,590**
Over 1 through 5 years	3,480	1.83	900	2.52	3	5.66	373	0.47	—	—	**4,756**
Over 5 through 10 years	311	2.18	—	—	—	—	509	0.85	—	—	**820**
Over 10 years	—	—	—	—	14	4.76	—	—	—	—	**14**
Mortgage-backed securities	—	—	—	—	—	—	—	—	26,802	2.92	**26,802**
Total	$ 4,727	1.77%	$ 1,497	2.01%	$ 17	4.95%	$ 939	0.67%	$ 26,802	2.92%	**$ 33,982**

(a) Yields are based upon the amortized cost of securities.

Other-than-temporary impairment

For each security in the securities portfolio, a quarterly review is conducted to determine if an OTTI has occurred. See Note 1 for a discussion of the determination of OTTI.

The following table reflects securities credit losses recorded in earnings. The beginning balance represents the credit loss component for which OTTI occurred on debt securities in the prior year. The additions represent the first time a debt security was credit impaired or when subsequent credit impairments have occurred. The deductions represent credit losses on securities that have been sold, are required to be sold, or for which it is our intention to sell.

Debt securities credit loss roll forward *(in millions)*	**2018**	2017
Beginning balance as of Dec. 31	**$ 84**	$ 88
Add: Subsequent OTTI credit losses	**1**	4
Less: Realized losses for securities sold	**7**	8
Ending balance as of Dec. 31	**$ 78**	$ 84

The following table presents pre-tax net securities (losses) gains by type.

Net securities (losses) gains *(in millions)*	**2018**	2017	2016
Agency RMBS	**$ (42)**	$ (12)	$ 22
U.S. Treasury	**(4)**	(16)	4
Foreign covered bonds	**(1)**	—	10
Non-agency RMBS	**—**	4	8
Other	**(1)**	27	31
Total net securities (losses) gains	**$ (48)**	$ 3	$ 75

Pledged assets

At Dec. 31, 2018, BNY Mellon had pledged assets of $120 billion, including $96 billion pledged as collateral for potential borrowings at the Federal Reserve Discount Window and $7 billion pledged as collateral for borrowing at the FHLB. The components of the assets pledged at Dec. 31, 2018 included $100 billion of securities, $15 billion of loans, $4 billion of trading assets and $1 billion of interest-bearing deposits with banks.

If there has been no borrowing at the Federal Reserve Discount Window, the Federal Reserve generally allows banks to freely move assets in and out of their pledged assets account to sell or repledge the assets for other purposes. BNY Mellon regularly moves assets in and out of its pledged assets account at the Federal Reserve.

At Dec. 31, 2017, BNY Mellon had pledged assets of $111 billion, including $92 billion pledged as collateral for potential borrowing at the Federal Reserve Discount Window and $5 billion pledged as collateral for borrowing at the FHLB. The components of the assets pledged at Dec. 31, 2017 included $96 billion of securities, $13 billion of loans and $2 billion of trading assets.

At Dec. 31, 2018 and Dec. 31, 2017, pledged assets included $13 billion and $10 billion, respectively, for which the recipients were permitted to sell or repledge the assets delivered.

We also obtain securities as collateral, including receipts under resale agreements, securities borrowed, derivative contracts and custody agreements on terms which permit us to sell or repledge the securities to others. At Dec. 31, 2018 and Dec. 31, 2017, the market value of the securities received that can be sold or repledged was $151 billion and $86 billion, respectively. We routinely sell or repledge these securities through delivery to third parties. As of Dec. 31, 2018 and Dec. 31, 2017, the market value of securities collateral sold or repledged was $101 billion and $49 billion, respectively.

Restricted cash and securities

Cash and securities may be segregated under federal and other regulations or requirements. At Dec. 31, 2018 and Dec. 31, 2017, cash segregated under federal and other regulations or requirements was $2 billion and $2 billion, respectively. Restricted cash is included in interest-bearing deposits with banks on the consolidated balance sheet. Securities segregated for these purposes were $2 billion at Dec. 31, 2018 and $1 billion at Dec. 31, 2017. Restricted securities were sourced from securities purchased under resale agreements at Dec. 31, 2018 and Dec. 31, 2017 and are included in federal funds sold and securities purchased under resale agreements on the consolidated balance sheet.

Note 5–Loans and asset quality

Loans

The table below provides the details of our loan portfolio and industry concentrations of credit risk at Dec. 31, 2018 and Dec. 31, 2017.

Loans *(in millions)*	Dec. 31, 2018	Dec. 31, 2017
Domestic:		
Commercial	**$ 1,949**	$ 2,744
Commercial real estate	**4,787**	4,900
Financial institutions	**5,091**	5,568
Lease financings	**706**	772
Wealth management loans and mortgages	**15,843**	16,420
Other residential mortgages	**594**	708
Overdrafts	**1,550**	963
Other	**1,181**	1,131
Margin loans	**13,343**	15,689
Total domestic	**45,044**	48,895
Foreign:		
Commercial	**183**	167
Financial institutions	**6,492**	7,483
Lease financings	**551**	527
Wealth management loans and mortgages	**122**	108
Other (primarily overdrafts)	**4,031**	4,264
Margin loans	**141**	96
Total foreign	**11,520**	12,645
Total loans *(a)*	**$ 56,564**	$ 61,540

(a) Net of unearned income of $358 million at Dec. 31, 2018 and $394 million at Dec. 31, 2017 primarily related to domestic and foreign lease financings.

Our loan portfolio consists of three portfolio segments: commercial, lease financings and mortgages. We manage our portfolio at the class level, which consists of six classes of financing receivables: commercial, commercial real estate, financial institutions, lease financings, wealth management loans and mortgages, and other residential mortgages.

The following tables are presented for each class of financing receivable and provide additional information about our credit risks and the adequacy of our allowance for credit losses.

Allowance for credit losses

Activity in the allowance for credit losses is summarized as follows.

Allowance for credit losses activity for the year ended Dec. 31, 2018 *(in millions)*	Commercial	Commercial real estate	Financial institutions	Lease financings	Wealth management loans and mortgages	Other residential mortgages	All other	Foreign	Total
Beginning balance	$ 77	$ 76	$ 23	$ 8	$ 22	$ 20	$ —	$ 35	$ 261
Charge-offs	—	—	—	—	—	(1)	—	—	(1)
Recoveries	—	—	—	—	—	2	—	1	3
Net recoveries	—	—	—	—	—	1	—	1	2
Provision	4	(1)	(1)	(3)	(1)	(5)	—	(4)	(11)
Ending balance	**$ 81**	**$ 75**	**$ 22**	**$ 5**	**$ 21**	**$ 16**	**$ —**	**$ 32**	**$ 252**
Allowance for:									
Loan losses	$ 24	$ 56	$ 7	$ 5	$ 18	$ 16	$ —	$ 20	$ 146
Lending-related commitments	57	19	15	—	3	—	—	12	106
Individually evaluated for impairment:									
Loan balance	$ —	$ —	$ —	$ —	$ 4	$ —	$ —	$ —	$ 4
Allowance for loan losses	—	—	—	—	—	—	—	—	—
Collectively evaluated for impairment:									
Loan balance	$ 1,949	$ 4,787	$ 5,091	$ 706	$ 15,839	$ 594	$ 16,074 *(a)*	$ 11,520	$ 56,560
Allowance for loan losses	24	56	7	5	18	16	—	20	146

(a) Includes $1,550 million of domestic overdrafts, $13,343 million of margin loans and $1,181 million of other loans at Dec. 31, 2018.

Allowance for credit losses activity for the year ended Dec. 31, 2017 *(in millions)*	Commercial	Commercial real estate	Financial institutions	Lease financings	Wealth management loans and mortgages	Other residential mortgages	All other	Foreign	Total
Beginning balance	$ 82	$ 73	$ 26	$ 13	$ 23	$ 28	$ —	$ 36	$ 281
Charge-offs	—	—	—	—	—	(1)	—	—	(1)
Recoveries	—	—	—	—	—	5	—	—	5
Net recoveries	—	—	—	—	—	4	—	—	4
Provision	(5)	3	(3)	(5)	(1)	(12)	—	(1)	(24)
Ending balance	$ 77	$ 76	$ 23	$ 8	$ 22	$ 20	$ —	$ 35	$ 261
Allowance for:									
Loan losses	$ 24	$ 58	$ 7	$ 8	$ 18	$ 20	$ —	$ 24	$ 159
Lending-related commitments	53	18	16	—	4	—	—	11	102
Individually evaluated for impairment:									
Loan balance	$ —	$ —	$ 1	$ —	$ 5	$ —	$ —	$ —	$ 6
Allowance for loan losses	—	—	—	—	1	—	—	—	1
Collectively evaluated for impairment:									
Loan balance	$ 2,744	$ 4,900	$ 5,567	$ 772	$ 16,415	$ 708	$ 17,783 *(a)*	$ 12,645	$ 61,534
Allowance for loan losses	24	58	7	8	17	20	—	24	158

(a) Includes $963 million of domestic overdrafts, $15,689 million of margin loans and $1,131 million of other loans at Dec. 31, 2017.

Allowance for credit losses activity for the year ended Dec. 31, 2016 *(in millions)*	Commercial	Commercial real estate	Financial institutions	Lease financings	Wealth management loans and mortgages	Other residential mortgages	All other		Foreign	Total
Beginning balance	$ 82	$ 59	$ 31	$ 15	$ 19	$ 34	$ —		$ 35	$ 275
Charge-offs	—	—	—	—	—	(2)	—		—	(2)
Recoveries	—	—	13	—	—	5	—		1	19
Net recoveries	—	—	13	—	—	3	—		1	17
Provision	—	14	(18)	(2)	4	(9)	—		—	(11)
Ending balance	$ 82	$ 73	$ 26	$ 13	$ 23	$ 28	$ —		$ 36	$ 281
Allowance for:										
Loans losses	$ 25	$ 52	$ 8	$ 13	$ 19	$ 28	$ —		$ 24	$ 169
Unfunded commitments	57	21	18	—	4	—	—		12	112
Individually evaluated for impairment:										
Loan balance	$ —	$ —	$ —	$ 4	$ 5	$ —	$ —		$ —	$ 9
Allowance for loan losses	—	—	—	2	3	—	—		—	5
Collectively evaluated for impairment:										
Loan balance	$ 2,286	$ 4,639	$ 6,342	$ 985	$ 15,550	$ 854	$ 19,760	*(a)*	$ 14,033	$ 64,449
Allowance for loan losses	25	52	8	11	16	28	—		24	164

(a) Includes $1,055 million of domestic overdrafts, $17,503 million of margin loans and $1,202 million of other loans at Dec. 31, 2016.

Nonperforming assets

The table below presents our nonperforming assets.

Nonperforming assets *(in millions)*	Dec. 31, **2018**	2017
Nonperforming loans:		
Other residential mortgages	**$ 67**	$ 78
Wealth management loans and mortgages	**9**	7
Commercial real estate	**—**	1
Total nonperforming loans	**76**	86
Other assets owned	**3**	4
Total nonperforming assets	**$ 79**	$ 90

At Dec. 31, 2018, undrawn commitments to borrowers whose loans were classified as nonaccrual or reduced rate were not material.

Lost interest

The table below presents the amount of lost interest income.

Lost interest *(in millions)*	**2018**	2017	2016
Amount by which interest income recognized on nonperforming loans exceeded reversals			
Total	**$ —**	$ —	$ —
Foreign	**—**	—	—
Amount by which interest income would have increased if nonperforming loans at year-end had been performing for the entire year			
Total	**$ 5**	$ 5	$ 6
Foreign	**—**	—	—

Impaired loans

The tables below present information about our impaired loans. We use the discounted cash flow method as the primary method for valuing impaired loans.

Impaired loans	**2018**		2017		2016	
(in millions)	Average recorded investment	Interest income recognized	Average recorded investment	Interest income recognized	Average recorded investment	Interest income recognized
Impaired loans with an allowance:						
Commercial real estate	**$ —**	**$ —**	$ —	$ —	$ 1	$ —
Financial institutions	**—**	**—**	1	—	—	—
Wealth management loans and mortgages	**1**	**—**	2	—	5	—
Lease financings	**—**	**—**	1	—	3	—
Total impaired loans with an allowance	**1**	**—**	4	—	9	—
Impaired loans without an allowance:						
Commercial real estate	**—**	**—**	—	—	1	—
Financial institutions	**—**	**—**	—	—	102	—
Wealth management loans and mortgages	**4**	**—**	3	—	2	—
Total impaired loans without an allowance *(a)*	**4**	**—**	3	—	105	—
Total impaired loans	**$ 5**	**$ —**	$ 7	$ —	$ 114	$ —

(a) When the discounted cash flows, collateral value or market price equals or exceeds the carrying value of the loan, then the loan does not require an allowance under the accounting standard related to impaired loans.

Impaired loans	**Dec. 31, 2018**			Dec. 31, 2017		
(in millions)	Recorded investment	Unpaid principal balance	Related allowance *(a)*	Recorded investment	Unpaid principal balance	Related allowance *(a)*
Impaired loans with an allowance:						
Commercial real estate	**$ —**	**$ —**	**$ —**	$ —	$ 3	$ —
Financial institutions	**—**	**—**	**—**	1	1	—
Wealth management loans and mortgages	**—**	**—**	**—**	1	1	1
Total impaired loans with an allowance	**—**	**—**	**—**	2	5	1
Impaired loans without an allowance*:*						
Wealth management loans and mortgages	**4**	**4**	**N/A**	4	4	N/A
Total impaired loans without an allowance *(b)*	**4**	**4**	**N/A**	4	4	N/A
Total impaired loans *(c)*	**$ 4**	**$ 4**	**$ —**	$ 6	$ 9	$ 1

(a) The allowance for impaired loans is included in the allowance for loan losses.
(b) When the discounted cash flows, collateral value or market price equals or exceeds the carrying value of the loan, then the loan does not require an allowance under the accounting standard related to impaired loans.
(c) Excludes an aggregate of less than $1 million of impaired loans in amounts individually less than $1 million at both Dec. 31, 2018 and Dec. 31, 2017, respectively. The allowance for loan losses associated with these loans totaled less than $1 million at both Dec. 31, 2018 and Dec. 31, 2017, respectively.

Past due loans

The table below presents our past due loans.

Past due loans and still accruing interest	**Dec. 31, 2018**				Dec. 31, 2017			
	Days past due			Total	Days past due			Total
(in millions)	30-59	60-89	≥90	past due	30-59	60-89	≥90	past due
Wealth management loans and mortgages	**$ 22**	**$ 1**	**$ 5**	**$ 28**	$ 39	$ 5	$ —	$ 44
Other residential mortgages	**12**	**6**	**7**	**25**	18	5	5	28
Commercial real estate	**1**	**—**	**—**	**1**	44	—	—	44
Financial institutions	**3**	**3**	**—**	**6**	1	—	—	1
Total past due loans	**$ 38**	**$ 10**	**$ 12**	**$ 60**	$ 102	$ 10	$ 5	$ 117

Troubled debt restructurings

A modified loan is considered a TDR if the debtor is experiencing financial difficulties and the creditor grants a concession to the debtor that would not otherwise be considered. A TDR may include a transfer of real estate or other assets from the debtor to the creditor, or a modification of the term of the loan. Not all modified loans are considered TDRs.

The following table presents our TDRs.

TDRs	**2018**			2017		
	Number of contracts	Outstanding recorded investment		Number of contracts	Outstanding recorded investment	
(dollars in millions)		Pre-modification	Post-modification		Pre-modification	Post-modification
Other residential mortgages	**17**	**$ 4**	**$ 4**	50	$ 13	$ 14
Wealth management loans and mortgages	**—**	**—**	**—**	2	6	6
Total TDRs	**17**	**$ 4**	**$ 4**	52	$ 19	$ 20

The modifications of the other residential mortgage loans in 2018 and 2017 consisted of reducing the stated interest rates and, in certain cases, a forbearance of default and extending the maturity dates. The modified loans are primarily collateral dependent for which the value is based on the fair value of the collateral.

TDRs that subsequently defaulted

There were six residential mortgage loans and one wealth management loan, with an aggregate recorded investment of $1 million, which were restructured in a TDR during the previous 12 months and subsequently defaulted in 2018.

Credit quality indicators

Our credit strategy is to focus on investment-grade clients that are active users of our non-credit services. Each customer is assigned an internal credit rating, which is mapped to an external rating agency grade equivalent, if possible, based upon a number of dimensions, which are continually evaluated and may change over time.

The following tables present information about credit quality indicators.

Commercial loan portfolio

Commercial loan portfolio – Credit risk profile by creditworthiness category	Commercial		Commercial real estate		Financial institutions	
	Dec. 31,		Dec. 31,		Dec. 31,	
(in millions)	**2018**	2017	**2018**	2017	**2018**	2017
Investment grade	**$ 2,036**	$ 2,685	**$ 4,184**	$ 4,277	**$ 9,586**	$ 10,021
Non-investment grade	**96**	226	**603**	623	**1,997**	3,030
Total	**$ 2,132**	$ 2,911	**$ 4,787**	$ 4,900	**$ 11,583**	$ 13,051

The commercial loan portfolio is divided into investment grade and non-investment grade categories based on the assigned internal credit ratings, which are generally consistent with those of the public rating agencies. Customers with ratings consistent with BBB- (S&P)/ Baa3 (Moody's) or better are considered to be investment grade. Those clients with ratings lower than this threshold are considered to be non-investment grade.

Wealth management loans and mortgages

Wealth management loans and mortgages – Credit risk profile by internally assigned grade		
	Dec. 31,	
(in millions)	**2018**	2017
Wealth management loans:		
Investment grade	**$ 6,901**	$ 7,042
Non-investment grade	**106**	185
Wealth management mortgages	**8,958**	9,301
Total	**$ 15,965**	$ 16,528

Wealth management non-mortgage loans are not typically rated by external rating agencies. A majority of the wealth management loans are secured by the customers' investment management accounts or custody accounts. Eligible assets pledged for these loans are typically investment grade fixed-income securities, equities and/or mutual funds. Internal ratings for this portion of the wealth management portfolio, therefore, would equate to investment-grade external ratings. Wealth management loans are provided to select customers based on the pledge of other types of assets, including business assets, fixed assets or a modest amount of commercial real estate. For the loans collateralized by other assets, the credit quality of the obligor is carefully analyzed, but we do not consider this portfolio of loans to be investment grade.

Credit quality indicators for wealth management mortgages are not correlated to external ratings. Wealth management mortgages are typically loans to high-net-worth individuals, which are secured primarily by residential property. These loans are primarily interest-only, adjustable rate mortgages with a weighted-average loan-to-value ratio of 62% at origination. In the wealth management portfolio, less than 1% of the mortgages were past due at Dec. 31, 2018.

At Dec. 31, 2018, the wealth management mortgage portfolio consisted of the following geographic concentrations: California - 24%; New York - 18%; Massachusetts - 10%; Florida - 8%; and other - 40%.

Other residential mortgages

The other residential mortgage portfolio primarily consists of 1-4 family residential mortgage loans and totaled $594 million at Dec. 31, 2018 and $708 million at Dec. 31, 2017. These loans are not typically correlated to external ratings. Included in this portfolio at Dec. 31, 2018 were $128 million of mortgage loans purchased in 2005, 2006 and the first quarter of 2007, of which, 11% of the serviced loan balance was at least 60 days delinquent.

Overdrafts

Overdrafts primarily relate to custody and securities clearance clients and totaled $5.5 billion at Dec. 31, 2018 and $5.1 billion at Dec. 31, 2017. Overdrafts occur on a daily basis primarily in the custody and securities clearance business and are generally repaid within two business days.

Other loans

Other loans primarily include loans to consumers that are fully collateralized with equities, mutual funds and fixed-income securities.

Margin loans

We had $13.5 billion of secured margin loans on our consolidated balance sheet at Dec. 31, 2018 compared with $15.8 billion at Dec. 31, 2017. Margin loans are collateralized with marketable securities, and borrowers are required to maintain a daily collateral margin in excess of 100% of the value of the loan. We have rarely suffered a loss on these types of loans and do not allocate any of our allowance for credit losses to margin loans.

Reverse repurchase agreements

Reverse repurchase agreements are transactions fully collateralized with high-quality liquid securities. These transactions carry minimal credit risk and therefore are not allocated an allowance for credit losses.

Note 6–Goodwill and intangible assets

Goodwill

The table below provides a breakdown of goodwill by business.

Goodwill by business *(in millions)*		Investment Services		Investment Management		Other		Consolidated
Balance at Dec. 31, 2016	$	8,269	$	9,000	$	47	$	17,316
Foreign currency translation		120		128		—		248
Balance at Dec. 31, 2017	$	8,389	$	9,128	$	47	$	17,564
Dispositions		—		(65)		—		(65)
Foreign currency translation		(56)		(93)		—		(149)
Balance at Dec. 31, 2018	**$**	**8,333**	**$**	**8,970**	**$**	**47**	**$**	**17,350**

Total goodwill decreased in 2018 compared with 2017 reflecting the impact of foreign exchange translation on non-U.S. dollar denominated goodwill and dispositions in the Investment Management business.

Intangible assets

The table below provides a breakdown of intangible assets by business.

Intangible assets – net carrying amount by business *(in millions)*		Investment Services		Investment Management		Other		Consolidated
Balance at Dec. 31, 2016	$	1,032	$	1,717	$	849	$	3,598
Amortization		(149)		(60)		—		(209)
Foreign currency translation		5		17		—		22
Balance at Dec. 31, 2017	$	888	$	1,674	$	849	$	3,411
Amortization		(129)		(51)		—		(180)
Foreign currency translation		(1)		(10)		—		(11)
Balance at Dec. 31, 2018	**$**	**758**	**$**	**1,613**	**$**	**849**	**$**	**3,220**

Intangible assets decreased in 2018 compared with 2017 primarily reflecting amortization.

The table below provides a breakdown of intangible assets by type.

Intangible assets	**Dec. 31, 2018**				Dec. 31, 2017		
(in millions)	Gross carrying amount	Accumulated amortization	Net carrying amount	Remaining weighted-average amortization period	Gross carrying amount	Accumulated amortization	Net carrying amount
Subject to amortization: *(a)*							
Customer contracts—Investment Services	**$ 1,572**	**$ (1,186)**	**$ 386**	**10 years**	$ 2,260	$ (1,744)	$ 516
Customer relationships—Investment Management	**899**	**(699)**	**200**	**11 years**	1,262	(1,015)	247
Other	**26**	**(12)**	**14**	**4 years**	42	(23)	19
Total subject to amortization	**2,497**	**(1,897)**	**600**	**10 years**	3,564	(2,782)	782
Not subject to amortization: *(b)*							
Tradenames	**1,332**	**N/A**	**1,332**	**N/A**	1,334	N/A	1,334
Customer relationships	**1,288**	**N/A**	**1,288**	**N/A**	1,295	N/A	1,295
Total not subject to amortization	**2,620**	**N/A**	**2,620**	**N/A**	2,629	N/A	2,629
Total intangible assets	**$ 5,117**	**$ (1,897)**	**$ 3,220**	**N/A**	$ 6,193	$ (2,782)	$ 3,411

(a) Excludes fully amortized intangible assets.
(b) Intangible assets not subject to amortization have an indefinite life.

Estimated annual amortization expense for current intangibles for the next five years is as follows:

For the year ended Dec. 31,	Estimated amortization expense *(in millions)*
2019	$ **115**
2020	**102**
2021	**78**
2022	**60**
2023	**50**

Impairment testing

The goodwill impairment test is performed at least annually at the reporting unit level. Intangible assets not subject to amortization are tested for impairment annually or more often if events or circumstances indicate they may be impaired.

BNY Mellon's three business segments include seven reporting units for which goodwill impairment testing is performed on an annual basis. The Investment Services segment is comprised of four reporting units; the Investment Management segment is comprised of two reporting units and one reporting unit is included in the Other segment. As a result of the annual goodwill impairment test of the seven reporting units conducted in the second quarter of 2018, no goodwill impairment was recognized.

Note 7–Other assets

The following table provides the components of other assets presented on the consolidated balance sheet.

