

CITIGROUP GLOBAL MARKETS HOLDINGS INC.

ANNUAL FINANCIAL REPORT

FOR THE YEAR ENDED DECEMBER 31, 2018

April 30, 2019

Responsibility Statement

The below named authorized officers of Citigroup Global Markets Holdings Inc., a New York corporation (the “Company”), confirm that to the best of their knowledge: (i) the accompanying financial statements (a) were prepared in accordance with Generally Accepted Accounting Principles in the United States of America and (b) give a true and fair view of the assets, liabilities, financial position and income or loss of the Company and the undertakings included in the consolidation taken as a whole; and (ii) the accompanying Management Report includes (a) a fair review of the development and performance of the business and position of the Company and the undertakings included in the consolidation taken as a whole and (b) a description of the principal risks and uncertainties that they face.

CITIGROUP GLOBAL MARKETS HOLDINGS INC.

By: /s/ James A. Forese
James A. Forese
Chairman and
Chief Executive Officer

By: /s/ Daniel S. Palomaki
Daniel S. Palomaki
Chief Financial Officer

CITIGROUP GLOBAL MARKETS HOLDINGS INC.

MANAGEMENT REPORT

CITIGROUP GLOBAL MARKETS HOLDINGS INC.

Citigroup Global Markets Holdings Inc. (**CGMHI**), operating through its subsidiaries, engages in full-service investment banking and securities brokerage business. As used in this description, **CGMHI**, **Citigroup Global Markets**, and the **Company** refer to CGMHI and its consolidated subsidiaries. Citigroup Global Markets operates in the *Institutional Clients Group* business segment.

CGMHI's parent, Citigroup Inc. (**Citigroup**, or **Citi**), is a global diversified financial services holding company whose businesses provide consumers, corporations, governments and institutions with a broad, yet focused, range of financial products and services, including consumer banking and credit, corporate and investment banking, securities brokerage, trade and securities services and wealth management. Citi has approximately 200 million customer accounts and does business in more than 160 countries and jurisdictions.

Citigroup currently operates, for management reporting purposes, via two primary business segments: *Global Consumer Banking* and *Institutional Clients Group*, with the remaining operations in *Corporate/Other*.

The principal offices of CGMHI are located at 388 Greenwich Street, New York, New York 10013, telephone number (212) 816-6000. CGMHI was incorporated in New York on 23 February 1977 and is the successor to Salomon Smith Barney Holdings Inc., a Delaware corporation, following a statutory merger effective on 1 July 1999, for the purpose of changing its state of incorporation. On 7 April 2003, CGMHI filed a Restated Certificate of Incorporation in the State of New York changing its name from Salomon Smith Barney Holdings Inc. to Citigroup Global Markets Holdings Inc.

Institutional Clients Group

Institutional Clients Group (ICG) includes *Banking and Markets and securities services*. *ICG* provides corporate, institutional, public sector and high-net-worth clients around the world with a full range of wholesale banking products and services, including fixed income and equity sales and trading, foreign exchange, prime brokerage, derivative services, equity and fixed income research, corporate lending, investment banking and advisory services, private banking, cash management, trade finance and securities services. *ICG* transacts with clients in both cash instruments and derivatives, including fixed income, foreign currency, equity and commodity products.

ICG revenue is generated primarily from fees and spreads associated with these activities. *ICG* earns fee income for assisting clients with transactional services and clearing and providing brokerage and investment banking services and other such activities. Such fees are recognized at the point in time when Citigroup's performance under the terms of a contractual arrangement is completed, which is typically at the trade/execution date or closing of a transaction. Revenue generated from these activities is recorded in *Commissions and fees* and *Investment banking*. Revenue is also generated from assets under custody and administration, which is recognized as/when the associated promised service is satisfied, which normally occurs at the point in time the service is requested by the customer and provided by Citi. Revenue generated from these activities is primarily recorded in *Administration and other fiduciary fees*. For additional information on these various types of revenues, see Note 5 to Citigroup's Consolidated Financial Statements.

In addition, as a market maker, *ICG* facilitates transactions, including holding product inventory to meet client demand, and earns the differential between the price at which it buys and sells the products. These price differentials and the unrealized gains and losses on the inventory are recorded in *Principal transactions* (for additional information on *Principal transactions revenue*, see Note 6 to Citigroup's Consolidated Financial Statements).

The amount and types of *Markets* revenues are impacted by a variety of interrelated factors, including market liquidity; changes in market variables such as interest rates, foreign exchange rates, equity prices, commodity prices and credit spreads, as well as their implied volatilities; investor confidence and other macroeconomic conditions. Assuming all other market conditions do not change, increases in client activity levels or bid/offer spreads generally result in

increases in revenues. However, changes in market conditions can significantly impact client activity levels, bid/offer spreads and the fair value of product inventory. For example, a decrease in market liquidity may increase bid/offer spreads, decrease client activity levels and widen credit spreads on product inventory positions.

ICG's management of the *Markets* businesses involves daily monitoring and evaluation of the above factors at the trading desk as well as the country level. *ICG* does not separately track the impact on total *Markets* revenues of the volume of transactions, bid/offer spreads, fair value changes of product inventory positions and economic hedges because, as noted above, these components are interrelated and are not deemed useful or necessary individually to manage the *Markets* businesses at an aggregate level.

In the *Markets* businesses, client revenues are those revenues directly attributable to client transactions at the time of inception, including commissions, interest or fees earned. Client revenues do not include the results of client facilitation activities (e.g., holding product inventory in anticipation of client demand) or the results of certain economic hedging activities.

ICG's international presence is supported by trading floors in approximately 80 countries and a proprietary network in 98 countries and jurisdictions. At December 31, 2018, *ICG* had approximately \$1.4 trillion of assets and \$690 billion of deposits, while two of its businesses—securities services and issuer services—managed approximately \$17.5 trillion of assets under custody as of December 31, 2018 and 2017.

INFORMATION RELATING TO DERIVATIVE INSTRUMENTS AND RISK MANAGEMENT DERIVATIVES ACTIVITIES

In the ordinary course of business, the Company enters into various types of derivative transactions, which include:

- *Futures and forward contracts*, which are commitments to buy or sell at a future date a financial instrument, commodity or currency at a contracted price and may be settled in cash or through delivery of an item readily convertible to cash.
- *Swap contracts*, which are commitments to settle in cash at a future date or dates that may range from a few days to a number of years, based on differentials between specified indices or financial instruments, as applied to a notional principal amount.
- *Option contracts*, which give the purchaser, for a premium, the right, but not the obligation, to buy or sell within a specified time a financial instrument, commodity or currency at a contracted price that may also be settled in cash, based on differentials between specified indices or prices.

Swaps, forwards and some option contracts are over-the-counter (OTC) derivatives that are bilaterally negotiated with counterparties and settled with those counterparties, except for swap contracts that are novated and "cleared" through central counterparties (CCPs). Futures contracts and other option contracts are standardized contracts that are traded on an exchange with a CCP as the counterparty from the inception of the transaction. The Company enters into derivative contracts relating to interest rate, foreign currency, commodity and other market/credit risks for the following reasons:

- *Trading Purposes*: The Company trades derivatives as an active market maker. The Company offers its customers derivatives in connection with their risk management actions to transfer, modify or reduce their interest rate, foreign exchange and other market/credit risks or for their own trading purposes. The Company also manages its derivative risk positions through offsetting trade activities, controls focused on price verification and daily reporting of positions to senior managers.