Other assets	Dec. 31,	
(in millions)	**2018**	2017
Corporate/bank-owned life insurance	$ **4,937**	$ 4,857
Accounts receivable	**3,692**	4,590
Fails to deliver	**2,274**	2,817
Software	**1,652**	1,499
Prepaid pension assets	**1,357**	1,416
Renewable energy investments	**1,264**	1,368
Income taxes receivable	**1,125**	1,533
Equity in a joint venture and other investments	**1,064**	1,083
Qualified affordable housing project investments	**999**	1,014
Federal Reserve Bank stock	**484**	477
Prepaid expense	**385**	395
Fair value of hedging derivatives	**289**	323
Seed capital	**224**	288
Other *(a)*	**1,552**	1,369
Total other assets	$ **21,298**	$ 23,029

(a) At Dec. 31, 2018 and Dec. 31, 2017, other assets include $111 million and $82 million, respectively, of Federal Home Loan Bank stock, at cost.

Qualified affordable housing project investments

We invest in affordable housing projects primarily to satisfy the Company's requirements under the Community Reinvestment Act. Our total investment in qualified affordable housing projects totaled $1.0 billion at Dec. 31, 2018 and $1.0 billion at Dec. 31, 2017. Commitments to fund future investments in qualified affordable housing projects totaled $479 million at Dec. 31, 2018 and $486 million at Dec. 31, 2017 and are recorded in other liabilities. A summary of the commitments to fund future investments is as follows: 2019 – $201 million; 2020 – $108 million; 2021 – $122 million; 2022 – $29 million; 2023 – $1 million; and 2024 and thereafter – $18 million.

Tax credits and other tax benefits recognized were $163 million in 2018, $156 million in 2017 and $155 million in 2016.

Amortization expense included in the provision for income taxes was $136 million in 2018, $153 million in 2017 and $115 million in 2016.

Investments valued using net asset value per share

In our Investment Management business, we manage investment assets, including equities, fixed income, money market and multi-asset and alternative investment funds for institutions and other investors. As part of that activity, we make seed capital investments in certain funds. We also hold private equity investments, specifically SBICs, which are compliant with the Volcker Rule, and certain other corporate investments. Seed capital, private equity and other corporate investments are included in other assets on the consolidated balance sheet. The fair value of these investments was estimated using the net asset value ("NAV") per share for BNY Mellon's ownership interest in the funds.

The table below presents information on our investments valued using NAV.

Other assets valued using NAV	**Dec. 31, 2018**				Dec. 31, 2017			
(dollars in millions)	Fair value	Unfunded commitments	Redemption frequency	Redemption notice period	Fair value	Unfunded commitments	Redemption frequency	Redemption notice period
Seed capital	**$ 54**	**$ —**	**Daily-quarterly**	**1-90 days**	$ 40	$ 1	Daily-quarterly	1-90 days
Private equity investments (SBICs) *(a)*	**74**	**41**	**N/A**	**N/A**	55	42	N/A	N/A
Other *(b)*	**87**	**—**	**Daily-quarterly**	**1-95 days**	59	—	Daily-quarterly	1-95 days
Total	**$ 215**	**$ 41**			$ 154	$ 43		

(a) Private equity investments include Volcker Rule-compliant investments in SBICs that invest in various sectors of the economy. Private equity investments do not have redemption rights. Distributions from such investments will be received as the underlying investments in the private equity investments, which have a life of 10 years, are liquidated.

(b) Primarily relates to investments in funds that relate to deferred compensation arrangements with employees.

Note 8–Deposits

Total time deposits in denominations of $250,000 or more were $32.1 billion at Dec. 31, 2018 and $37.3 billion at Dec. 31, 2017. At Dec. 31, 2018, the scheduled maturities of all time deposits are as follows: 2019 – $40.5 billion; 2020 – $47 million; 2021 – $1 million; 2022 – $- million; 2023 – $- million; and 2024 and thereafter – $1 million.

Note 9–Contract revenue

Nature of services and revenue recognition

Fee revenue in Investment Services and Investment Management is primarily variable, based on levels of AUC/A, AUM and the level of client-driven transactions, as specified in fee schedules.

Investment Services fees are based primarily on the market value of AUC/A; client accounts, balances and the volume of transactions; securities lending volume and spreads; and fees for other services. Certain fees based on the market value of assets are calculated in arrears on a monthly or quarterly basis.

Substantially all services within the Investment Services business are provided over time. Revenue on these services is recognized using the time elapsed method, equal to the expected invoice amount, which typically represents the value provided to the customer for our performance completed to date.

Clearing services revenue includes multiple types of fees, some of which are driven by customer actions and are delivered at a point-in-time. These transaction-based fees are generally recognized on trade date. Other contractual clearing services fees are driven by the amount of AUC/A or the number of accounts or securities positions and are billed on a monthly or quarterly basis.

Investment management fees are dependent on the overall level and mix of AUM. The management fees, expressed in basis points, are charged for managing those assets. Management fees are typically subject to fee schedules based on the overall level of assets managed and products in which those assets are invested.

Investment management fee revenue also includes transactional- and account-based fees. These fees along with distribution and servicing fees are recognized when the services have been completed. Clients are generally billed for services performed on a monthly or quarterly basis.

Performance fees are generally calculated as a percentage of the applicable portfolio's performance in excess of a benchmark index or a peer group's performance. Performance fees are recognized at the end of the measurement period when they are determinable.

See Note 23 for additional information on our principal businesses, Investment Services and Investment Management, and the primary services provided.

Disaggregation of contract revenue

Contract revenue is included in fee revenue on the consolidated income statement. The following table presents fee revenue related to contracts with customers, disaggregated by type, for each business segment.

Disaggregation of contract revenue by business segment *(a)*

	Year ended Dec. 31, 2018			
(in millions)	Investment Services	Investment Management	Other	Total
Fee revenue - contract revenue:				
Investment services fees:				
Asset servicing	$ 4,395	$ 88	$ 1	$ 4,484
Clearing services	1,577	—	—	1,577
Issuer services	1,099	—	—	1,099
Treasury services	553	1	—	554
Total investment services fees	7,624	89	1	7,714
Investment management and performance fees	54	3,619	—	3,673
Financing-related fees	61	1	(2)	60
Distribution and servicing	(51)	191	—	140
Investment and other income	279	(202)	2	79
Total fee revenue - contract revenue	7,967	3,698	1	11,666
Fee and other revenue - not in scope of ASC 606 *(b)(c)*	959	83	84	1,126
Total fee and other revenue	$ 8,926	$ 3,781	$ 85	$12,792

(a) Business segment data has been determined on an internal management basis of accounting, rather than the generally accepted accounting principles used for consolidated financial reporting.
(b) Primarily includes foreign exchange and other trading revenue, investment and other income, financing-related fees and net securities losses, all of which are accounted for using other accounting guidance.
(c) The Investment Management business includes a loss from consolidated investment management funds, net of noncontrolling interests of $1 million in 2018.

Contract balances

Our clients are billed based on fee schedules that are agreed upon in each customer contract. Receivable from customers were $3.9 billion at Jan. 1, 2018 and $2.5 billion at Dec. 31, 2018. An allowance is maintained for accounts receivables which is generally based on the number of days outstanding. Adjustments to the allowance are recorded in other expense in the consolidated income statement. A provision of $11 million was recorded in 2018.

Contract assets represent accrued revenues that have not yet been billed to the customers due to certain contractual terms other than the passage of time and were $30 million at Jan. 1, 2018 and $36 million at Dec. 31, 2018. Accrued revenues recorded as contract assets are usually billed on an annual basis. There were no impairments recorded on contract assets in 2018.

Both receivables from customers and contract assets are included in other assets on the consolidated balance sheet.

Contract liabilities represent payments received in advance of providing services under certain contracts and were $167 million at Jan. 1, 2018 and $171 million at Dec. 31, 2018. Contract liabilities are included in other liabilities on the consolidated balance sheet. Revenue recognized in 2018 relating to contract liabilities as of Jan. 1, 2018 was $96 million.

Changes in contract assets and liabilities primarily relate to either party's performance under the contracts.

Contract costs

Incremental costs for obtaining contracts that are deemed recoverable are capitalized as contract costs. Such costs result from the payment of sales incentives, primarily in the Wealth Management business, and totaled $98 million at Dec. 31, 2018. Capitalized sales incentives are amortized based on the transfer of goods or services to which the assets relate and typically average nine years. The amortization of capitalized sales incentives, which is primarily included in staff expense, totaled $22 million in 2018.

Costs to fulfill a contract are capitalized when they relate directly to an existing contract or specific anticipated contract, generate or enhance resources that will be used to fulfill performance obligations and are recoverable. Such costs generally represent set-up costs, which include any direct cost incurred at inception of a contract which enables the fulfillment of the performance obligation and totaled $20 million at Dec. 31, 2018. These capitalized costs are amortized on a straight-line basis over the expected contract period which generally range from seven to nine years. The amortization is included in other expense and totaled $5 million in 2018.

There were no impairments recorded on capitalized contract costs in 2018.

Unsatisfied performance obligations

We do not have any unsatisfied performance obligations other than those that are subject to a practical expedient election under ASC 606, *Revenue From Contracts With Customers*. The practical expedient election applies to (i) contracts with an original expected length of one year or less, and (ii) contracts for which we recognize revenue at the amount to which we have the right to invoice for services performed.

Note 10–Net interest revenue

The following table provides the components of net interest revenue presented on the consolidated income statement.

Net interest revenue	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Interest revenue			
Deposits with banks	**$ 219**	$ 120	$ 104
Deposits with the Federal Reserve and other central banks	**531**	319	198
Federal funds sold and securities purchased under resale agreements	**1,116**	423	233
Margin loans	**510**	343	265
Non-margin loans	**1,356**	1,077	873
Securities:			
Taxable	**2,520**	1,977	1,772
Exempt from federal income taxes	**54**	64	70
Total securities	**2,574**	2,041	1,842
Trading securities	**126**	59	60
Total interest revenue	**6,432**	4,382	3,575
Interest expense			
Deposits in domestic offices	**537**	107	41
Deposits in foreign offices	**340**	55	(25)
Federal funds purchased and securities sold under repurchase agreements	**758**	225	36
Trading liabilities	**29**	7	6
Other borrowed funds	**58**	26	8
Commercial paper	**51**	29	5
Customer payables	**191**	64	12
Long-term debt	**857**	561	354
Total interest expense	**2,821**	1,074	437
Net interest revenue	**3,611**	3,308	3,138
Provision for credit losses	**(11)**	(24)	(11)
Net interest revenue after provision for credit losses	**$ 3,622**	$ 3,332	$ 3,149

Note 11–Income taxes

The components of the income tax provision are as follows:

Provision for income taxes	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Current tax expense (benefit):			
Federal	**$ 902**	$ (99)	$ 823
Foreign	**442**	388	327
State and local	**119**	74	153
Total current tax expense	**1,463**	363	1,303
Deferred tax (benefit) expense:			
Federal	**(556)**	36	(75)
Foreign	**9**	14	(14)
State and local	**22**	83	(37)
Total deferred tax (benefit) expense:	**(525)**	133	(126)
Provision for income taxes	**$ 938**	$ 496	$ 1,177

In December 2017, the Tax Cuts and Jobs Act of 2017 ("U.S. tax legislation") was signed into law in the United States. U.S. GAAP requires companies to recognize the effect of tax law changes on deferred tax assets and liabilities and other recognized assets in the period of enactment. Also in December 2017, the Securities and Exchange Commission staff issued Staff Accounting Bulletin No.118 ("SAB 118"). SAB 118 allows the recording of a provisional estimate to reflect the income tax impact of the U.S. tax legislation and provides a measurement period up to one year from the enactment date. Due to the timing of the enactment and the complexity involved in applying the provisions of the U.S. tax legislation, we recorded a provisional tax benefit of $710 million in the fourth quarter of 2017.

In 2018, we completed our analysis of the U.S. tax legislation and filed our 2017 income tax returns, taking into account new Internal Revenue Service ("IRS") guidance. Accordingly we recorded an additional $70 million tax benefit for remeasurement of our net deferred tax liability.

The U.S. tax legislation provided a one-time deemed repatriation tax on undistributed foreign earnings and profits ("repatriation tax"). In 2017, we recorded $723 million provisional repatriation tax. In 2018, we completed our analysis of foreign earnings taking into account new IRS guidance and reduced the repatriation tax by $36 million.

The components of U.S. tax legislation are as follows:

Income tax (benefit) expense *(estimated in millions)*	**2018**	2017
Remeasurement of net deferred tax liabilities	**$ (70)**	$ (1,472)
Repatriation tax	**(36)**	723
Other items	**—**	39
Net income tax (benefit)	**$ (106)**	$ (710)

The components of income before taxes are as follows:

Income before taxes	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Domestic	**$ 3,008**	$ 2,699	$ 3,147
Foreign	**2,184**	1,911	1,578
Income before taxes	**$ 5,192**	$ 4,610	$ 4,725

The components of our net deferred tax liability are as follows:

Net deferred tax liability	Dec. 31,	
(in millions)	**2018**	2017
Depreciation and amortization	**$ 2,060**	$ 1,960
Pension obligation	**300**	283
Renewable energy investment	**295**	278
Lease financings	**130**	151
Equity investments	**65**	65
Repatriation	**—**	617
Securities valuation	**(15)**	11
Credit losses on loans	**(54)**	(55)
Reserves not deducted for tax	**(143)**	(103)
Employee benefits	**(266)**	(287)
Other assets	**(65)**	(85)
Other liabilities	**189**	186
Net deferred tax liability	**$ 2,496**	$ 3,021

We believe it is more likely than not that we will fully realize our deferred tax assets. This conclusion is based on financial results and profit forecasts.

We have completed our analysis of the U.S. tax legislation's impact to foreign earnings and the amount of foreign earnings considered permanently reinvested abroad. As of Dec. 31, 2018, we had approximately $250 million of earnings attributable to foreign subsidiaries that have been permanently reinvested abroad and for which no local distribution tax provision has been recorded. If these earnings were to be repatriated, the estimated tax liability as of Dec. 31, 2018 would be up to $50 million.

The statutory federal income tax rate is reconciled to our effective income tax rate below:

Effective tax rate	Year ended Dec. 31,		
	2018	2017	2016
Federal rate	**21.0%**	35.0%	35.0%
State and local income taxes, net of federal income tax benefit	**2.1**	1.8	1.6
Foreign operations	**0.5**	(4.2)	(5.6)
Tax credits	**(3.3)**	(3.7)	(2.2)
Tax-exempt income	**(0.8)**	(1.9)	(1.8)
Leverage lease adjustment	**—**	(1.4)	(0.9)
FDIC Assessment	**0.5**	—	—
Stock compensation	**(0.6)**	(1.1)	—
U.S. tax legislation	**(1.7)**	(13.3)	—
Other – net	**0.4**	(0.4)	(1.2)
Effective tax rate	**18.1%**	10.8%	24.9%

Unrecognized tax positions *(in millions)*	**2018**	2017	2016
Beginning balance at Jan. 1, – gross	**$ 128**	$ 146	$ 649
Prior period tax positions:			
Increases	**6**	20	8
Decreases	**(8)**	(4)	(40)
Current period tax positions	**9**	10	16
Settlements	**(32)**	(44)	(477)
Statute expiration	**—**	—	(10)
Ending balance at Dec. 31, – gross	**$ 103**	$ 128	$ 146

Our total tax reserves as of Dec. 31, 2018 were $103 million compared with $128 million at Dec. 31, 2017. If these tax reserves were unnecessary, $103 million would affect the effective tax rate in future periods. We recognize accrued interest and penalties, if applicable, related to income taxes in income tax expense. Included in the balance sheet at Dec. 31, 2018 is accrued interest, where applicable, of $22 million. The additional tax expense related to interest for the year ended Dec. 31, 2018 was $8 million, compared with $12 million for the year ended Dec. 31, 2017.

It is reasonably possible the total reserve for uncertain tax positions could decrease within the next 12 months by approximately $20 million as a result of adjustments related to tax years that are still subject to examination.

Our federal income tax returns are closed to examination through 2013. Our New York State, New York City and UK income tax returns are closed to examination through 2012.

Note 12–Long-term debt

Long-term debt	Dec. 31, 2018			Dec. 31, 2017	
(in millions)	**Rate**	**Maturity**	**Amount**	Rate	Amount
Senior debt:					
Fixed rate	**2.05 - 5.45%**	**2019 - 2028**	**$ 24,995**	1.30 - 5.45%	$ 23,329
Floating rate	**2.61 - 3.86%**	**2019 - 2038**	**2,628**	1.49 - 2.74%	2,829
Subordinated debt *(a)*	**3.00 - 7.50%**	**2021 - 2029**	**1,540**	3.00 - 7.50%	1,821
Total			**$ 29,163**		$ 27,979

(a) Fixed rate.

Total long-term debt maturing during the next five years for BNY Mellon is as follows: 2019 – $4.3 billion, 2020 – $5.0 billion, 2021 – $4.6 billion, 2022 – $1.3 billion and 2023 – $5.5 billion.

Note 13–Variable interest entities and securitization

BNY Mellon has variable interests in VIEs, which include investments in retail, institutional and alternative investment funds, including CLO structures in which we provide asset management services, some of which are consolidated. The investment funds are offered to our retail and institutional clients to provide them with access to investment vehicles with specific investment objectives and strategies that address the client's investment needs.

BNY Mellon earns management fees from these funds as well as performance fees in certain funds and may also provide start-up capital for its new funds. The funds are primarily financed by our customers' investments in the funds' equity or debt.

Additionally, BNY Mellon invests in qualified affordable housing and renewable energy projects, which are designed to generate a return primarily through the realization of tax credits by the Company. The projects, which are structured as limited partnerships and LLCs, are also VIEs, but are not consolidated.

The following table presents the incremental assets and liabilities included in BNY Mellon's consolidated financial statements as of Dec. 31, 2018 and Dec. 31, 2017. The net assets of any consolidated VIE are solely available to settle the liabilities of the VIE and to settle any investors' ownership liquidation requests, including any seed capital invested in the VIE by BNY Mellon.

Consolidated investments	Dec. 31, 2018			Dec. 31, 2017		
(in millions)	Investment Management funds	Securitization	Total consolidated investments	Investment Management funds	Securitization	Total consolidated investments
Securities - Available-for-sale	**$ —**	**$ —**	**$ —**	$ —	$ 400	$ 400
Trading assets	**243**	**400**	**643**	516	—	516
Other assets	**220**	**—**	**220**	215	—	215
Total assets	**$ 463** *(a)*	**$ 400**	**$ 863**	$ 731 *(b)*	$ 400	$ 1,131
Other liabilities	**$ 2**	**$ 371**	**$ 373**	$ 2	$ 367	$ 369
Total liabilities	**$ 2** *(a)*	**$ 371**	**$ 373**	$ 2 *(b)*	$ 367	$ 369
Nonredeemable noncontrolling interests	**$ 101** *(a)*	**$ —**	**$ 101**	$ 316 *(b)*	$ —	$ 316

(a) Includes VMEs with assets of $253 million, liabilities of $2 million and nonredeemable noncontrolling interests of less than $1 million.
(b) Includes VMEs with assets of $84 million, liabilities of $1 million and nonredeemable noncontrolling interests of $1 million.

BNY Mellon has not provided financial or other support that was not otherwise contractually required to be provided to our VIEs. Additionally, creditors of any consolidated VIEs do not have any recourse to the general credit of BNY Mellon.

Non-consolidated VIEs

As of Dec. 31, 2018 and Dec. 31, 2017, the following assets and liabilities related to the VIEs where BNY Mellon is not the primary beneficiary are included in our consolidated financial statements and primarily relate to accounting for our investments in qualified affordable housing and renewable energy projects.

The maximum loss exposure indicated in the table below relates solely to BNY Mellon's investments in, and unfunded commitments to, the VIEs.

Non-consolidated VIEs	**Dec. 31, 2018**			Dec. 31, 2017		
(in millions)	Assets	Liabilities	Maximum loss exposure	Assets	Liabilities	Maximum loss exposure
Securities - Available-for-sale *(a)*	**$ 214**	**$ —**	**$ 214**	$ 203	$ —	$ 203
Other	**2,450**	**479**	**2,929**	2,592	486	3,078

(a) Includes investments in the Company's sponsored CLOs.

Note 14–Shareholders' equity

Common stock

BNY Mellon has 3.5 billion authorized shares of common stock with a par value of $0.01 per share. At Dec. 31, 2018, 960,425,669 shares of common stock were outstanding.

Common stock repurchase program

In June 2017, in connection with the Federal Reserve's non-objection to our 2017 capital plan, BNY Mellon announced a share repurchase plan providing for the repurchase of up to $2.6 billion of common stock. The 2017 capital plan began in the third quarter of 2017 and continued through the second quarter of 2018. In June 2018, in connection with the Federal Reserve's non-objection to our 2018 capital plan, BNY Mellon announced a share repurchase plan providing for the repurchase of up to $2.4 billion of common stock starting in the third quarter of 2018 and continuing through the second quarter of 2019. This new share repurchase plan replaces all previously authorized share repurchase plans.

In December 2018, BNY Mellon announced that the Federal Reserve approved the repurchase of $830 million of additional common stock. Our Board of Directors approved the additional share repurchases, which were completed in the fourth quarter of 2018. These repurchases were in addition to the Company's repurchase of $2.4 billion of common stock previously approved by the Board and announced in June 2018.

Share repurchases may be executed through open market repurchases, in privately negotiated transactions or by other means, including through repurchase plans designed to comply with Rule 10b5-1 and other derivative, accelerated share repurchase and other structured transactions. In 2018, we repurchased 63.7 million common shares at an average price of $51.29 per common share for a total of $3.3 billion. At Dec. 31, 2018, the maximum dollar value of shares that may yet be purchased under the June 2018 program, including employee benefit plan repurchases, totaled $1.3 billion.

Preferred stock

BNY Mellon has 100 million authorized shares of preferred stock with a par value of $0.01 per share. The following table summarizes BNY Mellon's preferred stock issued and outstanding at Dec. 31, 2018 and Dec. 31, 2017.

Preferred stock summary *(a)*		**Total shares issued and outstanding**		**Carrying value** *(b)* *(in millions)*	
		Dec. 31,		Dec. 31,	
	Per annum dividend rate	**2018**	2017	**2018**	2017
Series A	Greater of (i) three-month LIBOR plus 0.565% for the related distribution period; or (ii) 4.000%	**5,001**	5,001	**$ 500**	$ 500
Series C	5.2%	**5,825**	5,825	**568**	568
Series D	4.50% to but excluding June 20, 2023, then a floating rate equal to the three-month LIBOR plus 2.46%	**5,000**	5,000	**494**	494
Series E	4.95% to and including June 20, 2020, then a floating rate equal to the three-month LIBOR plus 3.42%	**10,000**	10,000	**990**	990
Series F	4.625% to and including Sept. 20, 2026, then a floating rate equal to the three-month LIBOR plus 3.131%	**10,000**	10,000	**990**	990
Total		**35,826**	35,826	**$ 3,542**	$ 3,542

(a) All outstanding preferred stock is noncumulative perpetual preferred stock with a liquidation preference of $100,000 per share.
(b) The carrying value of the Series C, Series D, Series E and Series F preferred stock is recorded net of issuance costs.

Holders of both the Series A and Series C preferred stock are entitled to receive dividends on each dividend payment date (March 20, June 20, September 20 and December 20 of each year), if declared by BNY Mellon's Board of Directors. Holders of the Series D preferred stock are entitled to receive dividends, if declared by BNY Mellon's Board of Directors, on each June 20 and December 20, to but excluding June 20, 2023; and on each March 20, June 20, September 20 and December 20, from and including June 20, 2023. Holders of the Series E preferred stock are entitled to receive dividends, if declared by BNY Mellon's Board of Directors, on each June 20 and December 20, to and including June 20, 2020; and on each March 20, June 20, September 20 and December 20, from and including Sept. 20, 2020. Holders of the Series F preferred stock are entitled to receive dividends, if declared by BNY Mellon's Board of Directors, on each March 20 and September 20, commencing March 20, 2017, to and including Sept. 20, 2026; and on each March 20, June 20, September 20 and December 20, commencing Dec. 20, 2026. BNY Mellon's ability to declare or pay dividends on, or purchase, redeem or otherwise acquire, shares of our common stock or any of our shares that rank junior to the preferred stock as to the payment of dividends and/or the distribution of any assets on any liquidation, dissolution or winding-up of BNY Mellon will be prohibited, subject to certain restrictions, in the event that we do not declare and pay in full preferred dividends for the then current dividend period of the Series A preferred stock or the last preceding dividend period of the Series C, Series D, Series E and Series F preferred stock.

All of the outstanding shares of the Series A preferred stock are owned by Mellon Capital IV, which will pass through any dividend on the Series A preferred stock to the holders of its Normal Preferred Capital Securities. All of the outstanding shares of the Series C, Series D, Series E and Series F preferred stock are held by the depositary of the depositary shares, which will pass through the applicable portion of any dividend on the Series C, Series D, Series E and Series F preferred stock to the holders of record of their respective depositary shares.

The table below presents the dividends paid on our preferred stock.

Dividend paid per preferred share	Depositary shares per share	**2018**		2017		2016	
		per share	*in millions*	*per share*	*in millions*	*per share*	*in millions*
Series A	**100** *(a)*	**$ 4,055.55**	**$ 20**	$ 4,055.55	$ 20	$ 4,055.55	$ 20
Series C	**4,000**	**5,200.00**	**31**	5,200.00	31	5,200.00	30
Series D	**100**	**4,500.00**	**22**	4,500.00	22	4,500.00	22
Series E	**100**	**4,950.00**	**50**	4,950.00	50	4,950.00	50
Series F	**100**	**4,625.00**	**46**	5,254.51	52	N/A	—
Total			**$ 169**		$ 175		$ 122

(a) Represents Normal Preferred Capital Securities.

The preferred stock is not subject to the operation of a sinking fund and is not convertible into, or exchangeable for, shares of our common stock or any other class or series of our other securities. We may redeem the Series A or Series C preferred stock, in whole or in part, at our option. We may also, at our option, redeem the shares of the Series D preferred stock, in whole or in part, on or after the dividend payment date in June 2023, the Series E preferred stock, in whole or in part, on or after the dividend payment date in June 2020, and the Series F preferred stock, in whole or in part, on or after the dividend payment date in September 2026. The Series C, Series D, Series E or Series F preferred stock can be redeemed, in whole but not in part, at any time within 90 days following a regulatory capital treatment event (as defined in each of the Series C, Series D, Series E and Series F's Certificates of Designation). Redemption of the preferred stock is subject to the prior approval of the Federal Reserve.

Terms of the Series A, Series C, Series D, Series E and Series F preferred stock are more fully described in each of their Certificates of Designations, each of which is filed as an Exhibit to BNY Mellon's Annual Report on Form 10-K for the year ended Dec. 31, 2018.

Temporary equity

Temporary equity was $129 million at Dec. 31, 2018 and $179 million at Dec. 31, 2017. Temporary equity represents the redemption value recorded for redeemable noncontrolling interests resulting from equity-classified share-based payment arrangements that are currently redeemable or are expected to become redeemable.

Capital adequacy

Regulators establish certain levels of capital for BHCs and banks, including BNY Mellon and our bank subsidiaries, in accordance with established quantitative measurements. For the Parent to maintain its status as a FHC, our bank subsidiaries and BNY Mellon must, among other things, qualify as "well capitalized."

As of Dec. 31, 2018 and Dec. 31, 2017, BNY Mellon and our U.S. bank subsidiaries were "well capitalized."

Our consolidated and largest bank subsidiary, The Bank of New York Mellon, regulatory capital ratios are shown below.

Consolidated and largest bank subsidiary regulatory capital ratios *(a)*	Dec. 31, **2018**	Dec. 31, 2017 *(b)*
Consolidated regulatory capital ratios:		
CET1 ratio	**10.7%**	10.7%
Tier 1 capital ratio	**12.8**	12.7
Total capital ratio	**13.6**	13.4
Tier 1 leverage ratio	**6.6**	6.6
SLR *(c)*	**6.0**	N/A
The Bank of New York Mellon regulatory capital ratios:		
CET1 ratio	**14.0%**	14.1%
Tier 1 capital ratio	**14.3**	14.4
Total capital ratio	**14.7**	14.7
Tier 1 leverage ratio	**7.6**	7.6
SLR *(c)*	**6.8**	N/A

(a) *For our CET1, Tier 1 capital and Total capital ratios, our effective capital ratios under U.S. capital rules are the lower of the ratios as calculated under the Standardized and Advanced Approaches, which for the periods noted above was the Advanced Approaches. The Tier 1 leverage ratio is based on Tier 1 capital and quarterly average total assets. For BNY Mellon to qualify as "well capitalized," its Tier 1 capital and Total capital ratios must be at least 6% and 10%, respectively. For The Bank of New York Mellon, our largest bank subsidiary, to qualify as "well capitalized," its CET1, Tier 1 capital, Total capital and Tier 1 leverage ratios must be at least 6.5%, 8%, 10% and 5%, respectively.*

(b) *Reflects transitional adjustments required in 2017 under the U.S. capital rules.*

(c) *The SLR is based on Tier 1 capital and total leverage exposure, which includes certain off-balance sheet exposures and became a binding measure on Jan. 1, 2018. For The Bank of New York Mellon to qualify as "well capitalized," its SLR must be at least 6%.*

Failure to satisfy regulatory standards, including "well capitalized" status or capital adequacy rules more generally, could result in limitations on our activities and adversely affect our financial condition. If a BHC such as BNY Mellon or bank such as The Bank of New York Mellon or BNY Mellon, N.A. fails to qualify as "adequately capitalized," regulatory sanctions and limitations are imposed.

The following table presents our capital components and RWAs determined under the Standardized and Advanced Approaches and the average assets used for leverage capital purposes.

Capital components and risk-weighted assets *(in millions)*	Dec. 31, **2018**	2017 *(a)*
CET1:		
Common shareholders' equity	**$ 37,096**	$ 37,859
Adjustments for:		
Goodwill and intangible assets *(b)*	**(18,806)**	(18,684)
Net pension fund assets	**(320)**	(169)
Equity method investments	**(361)**	(372)
Deferred tax assets	**(42)**	(33)
Other	**—**	(8)
Total CET1	**17,567**	18,593
Other Tier 1 capital:		
Preferred stock	**3,542**	3,542
Deferred tax assets	**—**	(8)
Net pension fund assets	**—**	(42)
Other	**(65)**	(41)
Total Tier 1 capital	**$ 21,044**	$ 22,044
Tier 2 capital:		
Subordinated debt	**$ 1,250**	$ 1,250
Allowance for credit losses	**252**	261
Other	**(10)**	(12)
Total Tier 2 capital – Standardized Approach	**1,492**	1,499
Excess of expected credit losses	**65**	31
Less: Allowance for credit losses	**252**	261
Total Tier 2 capital – Advanced Approach	**$ 1,305**	$ 1,269
Total capital:		
Standardized Approach	**$ 22,536**	$ 23,543
Advanced Approach	**$ 22,349**	$ 23,313
Risk-weighted assets:		
Standardized Approach	**$ 149,618**	$ 155,621
Advanced Approach:		
Credit Risk	**$ 92,917**	$ 101,681
Market Risk	**3,454**	3,657
Operational Risk	**68,300**	68,688
Total Advanced Approach	**$ 164,671**	$ 174,026
Average assets for Tier 1 leverage ratio	**$ 319,007**	$ 331,600
Total leverage exposure for SLR purposes *(c)*	**$ 347,943**	N/A

(a) Reflects transitional adjustments to CET1, Tier 1 capital and Tier 2 capital required in 2017 under the U.S. capital rules.
(b) Reduced by deferred tax liabilities associated with intangible assets and tax deductible goodwill.
(c) SLR became a binding measure on Jan. 1, 2018.

The following table presents the amount of capital by which BNY Mellon and our largest bank subsidiary, The Bank of New York Mellon, exceeded the capital thresholds determined under U.S. capital rules.

Capital above thresholds at Dec. 31, 2018 *(in millions)*	**Consolidated** *(a)*	**The Bank of New York Mellon** *(b)*
CET1	$ 5,217	$ 10,036
Tier 1 capital	6,224	8,372
Total capital	4,235	6,273
Tier 1 leverage ratio	8,284	6,441
SLR *(c)*	3,647	2,336

(a) Based on minimum required standards, with applicable buffers.
(b) Based on well capitalized standards.
(c) SLR became a binding measure on Jan. 1, 2018.

Note 15–Other comprehensive income (loss)

Components of other comprehensive income (loss)	Year ended Dec. 31,								
	2018			2017			2016		
(in millions)	Pre-tax amount	Tax (expense) benefit	After-tax amount	Pre-tax amount	Tax benefit (expense)	After-tax amount	Pre-tax amount	Tax (expense) benefit	After-tax amount
Foreign currency translation:									
Foreign currency translation adjustments arising during the period *(a)*	**$ (157)**	**$ (156)**	**$ (313)**	$ 659	$ 194	$ 853	$ (518)	$ (332)	$ (850)
Total foreign currency translation	**(157)**	**(156)**	**(313)**	659	194	853	(518)	(332)	(850)
Unrealized (loss) gain on assets available-for-sale:									
Unrealized (loss) gain arising during period	**(542)**	**126**	**(416)**	237	(84)	153	(388)	146	(242)
Reclassification adjustment *(b)*	**48**	**(12)**	**36**	(3)	—	(3)	(75)	26	(49)
Net unrealized (loss) gain on assets available-for-sale	**(494)**	**114**	**(380)**	234	(84)	150	(463)	172	(291)
Defined benefit plans:									
Net (loss) gain arising during the period	**(244)**	**55**	**(189)**	454	(112)	342	(151)	43	(108)
Foreign exchange adjustment	**—**	**—**	**—**	1	—	1	(1)	1	—
Amortization of prior service credit, net loss and initial obligation included in net periodic benefit cost *(b)*	**93**	**(24)**	**69**	100	(32)	68	88	(31)	57
Total defined benefit plans	**(151)**	**31**	**(120)**	555	(144)	411	(64)	13	(51)
Unrealized (loss) gain on cash flow hedges:									
Unrealized hedge (loss) gain arising during period	**(15)**	**4**	**(11)**	33	(9)	24	(52)	18	(34)
Reclassification of net (gain) loss to net income:									
FX contracts - trading revenue	**—**	**—**	**—**	(2)	1	(1)	16	(6)	10
FX contracts - other revenue	**(2)**	**—**	**(2)**	(8)	2	(6)	—	—	—
FX contracts - net interest revenue	**—**	**—**	**—**	—	—	—	18	(6)	12
FX contracts - staff expense	**4**	**(1)**	**3**	(10)	2	(8)	11	(3)	8
Total reclassifications to net income *(b)*	**2**	**(1)**	**1**	(20)	5	(15)	45	(15)	30
Net unrealized (loss) gain on cash flow hedges	**(13)**	**3**	**(10)**	13	(4)	9	(7)	3	(4)
Total other comprehensive (loss) income	**$ (815)**	**$ (8)**	**$ (823)**	$ 1,461	$ (38)	$ 1,423	$ (1,052)	$ (144)	$ (1,196)

(a) *Includes the impact of hedges of net investments in foreign subsidiaries. See Note 22 for additional information.*
(b) *The reclassification adjustment related to the unrealized gain (loss) on assets available-for-sale is recorded as net securities gains on the consolidated income statement. The amortization of prior service credit, net loss and initial obligation included in net periodic benefit cost is recorded as staff expense on the consolidated income statement. See Note 22 for the location of the reclassification adjustment related to cash flow hedges on the consolidated income statement.*

Changes in accumulated other comprehensive income (loss) attributable to The Bank of New York Mellon Corporation shareholders						
		ASC 820 Adjustments				
(in millions)	Foreign currency translation	Pensions	Other post-retirement benefits	Unrealized gain (loss) on assets available-for-sale	Unrealized gain (loss) on cash flow hedges	Total accumulated other comprehensive income (loss), net of tax
2015 ending balance	$ (1,632)	$ (1,250)	$ (47)	$ 327	$ 2	$ (2,600)
Change in 2016	(819)	(56)	5	(291)	(4)	(1,165)
2016 ending balance	$ (2,451)	$ (1,306)	$ (42)	$ 36	$ (2)	$ (3,765)
Change in 2017	838	419	(8)	150	9	1,408
2017 ending balance	$ (1,613)	$ (887)	$ (50)	$ 186	$ 7	$ (2,357)
Adjustment for the cumulative effect of applying ASU 2017-12 for derivatives and hedging	**—**	**—**	**—**	**(2)**	**—**	**(2)**
Adjusted balance at Jan. 1, 2018	**(1,613)**	**(887)**	**(50)**	**184**	**7**	**(2,359)**
Change in 2018	**(302)**	**(118)**	**(2)**	**(380)**	**(10)**	**(812)**
2018 ending balance	**$ (1,915)**	**$ (1,005)**	**$ (52)**	**$ (196)**	**$ (3)**	**$ (3,171)**

Note 16–Stock-based compensation

Our Long-Term Incentive Plans provide for the issuance of stock options, restricted stock, restricted stock units ("RSUs") and other stock-based awards to employees and directors of BNY Mellon. At Dec. 31, 2018, under the Long-Term Incentive Plan approved in April 2014, we may issue 23,524,349 new stock-based awards. Of this amount, 8,761,715 shares (subject to potential increase as provided in the Long-Term Incentive Plan) may be issued as restricted stock or RSUs. Stock-based compensation expense related to retirement eligibility vesting totaled $93 million in 2018, $109 million in 2017 and $106 million in 2016.

Stock options

Our Long-Term Incentive Plans provide for the issuance of stock options at fair market value at the date of grant to officers and employees of BNY Mellon. Generally, each option granted is exercisable between one and 10 years from the date of grant. No stock options were granted in 2018, 2017 and 2016.

Compensation costs that were charged against income were less than $1 million in both 2018 and 2017 and $2 million in 2016. The income tax benefit recognized in the consolidated income statement related to compensation costs was less than $1 million in 2018 and 2017 and $1 million in 2016.

A summary of the status of our options as of Dec. 31, 2018, and changes during the year, is presented below:

Stock option activity	Shares subject to option	Weighted-average exercise price	Weighted-average remaining contractual term *(in years)*
Balance at Dec. 31, 2017	9,302,140	$ 27.27	2.7
Granted	—	—	
Exercised	(2,539,135)	31.29	
Canceled/Expired	(48,722)	37.56	
Balance at Dec. 31, 2018	**6,714,283**	**$ 25.67**	**2.0**
Vested and expected to vest at Dec. 31, 2018	**6,714,283**	**25.67**	**2.0**
Exercisable at Dec. 31, 2018	**6,714,283**	**25.67**	**2.0**

Stock options outstanding at Dec. 31, 2018	Options outstanding			Options exercisable *(a)*	
Range of exercise prices	Outstanding	Weighted-average remaining contractual life *(in years)*	Weighted-average exercise price	Exercisable	Weighted-average exercise price
$ 18 to 31	6,714,283	2.0	$ 25.67	6,714,283	$ 25.67

(a) *At Dec. 31, 2017 and Dec. 31, 2016, 9,302,140 and 21,241,568 options were exercisable at a weighted-average price per common share of $27.27 and $32.57, respectively.*

Aggregate intrinsic value of options *(in millions)*	**2018**	2017	2016
Outstanding at Dec. 31,	**$ 144**	$ 247	$ 315
Exercisable at Dec. 31,	**$ 144**	$ 247	$ 315

The total intrinsic value of options exercised was $61 million in 2018, $159 million in 2017 and $122 million in 2016.

Cash received from option exercises totaled $80 million in 2018, $431 million in 2017 and $438 million in 2016. The actual excess tax benefit realized for the tax deductions from options exercised totaled $10 million in 2018, $16 million in 2017 and $3 million in 2016. Consistent with the adoption of ASU 2016-09, the tax benefits in 2018 and 2017 were recognized in the provision for income taxes and in 2016 were recorded to additional paid-in capital.

Restricted stock, RSUs and Performance share units

Restricted stock and RSUs are granted under our long-term incentive plans at no cost to the recipient. These awards are subject to forfeiture until certain restrictions have lapsed, including continued employment, for a specified period. The recipient of a share of restricted stock is entitled to voting rights and generally is entitled to dividends on the common stock. An RSU entitles the recipient to receive a share of common stock after the applicable restrictions lapse. The recipient generally is entitled to receive cash payments equivalent to any dividends paid on the underlying common stock during the period the RSU is outstanding but does not receive voting rights.

The fair value of restricted stock and RSUs is equal to the fair market value of our common stock on the date of grant. The expense is recognized over the vesting period, which is generally zero to four years. The total compensation expense recognized for restricted stock and RSUs was $270 million in 2018, $273 million in 2017 and $256 million in 2016. The total income tax benefit recognized in the consolidated income statement related to compensation costs was $65 million in 2018, $66 million in 2017 and $91 million in 2016.

BNY Mellon's Executive Committee members were granted a target award of 362,798 performance share units ("PSUs") in 2018, 793,847 in 2017 and 548,391 in 2016. The 2018 awards cliff vest in 3 years based on average revenue growth and average operating margin, both as adjusted. These awards are classified as equity and marked-to-market to earnings as the earnout percentages are determined at the discretion of the Human Resources Compensation Committee based on a payout table. The 2017 and 2016 awards cliff vest in 3 years based on operating earnings per share with the potential of a risk modifier based on appropriate growth in RWAs. These awards are liability classified as they contain an interest rate condition that is not linked to performance or market and marked-to-market to earnings as the earnout percentages are determined at the discretion of the Human Resources Compensation Committee based on a payout table.

The following table summarizes our non-vested PSU, restricted stock and RSU activity for 2018.

Non-vested PSU, restricted stock and RSU activity	Number of shares		Weighted-average fair value at grant date
Non-vested PSUs, restricted stock and RSUs at Dec. 31, 2017	16,731,332	$	42.42
Granted	**5,125,001**		**57.67**
Vested	**(7,005,313)**		**39.06**
Forfeited	**(639,308)**		**45.90**
Non-vested PSUs, restricted stock and RSUs at Dec. 31, 2018	**14,211,712**	**$**	**49.43**

As of Dec. 31, 2018, $207 million of total unrecognized compensation costs related to non-vested PSUs, restricted stock and RSUs is expected to be recognized over a weighted-average period of 2.1 years.

The total fair value of restricted stock, RSUs and PSUs that vested was $289 million in 2018, $260 million in 2017 and $236 million in 2016. The actual excess tax benefit realized for the tax deductions from shares vested totaled $26 million in 2018, $34 million in 2017 and $8 million in 2016. Consistent with the adoption of ASU 2016-09, the tax benefits in 2018 and 2017 were recognized in the provision for income taxes and in 2016 were recorded to additional paid-in capital.

Subsidiary Long-Term Incentive Plans

BNY Mellon also has several subsidiary Long-Term Incentive Plans which have issued restricted subsidiary shares to certain employees. These share awards are subject to forfeiture until certain restrictions have lapsed, including continued employment for a specified period of time. The shares are non-voting and non-dividend paying. Once the restrictions lapse, which generally occurs in three to five years, the shares can only be sold, at the option of the employee, to BNY Mellon at a price based generally on the fair value of the subsidiary at the time of repurchase. In certain instances BNY Mellon has an election to call the shares.

Note 17–Employee benefit plans

BNY Mellon has defined benefit and/or defined contribution retirement plans and other post-retirement plans providing healthcare benefits.

The defined benefit pension plans cover approximately 12,400 U.S. employees and approximately 14,700 non-U.S. employees.

BNY Mellon has one qualified and several non-qualified defined benefit pension plans in the U.S. and several pension plans overseas.

Effective June 30, 2015, the benefit accruals under the U.S. qualified and nonqualified defined benefit plans were frozen. This change resulted in no additional benefits being earned by participants in those plans based on service or pay after June 30, 2015. These plans were previously closed to new participants effective Dec. 31, 2010, at which time a non-elective contribution was added to the Company's defined contribution plan for employees not eligible to join the pension plan. Employees previously participating in the pension plan received this non-elective contribution starting July 1, 2015.

Effective Dec. 31, 2018, the benefit accruals were frozen under our largest foreign plan, which covers certain UK employees. This change results in no additional benefits being earned by participants in that plan based on service or pay after Dec. 31, 2018. Most UK employees currently earn benefits only on a defined contribution basis. UK employees impacted by the pension plan freeze will begin earning benefits on a defined contribution basis in 2019.

Pension and post-retirement healthcare plans

The following tables report the combined data for our domestic and foreign defined benefit pension and post-retirement healthcare plans.

	Pension Benefits				Healthcare Benefits			
	Domestic		Foreign		Domestic		Foreign	
(dollar amounts in millions)	**2018**	2017	**2018**	2017	**2018**	2017	**2018**	2017
Weighted-average assumptions used to determine benefit obligations								
Discount rate	**4.45%**	3.97%	**2.95%**	2.45%	**4.45%**	3.97%	**3.10%**	2.50%
Rate of compensation increase	**N/A**	N/A	**2.98**	3.02	**3.00**	3.00	**N/A**	N/A
Cash balance interest crediting rate	**4.00**	4.00	**N/A**	N/A	**N/A**	N/A	**N/A**	N/A
Change in benefit obligation *(a)*								
Benefit obligation at beginning of period	**$ (4,405)**	$ (4,274)	**$ (1,322)**	$ (1,248)	**$ (175)**	$ (169)	**$ (4)**	$ (2)
Service cost	**—**	—	**(28)**	(31)	**(1)**	(1)	**—**	—
Interest cost	**(169)**	(180)	**(32)**	(33)	**(7)**	(7)	**—**	—
Employee contributions	**—**	—	**—**	(1)	**—**	—	**—**	—
Actuarial gain (loss)	**219**	(165)	**173**	88	**22**	(10)	**(1)**	(1)
Curtailments	**—**	—	**11**	—	**—**	—	**—**	—
Benefits paid	**232**	214	**25**	31	**12**	12	**—**	—
Foreign exchange adjustment	**N/A**	N/A	**69**	(128)	**N/A**	N/A	**—**	(1)
Benefit obligation at end of period	**(4,123)**	(4,405)	**(1,104)**	(1,322)	**(149)**	(175)	**(5)**	(4)
Change in fair value of plan assets								
Fair value at beginning of period	**5,496**	4,906	**1,393**	1,090	**107**	97	**—**	—
Actual return on plan assets	**(257)**	783	**1**	128	**(8)**	10	**—**	—
Employer contributions	**33**	21	**22**	93	**12**	12	**—**	—
Employee contributions	**—**	—	**—**	1	**—**	—	**—**	—
Benefit payments	**(232)**	(214)	**(25)**	(31)	**(12)**	(12)	**—**	—
Foreign exchange adjustment	**N/A**	N/A	**(75)**	112	**N/A**	N/A	**—**	—
Fair value at end of period	**5,040**	5,496	**1,316**	1,393	**99**	107	**—**	—
Funded status at end of period	**$ 917**	$ 1,091	**$ 212**	$ 71	**$ (50)**	$ (68)	**$ (5)**	$ (4)
Amounts recognized in accumulated other comprehensive loss (income) consist of:								
Net loss (gain)	**$ 1,598**	$ 1,294	**$ 105**	$ 255	**$ 84**	$ 97	**$ —**	$ (1)
Prior service cost (credit)	**—**	—	**1**	1	**(40)**	(49)	**—**	—
Total (before tax effects)	**$ 1,598**	$ 1,294	**$ 106**	$ 256	**$ 44**	$ 48	**$ —**	$ (1)

(a) The benefit obligation for pension benefits is the projected benefit obligation, and for healthcare benefits, it is the accumulated benefit obligation.

A number of key assumptions and measurement date values determine pension expense. The key elements include the long-term rate of return on plan assets, the discount rate, the market-related value of plan assets and the price used to value stock in the Employee Stock Ownership Plan ("ESOP").

The discount rate for U.S. pension plans was determined after reviewing equivalent rates obtained by discounting the pension plans' expected cash flows using various high-quality, long-term corporate bond yield curves. We also reviewed the results of several models that matched bonds to our pension cash flows. After reviewing the various indices and models, we selected a discount rate of 4.45% as of Dec. 31, 2018.

The discount rates for foreign pension plans are based on high-quality corporate bond rates in countries that have an active corporate bond market. In those countries with no active corporate bond market, discount rates are based on local government bond rates plus a credit spread.