- *Hedging*: The Company uses derivatives in connection with its own risk management activities to hedge certain risks. Hedging may be accomplished by applying hedge accounting in accordance with ASC 815, *Derivatives and Hedging*. For example, CGMHI issues fixed-rate long-term debt and then enters into a receive-fixed, pay-variable-rate interest rate swap with the same tenor and notional amount to synthetically convert the interest payments to a net variable-rate basis. This strategy is the most common form of an interest rate hedge, as it minimizes net interest cost in certain yield curve environments. Derivatives are also used to manage market risks inherent in specific groups of on-balance sheet assets and liabilities, including commodities and borrowings.

Derivatives may expose the Company to market, credit or liquidity risks in excess of the amounts recorded on the Consolidated Statement of Financial Condition. Market risk on a derivative product is the exposure created by potential fluctuations in interest rates, market prices, foreign exchange rates and other factors and is a function of the type of product, the volume of transactions, the tenor and terms of the agreement and the underlying volatility. Credit risk is the exposure to loss in the event of nonperformance by the other party to satisfy a derivative liability where the value of any collateral held by CGMHI is not adequate to cover such losses. The recognition in earnings of unrealized gains on derivative transactions is subject to management's assessment of the probability of counterparty default. Liquidity risk is the potential exposure that arises when the size of a derivative position may affect the ability to monetize the position in a reasonable period of time and at a reasonable cost in periods of high volatility and financial stress.

Derivative transactions are customarily documented under industry standard master netting agreements, which provide that following an event of default, the non-defaulting party may promptly terminate all transactions between the parties and determine the net amount due to be paid to, or by, the defaulting party. Events of default include (i) failure to make a payment on a derivative transaction that remains uncured following applicable notice and grace periods, (ii) breach of agreement that remains uncured after applicable notice and grace periods, (iii) breach of a representation, (iv) cross default, either to third-party debt or to other derivative transactions entered into between the parties, or, in some cases, their affiliates, (v) the occurrence of a merger or consolidation that results in a party's becoming a materially weaker credit and (vi) the cessation or repudiation of any applicable guarantee or other credit support document. Obligations under master netting agreements are often secured by collateral posted under an industry standard credit support annex to the master netting agreement. An event of default may also occur under a credit support annex if a party fails to make a collateral delivery that remains uncured following applicable notice and grace periods.

The netting and collateral rights incorporated in the master netting agreements are considered to be legally enforceable if a supportive legal opinion has been obtained from counsel of recognized standing that provides (i) the requisite level of certainty regarding enforceability, and (ii) that the exercise of rights by the non-defaulting party to terminate and close-out transactions on a net basis under these agreements will not be stayed or avoided under applicable law upon an event of default, including bankruptcy, insolvency or similar proceeding.

A legal opinion may not be sought for certain jurisdictions where local law is silent or unclear as to the enforceability of such rights or where adverse case law or conflicting regulation may cast doubt on the enforceability of such rights. In some jurisdictions and for some counterparty types, the insolvency law may not provide the requisite level of certainty. For example, this may be the case for certain sovereigns, municipalities, central banks and U.S. pension plans.

Exposure to credit risk on derivatives is affected by market volatility, which may impair the ability of counterparties to satisfy their obligations to the Company. Credit limits are established and closely monitored for customers engaged in derivatives transactions. CGMHI considers the level of legal certainty regarding enforceability of its offsetting rights under master netting agreements and credit support annexes to be an important factor in its risk management process. Specifically, CGMHI generally transacts much lower volumes of derivatives under master netting agreements where CGMHI does not have the requisite level of legal certainty regarding enforceability,

because such derivatives consume greater amounts of single counterparty credit limits than those executed under enforceable master netting agreements.

Cash collateral and security collateral in the form of G10 government debt securities are often posted by a party to a master netting agreement to secure the net open exposure of the other party; the receiving party is free to commingle/rehypothecate such collateral in the ordinary course of its business. Nonstandard collateral such as corporate bonds, municipal bonds, U.S. agency securities and/or MBS may also be pledged as collateral for derivative transactions. Security collateral posted to open and maintain a master netting agreement with a counterparty, in the form of cash and/or securities, may from time to time be segregated in an account at a third-party custodian pursuant to a tri-party account control agreement.

RISK FACTORS

(Extracted from the Annual Report on Form 10-K for the fiscal year ended 31 December 2018, filed by Citigroup Inc. with the U.S. Securities and Exchange Commission on 22 February 2019.)

The following discussion sets forth what management currently believes could be the most significant risks and uncertainties that could impact Citi's businesses, results of operations and financial condition. Other risks and uncertainties, including those not currently known to Citi or its management, could also negatively impact Citi's businesses, results of operations and financial condition. Thus, the following should not be considered a complete discussion of all of the risks and uncertainties Citi may face.

STRATEGIC RISKS

Citi's Ability to Return Capital to Common Shareholders Consistent with Its Capital Planning Efforts and Targets Substantially Depends on the CCAR Process and the Results of Regulatory Stress Tests.

Citi's ability to return capital to its common shareholders consistent with its capital planning efforts and targets, whether through its common stock dividend or through a share repurchase program, substantially depends, among other things, on regulatory approval, including through the CCAR process required by the Federal Reserve Board (FRB) and the supervisory stress tests required under the Dodd-Frank Act. The ability to return capital also depends on Citi's results of operations and effectiveness in managing its level of risk-weighted assets and GSIB surcharge. Citi's ability to accurately predict, interpret or explain to stakeholders the outcome of the CCAR process, and thus to address any market or investor perceptions, may be limited as the FRB's assessment of Citi's capital adequacy is conducted using the FRB's proprietary stress test models, as well as a number of qualitative factors, including a detailed assessment of Citi's "capital adequacy process," as defined by the FRB.

The FRB has stated that it expects leading capital adequacy practices will continue to evolve and will likely be determined by the FRB each year as a result of its cross-firm review of capital plan submissions. Similarly, the FRB has indicated that, as part of its stated goal to continually evolve its annual stress testing requirements, several parameters of the annual stress testing process may continue to be altered, including the severity of the stress test scenario, the FRB modeling of Citi's balance sheet and the addition of components deemed important by the FRB.

Additionally, in April 2018, the FRB proposed integration of the annual stress testing requirements with ongoing regulatory capital requirements. Proposed changes to the stress testing regime include, among others, introduction of a firm-specific "stress capital buffer" (SCB), which would be equal to the maximum decline in a firm's Common Equity Tier 1 Capital ratio under a severely adverse scenario over a nine-quarter CCAR measurement period, subject to a minimum requirement of 2.5%. The FRB proposed that the SCB would replace the capital conservation buffer in the firm's ongoing regulatory capital requirements for Standardized Approach capital ratios. The SCB would be calculated by the FRB using its proprietary data and modelling of each firm's results. Accordingly, a firm's SCB would change annually based on the supervisory stress test results, thus potentially resulting in year-to-year volatility in the calculation of the SCB.

Although various uncertainties exist regarding the extent of, and the ultimate impact to Citi from, these changes to the FRB's stress testing and CCAR regimes, these changes would likely increase the level of capital Citi is required or

elects to hold, including as part of Citi's estimated management buffer, thus potentially impacting the extent to which Citi is able to return capital to shareholders.