Actuarial gains (loss) on the benefit obligation for both the domestic and foreign pension plans in 2018, as well as the domestic pension plans in 2017, were primarily attributable to changes in discount rates. The actuarial gain on the benefit obligation for foreign pension plans in 2017 was primarily attributable to a decrease in assumed inflation rates for pension plans in the UK.

Net periodic benefit (credit) cost	Pension Benefits						Healthcare Benefits					
	Domestic			Foreign			Domestic			Foreign		
(dollar amounts in millions)	**2018**	2017	2016	**2018**	2017	2016	**2018**	2017	2016	**2018**	2017	2016
Weighted-average assumptions as of Jan. 1:												
Market-related value of plan assets	**$ 5,238**	$ 5,026	$ 4,830	**$ 1,266**	$ 994	$ 994	**$ 108**	$ 102	$ 97	**N/A**	N/A	N/A
Discount rate	**3.97%**	4.35%	4.48%	**2.45%**	2.53%	3.45%	**3.97%**	4.35%	4.48%	**2.50%**	2.60%	3.60%
Expected rate of return on plan assets	**6.625**	6.625	7.00	**4.56**	4.61	5.35	**6.625**	6.625	7.00	**N/A**	N/A	N/A
Rate of compensation increase	**N/A**	N/A	N/A	**3.02**	3.60	3.51	**3.00**	3.00	3.00	**N/A**	N/A	N/A
Cash balance interest crediting rate	**4.00**	4.00	4.00	**N/A**	N/A	N/A	**N/A**	N/A	N/A	**N/A**	N/A	N/A
Components of net periodic benefit (credit) cost :												
Service cost	**$ —**	$ —	$ —	**$ 28**	$ 31	$ 29	**$ 1**	$ 1	$ 1	**$ —**	$ —	$ —
Interest cost	**169**	180	182	**32**	33	36	**7**	7	8	**—**	—	—
Expected return on assets	**(339)**	(325)	(330)	**(57)**	(50)	(51)	**(8)**	(7)	(7)	**—**	—	—
Amortization of:												
Prior service cost (credit)	**—**	—	—	**—**	—	1	**(9)**	(10)	(10)	**—**	—	—
Net actuarial loss	**68**	67	69	**22**	35	17	**7**	6	8	**—**	—	—
Settlement loss	**5**	2	2	**—**	—	1	**—**	—	—	**—**	—	—
Net periodic benefit (credit) cost	**$ (97)**	$ (76)	$ (77)	**$ 25**	$ 49	$ 33	**$ (2)**	$ (3)	$ —	**$ —**	$ —	$ —

Changes in other comprehensive loss (income) in 2018	Pension Benefits		Healthcare Benefits	
(in millions)	Domestic	Foreign	Domestic	Foreign
Net loss (gain) arising during period	**$ 377**	**$ (128)**	**$ (6)**	**$ 1**
Recognition of prior years' net (loss)	**(73)**	**(22)**	**(7)**	**—**
Recognition of prior years' service credit	**—**	**—**	**9**	**—**
Total recognized in other comprehensive (income) loss (before tax effects)	**$ 304**	**$ (150)**	**$ (4)**	**$ 1**

	Domestic		Foreign	
(in millions)	**2018**	2017	**2018**	2017
Pension benefits:				
Prepaid benefit cost	**$ 1,077**	$ 1,282	**$ 280**	$ 134
Accrued benefit cost	**(160)**	(191)	**(68)**	(63)
Total pension benefits	**$ 917**	$ 1,091	**$ 212**	$ 71
Healthcare benefits:				
Accrued benefit cost	**$ (50)**	$ (68)	**$ (5)**	$ (4)
Total healthcare benefits	**$ (50)**	$ (68)	**$ (5)**	$ (4)

The accumulated benefit obligation for all defined benefit plans was $5.2 billion at Dec. 31, 2018 and $5.7 billion at Dec. 31, 2017.

Plans with obligations in excess of plan assets	Pension Benefits					Healthcare Benefits			
	Domestic		Foreign			Domestic		Foreign	
(in millions)	**2018**	2017	**2018**	2017		**2018**	2017	**2018**	2017
Projected benefit obligation	**$ 160**	$ 191	**$ 245**	$ 244	*(a)*	**N/A**	N/A	**N/A**	N/A
Fair value of plan assets	**—**	—	**177**	181	*(a)*	**N/A**	N/A	**N/A**	N/A
Accumulated benefit obligation	**160**	191	**67**	61		**80**	88	**5**	4
Fair value of plan assets	**—**	—	**27**	25		**—**	—	**—**	—

(a) Amounts reported in 2017 have been revised based on the clarification provided in ASU 2018-14.

Assumed healthcare cost trend

The assumed healthcare cost trend rate used in determining domestic benefit expense for 2019 is 6.00%, decreasing to 4.75% in 2024 for pre-Medicare costs and 5.50% decreasing to 4.75% in 2022 for Medicare costs. This projection is based on various economic models that forecast a decreasing growth rate of healthcare expenses over time. The underlying assumption is that healthcare expense growth cannot outpace gross national product growth indefinitely, and over time a lower equilibrium growth rate will be achieved. Further, the ultimate growth rate of 4.75% bears a reasonable relationship to the discount rate. In addition, 2020 costs are assumed to increase beyond the assumed health care cost trend rate for 2019 due to the assumed reinstatement of the health insurer fee which was waived.

The following benefit payments for BNY Mellon's pension and healthcare plans, which reflect expected future service as appropriate, are expected to be paid over the next 10 years:

Expected benefit payments *(in millions)*	**Domestic**	**Foreign**
Pension benefits:		
Year 2019	$ 265	$ 19
2020	266	20
2021	264	20
2022	261	22
2023	266	24
2024-2028	1,297	130
Total pension benefits	$ 2,619	$ 235
Healthcare benefits:		
Year 2019	$ 11	$ —
2020	12	—
2021	12	—
2022	11	—
2023	11	—
2024-2028	50	1
Total healthcare benefits	$ 107	$ 1

Plan contributions

BNY Mellon expects to make cash contributions to fund its defined benefit pension plans in 2019 of $14 million for the domestic plans and $19 million for the foreign plans.

BNY Mellon expects to make cash contributions to fund its post-retirement healthcare plans in 2019 of $11 million for the domestic plans and less than $1 million for the foreign plans.

Investment strategy and asset allocation

BNY Mellon is responsible for the administration of various employee pension and healthcare post-retirement benefits plans, both domestically and internationally. The domestic plans are administered by BNY Mellon's Benefits Administration Committee, a named fiduciary. Subject to the following, at all relevant times, BNY Mellon's Benefits Investment Committee, another named fiduciary to the domestic plans, is responsible for the investment of plan assets. The Benefits Investment Committee's responsibilities include the investment of all domestic defined benefit plan assets, as well as the determination of investment options offered to participants in all domestic defined contribution plans. The Benefits Investment Committee conducts periodic reviews of investment performance, asset allocation and investment manager suitability. In addition, the Benefits Investment Committee has oversight of the Regional Governance Committees for the foreign defined benefit plans.

Our investment objective for U.S. and foreign plans is to maximize total return while maintaining a broadly diversified portfolio for the primary purpose of satisfying obligations for future benefit payments.

Equities are the main holding of the plans. Alternative investments (including private equities) and fixed-income securities provide diversification and, in certain cases, lower the volatility of returns. In general, equity securities and alternative investments within any domestic plan's portfolio can be maintained in the range of 30% to 70% of total plan assets, fixed-income securities can range from 20% to 50% of plan assets and cash equivalents can be held in amounts ranging from 0% to 5% of plan assets. Actual asset allocation within the approved ranges varies from time to time based on economic conditions (both current and forecast) and the advice of professional advisors.

Our pension assets were invested as follows at Dec. 31, 2018 and Dec. 31, 2017:

Asset allocations	Domestic		Foreign	
	2018	2017	**2018**	2017
Equities	**52%**	63%	**48%**	51%
Fixed income	**45**	33	**36**	33
Alternative investment	**2**	2	**9**	9
Private equities	**1**	1	**—**	—
Real estate	**—**	—	**4**	4
Cash	**—**	1	**3**	3
Total pension benefits	**100%**	100%	**100%**	100%

We held no The Bank of New York Mellon Corporation stock in our pension plans at Dec. 31, 2018 and Dec. 31, 2017. Assets of the U.S. post-retirement healthcare plan are invested in an insurance contract.

Fair value measurement of plan assets

In accordance with ASC 715, *Compensation - Retirement Benefits*, BNY Mellon has established a three-level hierarchy for fair value measurements of its pension plan assets based upon the transparency of inputs to the valuation of an asset as of the measurement date. The valuation hierarchy is consistent with guidance in ASC 820, *Fair Value Measurement*, which is detailed in Note 19.

The following is a description of the valuation methodologies used for assets measured at fair value, as well as the general classification of such assets pursuant to the valuation hierarchy.

Cash and currency

This category consists primarily of foreign currency balances and is included in Level 1 of the valuation hierarchy. Foreign currency is translated monthly based on current exchange rates.

Common and preferred stock and mutual funds

These investments include equities and mutual funds and are valued at the closing price reported in the active market in which the individual securities are traded, if available. Where there are no readily available market quotations, we determine fair value primarily based on pricing sources with reasonable levels of price transparency. Common and preferred stock and mutual funds are included in Level 1 of the valuation hierarchy.

Collective trust funds

Collective trust funds include commingled and U.S. equity funds that have no readily available market quotations. The fair value of the funds is based on the securities in the portfolio, which typically are the amount that the fund might reasonably expect to receive for the securities upon a sale. These funds are valued using observable inputs on either a daily or monthly basis. Collective trust funds are included in Level 2 of the valuation hierarchy.

Fixed-income investments

Fixed-income investments include U.S. Treasury securities, U.S. government agencies, sovereign government obligations, U.S. corporate bonds and foreign corporate debt funds. U.S. Treasury securities are valued at the closing price reported in the active market in which the individual security is traded and included as Level 1 of the valuation hierarchy. U.S. government agencies, sovereign government obligations, U.S. corporate bonds and foreign corporate debt funds are valued based on quoted prices for comparable securities with similar yields and credit ratings. When quoted prices are not available for identical or similar bonds, the bonds are valued using discounted cash flows that maximize observable inputs, such as current yields of similar instruments, but includes adjustments for certain risks that may not be observable, such as credit and liquidity risks. U.S. government agencies, sovereign government obligations, U.S. corporate bonds and foreign corporate debt funds are primarily included in Level 2 of the valuation hierarchy.

Other assets measured at NAV

Other assets measured at NAV include funds of funds and venture capital and partnership interests, property funds and other funds. There are no readily available market quotations for these funds. The fair value of the funds of funds is based on NAVs of the funds in the portfolio, which reflects the value of the underlying securities. The fair value of the underlying securities is typically the amount that the fund might reasonably expect to receive upon selling those hard to value or illiquid securities within the portfolios. These funds are either valued on a daily or monthly basis. The fair value of the venture capital and partnership interests is based on the pension plan's ownership percentage of the fair value of the underlying funds as provided by the fund managers. These funds are typically valued on a quarterly basis. The pension plan's venture capital and partnership interests are valued at NAV as a practical expedient for fair value.

The following tables present the fair value of each major category of plan assets as of Dec. 31, 2018 and Dec. 31, 2017, by captions and by ASC 820, *Fair Value Measurement,* valuation hierarchy.

Plan assets measured at fair value on a recurring basis—domestic plans at Dec. 31, 2018

(in millions)	Level 1	Level 2	Level 3	Total fair value
Common and preferred stock:				
U.S. equity	**$ 1,514**	**$ —**	**$ —**	**$ 1,514**
Non-U.S. equity	**160**	**—**	**—**	**160**
Collective trust funds:				
Commingled	**—**	**435**	**—**	**435**
U.S. equity	**—**	**934**	**—**	**934**
Fixed income:				
U.S. Treasury securities	**630**	**—**	**—**	**630**
U.S. government agencies	**—**	**44**	**—**	**44**
Sovereign government obligations	**3**	**5**	**—**	**8**
U.S. corporate bonds	**—**	**972**	**—**	**972**
Other	**—**	**69**	**—**	**69**
Mutual funds	**114**	**—**	**—**	**114**
Total domestic plan assets in the fair value hierarchy	**$ 2,421**	**$ 2,459**	**$ —**	**$ 4,880**
Other assets measured at NAV:				
Funds of funds				**130**
Venture capital and partnership interests				**30**
Total domestic plan assets, at fair value				**$ 5,040**

Plan assets measured at fair value on a recurring basis—foreign plans at Dec. 31, 2018

(in millions)	Level 1	Level 2	Level 3	Total fair value
Equity funds	**$ —**	**$ 194**	**$ —**	**$ 194**
Sovereign/government obligation funds	**—**	**126**	**—**	**126**
Corporate debt funds	**—**	**418**	**—**	**418**
Cash and currency	**356**	**—**	**—**	**356**
Total foreign plan assets in the fair value hierarchy	**$ 356**	**$ 738**	**$ —**	**$ 1,094**
Other assets measured at NAV				**222**
Total foreign plan assets, at fair value				**$ 1,316**

Plan assets measured at fair value on a recurring basis—domestic plans at Dec. 31, 2017

(in millions)	Level 1	Level 2	Level 3	Total fair value
Common and preferred stock:				
U.S. equity	$ 1,815	$ —	$ —	$ 1,815
Non-U.S. equity	243	—	—	243
Collective trust funds:				
Commingled	—	193	—	193
U.S. equity	—	1,389	—	1,389
Fixed income:				
U.S. Treasury securities	452	—	—	452
U.S. government agencies	—	48	—	48
Sovereign government obligations	5	6	—	11
U.S. corporate bonds	—	910	—	910
Other	—	100	—	100
Mutual funds	163	—	—	163
Total domestic plan assets in the fair value hierarchy	$ 2,678	$ 2,646	$ —	$ 5,324
Other assets measured at NAV:				
Funds of funds				129
Venture capital and partnership interests				43
Total domestic plan assets, at fair value				$ 5,496

Plan assets measured at fair value on a recurring basis—foreign plans at Dec. 31, 2017

(in millions)	Level 1	Level 2	Level 3	Total fair value
Equity funds	$ 434	$ 277	$ —	$ 711
Sovereign/government obligation funds	—	104	—	104
Corporate debt funds	—	345	—	345
Cash and currency	41	—	—	41
Total foreign plan assets in the fair value hierarchy	$ 475	$ 726	$ —	$ 1,201
Other assets measured at NAV				192
Total foreign plan assets, at fair value				$ 1,393

Changes in Level 3 fair value measurements

The table below presents a rollforward of the plan assets, for the year ended Dec. 31, 2017 (including the change in fair value), for financial instruments classified in Level 3 of the valuation hierarchy.

Fair value measurements using significant unobservable inputs—foreign plans—for the year ended Dec. 31, 2017	
(in millions)	Corporate debt funds
Fair value at Dec. 31, 2016	$ 17
Transfers out of Level 3	(20)
Total gains included in plan assets	3
Fair value at Dec. 31, 2017	$ —
Change in unrealized gains or (losses) for the period included in earnings for assets held at the end of the reporting period	$ —

Funds of funds and venture capital and partnership interests valued using NAV per share

BNY Mellon had pension and post-retirement plan assets invested in funds of funds, venture capital and partnership interests, property funds and other contracts valued using NAV. The funds of funds investments are redeemable at NAV under agreements with the funds of funds managers.

Assets valued using NAV at Dec. 31, 2018				
(dollar amounts in millions)	Fair value	Unfunded commitments	Redemption frequency	Redemption notice period
Funds of funds *(a)*	$ 147	$ —	Monthly	30-45 days
Venture capital and partnership interests *(b)*	148	—	N/A	N/A
Property funds *(c)*	52	—	Monthly	0-90 days
Corporate debt	19	—	N/A	N/A
Other contracts *(d)*	16	—	N/A	N/A
Total	**$ 382**	**$ —**		

Assets valued using NAV at Dec. 31, 2017				
(dollar amounts in millions)	Fair value	Unfunded commitments	Redemption frequency	Redemption notice period
Funds of funds *(a)*	$ 152	$ —	Monthly	30-45 days
Venture capital and partnership interests *(b)*	128	49	N/A	N/A
Property funds *(c)*	51	—	Monthly	0-90 days
Corporate debt	20	—	N/A	N/A
Other contracts *(d)*	13	—	N/A	N/A
Total	$ 364	$ 49		

(a) *Funds of funds include multi-strategy hedge funds that utilize investment strategies that invest over both long-term investment and short-term investment horizons.*
(b) *Venture capital and partnership interests do not have redemption rights. Distributions from such funds will be received as the underlying investments are liquidated.*
(c) *Property funds include funds invested in regional real estate vehicles that hold direct interest in real estate properties.*
(d) *Other contracts include assets invested in pooled accounts at insurance companies that are privately valued by the asset manager.*

Defined contribution plans

BNY Mellon sponsors defined contribution plans in the U.S. and in certain non-U.S. locations, all of which are administered in accordance with local laws. The most significant defined contribution plan is The Bank of New York Mellon Corporation 401(k) Savings Plan sponsored by the Company in the U.S. and covers substantially all U.S. employees.

Under The Bank of New York Mellon Corporation 401(k) Savings Plan, the Company matched 100% of the first 4% of an employee's eligible base pay plus 50% of the next 2% of eligible pay contributed by the participant for a maximum matching contribution of 5% for 2018, 2017 and 2016, subject to statutory limits.

The U.S. qualified and nonqualified defined benefit plans were closed to new participants effective Dec. 31, 2010, at which time an annual non-elective contribution equal to 2% of eligible base pay was added to The Bank of New York Mellon Corporation 401(k) Savings Plan.

At Dec. 31, 2018 and Dec. 31, 2017, The Bank of New York Mellon Corporation 401(k) Savings Plan owned 12.7 million and 13.2 million shares of our common stock, respectively. The fair value of total assets was $6.2 billion at Dec. 31, 2018 and $6.6 billion at Dec. 31, 2017. We recorded expense of $244 million in 2018, $232 million in 2017 and $224 million in 2016 primarily for contributions to our defined contribution plans.

We also have an ESOP covering certain domestic full-time employees hired on or before July 1, 2008. The ESOP works in conjunction with the defined benefit pension plan. Employees are entitled to the higher of their benefit under the ESOP or such defined benefit pension plan at retirement. Benefits payable under the defined benefit pension plan are offset by the equivalent value of benefits earned under the ESOP.

At Dec. 31, 2018 and Dec. 31, 2017, the ESOP owned 5.0 million and 5.4 million shares of our common stock, respectively. The fair value of total ESOP assets was $236 million at Dec. 31, 2018 and $293 million at Dec. 31, 2017. The Company is not permitted to make contributions to the ESOP.

The Benefits Investment Committee appointed Fiduciary Counselors, Inc. to serve as the independent fiduciary to (i) make all fiduciary decisions related to the continued prudence of offering the common stock of BNY Mellon or its affiliates as an investment option under the plans, other than plan sponsor decisions, and (ii) select and monitor any actively or passively managed investments of BNY Mellon or its affiliates to be offered to participants as investment options under the plans, excluding self-directed accounts.

Note 18–Company financial information (Parent Corporation)

In connection with our single point of entry resolution strategy, we have established an IHC to facilitate the provision of capital and liquidity resources to certain key subsidiaries in the event of material financial distress or failure. In 2017, we entered into a binding support agreement with those key subsidiaries and other related entities that requires the IHC to provide that support. The support agreement requires the Parent to transfer cash and other liquid financial assets to the IHC, subject to certain amounts retained by the Parent to meet its near-term cash needs. The Parent's and the IHC's obligations under the support agreement are secured. The IHC has provided the Parent with a committed line of credit that allows the Parent to draw funds necessary to service near-term obligations. As a result, during business-as-usual circumstances, the Parent is expected to continue to have access to the funds necessary to pay dividends, repurchase common stock, service its debt and satisfy its other obligations. If our projected liquidity resources deteriorate so severely that resolution of the Parent becomes imminent, the committed line of credit the IHC provided to the Parent will automatically terminate, with all amounts outstanding becoming due and payable, and the support agreement will require the Parent to transfer most of its remaining assets (other than stock in subsidiaries and a cash reserve to fund bankruptcy expenses) to the IHC. As a result, during a period of severe financial stress, the Parent could become unable to meet its debt and payment obligations (including with respect to its securities), causing the Parent to seek protection under bankruptcy laws earlier than it otherwise would have.

Our bank subsidiaries are subject to dividend limitations under the Federal Reserve Act, as well as national and state banking laws. Under these statutes, prior regulatory consent is required for dividends in any year that would exceed the bank's net profits for such year combined with retained net profits for the prior two years. Additionally, such bank subsidiaries may not declare dividends in excess of net profits on hand, as defined, after deducting the amount by which the principal amount of all loans, on which interest is past due for a period of six months or more, exceeds the allowance for credit losses.

The payment of dividends also is limited by minimum capital requirements imposed on banks. As of Dec. 31, 2018, BNY Mellon's bank subsidiaries exceeded these minimum requirements.

Subsequent to Dec. 31, 2018, our U.S. bank subsidiaries could declare dividends to the Parent of approximately $3.7 billion, without the need for a regulatory waiver. In addition, at Dec. 31, 2018, non-bank subsidiaries of the Parent had liquid assets of approximately $1.7 billion.

The bank subsidiaries declared dividends of $3.8 billion in 2018, $1.3 billion in 2017 and $160 million in 2016. The Federal Reserve and the OCC have issued additional guidelines that require BHCs and national banks to continually evaluate the level of cash dividends in relation to their respective operating income, capital needs, asset quality and overall financial condition.

The Federal Reserve policy with respect to the payment of cash dividends by BHCs provides that, as a matter of prudent banking, a BHC should not maintain a rate of cash dividends unless its net income available to common shareholders has been sufficient to fully fund the dividends, and the prospective rate of earnings retention appears to be consistent with the holding company's capital needs, asset quality and overall financial condition. The Federal Reserve can also prohibit a dividend if payment would constitute an unsafe or unsound banking practice. Any increase in BNY Mellon's ongoing quarterly dividends would require approval from the Federal Reserve.

BNY Mellon and other affected BHCs may pay dividends, repurchase stock, and make other capital distributions only in accordance with a capital plan that has been reviewed by the Federal Reserve and as to which the Federal Reserve has not objected. The Federal Reserve may object to a capital plan if the plan does not show that the covered BHC will meet, for each quarter throughout the nine-quarter planning horizon covered by the capital plan, all minimum regulatory capital ratios under applicable capital rules as in effect for that quarter on a *pro forma* basis under the base case and stressed scenarios (including a severely adverse scenario provided by the Federal Reserve). The capital plan rules also stipulate that a covered BHC may not make a capital distribution unless after giving effect to the distribution it will meet all minimum regulatory capital ratios. As part of this process, BNY Mellon also provides the Federal Reserve with estimates of the composition and levels of regulatory capital, RWAs and other measures under Basel III under an identified scenario.

In June 2018, in connection with the Federal Reserve's non-objection to our 2018 capital plan, BNY Mellon announced a share repurchase plan providing for the repurchase of up to $2.4 billion of common stock starting in the third quarter of 2018 and continuing through the second quarter of 2019. This new share repurchase plan replaces all previously authorized share repurchase plans.

On Dec. 10, 2018, BNY Mellon announced that the Federal Reserve approved the repurchase of up to $830 million of additional common stock. Our Board of Directors approved the additional share repurchases, all of which were repurchased in the fourth quarter of 2018. These repurchases were in addition to the Company's repurchase of $2.4 billion of common stock previously approved by the Board and announced in June 2018.

The Federal Reserve Act limits, and requires collateral for, extensions of credit by our insured subsidiary banks to BNY Mellon and certain of its non-bank affiliates. Also, there are restrictions on the amounts of investments by such banks in stock and other securities of BNY Mellon and such affiliates, and restrictions on the acceptance of their securities as collateral for loans by such banks. Extensions of credit by the banks to each of our affiliates are limited to 10% of such bank's regulatory capital, and in the aggregate for BNY Mellon and all such affiliates to 20%, and collateral must be between 100% and 130% of the amount of the credit, depending on the type of collateral.

Our insured subsidiary banks are required to maintain reserve balances with Federal Reserve Banks under the Federal Reserve Act and Regulation D. Required balances averaged $6.1 billion and $5.6 billion for the years 2018 and 2017, respectively.

In the event of impairment of the capital stock of one of the Parent's national banks or The Bank of New York Mellon, the Parent, as the banks' stockholder, could be required to pay such deficiency.

The Parent guarantees the debt issued by Mellon Funding Corporation, a wholly owned financing subsidiary of the Company. The Parent also guarantees committed and uncommitted lines of credit of Pershing LLC and Pershing Limited subsidiaries. The Parent guarantees described above are full and unconditional and contain the standard provisions relating to parent guarantees of subsidiary debt. Additionally, the Parent guarantees or indemnifies obligations of its consolidated subsidiaries as needed. Generally, there are no stated notional amounts included in these indemnifications and the contingencies triggering the obligation for indemnification are not expected to occur. As a result, we are unable to develop an estimate of the maximum payout under these indemnifications. However, we believe the possibility is remote that we will have to make any material payment under these guarantees and indemnifications.

The condensed financial statements of the Parent include the accounts of the Parent; Mellon Funding Corporation and MIPA, LLC, a single-member limited liability company, created to hold and administer corporate-owned life insurance. Financial data for the Parent, the financing subsidiary and the single-member limited liability company are combined for financial reporting purposes because of the limited function of these entities and the unconditional guarantee by BNY Mellon of their obligations.

The Parent's condensed financial statements are as follows:

Condensed Income Statement—The Bank of New York Mellon Corporation (Parent Corporation)

	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Dividends from bank subsidiaries	**$ 3,874**	$ 1,405	$ 125
Dividends from nonbank subsidiaries	**1,869**	382	798
Interest revenue from bank subsidiaries	**13**	25	70
Interest revenue from nonbank subsidiaries	**200**	171	121
Gain on securities held for sale	**1**	—	—
Other revenue	**36**	67	39
Total revenue	**5,993**	2,050	1,153
Interest (including, $59, $73, $88, to subsidiaries, respectively)	**658**	663	427
Other expense	**439**	254	262
Total expense	**1,097**	917	689
Income before income taxes and equity in undistributed net income of subsidiaries	**4,896**	1,133	464
(Benefit) for income taxes	**(165)**	(526)	(333)
Equity in undistributed net income:			
Bank subsidiaries	**(508)**	1,524	2,474
Nonbank subsidiaries	**(287)**	907	276
Net income	**4,266**	4,090	3,547
Preferred stock dividends	**(169)**	(175)	(122)
Net income applicable to common shareholders of The Bank of New York Mellon Corporation	**$ 4,097**	$ 3,915	$ 3,425

Condensed Balance Sheet—The Bank of New York Mellon Corporation (Parent Corporation)

	Dec. 31,	
(in millions)	**2018**	2017
Assets:		
Cash and due from banks	**$ 909**	$ 1,301
Securities	**27**	40
Investment in and advances to subsidiaries and associated companies:		
Banks	**31,285**	32,967
Other	**37,986**	37,660
Subtotal	**69,271**	70,627
Corporate-owned life insurance	**761**	756
Other assets	**740**	1,135
Total assets	**$ 71,708**	$ 73,859
Liabilities:		
Deferred compensation	**$ 445**	$ 476
Affiliate borrowings	**1,616**	3,177
Other liabilities	**1,246**	1,373
Long-term debt	**27,763**	27,582
Total liabilities	**31,070**	32,608
Shareholders' equity	**40,638**	41,251
Total liabilities and shareholders' equity	**$ 71,708**	$ 73,859

Condensed Statement of Cash Flows—The Bank of New York Mellon Corporation (Parent Corporation)

	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Operating activities:			
Net income	**$ 4,266**	$ 4,090	$ 3,547
Adjustments to reconcile net income to net cash provided by operating activities:			
Equity in undistributed net loss (income) of subsidiaries	**795**	(2,431)	(2,750)
Change in accrued interest receivable	**27**	(6)	2
Change in accrued interest payable	**29**	42	4
Change in taxes payable *(a)*	**224**	(600)	452
Other, net	**(257)**	38	(31)
Net cash provided by operating activities	**5,084**	1,133	1,224
Investing activities:			
Purchases of securities	**—**	(991)	(1,739)
Proceeds from sales of securities	**13**	2,729	—
Change in loans	**—**	7	13
Acquisitions of, investments in, and advances to subsidiaries *(b)*	**(53)**	(7,208)	(317)
Other, net	**1**	—	—
Net cash (used for) investing activities	**(39)**	(5,463)	(2,043)
Financing activities:			
Proceeds from issuance of long-term debt	**4,144**	4,738	6,229
Repayments of long-term debt	**(3,650)**	(997)	(2,700)
Change in advances from subsidiaries	**(1,561)**	(3,930)	(1,136)
Issuance of common stock	**120**	465	465
Treasury stock acquired	**(3,269)**	(2,686)	(2,398)
Issuance of preferred stock	**—**	—	990
Cash dividends paid	**(1,221)**	(1,076)	(900)
Tax benefit realized on share-based payment awards	**—**	—	3
Net cash (used for) provided by financing activities	**(5,437)**	(3,486)	553
Change in cash and due from banks	**(392)**	(7,816)	(266)
Cash and due from banks at beginning of year	**1,301**	9,117	9,383
Cash and due from banks at end of year	**$ 909**	$ 1,301	$ 9,117
Supplemental disclosures			
Interest paid	**$ 629**	$ 705	$ 409
Income taxes paid	**12**	61	1
Income taxes refunded	**7**	15	12

(a) *Includes payments received from subsidiaries for taxes of $837 million in 2018, $189 million in 2017 and $189 million in 2016.*
(b) *Includes $2,807 million of cash outflows, net of $2,754 million of cash inflows in 2018 and $10,296 million of cash outflows, net of $3,088 million of cash inflows in 2017.*

Note 19–Fair value measurement

Fair value is defined as the price that would be received to sell an asset, or paid to transfer a liability, in an orderly transaction between market participants at the measurement date. A three-level hierarchy for fair value measurements is utilized based upon the transparency of inputs to the valuation of an asset or liability as of the measurement date. BNY Mellon's own creditworthiness is considered when valuing liabilities.

Fair value focuses on exit price in an orderly transaction (that is, not a forced liquidation or distressed sale) between market participants at the measurement date under current market conditions. If there has been a significant decrease in the volume and level of activity for the asset or liability, a change in valuation technique or the use of multiple valuation techniques may be appropriate. In such instances, determining the price at which willing market participants would transact at the measurement date under current market conditions depends on the facts and circumstances and requires the use of significant judgment. The objective is to determine from weighted indicators of fair value a reasonable point within the range that is most representative of fair value under current market conditions.

Determination of fair value

We have established processes for determining fair values. Fair value is based upon quoted market prices in active markets, where available. For financial instruments where quotes from recent exchange transactions are not available, we determine fair value based on discounted cash flow analysis, comparison to similar instruments and the use of financial models. Discounted cash flow analysis is dependent upon estimated future cash flows and the level of interest rates. Model-based pricing uses inputs of observable prices, where available, for interest rates, foreign exchange rates, option volatilities and other factors. Models are benchmarked and validated by an independent internal risk management function. Our valuation process takes into consideration factors such as counterparty credit quality, liquidity, concentration concerns and observability of model parameters. Valuation adjustments may be made to record financial instruments at fair value.

Most derivative contracts are valued using internally developed models which are calibrated to observable market data and employ standard market pricing theory for their valuations. Valuation models incorporate counterparty credit risk by discounting each trade's expected exposures to the counterparty using the counterparty's credit spreads, as implied by the credit default swap market. We also adjust expected liabilities to the counterparty using BNY Mellon's own credit spreads, as implied by the credit default swap market. Accordingly, the valuation of our derivative positions is sensitive to the current changes in our own credit spreads as well as those of our counterparties.

In certain cases, recent prices may not be observable for instruments that trade in inactive or less active markets. Upon evaluating the uncertainty in valuing financial instruments subject to liquidity issues, we make an adjustment to their value. The determination of the liquidity adjustment includes the availability of external quotes, the time since the latest available quote and the price volatility of the instrument.

Certain parameters in some financial models are not directly observable and, therefore, are based on management's estimates and judgments. These financial instruments are normally traded less actively. We apply valuation adjustments to mitigate the possibility of error and revision in the model based estimate value. Examples include products where parameters such as correlation and recovery rates are unobservable.

The methods described above for instruments that trade in inactive or less active markets may produce a current fair value calculation that may not be indicative of net realizable value or reflective of future fair values. We believe our methods of determining fair value are appropriate and consistent with other market participants. However, the use of different methodologies or different assumptions to value certain financial instruments could result in a different estimate of fair value.

Valuation hierarchy

A three-level valuation hierarchy is used for disclosure of fair value measurements based upon the transparency of inputs to the valuation of an asset or liability as of the measurement date. The three levels are described below.

Level 1: Inputs to the valuation methodology are quoted prices (unadjusted) for identical assets or liabilities in active markets. Level 1 assets and liabilities include certain debt and equity securities, derivative financial instruments actively traded on exchanges and highly liquid government bonds.

Level 2: Observable inputs other than Level 1 prices, for example, quoted prices for similar assets and liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, and inputs that are observable or can be corroborated, either directly or indirectly, for substantially the full term of the financial instrument. Level 2 assets and liabilities include debt instruments that are traded less frequently than exchange-traded securities and derivative financial instruments whose model inputs are observable in the market or can be corroborated by market-observable data. Examples in this category are mortgage-backed securities, corporate debt securities and OTC derivative contracts.

Level 3: Inputs to the valuation methodology are unobservable and significant to the fair value measurement.

A financial instrument's categorization within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement.

Valuation methodology

Following is a description of the valuation methodologies used for instruments measured at fair value, as well as the general classification of such instruments pursuant to the valuation hierarchy.

Securities

We determine fair value primarily based on pricing sources with reasonable levels of price transparency. Where quoted prices are available in an active market, we classify the securities within Level 1 of the valuation hierarchy. Securities include both long and short positions. Level 1 securities include U.S. Treasury and certain sovereign debt securities that are actively traded in highly liquid OTC markets, money market funds and exchange-traded equities.

If quoted market prices are not available, fair values are primarily determined using pricing models using observable trade data, market data, quoted prices of securities with similar characteristics or discounted cash flows. Examples of such instruments, which would generally be classified within Level 2 of the valuation hierarchy, include mortgage-backed securities, state and political subdivisions, certain sovereign debt, corporate bonds and foreign covered bonds.

Specifically, the pricing sources obtain recent transactions for similar types of securities (e.g., vintage, position in the securitization structure) and ascertain variables such as discount rate and speed of prepayment for the types of transaction and apply such variables to similar types of bonds. We view these as observable transactions in the current marketplace and classify such securities as Level 2. Pricing sources discontinue pricing any specific security whenever they determine there is insufficient observable data to provide a good faith opinion on price.

In certain cases where there is limited activity or less transparency around inputs to the valuation, we classify those securities in Level 3 of the valuation hierarchy. We have no instruments included in Level 3 of the valuation hierarchy.

At Dec. 31, 2018, approximately 99% of our securities were valued by pricing sources with reasonable levels of price transparency. Additional disclosures of securities are provided in Note 4.

Derivative financial instruments

We classify exchange-traded derivative financial instruments valued using quoted prices in Level 1 of the valuation hierarchy. Examples include exchange-traded equity and foreign exchange options. Since few other classes of derivative contracts are listed on an exchange, most of our derivative positions are valued using internally developed models that use as their basis readily observable market parameters, and we classify them in Level 2 of the valuation hierarchy. Such derivative financial instruments include swaps and options, foreign exchange spot and forward contracts and credit default swaps.

Derivatives valued using models with significant unobservable market parameters in markets that lack two-way flow are classified in Level 3 of the valuation hierarchy. Examples may include long-dated swaps and options, where parameters may be unobservable for longer maturities; and certain highly structured products, where correlation risk is unobservable. As of Dec. 31, 2018 we have no Level 3 derivatives. Additional disclosures of derivative instruments are provided in Note 22.

Seed capital

In our Investment Management business, we manage investment assets, including equities, fixed income, money market and multi-asset and alternative investment funds for institutions and other investors. As part of that activity, we make seed capital investments in certain funds. Seed capital is generally included in other assets on the consolidated balance sheet. When applicable, we value seed capital based on the published NAV of the fund.

For other types of investments in funds, we consider all of the rights and obligations inherent in our ownership interest, including the reported NAV as well as other factors that affect the fair value of our interest in the fund.

Interests in securitizations

For the interests in securitizations that are classified in securities available-for-sale, trading assets and long-term debt, we use discounted cash flow models, which generally include assumptions of projected finance charges related to the securitized assets, estimated net credit losses, prepayment assumptions and estimates of payments to third-party investors. When available, we compare our fair value estimates and assumptions to market activity and to the actual results of the securitized portfolio.

Other assets measured at NAV

BNY Mellon holds private equity investments, specifically SBICs, which are compliant with the Volcker Rule. There are no readily available market quotations for these investment partnerships. The fair value of the SBICs is based on our ownership percentage of the fair value of the underlying investments as provided by the partnership managers. These investments are typically valued on a quarterly basis. Our SBIC private equity investments are valued at NAV as a practical expedient for fair value.

The following tables present the financial instruments carried at fair value at Dec. 31, 2018 and Dec. 31, 2017, by caption on the consolidated balance sheet and by the three-level valuation hierarchy. We have included credit ratings information in certain of the tables because the information indicates the degree of credit risk to which we are exposed, and significant changes in ratings classifications could result in increased risk for us.

Assets measured at fair value on a recurring basis at Dec. 31, 2018 *(dollars in millions)*	Level 1	Level 2	Level 3	Netting *(a)*	Total carrying value
Available-for-sale securities:					
Agency RMBS	$ —	$ 25,308	$ —	$ —	$ 25,308
U.S. Treasury	20,076	—	—	—	20,076
Sovereign debt/sovereign guaranteed	6,613	4,137	—	—	10,750
Agency commercial MBS	—	9,691	—	—	9,691
CLOs	—	3,364	—	—	3,364
Supranational	—	2,984	—	—	2,984
Foreign covered bonds	—	2,878	—	—	2,878
State and political subdivisions	—	2,247	—	—	2,247
Other asset-backed securities	—	1,773	—	—	1,773
U.S. government agencies	—	1,657	—	—	1,657
Non-agency commercial MBS	—	1,464	—	—	1,464
Non-agency RMBS *(b)*	—	1,325	—	—	1,325
Corporate bonds	—	1,054	—	—	1,054
Other debt securities	—	1,238	—	—	1,238
Total available-for-sale securities	26,689	59,120	—	—	85,809
Trading assets:					
Debt instruments	801	2,594	—	—	3,395
Equity instruments *(c)*	1,114	—	—	—	1,114
Derivative assets not designated as hedging:					
Interest rate	7	3,583	—	(2,202)	1,388
Foreign exchange	—	4,807	—	(3,724)	1,083
Equity and other contracts	9	59	—	(13)	55
Total derivative assets not designated as hedging	16	8,449	—	(5,939)	2,526
Total trading assets	1,931	11,043	—	(5,939)	7,035
Other assets:					
Derivative assets designated as hedging:					
Interest rate	—	23	—	—	23
Foreign exchange	—	266	—	—	266
Total derivative assets designated as hedging	—	289	—	—	289
Other assets *(d)*	68	170	—	—	238
Other assets measured at NAV *(d)*					215
Total other assets	68	459	—	—	742
Subtotal assets of operations at fair value	**28,688**	**70,622**	**—**	**(5,939)**	**93,586**
Percentage of assets of operations prior to netting	29%	71%	—%		
Assets of consolidated investment management funds	210	253	—	—	463
Total assets	**$ 28,898**	**$ 70,875**	**$ —**	**$ (5,939)**	**$ 94,049**
Percentage of total assets prior to netting	29%	71%	—%		

Liabilities measured at fair value on a recurring basis at Dec. 31, 2018 *(dollars in millions)*	Level 1	Level 2	Level 3	Netting *(a)*	Total carrying value
Trading liabilities:					
Debt instruments	$ 1,006	$ 118	$ —	$ —	$ 1,124
Equity instruments	75	—	—	—	75
Derivative liabilities not designated as hedging:					
Interest rate	12	3,104	—	(2,508)	608
Foreign exchange	—	5,215	—	(3,626)	1,589
Equity and other contracts	1	118	—	(36)	83
Total derivative liabilities not designated as hedging	13	8,437	—	(6,170)	2,280
Total trading liabilities	1,094	8,555	—	(6,170)	3,479
Long-term debt *(c)*	—	371	—	—	371
Other liabilities – derivative liabilities designated as hedging:					
Interest rate	—	74	—	—	74
Foreign exchange	—	14	—	—	14
Total other liabilities – derivative liabilities designated as hedging	—	88	—	—	88
Subtotal liabilities of operations at fair value	**1,094**	**9,014**	**—**	**(6,170)**	**3,938**
Percentage of liabilities of operations prior to netting	11%	89%	—%		
Liabilities of consolidated investment management funds	2	—	—	—	2
Total liabilities	**$ 1,096**	**$ 9,014**	**$ —**	**$ (6,170)**	**$ 3,940**
Percentage of total liabilities prior to netting	11%	89%	—%		

(a) ASC 815, Derivatives and Hedging, permits the netting of derivative receivables and derivative payables under legally enforceable master netting agreements and permits the netting of cash collateral. Netting is applicable to derivatives not designated as hedging instruments included in trading assets or trading liabilities and derivatives designated as hedging instruments included in other assets or other liabilities. Netting is allocated to the derivative products based on the net fair value of each product.

(b) Includes $832 million in Level 2 that was included in the former Grantor Trust.

(c) Includes certain interests in securitizations.

(d) Includes seed capital, private equity investments and other assets.

Assets measured at fair value on a recurring basis at Dec. 31, 2017 *(dollars in millions)*	Level 1	Level 2	Level 3	Netting *(a)*	Total carrying value
Available-for-sale securities:					
Agency RMBS	$ —	$ 23,819	$ —	$ —	$ 23,819
U.S. Treasury	15,263	—	—	—	15,263
Sovereign debt/sovereign guaranteed	9,919	2,638	—	—	12,557
Agency commercial MBS	—	8,762	—	—	8,762
State and political subdivisions	—	2,957	—	—	2,957
CLOs	—	2,909	—	—	2,909
Foreign covered bonds	—	2,529	—	—	2,529
Supranational	—	2,079	—	—	2,079
Non-agency RMBS *(b)*	—	1,578	—	—	1,578
Non-agency commercial MBS	—	1,360	—	—	1,360
Corporate bonds	—	1,255	—	—	1,255
Other asset-backed securities	—	1,043	—	—	1,043
U.S. government agencies	—	908	—	—	908
Other RMBS	—	149	—	—	149
Other debt securities	—	1,412	—	—	1,412
Money market funds *(c)*	963	—	—	—	963
Total available-for-sale securities	26,145	53,398	—	—	79,543
Trading assets:					
Debt instruments	690	1,910	—	—	2,600
Equity instruments *(c)*	654	—	—	—	654
Derivative assets not designated as hedging:					
Interest rate	9	6,430	—	(5,075)	1,364
Foreign exchange	—	5,104	—	(3,720)	1,384
Equity and other contracts	—	70	—	(50)	20
Total derivative assets not designated as hedging	9	11,604	—	(8,845)	2,768
Total trading assets	1,353	13,514	—	(8,845)	6,022
Other assets:					
Derivative assets designated as hedging:					
Interest rate	—	278	—	—	278
Foreign exchange	—	45	—	—	45
Total derivative assets designated as hedging	—	323	—	—	323
Other assets *(d)*	144	170	—	—	314
Other assets measured at NAV *(d)*					154
Total other assets	144	493	—	—	791
Subtotal assets of operations at fair value	27,642	67,405	—	(8,845)	86,356
Percentage of assets of operations prior to netting	29%	71%	—%		
Assets of consolidated investment management funds	322	409	—	—	731
Total assets	$ 27,964	$ 67,814	$ —	$ (8,845)	$ 87,087
Percentage of total assets prior to netting	29%	71%	—%		

Liabilities measured at fair value on a recurring basis at Dec. 31, 2017 *(dollars in millions)*	Level 1	Level 2	Level 3	Netting *(a)*	Total carrying value
Trading liabilities:					
Debt instruments	$ 979	$ 80	$ —	$ —	$ 1,059
Equity instruments	149	—	—	—	149
Derivative liabilities not designated as hedging:					
Interest rate	4	6,349	—	(5,495)	858
Foreign exchange	—	5,067	—	(3,221)	1,846
Equity and other contracts	—	153	—	(81)	72
Total derivative liabilities not designated as hedging	4	11,569	—	(8,797)	2,776
Total trading liabilities	1,132	11,649	—	(8,797)	3,984
Long-term debt (*c*)	—	367	—	—	367
Other liabilities – derivative liabilities designated as hedging:					
Interest rate	—	534	—	—	534
Foreign exchange	—	266	—	—	266
Total other liabilities – derivative liabilities designated as hedging	—	800	—	—	800
Subtotal liabilities of operations at fair value	1,132	12,816	—	(8,797)	5,151
Percentage of liabilities of operations prior to netting	8%	92%	—%		
Liabilities of consolidated investment management funds	1	1	—	—	2
Total liabilities	$ 1,133	$ 12,817	$ —	$ (8,797)	$ 5,153
Percentage of total liabilities prior to netting	8%	92%	—%		

(a) ASC 815, Derivatives and Hedging, permits the netting of derivative receivables and derivative payables under legally enforceable master netting agreements and permits the netting of cash collateral. Netting is applicable to derivatives not designated as hedging instruments included in trading assets or trading liabilities and derivatives designated as hedging instruments included in other assets or other liabilities. Netting is allocated to the derivative products based on the net fair value of each product.

(b) Includes $1,091 million in Level 2 that was included in the former Grantor Trust.

(c) Includes certain interests in securitizations.

(d) Includes private equity investments and seed capital.

Details of certain available-for-sale securities measured at fair value on a recurring basis	**Dec. 31, 2018**						Dec. 31, 2017					
			Ratings *(a)*						Ratings *(a)*			
(dollars in millions)	**Total carrying value**	*(b)*	**AAA/ AA-**	**A+/ A-**	**BBB+/ BBB-**	**BB+ and lower**	Total carrying value	*(b)*	AAA/ AA-	A+/ A-	BBB+/ BBB-	BB+ and lower
Non-agency RMBS *(c)*, originated in:												
2007	**$ 315**		**15%**	**2%**	**3%**	**80%**	$ 419		13%	3%	—%	84%
2006	**363**		**—**	**19**	**—**	**81**	467		—	17	—	83
2005	**396**		**9**	**1**	**7**	**83**	509		6	2	6	86
2004 and earlier	**251**		**16**	**24**	**11**	**49**	332		3	2	31	64
Total non-agency RMBS	**$ 1,325**		**9%**	**11%**	**5%**	**75%**	$ 1,727	*(d)*	6%	6%	8%	80%
Non-agency commercial MBS, originated in:												
2009-2018	**$ 1,464**		**96%**	**4%**	**—%**	**—%**	$ 1,309		94%	6%	—%	—%
2005	**—**		**—**	**—**	**—**	**—**	51		100	—	—	—
Total non-agency commercial MBS	**$ 1,464**		**96%**	**4%**	**—%**	**—%**	$ 1,360		94%	6%	—%	—%
Foreign covered bonds:												
Canada	**$ 1,524**		**100%**	**—%**	**—%**	**—%**	$ 1,659		100%	—%	—%	—%
United Kingdom	**529**		**100**	**—**	**—**	**—**	103		100	—	—	—
Australia	**333**		**100**	**—**	**—**	**—**	265		100	—	—	—
Sweden	**187**		**100**	**—**	**—**	**—**	136		100	—	—	—
Other	**305**		**100**	**—**	**—**	**—**	366		100	—	—	—
Total foreign covered bonds	**$ 2,878**		**100%**	**—%**	**—%**	**—%**	$ 2,529		100%	—%	—%	—%
Sovereign debt/sovereign guaranteed:												
United Kingdom	**$ 2,153**		**100%**	**—%**	**—%**	**—%**	$ 3,052		100%	—%	—%	—%
Germany	**1,826**		**100**	**—**	**—**	**—**	1,586		100	—	—	—
France	**1,548**		**100**	**—**	**—**	**—**	2,046		100	—	—	—
Spain	**1,365**		**—**	**—**	**100**	**—**	1,635		—	—	100	—
Italy	**939**		**—**	**—**	**100**	**—**	1,292		—	—	100	—
Netherlands	**875**		**100**	**—**	**—**	**—**	1,027		100	—	—	—
Ireland	**625**		**—**	**100**	**—**	**—**	843		—	100	—	—
Hong Kong	**450**		**100**	**—**	**—**	**—**	—		—	—	—	—
Canada	**378**		**100**	**—**	**—**	**—**	—		—	—	—	—
Belgium	**260**		**100**	**—**	**—**	**—**	803		100	—	—	—
Other *(e)*	**331**		**68**	**—**	**—**	**32**	273		50	—	—	50
Total sovereign debt/sovereign guaranteed	**$ 10,750**		**72%**	**6%**	**21%**	**1%**	$ 12,557		69%	7%	23%	1%

(a) *Represents ratings by S&P or the equivalent.*
(b) *At Dec. 31, 2018 and Dec. 31, 2017, sovereign debt/sovereign guaranteed securities were included in Level 1 and Level 2 in the valuation hierarchy. All other assets in the table are Level 2 assets in the valuation hierarchy.*
(c) *Includes $832 million at Dec. 31, 2018 and $1,091 million at Dec. 31, 2017 that were included in the former Grantor Trust.*
(d) *Includes other RMBS.*
(e) *Includes non-investment grade sovereign debt/sovereign guaranteed securities related to Brazil of $107 million at Dec. 31, 2018 and $136 million at Dec. 31, 2017.*

Assets and liabilities measured at fair value on a nonrecurring basis

Under certain circumstances, we make adjustments to fair value our assets, liabilities and unfunded lending-related commitments although they are not measured at fair value on an ongoing basis. Examples would be the recording of an impairment of an asset and non-readily marketable equity securities carried at cost with upward or downward adjustments.