Citi, Its Management and Its Businesses Must Continually Review, Analyze and Successfully Adapt to Ongoing Regulatory and Other Uncertainties and Changes in the U.S. and Globally.

Despite the adoption of final regulations in numerous areas impacting Citi and its businesses over the past several years, Citi, its management and its businesses continually face ongoing regulatory uncertainties and changes, both in the U.S. and globally. While the areas of ongoing regulatory uncertainties and changes facing Citi are too numerous to list completely, various examples include, but are not limited to (i) uncertainties and potential fiscal, monetary and regulatory changes arising from the U.S. Presidential administration and Congress; (ii) potential changes to various aspects of the regulatory capital framework applicable to Citi (see the CCAR risk factor above); and (iii) the terms of and other uncertainties resulting from the U.K.'s potential exit from the European Union (EU) (see the macroeconomic challenges and uncertainties risk factor below).

Ongoing regulatory uncertainties and changes make Citi's and its management's long-term business, balance sheet and budget planning difficult or subject to change. For example, the U.S. Presidential administration has implemented and continues to discuss various changes to certain regulatory requirements, which would require ongoing assessment by management as to the impact to Citi, its businesses and business planning. Business planning is required to be based on possible or proposed rules or outcomes, which can change dramatically upon finalization, or upon implementation or interpretive guidance from numerous regulatory bodies worldwide, and such guidance can change.

Moreover, U.S. and international regulatory initiatives have not always been undertaken or implemented on a coordinated basis, and areas of divergence have developed and continue to develop with respect to the scope, interpretation, timing, structure or approach, leading to inconsistent or even conflicting regulations, including within a single jurisdiction. For example, in 2016, the European Commission proposed to introduce a new requirement for major banking groups headquartered outside the EU (which would include Citi) to establish an intermediate EU holding company where the foreign bank has two or more institutions (broadly meaning banks, broker-dealers and similar financial firms) established in the EU. While the proposal mirrors an existing U.S. requirement for non-U.S. banking organizations to form U.S. intermediate holding companies, if adopted, it could lead to additional complexity with respect to Citi's resolution planning, capital and liquidity allocation and efficiency in various jurisdictions. Regulatory changes have also significantly increased Citi's compliance risks and costs (see the implementation and interpretation of regulatory changes risk factor below).

Citi's Ability to Utilize Its DTAs, and Thus Reduce the Negative Impact of the DTAs on Citi's Regulatory Capital, Will Be Driven by Its Ability to Generate U.S. Taxable Income and by the Provisions of and Guidance Issued in Connection with Tax Reform.

At December 31, 2018, Citi's net DTAs were \$22.9 billion, net of a valuation allowance of \$9.3 billion, of which \$11.0 billion was excluded from Citi's Common Equity Tier 1 Capital under the U.S. Basel III rules. Of the net DTAs at December 31, 2018, \$6.8 billion related to foreign tax credit carry-forwards (FTCs), net of a valuation allowance. The carry-forward utilization period for FTCs is 10 years and represents the most time-sensitive component of Citi's DTAs. The FTC carry-forwards at December 31, 2018 expire over the period of 2019-2028. Citi must utilize any FTCs generated in the then-current year tax return prior to utilizing any carry-forward FTCs.

The accounting treatment for realization of DTAs, including FTCs, is complex and requires significant judgment and estimates regarding future taxable earnings in the jurisdictions in which the DTAs arise and available tax planning strategies. Citi's ability to utilize its DTAs, including the FTC components, will be dependent upon Citi's ability to generate U.S. taxable income in the relevant tax carry-forward periods. Failure to realize any portion of the net DTAs would also have a corresponding negative impact on Citi's net income and financial returns.

The U.S. Department of the Treasury (U.S. Treasury) issued proposed regulations in November 2018 regarding the required allocation of existing FTC carry-forwards to the appropriate FTC baskets as redefined by Tax Reform and the allocation of the overall domestic loss (ODL) to these FTC baskets. An ODL allows a company to recharacterize

domestic income as income from sources outside the U.S., which enables a taxpayer to use FTC carry-forwards and FTCs generated in future years, assuming the generation of sufficient U.S. taxed income. If the final regulations issued by the U.S. Treasury differ from the proposed regulations, the valuation allowance against Citi's FTC carry-forwards would increase or decrease, depending upon the content of the final regulations. Citi's net income would change by a corresponding amount. However, a change in recognized FTC carry-forwards would not impact Citi's regulatory capital, given that such amounts are already fully disallowed.

Citi does not expect to be subject to the Base Erosion Anti-Abuse Tax (BEAT) added by Tax Reform. However, any final BEAT regulations could affect Citi's decisions as to how to structure its non-U.S. operations, possibly in a less cost-efficient manner. Further, if BEAT were to be applicable to Citi in any given year, it could have a significantly adverse effect on both Citi's net income and regulatory capital.

For additional information on the impact of Tax Reform and on Citi's DTAs, including the FTCs, see Notes 1 and 9 to Citigroup's Consolidated Financial Statements.

Citi's Interpretation or Application of the Complex Tax Laws to Which It Is Subject Could Differ from Those of the Relevant Governmental Authorities, Which Could Result in the Payment of Additional Taxes, Penalties or Interest.

Citi is subject to the various tax laws of the U.S. and its states and municipalities, as well as the numerous non-U.S. jurisdictions in which it operates. These tax laws are inherently complex and Citi must make judgments and interpretations about the application of these laws, including Tax Reform as mentioned above, to its entities, operations and businesses. Citi's interpretations and application of the tax laws, including with respect to Tax Reform, withholding tax obligations and stamp and other transactional taxes, could differ from that of the relevant governmental taxing authority, which could result in the payment of additional taxes, penalties or interest, which could be material.

Citi's Continued Investments and Efficiency Initiatives May Not Be as Successful as It Projects or Expects.

Citi continues to leverage its scale and make incremental investments to deepen client relationships, increase revenue and lower expenses. For example, Citi continues to make investments to enhance its digital capabilities across the franchise, including digital platforms and mobile and cloud architecture. Citi also has been investing in higher return businesses, such as the U.S. cards and wealth management businesses in *Global Consumer Banking (GCB)* as well as equities and other businesses in *Institutional Clients Group (ICG)*. Citi also continues to execute on its investment of more than \$1 billion in Citibanamex through 2020. Further, Citi has been pursuing efficiency savings through various technology and digital initiatives, location strategy and organizational simplification, which are intended to self-fund Citi's incremental investment initiatives as well as offset growth-related expenses.

Citi's investments and efficiency initiatives are being undertaken as part of its overall strategy to meet operational and financial objectives and targets, including operating efficiency and revenue and earnings growth expectations. There is no guarantee that these or other initiatives Citi may pursue will be as productive or effective as Citi expects, or at all. Citi's investment and efficiency initiatives may continue to evolve as its business strategies and the market environment change, which could make the initiatives more costly and more challenging to implement, and limit their effectiveness. Moreover, Citi's ability to achieve expected returns on its investments and costs savings depends, in part, on factors that it cannot control, such as macroeconomic conditions, customer, client and competitor actions and ongoing regulatory changes, among others.