The following table presents the financial instruments carried on the consolidated balance sheet by caption and level in the fair value hierarchy as of Dec. 31, 2018 and Dec. 31, 2017, for which a nonrecurring change in fair value has been recorded in the respective year.

Assets measured at fair value on a nonrecurring basis	**Dec. 31, 2018**				Dec. 31, 2017			
(in millions)	Level 1	Level 2	Level 3	Total carrying value	Level 1	Level 2	Level 3	Total carrying value
Loans *(a)*	$ —	$ 64	$ 4	$ 68	$ —	$ 73	$ 6	$ 79
Other assets *(b)*	—	57	—	57	—	4	—	4
Total assets at fair value on a nonrecurring basis	**$ —**	**$ 121**	**$ 4**	**$ 125**	$ —	$ 77	$ 6	$ 83

(a) *The fair value of these loans decreased $1 million in both 2018 and 2017, based on the fair value of the underlying collateral, as required by guidance in ASC 310, Receivables, with an offset to the allowance for credit losses.*
(b) *Includes non-readily marketable equity securities carried at cost with upward or downward adjustments and other assets received in satisfaction of debt.*

Estimated fair value of financial instruments

The following tables present the estimated fair value and the carrying amount of financial instruments not carried at fair value on the consolidated balance sheet at Dec. 31, 2018 and Dec. 31, 2017, by caption on the consolidated balance sheet and by the valuation hierarchy.

Summary of financial instruments	**Dec. 31, 2018**				
(in millions)	**Level 1**	**Level 2**	**Level 3**	**Total estimated fair value**	**Carrying amount**
Assets:					
Interest-bearing deposits with the Federal Reserve and other central banks	$ —	$ **67,988**	$ —	$ **67,988**	$ **67,988**
Interest-bearing deposits with banks	—	**14,168**	—	**14,168**	**14,148**
Federal funds sold and securities purchased under resale agreements	—	**46,795**	—	**46,795**	**46,795**
Securities held-to-maturity	**5,512**	**27,790**	—	**33,302**	**33,982**
Loans *(a)*	—	**55,142**	—	**55,142**	**55,161**
Other financial assets	**5,864**	**1,383**	—	**7,247**	**7,247**
Total	$ **11,376**	$ **213,266**	$ —	$ **224,642**	$ **225,321**
Liabilities:					
Noninterest-bearing deposits	$ —	$ **70,783**	$ —	$ **70,783**	$ **70,783**
Interest-bearing deposits	—	**165,914**	—	**165,914**	**167,995**
Federal funds purchased and securities sold under repurchase agreements	—	**14,243**	—	**14,243**	**14,243**
Payables to customers and broker-dealers	—	**19,731**	—	**19,731**	**19,731**
Commercial paper	—	**1,939**	—	**1,939**	**1,939**
Borrowings	—	**3,584**	—	**3,584**	**3,584**
Long-term debt	—	**28,347**	—	**28,347**	**28,792**
Total	$ —	$ **304,541**	$ —	$ **304,541**	$ **307,067**

(a) Does not include the leasing portfolio.

Summary of financial instruments	Dec. 31, 2017				
(in millions)	Level 1	Level 2	Level 3	Total estimated fair value	Carrying amount
Assets:					
Interest-bearing deposits with the Federal Reserve and other central banks	$ —	$ 91,510	$ —	$ 91,510	$ 91,510
Interest-bearing deposits with banks	—	11,982	—	11,982	11,979
Federal funds sold and securities purchased under resale agreements	—	28,135	—	28,135	28,135
Securities held-to-maturity	11,365	29,147	—	40,512	40,827
Loans *(a)*	—	60,219	—	60,219	60,082
Other financial assets	5,382	1,244	—	6,626	6,626
Total	$ 16,747	$ 222,237	$ —	$ 238,984	$ 239,159
Liabilities:					
Noninterest-bearing deposits	$ —	$ 82,716	$ —	$ 82,716	$ 82,716
Interest-bearing deposits	—	160,042	—	160,042	161,606
Federal funds purchased and securities sold under repurchase agreements	—	15,163	—	15,163	15,163
Payables to customers and broker-dealers	—	20,184	—	20,184	20,184
Commercial paper	—	3,075	—	3,075	3,075
Borrowings	—	2,931	—	2,931	2,931
Long-term debt	—	27,789	—	27,789	27,612
Total	$ —	$ 311,900	$ —	$ 311,900	$ 313,287

(a) Does not include the leasing portfolio.

The table below summarizes the carrying amount of the hedged financial instruments, the notional amount of the hedge and the unrealized gain (loss) (estimated fair value) of the derivatives.

Hedged financial instruments *(in millions)*	Carrying amount	Notional amount of hedge	Unrealized *(a)* Gain	Unrealized *(a)* (Loss)
Dec. 31, 2018				
Securities available-for-sale *(b)*	**$ 19,349**	**$ 19,437**	**$ 24**	**$ (74)**
Long-term debt	**16,147**	**16,600**	**—**	**—**
Dec. 31, 2017				
Securities available-for-sale	$ 12,307	$ 12,365	$ 102	$ (301)
Long-term debt	23,821	23,950	175	(233)

(a) *Unrealized gain/loss amounts reflect the fact that certain of the derivatives are cleared and settled through central clearing counterparties where cash collateral received and paid is deemed a settlement of the derivative.*
(b) *Includes foreign exchange fair value hedges with a carrying value of $148 million, a notional amount of $147 million and unrealized gains of $1 million.*

Note 20–Fair value option

We elected fair value as an alternative measurement for selected financial assets and liabilities. The following table presents the assets and liabilities of consolidated investment management funds, at fair value.

Assets and liabilities of consolidated investment management funds, at fair value *(in millions)*	Dec. 31, **2018**	Dec. 31, 2017
Assets of consolidated investment management funds:		
Trading assets	**$ 243**	$ 516
Other assets	**220**	215
Total assets of consolidated investment management funds	**$ 463**	$ 731
Liabilities of consolidated investment management funds:		
Other liabilities	**$ 2**	$ 2
Total liabilities of consolidated investment management funds	**$ 2**	$ 2

BNY Mellon values the assets and liabilities of its consolidated investment management funds using quoted prices for identical assets or liabilities in active markets or observable inputs such as quoted prices for similar assets or liabilities. Quoted prices for either identical or similar assets or liabilities in inactive markets may also be used. Accordingly, fair value best reflects the interests BNY Mellon holds in the economic performance of the consolidated investment management funds. Changes in the value of the assets and liabilities are recorded in the consolidated income statement as investment income of consolidated investment management funds and in the interest of investment management fund note holders, respectively.

We have elected the fair value option on $240 million of long-term debt. The fair value of this long-term debt was $371 million at Dec. 31, 2018 and $367 million at Dec. 31, 2017. The long-term debt is valued using observable market inputs and is included in Level 2 of the valuation hierarchy.

The following table presents the changes in fair value of long-term debt and certain loans for which we elected the fair value option that we previously held in 2016, and the location of the changes in the consolidated income statement. There were no loans valued under the fair value option election at Dec. 31, 2018, Dec. 31, 2017 and Dec. 31, 2016.

Impact of changes in fair value in the income statement *(a)* *(in millions)*	Year ended Dec. 31, **2018**	2017	2016
Loans:			
Investment and other income	**$ —**	$ —	$ 12
Long-term debt:			
Foreign exchange and other trading revenue	**$ (4)**	$ (4)	$ (4)

(a) *The changes in fair value of the loans and long-term debt are approximately offset by economic hedges included in foreign exchange and other trading revenue.*

Note 21–Commitments and contingent liabilities

Off-balance sheet arrangements

In the normal course of business, various commitments and contingent liabilities are outstanding that are not reflected in the accompanying consolidated balance sheets.

Our significant trading and off-balance sheet risks are securities, foreign currency and interest rate risk management products, commercial lending commitments, letters of credit and securities lending indemnifications. We assume these risks to reduce interest rate and foreign currency risks, to provide customers with the ability to meet credit and liquidity needs and to hedge foreign currency and interest rate risks. These items involve, to varying degrees, credit, foreign currency and interest rate risks not recognized on the balance sheet. Our off-balance sheet risks are managed and monitored in manners similar to those used for on-balance sheet risks.

The following table presents a summary of our off-balance sheet credit risks.

Off-balance sheet credit risks	Dec. 31,	
(in millions)	**2018**	2017
Lending commitments	**$ 50,631**	$ 51,467
Standby letters of credit *(a)*	**2,817**	3,531
Commercial letters of credit	**165**	122
Securities lending indemnifications *(b)(c)*	**401,504**	432,084

(a) Net of participations totaling $163 million at Dec. 31, 2018 and $672 million at Dec. 31, 2017.
(b) Excludes the indemnification for securities for which BNY Mellon acts as an agent on behalf of CIBC Mellon clients, which totaled $56 billion at Dec. 31, 2018 and $69 billion at Dec. 31, 2017.
(c) Includes cash collateral, invested in indemnified repurchase agreements, held by us as securities lending agent of $35 billion at Dec. 31, 2018 and $33 billion at Dec. 31, 2017.

The total potential loss on undrawn lending commitments, standby and commercial letters of credit, and securities lending indemnifications is equal to the total notional amount if drawn upon, which does not consider the value of any collateral.

Since many of the lending commitments are expected to expire without being drawn upon, the total amount does not necessarily represent future cash requirements. A summary of lending commitment maturities is as follows: $29.8 billion in less than one year, $20.3 billion in one to five years and $570 million over five years.

SBLCs principally support obligations of corporate clients and were collateralized with cash and securities of $223 million at Dec. 31, 2018 and $160 million at Dec. 31, 2017. At Dec. 31, 2018, $2.0 billion of the SBLCs will expire within one year and $845 million in one to five years.

We must recognize, at the inception of an SBLC and foreign and other guarantees, a liability for the fair value of the obligation undertaken in issuing the guarantee. The fair value of the liability, which was recorded with a corresponding asset in other assets, was estimated as the present value of contractual customer fees. The estimated liability for losses related to SBLCs and foreign and other guarantees, if any, is included in the allowance for lending-related commitments. The allowance for lending-related commitments was $106 million at Dec. 31, 2018 and $102 million at Dec. 31, 2017.

Payment/performance risk of SBLCs is monitored using both historical performance and internal ratings criteria. BNY Mellon's historical experience is that SBLCs typically expire without being funded. SBLCs below investment grade are monitored closely for payment/performance risk. The table below shows SBLCs by investment grade:

Standby letters of credit	Dec. 31,	
	2018	2017
Investment grade	**89%**	84%
Non-investment grade	**11%**	16%

A commercial letter of credit is normally a short-term instrument used to finance a commercial contract for the shipment of goods from a seller to a buyer. Although the commercial letter of credit is contingent upon the satisfaction of specified conditions, it represents a credit exposure if the buyer defaults on the underlying transaction. As a result, the total contractual amounts do not necessarily represent future cash requirements. Commercial letters of credit totaled $165 million at Dec. 31, 2018 and $122 million at Dec. 31, 2017.

We expect many of the lending commitments and letters of credit to expire without the need to advance any cash. The revenue associated with guarantees frequently depends on the credit rating of the obligor and the structure of the transaction, including collateral, if any.

A securities lending transaction is a fully collateralized transaction in which the owner of a security agrees to lend the security (typically through an agent, in our case, The Bank of New York Mellon), to a borrower, usually a broker-dealer or bank, on an open, overnight or term basis, under the terms of a prearranged contract.

We typically lend securities with indemnification against borrower default. We generally require the borrower to provide collateral with a minimum value of 102% of the fair value of the securities borrowed, which is monitored on a daily basis, thus reducing credit risk. Market risk can also arise in securities lending transactions. These risks are controlled through policies limiting the level of risk that can be undertaken. Securities lending transactions are generally entered into only with highly rated counterparties. Securities lending indemnifications were secured by collateral of $420 billion at Dec. 31, 2018 and $451 billion at Dec. 31, 2017.

CIBC Mellon, a joint venture between BNY Mellon and the Canadian Imperial Bank of Commerce (“CIBC”), engages in securities lending activities. CIBC Mellon, BNY Mellon and CIBC jointly and severally indemnify securities lenders against specific types of borrower default. At Dec. 31, 2018 and Dec. 31, 2017, $56 billion and $69 billion, respectively, of borrowings at CIBC Mellon, for which BNY Mellon acts as agent on behalf of CIBC Mellon clients, were secured by collateral of $59 billion and $73 billion, respectively. If, upon a default, a borrower’s collateral was not sufficient to cover its related obligations, certain losses related to the indemnification could be covered by the indemnitors.

Industry concentrations

We have significant industry concentrations related to credit exposure at Dec. 31, 2018. The tables below present our credit exposure in the financial institutions and commercial portfolios.

Financial institutions portfolio exposure *(in billions)*	**Dec. 31, 2018**		
	Loans	**Unfunded commitments**	**Total exposure**
Securities industry	**$ 3.1**	**$ 22.5**	**$ 25.6**
Banks	**6.3**	**1.6**	**7.9**
Asset managers	**1.3**	**6.1**	**7.4**
Insurance	**0.1**	**2.5**	**2.6**
Government	**0.1**	**0.5**	**0.6**
Other	**0.7**	**0.8**	**1.5**
Total	**$ 11.6**	**$ 34.0**	**$ 45.6**

Commercial portfolio exposure *(in billions)*	**Dec. 31, 2018**		
	Loans	**Unfunded commitments**	**Total exposure**
Manufacturing	**$ 0.8**	**$ 5.1**	**$ 5.9**
Services and other	**0.7**	**4.8**	**5.5**
Energy and utilities	**0.5**	**4.1**	**4.6**
Media and telecom	**0.1**	**1.2**	**1.3**
Total	**$ 2.1**	**$ 15.2**	**$ 17.3**

Major concentrations in securities lending are primarily to broker-dealers and are generally collateralized with cash and/or securities.

Operating leases

Net rent expense for premises and equipment was $295 million in 2018, $285 million in 2017 and $301 million in 2016.

At Dec. 31, 2018, we were obligated under various noncancelable lease agreements, some of which provide for additional rents based upon real estate taxes, insurance and maintenance and for various renewal options. A summary of the future minimum rental commitments under noncancelable operating leases, net of related sublease revenue, is as follows: 2019—$264 million; 2020—$244 million; 2021—$211 million; 2022—$172 million; 2023—$136 million and 2024 and thereafter—$432 million.

Exposure for certain administrative errors

In connection with certain offshore tax-exempt funds that we manage, we may be liable to the funds for certain administrative errors. The errors relate to the resident status of such funds, potentially exposing the Company to a tax liability related to the funds’ earnings. The Company is in discussions with tax authorities regarding the funds. We believe we are appropriately accrued and the additional reasonably possible exposure is not significant.

Indemnification arrangements

We have provided standard representations for underwriting agreements, acquisition and divestiture agreements, sales of loans and commitments, and other similar types of arrangements and customary indemnification for claims and legal proceedings related to providing financial services that are not otherwise included above. Insurance has been purchased to mitigate certain of these risks. Generally, there are no stated or notional amounts included in these indemnifications and the contingencies triggering the obligation for indemnification are not expected to occur. Furthermore, often counterparties to these transactions provide us with comparable indemnifications. We are unable to develop an estimate of the maximum payout under these indemnifications for several reasons. In addition to the lack of a stated or notional amount in a majority of such indemnifications, we are unable to predict the nature of events that would trigger indemnification or the level of indemnification for a certain event. We believe, however, that the possibility that we will have to make any material payments for these indemnifications is remote. At Dec. 31, 2018 and Dec. 31, 2017, we have not recorded any material liabilities under these arrangements.

Clearing and settlement exchanges

We are a noncontrolling equity investor in, and/or member of, several industry clearing or settlement exchanges through which foreign exchange, securities, derivatives or other transactions settle. Certain of these industry clearing and settlement exchanges require their members to guarantee their obligations and liabilities and/or to provide liquidity support in the event other members do not honor their obligations. We believe the likelihood that a clearing or settlement exchange (of which we are a member) would become insolvent is remote. Additionally, certain settlement exchanges have implemented loss allocation policies that enable the exchange to allocate settlement losses to the members of the exchange. It is not possible to quantify such mark-to-market loss until the loss occurs. Any ancillary costs that occur as a result of any mark-to-market loss cannot be quantified. In addition, we also sponsor clients as members on clearing and settlement exchanges and guarantee their obligations. At Dec. 31, 2018 and Dec. 31, 2017, we have not recorded any material liabilities under these arrangements.

Legal proceedings

In the ordinary course of business, BNY Mellon and its subsidiaries are routinely named as defendants in or made parties to pending and potential legal actions. We also are subject to governmental and regulatory examinations, information-gathering requests, investigations and proceedings (both formal and informal). Claims for significant monetary damages are often asserted in many of these legal actions, while claims for disgorgement, restitution, penalties and/or other remedial actions or sanctions may be sought in governmental and regulatory matters. It is inherently difficult to predict the eventual outcomes of such matters given their complexity and the particular facts and circumstances at issue in each of these matters. However, on the basis of our current knowledge and understanding, we do not believe that judgments, settlements or orders, if any, arising from these matters (either individually or in the aggregate, after giving effect to applicable reserves and insurance coverage) will have a material adverse effect on the consolidated financial position or liquidity of BNY Mellon, although they could have a material effect on our results of operations in a given period.

In view of the inherent unpredictability of outcomes in litigation and regulatory matters, particularly where (i) the damages sought are substantial or indeterminate, (ii) the proceedings are in the early stages, or (iii) the matters involve novel legal theories or a large number of parties, as a matter of course there is considerable uncertainty surrounding the timing or ultimate resolution of litigation and regulatory matters, including a possible eventual loss, fine, penalty or business impact, if any, associated with each such matter. In accordance with applicable accounting guidance, BNY Mellon establishes accruals for litigation and regulatory matters when those matters proceed to a stage where they present loss contingencies that are both probable and reasonably estimable. In such cases, there may be a possible exposure to loss in excess of any amounts accrued. BNY Mellon regularly monitors such matters for developments that could affect the amount of the accrual, and will adjust the accrual amount as appropriate. If the loss contingency in question is not both probable and reasonably estimable, BNY Mellon does not establish an accrual and the matter continues to be monitored for any developments that would make the loss contingency both probable and reasonably estimable. BNY Mellon believes that its accruals for legal proceedings are appropriate and, in the aggregate, are not material to the consolidated financial position of BNY Mellon, although future accruals could have a material effect on the results of operations in a given period.

For certain of those matters described here for which a loss contingency may, in the future, be reasonably possible (whether in excess of a related accrued liability or where there is no accrued liability), BNY Mellon is currently unable to estimate a range of reasonably possible loss. For those matters described here where BNY Mellon is able to estimate a reasonably possible loss, the aggregate range of such reasonably possible loss is up to $900 million in excess of the accrued liability (if any) related to those matters.

The following describes certain judicial, regulatory and arbitration proceedings involving BNY Mellon:

Mortgage-Securitization Trusts Proceedings

The Bank of New York Mellon has been named as a defendant in a number of legal actions brought by MBS investors alleging that the trustee has expansive duties under the governing agreements, including the duty to investigate and pursue breach of representation and warranty claims against other parties to the MBS transactions. These actions include a lawsuit brought in New York State court on June 18, 2014, and later re-filed in federal court, by a group of institutional investors who purport to sue on behalf of 233 MBS trusts.

Matters Related to R. Allen Stanford

In late December 2005, Pershing LLC (“Pershing”) became a clearing firm for Stanford Group Co. (“SGC”), a registered broker-dealer that was part of a group of entities ultimately controlled by R. Allen Stanford (“Stanford”). Stanford International Bank (“SIB”), also controlled by Stanford, issued certificates of deposit (“CDs”). Some investors allegedly wired funds from their SGC accounts to purchase CDs. In 2009, the SEC charged Stanford with operating a Ponzi scheme in connection with the sale of CDs, and SGC was placed into receivership. Alleged purchasers of CDs have filed 15 lawsuits against Pershing that are pending in Texas, including two putative class actions. The purchasers allege that Pershing, as SGC’s clearing firm, assisted Stanford in a fraudulent scheme and assert contractual, statutory and common law claims. On July 12, 2018, a federal district court dismissed six of the individual lawsuits and those cases are on appeal. A series of FINRA arbitration proceedings also have been initiated by alleged purchasers asserting similar claims.

Brazilian Postalis Litigation

BNY Mellon Servicos Financeiros DTVM S.A. (“DTVM”), a subsidiary that provides asset services in Brazil, acts as administrator for certain investment funds in which a public pension fund for postal workers called Postalis-Instituto de Seguridade Social dos Correios e Telégrafos (“Postalis”) invested. On Aug. 22, 2014, Postalis sued DTVM in Rio de Janeiro, Brazil for losses related to a Postalis fund for which DTVM is administrator. Postalis alleges that DTVM failed to properly perform duties, including to conduct due diligence of and exert control over the manager. On March 12, 2015, Postalis filed a lawsuit in Rio de Janeiro against DTVM and BNY Mellon Administração de Ativos Ltda. (“Ativos”) alleging failure to properly perform duties relating to another fund of which DTVM is administrator and Ativos is manager. On Dec. 14, 2015, Associacão dos Profissionais dos Correiros (“ADCAP”), a Brazilian postal workers association, filed a lawsuit in São Paulo against DTVM and other defendants alleging that DTVM improperly contributed to Postalis investment losses. On March 20, 2017, the lawsuit was dismissed without prejudice, and ADCAP has appealed that decision. On Dec. 17, 2015, Postalis filed three lawsuits in Rio de Janeiro against DTVM and Ativos alleging failure to properly perform duties with respect to investments in several other funds. On Feb. 4, 2016, Postalis filed a lawsuit in Brasilia against DTVM, Ativos and BNY Mellon Alocação de Patrimônio Ltda., an investment management subsidiary, alleging failure to properly perform duties and liability for losses with respect to investments in various funds of which the defendants were administrator and/or manager. On Jan. 16, 2018, the Brazilian Federal Prosecution Service (“MPF”) filed a civil lawsuit in São Paulo against DTVM alleging liability for Postalis losses based on alleged failures to properly perform certain duties as administrator to certain funds in which Postalis invested or controller of Postalis’s own investment portfolio. On April 18, 2018, the court dismissed the lawsuit without prejudice, and the MPF has appealed that decision. On Oct. 31, 2018, Postalis filed an application in federal court in the Southern District of New York seeking an order authorizing it to take discovery from The Bank of New York Mellon Corporation and its U.S. subsidiaries, purportedly for use in the Brazilian proceedings. On Dec. 20, 2018, the court denied Postalis's application in its entirety.

Depositary Receipt Litigation
Between late December 2015 and February 2016, four putative class action lawsuits were filed against BNY Mellon asserting claims relating to BNY Mellon's foreign exchange pricing when converting dividends and other distributions from non-U.S. companies in its role as depositary bank to Depositary Receipt issuers. The claims are for breach of contract and violations of ERISA. The lawsuits have been consolidated into two suits that are pending in federal court in the Southern District of New York. The parties in the lawsuits have entered into settlement agreements to resolve the suits, which are subject to court approval.

Brazilian Silverado Litigation
DTVM acts as administrator for the Fundo de Investimento em Direitos Creditórios Multisetorial Silverado Maximum ("Silverado Maximum Fund"), which invests in commercial credit receivables. On June 2, 2016, the Silverado Maximum Fund sued DTVM in its capacity as administrator, along with Deutsche Bank S.A. - Banco Alemão in its capacity as custodian and Silverado Gestão e Investimentos Ltda. in its capacity as investment manager. The Fund alleges that each of the defendants failed to fulfill its respective duty, and caused losses to the Fund for which the defendants are jointly and severally liable.

Depositary Receipt Pre-Release Inquiry
In March 2014, the Staff of the U.S. Securities and Exchange Commission's Enforcement Division (the "Staff") commenced an investigation into certain issuers of American Depositary Receipts ("ADRs"), including BNY Mellon, for the period of 2011 to 2015. The Staff issued several requests to BNY Mellon for information relating to the pre-release of ADRs. BNY Mellon fully cooperated with the investigation. On Dec. 17, 2018, the SEC announced that BNY Mellon had settled an administrative proceeding to resolve the investigation of BNY Mellon's pre-release activity, in which BNY Mellon did not admit or deny the SEC's findings.

Note 22–Derivative instruments

We use derivatives to manage exposure to market risk, including interest rate risk, equity price risk and foreign currency risk, as well as credit risk. Our trading activities are focused on acting as a market-maker for our customers and facilitating customer trades in compliance with the Volcker Rule.

The notional amounts for derivative financial instruments express the dollar volume of the transactions; however, credit risk is much smaller. We perform credit reviews and enter into netting agreements and collateral arrangements to minimize the credit risk of derivative financial instruments. We enter into offsetting positions to reduce exposure to foreign currency, interest rate and equity price risk.

Use of derivative financial instruments involves reliance on counterparties. Failure of a counterparty to honor its obligation under a derivative contract is a risk we assume whenever we engage in a derivative contract. There were no counterparty default losses recorded in 2018 or 2017.

Hedging derivatives

We utilize interest rate swap agreements to manage our exposure to interest rate fluctuations. We enter into fair value hedges as an interest rate risk management strategy to reduce fair value variability by converting certain fixed rate interest payments associated with available-for-sale securities and long-term debt to LIBOR.

The available-for-sale securities hedged consist of U.S. Treasury bonds, agency and non-agency commercial MBS, sovereign debt, corporate bonds and covered bonds that had original maturities of 30 years or less at initial purchase. At Dec. 31, 2018, $19.2 billion face amount of available-for-sale securities were hedged with interest rate swaps designated as fair value hedges that had notional values of $19.3 billion.

The fixed rate long-term debt instruments hedged generally have original maturities of five to 30 years. We issue both callable and non-callable debt. The debt is hedged with "receive fixed rate, pay variable rate" swaps. At Dec. 31, 2018, $16.6 billion par value of debt was hedged with interest rate swaps designated as fair value hedges that had notional values of $16.6 billion.

In addition, we utilize forward foreign exchange contracts as hedges to mitigate foreign exchange exposures. We use forward foreign exchange contracts as cash flow hedges to convert certain forecasted non-U.S. dollar revenue and expenses into

U.S. dollars. We use forward foreign exchange contracts with maturities of 15 months or less as cash flow hedges to hedge our foreign exchange exposure to Indian rupee, British pound, Hong Kong dollar, Singapore dollar and Polish zloty revenue and expense transactions in entities that have the U.S. dollar as their functional currency. As of Dec. 31, 2018, the hedged forecasted foreign currency transactions and designated forward foreign exchange contract hedges were $234 million (notional), with a pre-tax loss of $1 million recorded in accumulated OCI. This loss will be reclassified to earnings over the next 12 months.

We also utilize forward foreign exchange contracts as fair value hedges of the foreign exchange risk associated with available-for-sale securities. Forward points are designated as an excluded component, and amortized into earnings over the hedge period. The unamortized derivative value associated with the excluded component is recognized in accumulated OCI. At Dec. 31, 2018, $147 million face amount of available-for-sale securities were hedged with foreign currency forward contracts that had a notional value of $147 million.

Forward foreign exchange contracts are also used to hedge the value of our net investments in foreign subsidiaries. These forward foreign exchange contracts have maturities of less than one year. The derivatives employed are designated as hedges of changes in value of our foreign investments due to exchange rates. Changes in the value of the forward foreign exchange contracts offset the changes in value of the foreign investments due to changes in foreign exchange rates. The change in fair market value of these forward foreign exchange contracts is reported within foreign currency translation adjustments in shareholders' equity, net of tax. At Dec. 31, 2018, forward foreign exchange contracts with notional amounts totaling $5.9 billion were designated as net investment hedges.

In addition to forward foreign exchange contracts, we also designate non-derivative financial instruments as hedges of our net investments in foreign subsidiaries. Those non-derivative financial instruments designated as hedges of our net investments in foreign subsidiaries were all long-term liabilities of BNY Mellon in various currencies, and, at Dec. 31, 2018, had a combined U.S. dollar equivalent value of $175 million.

The following table presents the gains (losses) related to our hedging derivative portfolio recognized in the consolidated income statement.

Income statement impact of fair value and cash flow hedges		Year ended Dec. 31,		
(in millions)	Location of gains (losses)	**2018**	2017	2016
Interest rate fair value hedges of available-for-sale securities				
Derivative	Interest income	$ **284**	$ 82	$ 49
Hedged item	Interest income	**(273)**	(97)	(50)
Interest rate fair value hedges of long-term debt				
Derivative	Interest expense	**(328)**	(197)	(323)
Hedged item	Interest expense	**330**	190	320
Foreign exchange fair value hedges of available-for-sale securities				
Derivative *(a)*	Other revenue	**(2)**	—	—
Hedged item	Other revenue	**2**	—	—
Cash flow hedges of forecasted FX exposures				
Gain (loss) reclassified from OCI into income	Trading revenue	**—**	2	(16)
Gain reclassified from OCI into income	Other revenue	**2**	8	—
(Loss) reclassified from OCI into income	Net interest revenue	**—**	—	(18)
(Loss) gain reclassified from OCI into income	Staff expense	**(4)**	10	(11)
Gains (losses) recognized in the consolidated income statement due to fair value and cash flow hedging relationships		$ **11**	$ (2)	$ (49)

(a) *Includes $1 million associated with the amortization of the excluded component. At Dec. 31, 2018, the remaining accumulated OCI balance associated with the excluded component was de minimis.*

The following table presents the impact of hedging derivatives used in net investment hedging relationships in the consolidated income statement.

Impact of derivative instruments used in net investment hedging relationships in the income statement							
(in millions)	Gain or (loss) recognized in accumulated OCI on derivatives Year ended Dec. 31,				Gain or (loss) reclassified from accumulated OCI into income Year ended Dec. 31,		
Derivatives in net investment hedging relationships	**2018**	2017	2016	Location of gain or (loss) reclassified from accumulated OCI into income	**2018**	2017	2016
FX contracts	**$ 535**	$ (625)	$ 652	Net interest revenue	**$ —**	$ —	$ —

The following table presents information on the hedged items in fair value hedging relationships.

Hedged items in fair value hedging relationships at Dec. 31, 2018 *(in millions)*	Carrying amount of hedged asset or liability	Hedge accounting basis adjustment (decrease)
Available-for-sale securities *(a)*	$ 19,201	$ (125)
Long-term debt	16,147	(453) *(b)*

(a) Excludes hedged items where only foreign currency risk is the designated hedged risk, as the basis adjustments related to foreign currency hedges will not reverse through the consolidated income statement in future periods. The carrying amount excluded for available-for-sale securities was $148 million at Dec. 31, 2018.

(b) Includes $284 million of basis adjustment on long-term debt associated with terminated hedges.

The following table summarizes the notional amount and credit exposure of our total derivative portfolio at Dec. 31, 2018 and Dec. 31, 2017.

Impact of derivative instruments on the balance sheet	Notional value		Asset derivatives fair value		Liability derivatives fair value	
	Dec. 31,		Dec. 31,		Dec. 31,	
(in millions)	**2018**	2017	**2018**	2017	**2018**	2017
Derivatives designated as hedging instruments: *(a)(b)*						
Interest rate contracts	**$ 35,890**	$ 36,315	**$ 23**	$ 278	**$ 74**	$ 534
Foreign exchange contracts	**6,330**	8,923	**266**	45	**14**	266
Total derivatives designated as hedging instruments			**$ 289**	$ 323	**$ 88**	$ 800
Derivatives not designated as hedging instruments: *(b)(c)*						
Interest rate contracts	**$ 248,534**	$ 267,485	**$ 3,590**	$ 6,439	**$ 3,116**	$ 6,353
Foreign exchange contracts	**831,730**	767,999	**4,807**	5,104	**5,215**	5,067
Equity contracts	**927**	1,698	**68**	70	**118**	149
Credit contracts	**150**	180	**—**	—	**1**	4
Total derivatives not designated as hedging instruments			**$ 8,465**	$ 11,613	**$ 8,450**	$ 11,573
Total derivatives fair value *(d)*			**$ 8,754**	$ 11,936	**$ 8,538**	$ 12,373
Effect of master netting agreements *(e)*			**(5,939)**	(8,845)	**(6,170)**	(8,797)
Fair value after effect of master netting agreements			**$ 2,815**	$ 3,091	**$ 2,368**	$ 3,576

(a) The fair value of asset derivatives and liability derivatives designated as hedging instruments is recorded as other assets and other liabilities, respectively, on the consolidated balance sheet.

(b) Pursuant to a rule change at a clearing organization in 2018, cash collateral exchanged is deemed a settlement of the derivative each day. The impact of the change reduced the gross fair value of derivative assets and liabilities and a corresponding decrease in effect of master netting agreements, with no impact to the consolidated balance sheet.

(c) The fair value of asset derivatives and liability derivatives not designated as hedging instruments is recorded as trading assets and trading liabilities, respectively, on the consolidated balance sheet.

(d) Fair values are on a gross basis, before consideration of master netting agreements, as required by ASC 815, Derivatives and Hedging.

(e) Effect of master netting agreements includes cash collateral received and paid of $809 million and $1,040 million, respectively, at Dec. 31, 2018, and $925 million and $877 million, respectively, at Dec. 31, 2017.

Trading activities (including trading derivatives)

Our trading activities are focused on acting as a market-maker for our customers, facilitating customer trades and risk mitigating economic hedging in compliance with the Volcker Rule. The change in the fair value of the derivatives utilized in our trading activities is recorded in foreign exchange and other trading revenue on the consolidated income statement.

The following table presents our foreign exchange and other trading revenue.

Foreign exchange and other trading revenue	Year ended Dec. 31,		
(in millions)	**2018**	2017	2016
Foreign exchange	**$ 663**	$ 638	$ 687
Other trading revenue	**69**	30	14
Total foreign exchange and other trading revenue	**$ 732**	$ 668	$ 701

Foreign exchange revenue includes income from purchasing and selling foreign currencies and currency forwards, futures and options. Other trading revenue reflects results from trading in cash instruments including fixed income and equity securities and non-foreign exchange derivatives.

We also use derivative financial instruments as risk mitigating economic hedges, which are not formally designated as accounting hedges. This includes hedging the foreign currency, interest rate or market risks inherent in some of our balance sheet exposures, such as seed capital investments and deposits, as well as certain investment management fee revenue streams. We also use total return swaps to economically hedge obligations arising from the company's deferred compensation plan whereby the participants defer compensation and earn a return linked to the performance of investments they select. The gains or losses on these total return swaps are recorded in staff expense on the consolidated income statement and was a loss of $20 million in 2018, a gain of $26 million in 2017 and a gain of $14 million in 2016.

We manage trading risk through a system of position limits, a VaR methodology based on historical simulation and other market sensitivity measures. Risk is monitored and reported to senior management by a separate unit, independent from trading, on a daily basis. Based on certain assumptions, the VaR methodology is designed to capture the potential overnight pre-tax dollar loss from adverse changes in fair values of all trading positions. The calculation assumes a one-day holding period, utilizes a 99% confidence level and incorporates non-linear product characteristics. The VaR model is one of several statistical models used to develop economic capital results, which are allocated to lines of business for computing risk-adjusted performance.

VaR methodology does not evaluate risk attributable to extraordinary financial, economic or other occurrences. As a result, the risk assessment process includes a number of stress scenarios based upon the risk factors in the portfolio and management's assessment of market conditions. Additional stress scenarios based upon historical market events are also performed. Stress tests may incorporate the impact of reduced market liquidity and the breakdown of historically observed correlations and extreme scenarios. VaR and other statistical measures, stress testing and sensitivity analysis are incorporated in other risk management materials.

Counterparty credit risk and collateral

We assess credit risk of our counterparties through regular examination of their financial statements, confidential communication with the management of those counterparties and regular monitoring of publicly available credit rating information. This and other information is used to develop proprietary credit rating metrics used to assess credit quality.

Collateral requirements are determined after a comprehensive review of the credit quality of each counterparty. Collateral is generally held or pledged in the form of cash and/or highly liquid government securities. Collateral requirements are monitored and adjusted daily.

Additional disclosures concerning derivative financial instruments are provided in Note 19.

Disclosure of contingent features in OTC derivative instruments

Certain OTC derivative contracts and/or collateral agreements contain credit-risk contingent features triggered upon a rating downgrade in which the counterparty has the right to request additional collateral or the right to terminate the contracts in a net liability position.

The following table shows the aggregate fair value of OTC derivative contracts in net liability positions that contained credit-risk contingent features and the value of collateral that has been posted.

(in millions)	Dec. 31, 2018	2017
Aggregate fair value of OTC derivatives in net liability positions *(a)*	$ **2,877**	$ 2,393
Collateral posted	$ **2,801**	$ 2,115

(a) Before consideration of cash collateral.

The aggregate fair value of OTC derivative contracts containing credit-risk contingent features can fluctuate from quarter to quarter due to changes in market conditions, composition of counterparty trades, new business or changes to the contingent features.

The Bank of New York Mellon, our largest banking subsidiary, enters into the substantial majority of our OTC derivative contracts and/or collateral agreements. As such, the contingent features may be triggered if The Bank of New York Mellon's long-term issuer rating was downgraded.

The following table shows the fair value of contracts falling under early termination provisions that were in net liability positions for three key ratings triggers.

Potential close-out exposures (fair value) *(a)*

(in millions)	Dec. 31, 2018	Dec. 31, 2017
If The Bank of New York Mellon's rating changed to: *(b)*		
A3/A-	$ **15**	$ 92
Baa2/BBB	$ **116**	$ 748
Ba1/BB+	$ **1,041**	$ 2,007

(a) The amounts represent potential total close-out values if The Bank of New York Mellon's long-term issuer rating were to immediately drop to the indicated levels, and do not reflect collateral posted.

(b) Represents rating by Moody's/S&P.

If The Bank of New York Mellon's debt rating had fallen below investment grade on Dec. 31, 2018 and Dec. 31, 2017, existing collateral arrangements would have required us to post additional collateral of $100 million and $102 million, respectively.

Offsetting assets and liabilities

The following tables present derivative instruments and financial instruments that are either subject to an enforceable netting agreement or offset by collateral arrangements. There were no derivative instruments or financial instruments subject to a legally enforceable netting agreement for which we are not currently netting.

Offsetting of derivative assets and financial assets at Dec. 31, 2018

(in millions)	Gross assets recognized	Gross amounts offset in the balance sheet *(a)*	Net assets recognized in the balance sheet	Gross amounts not offset in the balance sheet: Financial instruments	Gross amounts not offset in the balance sheet: Cash collateral received	Net amount
Derivatives subject to netting arrangements:						
Interest rate contracts	$ **2,654**	$ **2,202**	$ **452**	$ **133**	$ **—**	$ **319**
Foreign exchange contracts	**4,409**	**3,724**	**685**	**70**	**—**	**615**
Equity and other contracts	**38**	**13**	**25**	**—**	**—**	**25**
Total derivatives subject to netting arrangements	**7,101**	**5,939**	**1,162**	**203**	**—**	**959**
Total derivatives not subject to netting arrangements	**1,653**	**—**	**1,653**	**—**	**—**	**1,653**
Total derivatives	**8,754**	**5,939**	**2,815**	**203**	**—**	**2,612**
Reverse repurchase agreements	**112,245**	**76,040** *(b)*	**36,205**	**36,205**	**—**	**—**
Securities borrowing	**10,588**	**—**	**10,588**	**10,286**	**—**	**302**
Total	$ **131,587**	$ **81,979**	$ **49,608**	$ **46,694**	$ **—**	$ **2,914**

(a) Includes the effect of netting agreements and net cash collateral received. The offset related to the OTC derivatives was allocated to the various types of derivatives based on the net positions.

(b) Offsetting of reverse repurchase agreements relates to our involvement in the FICC, where we settle government securities transactions on a net basis for payment and delivery through the Fedwire system.

Offsetting of derivative assets and financial assets at Dec. 31, 2017					Gross amounts not offset in the balance sheet		
(in millions)	Gross assets recognized	Gross amounts offset in the balance sheet		Net assets recognized in the balance sheet	Financial instruments	Cash collateral received	Net amount
Derivatives subject to netting arrangements:							
Interest rate contracts	$ 5,915	$ 5,075		$ 840	$ 178	$ —	$ 662
Foreign exchange contracts	4,666	3,720		946	116	—	830
Equity and other contracts	67	50		17	—	—	17
Total derivatives subject to netting arrangements	10,648	8,845		1,803	294	—	1,509
Total derivatives not subject to netting arrangements	1,288	—		1,288	—	—	1,288
Total derivatives	11,936	8,845	(a)	3,091	294	—	2,797
Reverse repurchase agreements	42,784	25,848	(b)	16,936	16,923	—	13
Securities borrowing	11,199	—		11,199	10,858	—	341
Total	$ 65,919	$ 34,693		$ 31,226	$ 28,075	$ —	$ 3,151

(a) *Includes the effect of netting agreements and net cash collateral received. The offset related to the OTC derivatives was allocated to the various types of derivatives based on the net positions.*
(b) *Offsetting of reverse repurchase agreements relates to our involvement in the FICC, where we settle government securities transactions on a net basis for payment and delivery through the Fedwire system.*

Offsetting of derivative liabilities and financial liabilities at Dec. 31, 2018					Gross amounts not offset in the balance sheet		
(in millions)	Gross liabilities recognized	Gross amounts offset in the balance sheet		Net liabilities recognized in the balance sheet	Financial instruments	Cash collateral pledged	Net amount
Derivatives subject to netting arrangements:							
Interest rate contracts	**$ 3,144**	**$ 2,508**		**$ 636**	**$ 547**	**$ —**	**$ 89**
Foreign exchange contracts	**4,747**	**3,626**		**1,121**	**187**	**—**	**934**
Equity and other contracts	**75**	**36**		**39**	**37**	**—**	**2**
Total derivatives subject to netting arrangements	**7,966**	**6,170**		**1,796**	**771**	**—**	**1,025**
Total derivatives not subject to netting arrangements	**572**	**—**		**572**	**—**	**—**	**572**
Total derivatives	**8,538**	**6,170**	(a)	**2,368**	**771**	**—**	**1,597**
Repurchase agreements	**84,665**	**76,040**	(b)	**8,625**	**8,625**	**—**	**—**
Securities lending	**997**	**—**		**997**	**937**	**—**	**60**
Total	**$ 94,200**	**$ 82,210**		**$ 11,990**	**$ 10,333**	**$ —**	**$ 1,657**

(a) *Includes the effect of netting agreements and net cash collateral paid. The offset related to the OTC derivatives was allocated to the various types of derivatives based on the net positions.*
(b) *Offsetting of repurchase agreements relates to our involvement in the FICC, where we settle government securities transactions on a net basis for payment and delivery through the Fedwire system.*

Offsetting of derivative liabilities and financial liabilities at Dec. 31, 2017 (in millions)	Gross liabilities recognized	Gross amounts offset in the balance sheet		Net liabilities recognized in the balance sheet	Gross amounts not offset in the balance sheet: Financial instruments	Gross amounts not offset in the balance sheet: Cash collateral pledged	Net amount
Derivatives subject to netting arrangements:							
Interest rate contracts	$ 6,810	$ 5,495	*(a)*	$ 1,315	$ 1,222	$ —	$ 93
Foreign exchange contracts	4,765	3,221		1,544	177	—	1,367
Equity and other contracts	143	81		62	58	—	4
Total derivatives subject to netting arrangements	11,718	8,797		2,921	1,457	—	1,464
Total derivatives not subject to netting arrangements	655	—		655	—	—	655
Total derivatives	12,373	8,797		3,576	1,457	—	2,119
Repurchase agreements	33,908	25,848	*(b)*	8,060	8,059	—	1
Securities lending	2,186	—		2,186	2,091	—	95
Total	$ 48,467	$ 34,645		$ 13,822	$ 11,607	$ —	$ 2,215

(a) Includes the effect of netting agreements and net cash collateral paid. The offset related to the OTC derivatives was allocated to the various types of derivatives based on the net positions.
(b) Offsetting of repurchase agreements relates to our involvement in the FICC, where we settle government securities transactions on a net basis for payment and delivery through the Fedwire system.

Secured borrowings

The following table presents the contract value of repurchase agreements and securities lending transactions accounted for as secured borrowings by the type of collateral provided to counterparties.

Repurchase agreements and securities lending transactions accounted for as secured borrowings	**Dec. 31, 2018**				Dec. 31, 2017			
	Remaining contractual maturity				Remaining contractual maturity			
(in millions)	Overnight and continuous	Up to 30 days	30 days or more	Total	Overnight and continuous	Up to 30 days	30 days or more	Total
Repurchase agreements:								
U.S. Treasury	**$ 76,822**	**$ —**	**$ —**	**$ 76,822**	$ 26,883	$ 11	$ —	$ 26,894
U.S. government agencies	**759**	**—**	**—**	**759**	570	180	—	750
Agency RMBS	**3,184**	**—**	**4**	**3,188**	2,574	109	—	2,683
Corporate bonds	**416**	**—**	**1,413**	**1,829**	373	—	1,052	1,425
Other debt securities	**271**	**—**	**1,106**	**1,377**	253	—	731	984
Equity securities	**163**	**—**	**527**	**690**	655	—	517	1,172
Total	**$ 81,615**	**$ —**	**$ 3,050**	**$ 84,665**	$ 31,308	$ 300	$ 2,300	$ 33,908
Securities lending:								
U.S. government agencies	**$ 7**	**$ —**	**$ —**	**$ 7**	$ 72	$ —	$ —	$ 72
Other debt securities	**294**	**—**	**—**	**294**	316	—	—	316
Equity securities	**696**	**—**	**—**	**696**	1,798	—	—	1,798
Total	**$ 997**	**$ —**	**$ —**	**$ 997**	$ 2,186	$ —	$ —	$ 2,186
Total borrowings	**$ 82,612**	**$ —**	**$ 3,050**	**$ 85,662**	$ 33,494	$ 300	$ 2,300	$ 36,094

BNY Mellon's repurchase agreements and securities lending transactions primarily encounter risk associated with liquidity. We are required to pledge collateral based on predetermined terms within the agreements. If we were to experience a decline in the fair value of the collateral pledged for these transactions, we could be required to provide additional collateral to the counterparty, therefore decreasing the amount of assets available for other liquidity needs that may arise. BNY Mellon also offers tri-party collateral agency services in the tri-party repo market where we are exposed to credit risk. In order to mitigate this risk, we require dealers to fully secure intraday credit.