A Deterioration in or Failure to Maintain Citi's Co-Branding or Private Label Credit Card Relationships, Including as a Result of any Bankruptcy or Liquidation, Could Have a Negative Impact on Citi's Results of Operations or Financial Condition.

Citi has co-branding and private label relationships through its Citi-branded cards and Citi retail services credit card businesses with various retailers and merchants globally in the ordinary course of business whereby Citi issues credit cards to customers of the retailers or merchants. Citi's co-branding and private label agreements provide for shared economics between the parties and generally have a fixed term. The five largest relationships, including Sears, constituted an aggregate of approximately 11% of Citi's revenues in 2018.

These relationships could be negatively impacted by, among other things, external factors outside the control of either party to the relationship, such as the general economic environment, declining sales and revenues or other operational difficulties of the retailer or merchant, termination due to a contractual breach by Citi or by the retailer or merchant, or other factors, including bankruptcies, liquidations, restructurings, consolidations or other similar events. Over the last several years, a number of U.S. retailers have continued to experience declining sales, which has resulted in significant numbers of store closures and, in a number of cases, bankruptcies, as retailers attempt to cut costs and reorganize. For example, as previously disclosed, Sears filed for Chapter 11 bankruptcy protection in October 2018. On February 11, 2019, after bankruptcy court approval, ESL Investments purchased substantially all of Sears' assets on a going concern basis, including its credit card program agreement with Citi. In addition, as has been widely reported, competition among card issuers, including Citi, for these relationships is significant, and it has become increasingly difficult in recent years to maintain such relationships on the same terms or at all. While various mitigating factors could be available to Citi if any of these events were to occur—such as by replacing the retailer or merchant or offering other card products—such events, particularly bankruptcies or liquidations, could negatively impact the results of operations or financial condition of Citi-branded cards, Citi retail services or Citi as a whole, including as a result of loss of revenues, increased expenses, higher cost of credit, impairment of purchased credit card relationships and contract-related intangibles or other losses.

Macroeconomic and Geopolitical Challenges and Uncertainties Globally Could Have a Negative Impact on Citi's Businesses and Results of Operations.

Citi has experienced, and could experience in the future, negative impacts to its businesses and results of operations as a result of macroeconomic and geopolitical challenges, uncertainties and volatility. For example, changes in U.S. trade policies, which have resulted in retaliatory measures from other countries, could result in a reduction or realignment of trade flows among countries and negatively impact businesses, sectors and economic growth rates. Additional areas of uncertainty include, among others, geopolitical tensions and conflicts, natural disasters, election outcomes and other macroeconomic developments, such as those involving economic growth rates, consumer confidence and spending, employment rates and commodity prices.

Governmental fiscal and monetary actions, or expected actions, such as changes in interest rate policies and any balance sheet normalization program implemented by a central bank to reduce the size of its balance sheet could significantly impact interest rates, economic growth rates, the volatility of global financial markets, foreign exchange rates and capital flows among countries. For example, in 2017, the FRB began implementing a balance sheet normalization program to reduce the size of the central bank's balance sheet, although there are various uncertainties regarding the ultimate size of the balance sheet and its composition. Such actions could, among other things, result in higher interest rates. Although Citi estimates its overall net interest revenue would generally increase due to higher interest rates, higher rates could adversely affect Citi's funding costs, levels of deposits in its consumer and institutional businesses and certain business or product revenues.

As a result of the U.K.'s 2016 referendum on exiting the EU, numerous uncertainties have arisen regarding the U.K.'s potential exit from and future relationship with the EU. For example, the terms of a withdrawal continue to be negotiated within the U.K. and between the U.K. and the EU, and it is unclear whether the parties will be able to agree on terms prior to the currently scheduled exit on October 31, 2019. If no agreement is reached on terms of an exit, it could result in what is commonly referred to as a "cliff-edge" or "hard" exit scenario. A hard exit scenario would result in the U.K. and EU losing reciprocal financial services license-passporting rights and require the U.K. to deal with the EU as a third country regime, but without an equivalence regime or transition period in place. A hard exit scenario could cause severe disruptions in the movement of goods and services between the U.K. and EU countries and negatively impact financial markets and the U.K. and EU economies. Citi's business and operations could be impacted by these and other factors, including the preparedness and reaction of clients, counterparties and financial markets infrastructure. Further, the economic and fiscal situations of some EU countries have remained fragile, and concerns and uncertainties remain in Europe over the resulting effects of the U.K.'s potential exit from the EU.

Citi's Presence in the Emerging Markets Subjects It to Various Risks as well as Increased Compliance and Regulatory Risks and Costs.

During 2017, emerging markets revenues accounted for approximately 36% of Citi's total revenues (Citi generally defines emerging markets as countries in *Latin America*, Asia (other than Japan, Australia and New Zealand), Central and Eastern Europe, the Middle East and Africa).

Citi's presence in the emerging markets subjects it to a number of risks, including sovereign volatility, political events, foreign exchange controls, limitations on foreign investment, sociopolitical instability (including from hyperinflation), fraud, nationalization or loss of licenses, business restrictions, sanctions or asset freezes, potential criminal charges, closure of branches or subsidiaries and confiscation of assets. For example, Citi operates in several countries that have, or have had in the past, strict foreign exchange controls, such as Argentina, that limit its ability to convert local currency into U.S. dollars and/or transfer funds outside the country. In prior years, Citi has also discovered fraud in certain emerging markets in which it operates. Political turmoil and other instability have occurred in certain regions and countries, including Asia, the Middle East and Latin America, which have required management time and attention in prior years (e.g., monitoring the impact of sanctions on the Venezuelan and other countries' economies as well as Citi's businesses and results of operations).

Citi's emerging markets presence also increases its compliance and regulatory risks and costs. For example, Citi's operations in emerging markets, including facilitating cross-border transactions on behalf of its clients, subject it to higher compliance risks under U.S. regulations primarily focused on various aspects of global corporate activities, such as anti-money laundering regulations and the Foreign Corrupt Practices Act. These risks can be more acute in less-developed markets and thus require substantial investment in compliance infrastructure or could result in a reduction in certain of Citi's business activities. Any failure by Citi to comply with applicable U.S. regulations, as well as the regulations in the countries and markets in which it operates as a result of its global footprint, could result in fines, penalties, injunctions or other similar restrictions, any of which could negatively impact Citi's results of operations and reputation.

These and other global macroeconomic and geopolitical challenges, uncertainties and volatilities have negatively impacted, and could continue to negatively impact, Citi's businesses, results of operations and financial condition, including its credit costs, revenues in its *Markets and securities services* and other businesses, and AOCI (which would in turn negatively impact Citi's book and tangible book value).

Citi's Presence in the Emerging Markets Subjects It to Various Risks as well as Increased Compliance and Regulatory Risks and Costs.

During 2018, emerging markets revenues accounted for approximately 37% of Citi's total revenues (Citi generally defines emerging markets as countries in Latin America, Asia (other than Japan, Australia and New Zealand), Central and Eastern Europe, the Middle East and Africa). Although Citi continues to pursue its target client strategy, Citi's presence in the emerging markets subjects it to a number of risks, including sovereign volatility, election outcomes, regulatory changes and political events, foreign exchange controls, limitations on foreign investment, socio-political instability (including from hyperinflation), fraud, nationalization or loss of licenses, business restrictions, sanctions or asset freezes, potential criminal charges, closure of branches or subsidiaries and confiscation of assets. For example, Citi operates in several countries that have, or have had in the past, strict foreign exchange controls, such as Argentina, that limit its ability to convert local currency into U.S. dollars and/or transfer funds outside of the country. In prior years, Citi has also discovered fraud in certain emerging markets in which it operates. Political turmoil and instability have occurred in certain regions and countries, including Asia, the Middle East and Latin America, which have required management time and attention in prior years (such as monitoring the impact of sanctions on certain emerging market economies as well as on Citi's businesses and results of operations in affected countries).

Citi's emerging markets presence also increases its compliance and regulatory risks and costs. For example, Citi's operations in emerging markets, including facilitating cross border transactions on behalf of its clients, subject it to higher compliance risks under U.S. regulations primarily focused on various aspects of global corporate activities, such as anti-money laundering regulations and the Foreign Corrupt Practices Act. These risks can be more acute in less-

developed markets and thus require substantial investment in compliance infrastructure or could result in a reduction in certain of Citi's business activities. Any failure by Citi to comply with applicable U.S. regulations, as well as the regulations in the countries and markets in which it operates as a result of its global footprint, could result in fines, penalties, injunctions or other similar restrictions, any of which could negatively impact Citi's results of operations and reputation (see the implementation and interpretation of regulatory changes and legal and regulatory proceedings risk factors below).

Citi's Inability in Its Resolution Plan Submissions to Address Any Deficiencies Identified or Guidance Provided by the FRB and FDIC Could Subject Citi to More Stringent Capital, Leverage or Liquidity Requirements, or Restrictions on Its Growth, Activities or Operations, and Could Eventually Require Citi to Divest Assets or Operations.

Title I of the Dodd-Frank Act requires Citi to prepare and submit a plan to the FRB and the FDIC for the orderly resolution of Citigroup (the bank holding company) and its significant legal entities, under the U.S. Bankruptcy Code in the event of future material financial distress or failure. As previously announced, Citi's next resolution plan submission is due July 1, 2019. On December 20, 2018, the FRB and FDIC issued final guidance for the 2019 and subsequent resolution plan submissions for the eight U.S. GSIBs, including Citi.

Under Title I, if the FRB and the FDIC jointly determine that Citi's resolution plan is not "credible" (which, although not defined, is generally believed to mean the regulators do not believe the plan is feasible or would otherwise allow the regulators to resolve Citi in a way that protects systemically important functions without severe systemic disruption), or would not facilitate an orderly resolution of Citi under the U.S. Bankruptcy Code, and Citi fails to resubmit a resolution plan that remedies any identified deficiencies, Citi could be subjected to more stringent capital, leverage or liquidity requirements, or restrictions on its growth, activities or operations. If within two years from the imposition of any requirements or restrictions Citi has still not remediated any identified deficiencies, then Citi could eventually be required to divest certain assets or operations. Any such restrictions or actions would negatively impact Citi's reputation, market and investor perception, operations and strategy.

Citi's Performance and the Performance of Its Individual Businesses Could Be Negatively Impacted if Citi Is Not Able to Effectively Compete for Highly Qualified Employees.

Citi's performance and the performance of its individual businesses largely depends on the talents and efforts of its highly skilled employees. Specifically, Citi's continued ability to compete in its businesses, to manage its businesses effectively and to continue to execute its overall global strategy depends on its ability to attract new employees and to retain and motivate its existing employees. If Citi is unable to continue to attract and retain the most highly qualified employees, Citi's performance, including its competitive position, the successful execution of its overall strategy and its results of operations could be negatively impacted.

Citi's ability to attract and retain employees depends on numerous factors, some of which are outside of its control. For example, the banking industry generally is subject to more comprehensive regulation of executive and employee compensation than other industries, including deferral and clawback requirements for incentive compensation. Citi often competes in the market for talent with entities that are not subject to such comprehensive regulatory requirements on the structure of incentive compensation, including, among others, technology companies. Other factors that could impact Citi's ability to attract and retain employees include its culture and the management and leadership of the Company as well as its individual businesses, presence in the particular market or region at issue and the professional opportunities it offers.

Financial Services Companies and Others as well as Emerging Technologies Pose Increasingly Competitive Challenges to Citi.

Citi operates in an increasingly competitive environment, which includes both financial and non-financial services firms, such as traditional banks, online banks, financial technology companies and others. These companies compete on the basis of, among other factors, size, quality and type of products and services offered, price, technology and

reputation. Emerging technologies have the potential to intensify competition and accelerate disruption in the financial services industry. Citi competes with financial services companies in the U.S. and globally that continue to develop and introduce new products and services. In recent years, non-financial services firms, such as financial technology companies, have begun to offer services traditionally provided by financial institutions, such as Citi. These firms attempt to use technology and mobile platforms to enhance the ability of companies and individuals to borrow money, save and invest. To the extent Citi is not able to compete effectively with these and other firms, Citi could be placed at a competitive disadvantage, which could result in loss of customers and market share, and its businesses, results of operations and financial condition could suffer. For additional information on Citi's competitors, see the co-brand and private label cards risk factor above.

Uncertainties Regarding the Possible Discontinuance of the London Inter-Bank Offered Rate (LIBOR) or Any Other Interest Rate Benchmark Could Have Adverse Consequences for Market Participants, Including Citi.

In 2017, the U.K. Financial Conduct Authority (FCA) noted that market conditions raised serious questions about the future sustainability of LIBOR benchmarks. With the FCA securing voluntary panel bank support to sustain LIBOR only until 2021, the future of LIBOR beyond 2021 remains uncertain. In addition, following guidance provided by the Financial Stability Board (FSB), other regulators have suggested reforming or replacing other benchmark rates with alternative reference rates.

Given LIBOR's extensive use across financial markets, the transition away from LIBOR presents various risks and challenges to financial markets and institutions, including Citi. Citi's consumer and institutional businesses issue, trade, hold or otherwise use various products and securities that reference LIBOR, including, among others, mortgages and other consumer loans, commercial loans, corporate loans, various types of debt, derivatives and other securities. If not sufficiently planned for, the discontinuation of LIBOR or any other interest rate benchmark could result in increased financial, operational, legal, reputational or compliance risks. For example, a significant challenge will be the impact of LIBOR transition on contractual mechanics of floating rate financial instruments and contracts that reference LIBOR and mature after 2021. Certain of these instruments and contracts do not provide for alternative reference rates. Even if the instruments and contracts transition to alternative reference rates, the new reference rates are likely to differ from the prior benchmark rates. While there are a number of international working groups focused on transition plans and fallback contract language that seek to address market disruption and value transfer, replacement of LIBOR or any other benchmark with a new benchmark rate could adversely impact the value of and return on existing instruments and contracts. Moreover, replacement of LIBOR or other benchmark rates could result in market dislocations and have other adverse consequences for market participants, including the potential for increased costs, including by requiring Citi to pay higher interest on its obligations, and litigation risks.

CREDIT RISKS

Credit Risk and Concentrations of Risk Can Increase the Potential for Citi to Incur Significant Losses.