Note 23–Lines of business

We have an internal information system that produces performance data along product and service lines for our two principal businesses and the Other segment. The primary products and services and types of revenue for our principal businesses and a description of the Other segment are presented below.

Investment Services business

Line of business	*Primary products and services*	*Primary types of revenue*
Asset Servicing	Custody, accounting, ETF services, middle-office solutions, transfer agency, services for private equity and real estate funds, foreign exchange, securities lending, liquidity/lending services, prime brokerage and data analytics	- Asset servicing fees (includes securities lending revenue) - Foreign exchange revenue - Net interest revenue - Financing-related fees
Pershing	Clearing and custody, investment, wealth and retirement solutions, technology and enterprise data management, trading services and prime brokerage	- Clearing services fees - Net interest revenue
Issuer Services	Corporate Trust (trustee, administration and agency services and reporting and transparency) and Depositary Receipts (issuer services and support for brokers and investors)	- Issuer services fees - Net interest revenue - Foreign exchange revenue
Treasury Services	Integrated cash management solutions including payments, foreign exchange, liquidity management, receivables processing and payables management and trade finance and processing	- Treasury services fees - Net interest revenue
Clearance and Collateral Management	U.S. government clearing, global collateral management and tri-party repo	- Asset servicing fees - Net interest revenue

Investment Management business

Line of business	*Primary products and services*	*Primary types of revenue*
Asset Management	Diversified investment management strategies and distribution of investment products	- Investment management fees - Performance fees - Distribution and servicing fees
Wealth Management	Investment management, custody, wealth and estate planning and private banking services	- Investment management fees - Net interest revenue

Other segment	*Description*	*Primary types of revenue*
	Includes leasing portfolio, corporate treasury activities, including our securities portfolio, derivatives and other trading activity, corporate and bank-owned life insurance, renewable energy investments and business exits	- Net interest revenue - Investment and other income - Net gain (loss) on securities - Other trading revenue

Business accounting principles

Our business data has been determined on an internal management basis of accounting, rather than the generally accepted accounting principles used for consolidated financial reporting. These measurement principles are designed so that reported results of the businesses will track their economic performance.

Business results are subject to reclassification when organizational changes are made. There were no significant organizational changes in 2018. The results are also subject to refinements in revenue and expense allocation methodologies, which are typically reflected on a prospective basis.

The accounting policies of the businesses are the same as those described in Note 1.

The results of our businesses are presented and analyzed on an internal management reporting basis.

- Revenue amounts reflect fee and other revenue generated by each business. Fee and other revenue transferred between businesses under revenue transfer agreements is included within other revenue in each business.
- Revenues and expenses associated with specific client bases are included in those businesses. For example, foreign exchange activity associated with clients using custody products is included in Investment Services.
- Net interest revenue is allocated to businesses based on the yields on the assets and liabilities generated by each business. We employ a funds transfer pricing system that matches funds with the specific assets and liabilities of each business based on their interest sensitivity and maturity characteristics.
- The provision for credit losses associated with the respective credit portfolios is reflected in each business segment.
- Incentives expense related to restricted stock is allocated to the businesses.
- Support and other indirect expenses are allocated to businesses based on internally developed methodologies.
- Recurring FDIC expense is allocated to the businesses based on average deposits generated within each business.
- Litigation expense is generally recorded in the business in which the charge occurs.
- Management of the securities portfolio is a shared service contained in the Other segment. As a result, gains and losses associated with the valuation of the securities portfolio are included in the Other segment.
- Client deposits serve as the primary funding source for our securities portfolio. We typically allocate all interest revenue to the businesses generating the deposits. Accordingly, accretion related to the portion of the securities portfolio restructured in 2009 has been included in the results of the businesses.
- Balance sheet assets and liabilities and their related income or expense are specifically assigned to each business. Businesses with a net liability position have been allocated assets.
- Goodwill and intangible assets are reflected within individual businesses.

Total revenue includes approximately $2.6 billion in 2018, $2.4 billion in 2017 and $2.2 billion in 2016 of international operations domiciled in the UK which comprised 16%, 15% and 14% of total revenue, respectively.

The following consolidating schedules present the contribution of our businesses to our overall profitability.

For the year ended Dec. 31, 2018 *(dollars in millions)*	**Investment Services**	**Investment Management**		**Other**	**Consolidated**	
Total fee and other revenue	**$ 8,926**	**$ 3,781**	*(a)*	**$ 85**	**$ 12,792**	*(a)*
Net interest revenue (expense)	**3,372**	**303**		**(64)**	**3,611**	
Total revenue	**12,298**	**4,084**	*(a)*	**21**	**16,403**	*(a)*
Provision for credit losses	**1**	**3**		**(15)**	**(11)**	
Noninterest expense	**8,058**	**2,818**		**334**	**11,210**	*(b)*
Income (loss) before taxes	**$ 4,239**	**$ 1,263**	*(a)*	**$ (298)**	**$ 5,204**	*(a)(b)*
Pre-tax operating margin *(c)*	**34%**	**31%**		**N/M**	**32%**	
Average assets	**$ 262,747**	**$ 31,446**		**$ 49,581**	**$ 343,774**	

(a) Both total fee and other revenue and total revenue include a net loss from consolidated investment management funds of $1 million, representing $13 million of losses and a loss attributable to noncontrolling interests of $12 million. Income before taxes is net of a loss attributable to noncontrolling interests of $12 million.

(b) Noninterest expense includes a loss attributable to noncontrolling interests of $1 million related to other consolidated subsidiaries.

(c) Income before taxes divided by total revenue.

For the year ended Dec. 31, 2017 *(dollars in millions)*	Investment Services	Investment Management		Other	Consolidated	
Total fee and other revenue	$ 8,527	$ 3,668	*(a)*	$ 7	$ 12,202	*(a)*
Net interest revenue (expense)	3,058	329		(79)	3,308	
Total revenue (loss)	11,585	3,997	*(a)*	(72)	15,510	*(a)*
Provision for credit losses	(7)	2		(19)	(24)	
Noninterest expense	7,747	2,854		347	10,948	*(b)*
Income (loss) before taxes	$ 3,845	$ 1,141	*(a)*	$ (400)	$ 4,586	*(a)(b)*
Pre-tax operating margin *(c)*	33%	29%		N/M	30%	
Average assets	$ 254,646	$ 31,450		$ 57,752	$ 343,848	

(a) Both total fee and other revenue and total revenue include net income from consolidated investment management funds of $37 million, representing $70 million of income and noncontrolling interests of $33 million. Income before taxes is net of noncontrolling interests of $33 million.

(b) Noninterest expense includes a loss attributable to noncontrolling interest of $9 million related to other consolidated subsidiaries.

(c) Income before taxes divided by total revenue.

For the year ended Dec. 31, 2016 *(dollars in millions)*	Investment Services	Investment Management		Other	Consolidated	
Total fee and other revenue	$ 8,299	$ 3,424	*(a)*	$ 366	$ 12,089	*(a)*
Net interest revenue	2,797	327		14	3,138	
Total revenue	11,096	3,751	*(a)*	380	15,227	*(a)*
Provision for credit losses	8	6		(25)	(11)	
Noninterest expense	7,342	2,778		394	10,514	*(b)*
Income before taxes	$ 3,746	$ 967	*(a)*	$ 11	$ 4,724	*(a)(b)*
Pre-tax operating margin *(c)*	34%	26%		N/M	31%	
Average assets	$ 273,808	$ 30,169		$ 54,500	$ 358,477	

(a) Both total fee and other revenue and total revenue include net income from consolidated investment management funds of $16 million, representing $26 million of income and noncontrolling interests of $10 million. Income before taxes is net of noncontrolling interests of $10 million.

(b) Noninterest expense includes a loss attributable to noncontrolling interest of $9 million related to other consolidated subsidiaries.

(c) Income before taxes divided by total revenue.

Note 24–International operations

International activity includes Investment Services and Investment Management fee revenue generating businesses, foreign exchange trading activity, loans and other revenue producing assets and transactions in which the customer is domiciled outside of the United States and/or the international activity is resident at an international entity. Due to the nature of our international and domestic activities, it is not possible to precisely distinguish our international operations between internationally and domestically domiciled customers. As a result, it is necessary to make certain subjective assumptions such as:

- Income from international operations is determined after internal allocations for interest revenue, taxes, expenses and provision for credit losses.
- Expense charges to international operations include those directly incurred in connection with such activities, as well as an allocable share of general support and overhead charges.

Total assets, total revenue, income before income taxes and net income of our international operations are shown in the table below.

International operations *(in millions)*	International EMEA		International APAC	Other	Total International	Total Domestic	Total
2018							
Total assets at period end *(a)*	**$ 74,982**	*(b)*	**$ 23,199**	**$ 1,483**	**$ 99,664**	**$ 263,209**	**$ 362,873**
Total revenue	**4,252**	*(b)*	**1,103**	**684**	**6,039**	**10,353**	**16,392**
Income before income taxes	**1,694**		**564**	**455**	**2,713**	**2,479**	**5,192**
Net income	**1,345**		**448**	**361**	**2,154**	**2,100**	**4,254**
2017							
Total assets at period end *(a)*	$ 88,490	*(b)*	$ 20,676	$ 1,737	$ 110,903	$ 260,855	$ 371,758
Total revenue	3,982	*(b)*	997	610	5,589	9,954	15,543
Income before income taxes	1,497		538	296	2,331	2,279	4,610
Net income	1,186		426	234	1,846	2,268	4,114
2016							
Total assets at period end *(a)*	$ 73,303	*(b)*	$ 18,074	$ 1,350	$ 92,727	$ 240,742	$ 333,469
Total revenue	3,744	*(b)*	922	549	5,215	10,022	15,237
Income before income taxes	1,263		485	286	2,034	2,691	4,725
Net income	1,013		389	229	1,631	1,917	3,548

(a) Total assets include long-lived assets, which are not considered by management to be significant in relation to total assets. Long-lived assets are primarily located in the United States.
(b) Includes assets of approximately \$30.6 billion, \$32.9 billion and \$29.6 billion and revenue of approximately \$2.6 billion, \$2.4 billion and \$2.2 billion in 2018, 2017 and 2016, respectively, of international operations domiciled in the UK, which is 8%, 9% and 9% of total assets and 16%, 15% and 14% of total revenue, respectively.

Note 25–Supplemental information to the Consolidated Statement of Cash Flows

Non-cash investing and financing transactions that, appropriately, are not reflected in the consolidated statement of cash flows are listed below.

Non-cash investing and financing transactions *(in millions)*	Year ended Dec. 31, **2018**	2017	2016
Transfers from loans to other assets for other real estate owned	**$ 2**	$ 3	$ 4
Change in assets of consolidated VIEs	**268**	500	170
Change in liabilities of consolidated VIEs	**—**	313	69
Change in nonredeemable noncontrolling interests of consolidated investment management funds	**215**	302	120
Securities purchased not settled	**227**	112	75
Securities sold not settled	**187**	587	—
Securities matured not settled	**—**	70	—
Available-for-sale securities transferred to trading assets	**963**	—	—
Held-to-maturity securities transferred to available-for-sale	**1,087**	74	10
Premises and equipment/capitalized software funded by capital lease obligations	**26**	347	13

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
The Bank of New York Mellon Corporation:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of The Bank of New York Mellon Corporation and subsidiaries (BNY Mellon) as of December 31, 2018 and 2017, the related consolidated statements of income, comprehensive income, changes in equity, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of BNY Mellon as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), BNY Mellon's internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 27, 2019 expressed an unqualified opinion on the effectiveness of BNY Mellon's internal control over financial reporting.

Basis for Opinion

These consolidated financial statements are the responsibility of BNY Mellon's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to BNY Mellon in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

KPMG LLP

We have served as BNY Mellon's auditor since 2007.

New York, New York
February 27, 2019

Effective February 27, 2019

Directors

Steven D. Black
Co-Chief Executive Officer
Bregal Investments
Private equity firm

Linda Z. Cook
Partner, Managing Director and Member of the Executive Committee of EIG Global Energy Partners, an investment firm, and Chief Executive Officer of Harbour Energy, Ltd., an energy investment vehicle

Joseph J. Echevarria
Retired Chief Executive Officer
Deloitte LLP
Global provider of audit, consulting, financial advisory, risk management, tax and related services

Edward P. Garden
Chief Investment Officer and a founding partner, Trian Fund Management, L.P.
Alternative investment management firm

Jeffrey A. Goldstein
Chairman
SpringHarbor Holding Company LLC and a Senior Advisor, Hellman & Friedman LLC
Private equity firm

John M. Hinshaw
Former Executive Vice President and Chief Customer Officer at Hewlett Packard Enterprise Company
Global provider of IT, technology and enterprise products and solutions

Edmund F. (Ted) Kelly
Retired Chairman
Liberty Mutual Group
Multi-line insurance company

Jennifer B. Morgan
Executive Board Member of SAP and President of SAP Americas and Asia Pacific Japan, Global Customer Operations
Global software company

Mark A. Nordenberg
Chancellor Emeritus,
Chair of the Institute of Politics and Distinguished Service Professor of Law
University of Pittsburgh
Major public research university

Elizabeth E. Robinson
Former Global Treasurer, Partner and Managing Director of The Goldman Sachs Group, Inc.
Global financial services company

Charles W. Scharf
Chairman and Chief Executive Officer
The Bank of New York Mellon Corporation

Samuel C. Scott III
Retired Chairman, President and Chief Executive Officer
Ingredion Incorporated (formerly Corn Products International, Inc.)
Global ingredient solutions provider

Executive Committee and Other Executive Officers

Paul Camp
Chief Executive Officer, Treasury Services

Lisa Dolly
Chief Executive Officer, Pershing LLC

Bridget E. Engle *
Chief Information Officer

Thomas P. (Todd) Gibbons *
Chief Executive Officer, Clearing, Markets and Client Management

Mitchell E. Harris *
Chief Executive Officer, Investment Management

Monique R. Herena *
Chief Human Resources Officer

Hani A. Kablawi *
Chief Executive Officer, Global Asset Servicing and Chairman, Europe, Middle East and Africa

Catherine Keating
Chief Executive Officer, BNY Mellon Wealth Management

Kurtis R. Kurimsky *
Corporate Controller

Francis (Frank) La Salla *
Chief Executive Officer, Issuer Services

J. Kevin McCarthy *
General Counsel

Michelle M. Neal
Chief Executive Officer, BNY Mellon Markets

Lester J. Owens *
Head of Operations

Roman Regelman *
Head of Digital

Brian Ruane
Chief Executive Officer, BNY Mellon Government Securities Services Corp.

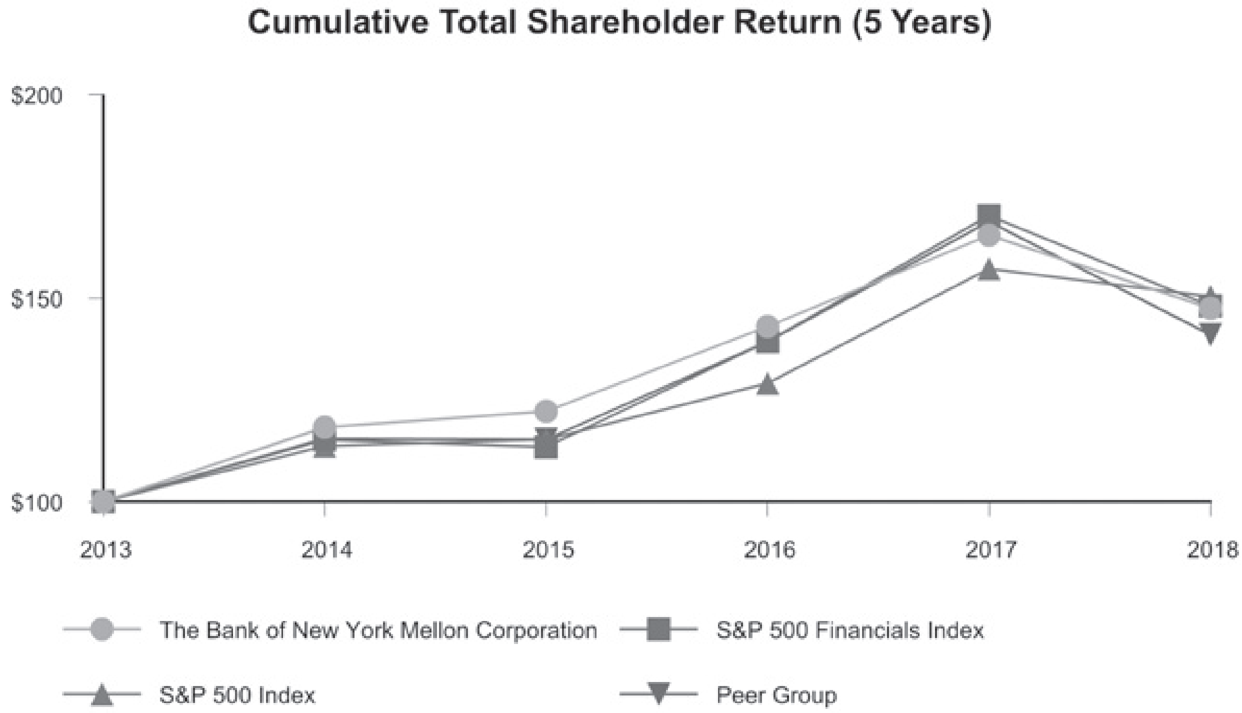
Michael P. Santomassimo *
Chief Financial Officer

Charles W. Scharf *
Chairman and Chief Executive Officer

Akash A. Shah *
Head of Strategy

James S. Wiener *
Chief Risk Officer

* Designated as an Executive Officer.



Cumulative shareholder returns *(a)* *(in dollars)*	Dec. 31, 2013	2014	2015	2016	2017	**2018**
The Bank of New York Mellon Corporation	$ 100.0	$ 118.3	$ 122.2	$ 143.0	$ 165.4	**$ 147.5**
S&P 500 Financials Index	100.0	115.2	113.4	139.3	170.2	**148.0**
S&P 500 Index	100.0	113.7	115.3	129.1	157.2	**150.3**
Peer Group	100.0	115.5	115.3	139.3	168.8	**141.0**

(a) Returns are weighted by market capitalization at the beginning of the measurement period.

This graph shows The Bank of New York Mellon Corporation's cumulative total shareholder returns over the five-year period from Dec. 31, 2013 to Dec. 31, 2018. Our peer group is composed of financial services companies which provide investment management and investment servicing. We also utilize the S&P 500 Financials Index as a benchmark against our performance. The graph shows the cumulative total returns for the same five-year period of the S&P 500 Financials Index, the S&P 500 Index as well as our peer group listed below. The comparison assumes a $100 investment on Dec. 31, 2013 in The Bank of New York Mellon Corporation common stock, in the S&P 500 Financials Index, in the S&P 500 Index and in the peer group detailed below and assumes that all dividends were reinvested.

Peer Group		
BlackRock, Inc.	Morgan Stanley	State Street Corporation
The Charles Schwab Corporation	Northern Trust Corporation	U.S. Bancorp
Franklin Resources, Inc.	The PNC Financial Services Group, Inc.	Wells Fargo & Company
JPMorgan Chase & Co.	Prudential Financial, Inc.	

Corporate Information

BNY Mellon is a global investments company dedicated to helping its clients manage and service their financial assets throughout the investment lifecycle. Whether providing financial services for institutions, corporations or individual investors, BNY Mellon delivers informed investment services and investment management in 35 countries. As of December 31, 2018, BNY Mellon had $33.1 trillion in assets under custody and/or administration, and $1.7 trillion in assets under management. BNY Mellon can act as a single point of contact for clients looking to create, trade, hold, manage, service, distribute or restructure investments. BNY Mellon is the corporate brand of The Bank of New York Mellon Corporation (NYSE: BK). Additional information is available on www.bnymellon.com. Follow us on Twitter @BNYMellon or visit our newsroom at www.bnymellon.com/newsroom for the latest company news.

CORPORATE HEADQUARTERS

240 Greenwich Street, New York, NY 10286
+ 1 212 495 1784
www.bnymellon.com

ANNUAL MEETING

The Annual Meeting of Shareholders will be held in New York at 240 Greenwich Street at 9 a.m. on Tuesday, April 9, 2019.

EXCHANGE LISTING

BNY Mellon's common stock is traded on the New York Stock Exchange under the trading symbol BK. Mellon Capital IV's 6.244% Fixed-to-Floating Rate Normal Preferred Capital Securities fully and unconditionally guaranteed by BNY Mellon (symbol BK/P) and depositary shares, each representing a 1/4,000th interest in a share of BNY Mellon's Series C Noncumulative Perpetual Preferred Stock (symbol BK PrC), also are listed on the New York Stock Exchange.

STOCK PRICES

Prices for BNY Mellon's common stock can be viewed at www.bnymellon.com/investorrelations.

CORPORATE GOVERNANCE

Corporate governance information is available at www.bnymellon.com/governance.

CORPORATE SOCIAL RESPONSIBILITY

Information about BNY Mellon's commitment to corporate social responsibility is available at www.bnymellon.com/csr. BNY Mellon's Corporate Social Responsibility (CSR) Report, which includes our Equal Employment Opportunity/Affirmative Action policies, can be viewed and printed at www.bnymellon.com/csr.

INVESTOR RELATIONS

Visit www.bnymellon.com/investorrelations or call +1 212 635 8529.

COMMON STOCK DIVIDEND PAYMENTS

Subject to approval of the Board of Directors, dividends are paid on BNY Mellon's common stock quarterly in February, May, August and November.

FORM 10-K AND SHAREHOLDER PUBLICATIONS

For a free copy of BNY Mellon's Annual Report on Form 10-K, including the financial statements and the financial statement schedules, or quarterly reports on Form 10-Q as filed with the Securities and Exchange Commission, send a request by email to investorrelations@bnymellon.com, or by mail to Investor Relations at The Bank of New York Mellon Corporation, 240 Greenwich Street, New York, NY 10286. The 2018 Annual Report, as well as Forms 10-K, 10-Q and 8-K and quarterly earnings and other news releases can be found at www.bnymellon.com/investorrelations.

TRANSFER AGENT AND REGISTRAR

EQ Shareowner Services

SHAREHOLDER SERVICES

EQ Shareowner Services maintains the records for our registered shareholders and can provide a variety of services such as those involving:

- Change of name or address
- Consolidation of accounts
- Duplicate mailings
- Dividend reinvestment enrollment
- Direct deposit of dividends
- Transfer of stock to another person

For assistance from EQ Shareowner Services, visit www.shareowneronline.com or call +1 800 205 7699.

DIRECT STOCK PURCHASE AND DIVIDEND REINVESTMENT PLAN

The Direct Stock Purchase and Dividend Reinvestment Plan provides a way to purchase shares of common stock directly from BNY Mellon at the current market value. Non-shareholders may purchase their first shares of BNY Mellon's common stock through the Plan, and shareholders may increase their shareholding by reinvesting cash dividends and through optional cash investments. Plan details are in a prospectus, which may be viewed online at www.shareowneronline.com, or obtained in printed form by calling +1 800 205 7699.

ELECTRONIC DEPOSIT OF DIVIDENDS

Registered shareholders may have quarterly dividends paid on BNY Mellon's common stock deposited electronically to their checking or savings accounts. To have dividends deposited electronically, go to www.shareowneronline.com to set up your account(s) for direct deposit. If you prefer, you may also send a request by mail to EQ Shareowner Services, Shareholder Relations, P.O. Box 64874, St. Paul, MN 55164-0874. For more information, call +1 800 205 7699.

SHAREHOLDER ACCOUNT ACCESS

BY INTERNET

www.shareowneronline.com
Shareholders can register to receive shareholder information electronically. To enroll, visit www.shareowneronline.com.

BY PHONE

Toll-free in the U.S. +1 800 205 7699
Outside the U.S. +1 651 450 4064

BY MAIL

EQ Shareowner Services
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St. Paul, MN 55164-0874

The contents of the listed Internet sites are not incorporated in this Annual Report.

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