Credit risk arises from Citi's lending and other businesses in both *GCB* and *ICG*. Citi has credit exposures to counterparties in the U.S. and various countries and jurisdictions globally, including end-of-period consumer loans of \$331 billion and end-of-period corporate loans of \$354 billion at year-end 2018. A default by a borrower or counterparty, or a decline in the credit quality or value of any underlying collateral, exposes Citi to credit risk. Various macroeconomic, geopolitical and other factors, among other things, can increase Citi's credit risk and credit costs (for additional information, see co-branding and private label credit card and macroeconomic challenges and uncertainties risk factors above). While Citi provides reserves for probable losses for its credit exposures, such reserves are subject to judgments and estimates that could be incorrect or differ from actual future events (see incorrect assumptions or estimates risk factor below).

Concentrations of risk, particularly credit and market risks, can also increase Citi's risk of significant losses. As of year-end 2018, Citi's most significant concentration of credit risk was with the U.S. government and its agencies, which primarily results from trading assets and investments issued by the U.S. government and its agencies (for additional

information, including concentrations of credit risk to other public sector entities, see Note 23 to Citigroup's Consolidated Financial Statements). Citi also routinely executes a high volume of securities, trading, derivative and foreign exchange transactions with non-U.S. sovereigns and with counterparties in the financial services industry, including banks, insurance companies, investment banks, governments, central banks and other financial institutions. A rapid deterioration of a large counterparty or within a sector or country where Citi has large exposures or unexpected market dislocations could cause Citi to incur significant losses.

LIQUIDITY RISKS

The Maintenance of Adequate Liquidity and Funding Depends on Numerous Factors, Including Those Outside of Citi's Control, Such as Market Disruptions and Increases in Citi's Credit Spreads.

As a global financial institution, adequate liquidity and sources of funding are essential to Citi's businesses. Citi's liquidity and sources of funding can be significantly and negatively impacted by factors it cannot control, such as general disruptions in the financial markets, governmental fiscal and monetary policies, regulatory changes or negative investor perceptions of Citi's creditworthiness, unexpected increases in cash or collateral requirements and the inability to monetize available liquidity resources. For example, Citi competes with other banks and financial institutions for deposits, which represent Citi's most stable and lowest cost of long-term funding. The competitive environment has increased for retail banking deposits, including as online banks and other competitors have increased rates paid for deposits. More recently, as interest rates have increased, a growing number of customers have transferred deposits to other products, including investments and interest bearing accounts, and/or other financial institutions. This, along with slower industry growth in deposits, has resulted in a more challenging environment for deposits. In addition, as interest rates continue to rise, financial institutions, such as Citi, may have to raise the rates paid for deposits, thus increasing the cost of funds and affecting net interest income and margin.

Moreover, Citi's costs to obtain and access secured funding and long-term unsecured funding are directly related to its credit spreads. Changes in credit spreads constantly occur and are market driven, including both external market factors and factors specific to Citi, and can be highly volatile.

In addition, Citi's ability to obtain funding may be impaired if other market participants are seeking to access the markets at the same time, or if market appetite is reduced, as is likely to occur in a liquidity or other market crisis. A sudden drop in market liquidity could also cause a temporary or lengthier dislocation of underwriting and capital markets activity. In addition, clearing organizations, central banks, clients and financial institutions with which Citi interacts may exercise the right to require additional collateral based on these market perceptions or market conditions, which could further impair Citi's access to and cost of funding.

As a holding company, Citi relies on interest, dividends, distributions and other payments from its subsidiaries to fund dividends as well as to satisfy its debt and other obligations. Several of Citi's U.S. and non-U.S. subsidiaries are or may be subject to capital adequacy or other regulatory or contractual restrictions on their ability to provide such payments, including any local regulatory stress test requirements. Limitations on the payments that Citi receives from its subsidiaries could also impact its liquidity.

The Credit Rating Agencies Continuously Review the Credit Ratings of Citi and Certain of Its Subsidiaries, and Ratings Downgrades Could Have a Negative Impact on Citi's Funding and Liquidity Due to Reduced Funding Capacity and Increased Funding Costs, Including Derivatives Triggers That Could Require Cash Obligations or Collateral Requirements.

The credit rating agencies, such as Fitch, Moody's and S&P, continuously evaluate Citi and certain of its subsidiaries, and their ratings of Citi and its more significant subsidiaries' long-term/senior debt and short-term/commercial paper, as applicable, are based on a number of factors, including standalone financial strength, as well as factors not entirely within the control of Citi and its subsidiaries, such as the agencies' proprietary rating methodologies and assumptions, and conditions affecting the financial services industry and markets generally.

Citi and its subsidiaries may not be able to maintain their current respective ratings. Ratings downgrades could negatively impact Citi's ability to access the capital markets and other sources of funds as well as the costs of those funds, and its ability to maintain certain deposits. A ratings downgrade could also have a negative impact on Citi's funding and liquidity due to reduced funding capacity, as well as the impact of derivative triggers, which could require Citi to meet cash obligations and collateral requirements. In addition, a ratings downgrade could also have a negative impact on other funding sources, such as secured financing and other margined transactions for which there may be no explicit triggers, as well as on contractual provisions and other credit requirements of Citi's counterparties and clients, which may contain minimum ratings thresholds in order for Citi to hold third-party funds.

Moreover, credit ratings downgrades can have impacts that may not be currently known to Citi or are not possible to quantify. For example, some entities may have ratings limitations as to their permissible counterparties, of which Citi may or may not be aware. Further, certain of Citi's corporate customers and trading counterparties, among other clients, could re-evaluate their business relationships with Citi and limit the trading of certain contracts or market instruments with Citi in response to ratings downgrades. Changes in customer and counterparty behavior could impact not only Citi's funding and liquidity but also the results of operations of certain Citi businesses.

OPERATIONAL RISKS

A Disruption of Citi's Operational Systems Could Negatively Impact Citi's Reputation, Customers, Clients, Businesses or Results of Operations and Financial Condition.

A significant portion of Citi's operations relies heavily on the secure processing, storage and transmission of confidential and other information as well as the monitoring of a large number of complex transactions on a minute-by-minute basis. For example, through its GCB and treasury and trade solutions and securities services businesses in ICG, Citi obtains and stores an extensive amount of personal and client-specific information for its retail, corporate and governmental customers and clients and must accurately record and reflect their extensive account transactions.

With the evolving proliferation of new technologies and the increasing use of the Internet, mobile devices and cloud technologies to conduct financial transactions, large global financial institutions such as Citi have been, and will continue to be, subject to an increasing risk of operational disruption or cyber or information security incidents from these activities (for additional information on cybersecurity risk, see the discussion below). These incidents are unpredictable and can arise from numerous sources, not all of which are in Citi's control, including, among others, human error, fraud or malice on the part of employees, accidental technological failure, electrical or telecommunication outages, failures of computer servers or other similar damage to Citi's property or assets. These issues can also arise as a result of failures by third parties with which Citi does business, such as failures by Internet, mobile technology and cloud service providers or other vendors to adequately safeguard their systems and prevent system disruptions or cyber attacks.

Such events could cause interruptions or malfunctions in the operations of Citi (such as the temporary loss of availability of Citi's online banking system or mobile banking platform), as well as the operations of its clients, customers or other third parties. Given Citi's global footprint and the high volume of transactions processed by Citi, certain errors or actions may be repeated or compounded before they are discovered and rectified, which would further increase these costs and consequences. Any such events could also result in financial losses as well as misappropriation, corruption or loss of confidential and other information or assets, which could negatively impact Citi's reputation, customers, clients, businesses or results of operations and financial condition, perhaps significantly.

Citi and Third Parties' Computer Systems and Networks Have Been, and Will Continue to Be, Susceptible to an Increasing Risk of Continually Evolving, Sophisticated Cybersecurity Activities That Could Result in the Theft, Loss, Misuse or Disclosure of Confidential Client or Customer Information, Damage to Citi's Reputation, Additional Costs to Citi, Regulatory Penalties, Legal Exposure and Financial Losses.

Citi's computer systems, software and networks are subject to ongoing cyber incidents such as unauthorized access, loss or destruction of data (including confidential client information), account takeovers, unavailability of service, computer

viruses or other malicious code, cyber attacks and other similar events. These threats can arise from external parties, including cyber criminals, cyber terrorists, hacktivists and nation state actors, as well as insiders who knowingly or unknowingly engage in or enable malicious cyber activities.

Third parties with which Citi does business, as well as retailers and other third parties with which Citi's customers do business, may also be sources of cybersecurity risks, particularly where activities of customers are beyond Citi's security and control systems. For example, Citi outsources certain functions, such as processing customer credit card transactions, uploading content on customer-facing websites, and developing software for new products and services. These relationships allow for the storage and processing of customer information by third-party hosting of or access to Citi websites, which could result in compromise or the potential to introduce vulnerable or malicious code, resulting in security breaches impacting Citi customers. Furthermore, because financial institutions are becoming increasingly interconnected with central agents, exchanges and clearing houses, including as a result of the derivatives reforms over the last few years, Citi has increased exposure to cyber attacks through third parties.

Citi has been subject to intentional cyber incidents from external sources over the last several years, including (i) denial of service attacks, which attempted to interrupt service to clients and customers, (ii) data breaches, which obtained unauthorized access to customer account data and (iii) malicious software attacks on client systems, which attempted to allow unauthorized entrance to Citi's systems under the guise of a client and the extraction of client data. While Citi's monitoring and protection services were able to detect and respond to the incidents targeting its systems before they became significant, they still resulted in limited losses in some instances as well as increases in expenditures to monitor against the threat of similar future cyber incidents. There can be no assurance that such cyber incidents will not occur again, and they could occur more frequently and on a more significant scale.

Further, although Citi devotes significant resources to implement, maintain, monitor and regularly upgrade its systems and networks with measures such as intrusion detection and prevention and firewalls to safeguard critical business applications, there is no guarantee that these measures or any other measures can provide absolute security. Because the methods used to cause cyber attacks change frequently or, in some cases, are not recognized until launched or even later, Citi may be unable to implement effective preventive measures or proactively address these methods until they are discovered. In addition, given the evolving nature of cyber threat actors and the frequency and sophistication of cyber activities they carry out, the determination of the severity and potential impact of a cyber incident may not occur for a substantial period until after the incident has been discovered. Also, while Citi engages in certain actions to reduce the exposure resulting from outsourcing, such as performing security control assessments of third-party vendors and limiting third-party access to the least privileged level necessary to perform job functions, these actions cannot prevent all third-party related cyber attacks or data breaches.

Cyber incidents can result in the disclosure of personal, confidential or proprietary customer or client information, damage to Citi's reputation with its clients and the market, customer dissatisfaction and additional costs, including credit costs, to Citi, such as repairing systems, replacing customer payment cards or adding new personnel or protection technologies. Regulatory penalties, loss of revenues, exposure to litigation and other financial losses, including loss of funds, to both Citi and its clients and customers and disruption to Citi's operational systems could also result from cyber incidents (for additional information on the potential impact of operational disruptions, see the operational systems risk factor above). Moreover, the increasing risk of cyber incidents has resulted in increased legislative and regulatory scrutiny of firms' cybersecurity protection services and calls for additional laws and regulations to further enhance protection of consumers' personal data.

While Citi maintains insurance coverage that may, subject to policy terms and conditions including significant self-insured deductibles, cover certain aspects of cyber risks, such insurance coverage may be insufficient to cover all losses.

Incorrect Assumptions or Estimates in Citi's Financial Statements Could Cause Significant Unexpected Losses in the Future, and Changes to Financial Accounting and Reporting Standards or Interpretations Could Have a Material Impact on How Citi Records and Reports Its Financial Condition and Results of Operations.

U.S. GAAP requires Citi to use certain assumptions and estimates in preparing its financial statements, including reserves related to litigation and regulatory exposures, valuation of DTAs, the estimate of the allowance for credit losses and the fair values of certain assets and liabilities, among other items. If Citi's assumptions or estimates underlying its financial statements are incorrect or differ from actual events, Citi could experience unexpected losses, some of which could be significant.

Periodically, the Financial Accounting Standards Board (FASB) issues financial accounting and reporting standards that may govern key aspects of Citi's financial statements or interpretations thereof when those standards become effective, including those areas where Citi is required to make assumptions or estimates. For example, the FASB's new accounting standard on credit losses (CECL), which will become effective for Citi on January 1, 2020, will require earlier recognition of credit losses on loans and held-to-maturity securities and other financial assets. The CECL methodology requires that lifetime "expected credit losses" be recorded at the time the financial asset is originated or acquired. The expected credit losses are adjusted each period for changes in expected lifetime credit losses. The CECL methodology replaces the multiple existing impairment models under U.S. GAAP that generally require that a loss be "incurred" before it is recognized.

Changes to financial accounting or reporting standards or interpretations, whether promulgated or required by the FASB or other regulators, could present operational challenges and could require Citi to change certain of the assumptions or estimates it previously used in preparing its financial statements, which could negatively impact how it records and reports its financial condition and results of operations generally and/or with respect to particular businesses. For additional information on the key areas for which assumptions and estimates are used in preparing Citi's financial statements, see Notes 1 and 27 to Citigroup's Consolidated Financial Statements.

Citi May Incur Significant Losses and Its Regulatory Capital and Capital Ratios Could Be Negatively Impacted if Its Risk Management Processes, Strategies or Models Are Deficient or Ineffective.

Citi utilizes a broad and diversified set of risk management and mitigation processes and strategies, including the use of risk models in analyzing and monitoring the various risks Citi assumes in conducting its activities. For example, Citi uses models as part of its comprehensive stress testing initiatives across Citi. Citi also relies on data to aggregate, assess and manage various risk exposures. Management of these risks is made even more challenging within a global financial institution such as Citi, particularly given the complex, diverse and rapidly changing financial markets and conditions in which Citi operates as well as that losses can occur from untimely, inaccurate or incomplete processes caused by unintentional human error.

These processes, strategies and models are inherently limited because they involve techniques, including the use of historical data in many circumstances, assumptions and judgments that cannot anticipate every economic and financial outcome in the markets in which Citi operates, nor can they anticipate the specifics and timing of such outcomes. Citi could incur significant losses, and its regulatory capital and capital ratios could be negatively impacted, if Citi's risk management processes, including its ability to manage and aggregate data in a timely and accurate manner, strategies or models are deficient or ineffective. Such deficiencies or ineffectiveness could also result in inaccurate financial, regulatory or risk reporting.

Moreover, Citi's Basel III regulatory capital models, including its credit, market and operational risk models, currently remain subject to ongoing regulatory review and approval, which may result in refinements, modifications or enhancements (required or otherwise) to these models. Modifications or requirements resulting from these ongoing reviews, as well as any future changes or guidance provided by the U.S. banking agencies regarding the regulatory capital framework applicable to Citi, have resulted in, and could continue to result in, significant changes to Citi's risk weighted assets. These changes can negatively impact Citi's capital ratios and its ability to achieve its regulatory capital requirements as it projects or as required.

COMPLIANCE RISKS

Ongoing Implementation and Interpretation of Regulatory Changes and Requirements in the U.S. and Globally Have Increased Citi's Compliance Risks and Costs.

As referenced above, over the past several years, Citi has been required to implement a significant number of regulatory changes across all of its businesses and functions, and these changes continue. In some cases, Citi's implementation of a regulatory requirement is occurring simultaneously with changing or conflicting regulatory guidance, legal challenges or legislative action to modify or repeal existing rules or enact new rules. Moreover, in many cases, these are entirely new regulatory requirements or regimes, resulting in much uncertainty regarding regulatory expectations as to what is definitely required in order to be in compliance. Accompanying this compliance uncertainty is heightened regulatory scrutiny and expectations in the U.S. and globally for the financial services industry with respect to governance and risk management practices, including its compliance and regulatory risks (for a discussion of heightened regulatory expectations on "conduct risk" at, and the overall "culture" of, financial institutions such as Citi, see the legal and regulatory proceedings risk factor below). A failure to resolve any identified deficiencies could result in increased regulatory oversight and restrictions. All of these factors have resulted in increased compliance risks and costs for Citi.

Examples of regulatory changes that have resulted in increased compliance risks and costs include (i) a proliferation of laws relating to the limitation of cross-border data movement and/or collection and use of customer information, including data localization and protection and privacy laws, which also can conflict with or increase compliance complexity with respect to other laws, including anti-money laundering laws; and (ii) the FRB's "total loss absorbing capacity" (TLAC) requirements, including, among other things, consequences of a breach of the clean holding company requirements, given there are no cure periods for the requirements.

Extensive compliance requirements can result in increased reputational and legal risks, as failure to comply with regulations and requirements, or failure to comply as expected, can result in enforcement and/or regulatory proceedings (for additional discussion, see the legal and regulatory proceedings risk factor below). Additionally, increased and ongoing compliance requirements and uncertainties have resulted in higher costs for Citi. For example, Citi employed roughly 30,000 risk, regulatory and compliance staff as of year-end 2018, out of a total employee population of 204,000, compared to approximately 14,000 as of year-end 2008 with a total employee population of 323,000. These higher regulatory and compliance costs can impede Citi's ongoing, business-as-usual cost reduction efforts, and can also require management to reallocate resources, including potentially away from ongoing business investment initiatives, as discussed above.

Citi Is Subject to Extensive Legal and Regulatory Proceedings, Investigations and Inquiries That Could Result in Significant Penalties and Other Negative Impacts on Citi, Its Businesses and Results of Operations.

At any given time, Citi is defending a significant number of legal and regulatory proceedings and is subject to numerous governmental and regulatory examinations, investigations and other inquiries. The global judicial, regulatory and political environment has generally been unfavorable for large financial institutions. The complexity of the federal and state regulatory and enforcement regimes in the U.S., coupled with the global scope of Citi's operations, also means that a single event or issue 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, as well as multiple civil litigation claims in multiple jurisdictions.

Moreover, U.S. and non-U.S. regulators have been increasingly focused on "conduct risk," a term used to describe the risks associated with behavior by employees and agents, including third-party vendors utilized by Citi, that could harm clients, customers, investors or the markets, such as improperly creating, selling, marketing or managing products and services or improper incentive compensation programs with respect thereto, failures to safeguard a party's personal information, or failures to identify and manage conflicts of interest. In addition to increasing Citi's compliance and reputational risks, this focus on conduct risk could lead to more regulatory or other enforcement proceedings and civil litigation, including for practices, which historically were acceptable but now receive greater scrutiny. Further, while Citi takes numerous steps to prevent and detect conduct by employees and agents that could potentially harm clients,

customers, investors or the markets, such behaviour may not always be deterred or prevented. Banking regulators have also focused on the overall culture of financial services firms, including Citi. In addition to regulatory restrictions or structural changes that could result from perceived deficiencies in Citi's culture, such focus could also lead to additional regulatory proceedings.

In addition, the severity of the remedies sought in legal and regulatory proceedings to which Citi is subject has remained elevated. U.S. and certain international governmental entities have increasingly brought criminal actions against, or have sought criminal convictions from, financial institutions, and criminal prosecutors in the U.S. have increasingly sought and obtained criminal guilty pleas or deferred prosecution agreements against corporate entities and other criminal sanctions from those institutions. These types of actions by U.S. and international governmental entities may, in the future, have significant collateral consequences for a financial institution, including loss of customers and business, and the inability to offer certain products or services and/or operate certain businesses. Citi may be required to accept or be subject to similar types of criminal remedies, consent orders, sanctions, substantial fines and penalties, remediation and other financial costs or other requirements in the future, including for matters or practices not yet known to Citi, any of which could materially and negatively affect Citi's businesses, business practices, financial condition or results of operations, require material changes in Citi's operations or cause Citi reputational harm.

Further, many large claims—both private civil and regulatory—asserted against Citi are highly complex, slow to develop and may involve novel or untested legal theories. The outcome of such proceedings is difficult to predict or estimate until late in the proceedings. Although Citi establishes accruals for its legal and regulatory matters according to accounting requirements, Citi's estimates of, and changes to, these accruals involve significant judgment and may be subject to significant uncertainty, and the amount of loss ultimately incurred in relation to those matters may be substantially higher than the amounts accrued. In addition, certain settlements are subject to court approval and may not be approved.

For additional information relating to Citi's legal and regulatory proceedings and matters, including Citi's policies on establishing legal accruals, see Note 27 to Citigroup's Consolidated Financial Statements.

MANAGING GLOBAL RISK

Overview

For Citi, effective risk management is of primary importance to its overall operations. Accordingly, Citi's risk management process has been designed to monitor, evaluate and manage the principal risks it assumes in conducting its activities. Specifically, the activities that Citi engages in, and the risks those activities generate, must be consistent with Citi's mission and value proposition, the key principles that guide it, and Citi's risk appetite.

Risk management must be built on a foundation of ethical culture. Under Citi's mission and value proposition, which was developed by Citi's senior leadership and distributed throughout the Company, Citi strives to serve its clients as a trusted partner by responsibly providing financial services that enable growth and economic progress while earning and maintaining the public's trust by constantly adhering to the highest ethical standards. As such, Citi asks all employees to ensure that their decisions pass three tests: they are in our clients' interests, create economic value and are always systemically responsible. Additionally, Citi evaluates employees' performance against behavioral expectations set out in Citi's leadership standards, which were designed in part to effectuate Citi's mission and value proposition. Other culture-related efforts in connection with conduct risk, ethics and leadership, escalation and treating customers fairly help Citi to execute its mission and value proposition.

Citi's Company-wide risk governance framework consists of the policies, standards, procedures and processes through which Citi identifies, assesses, measures, manages, monitors, reports and controls risks across the Company. It also emphasizes Citi's risk culture and lays out standards, procedures and programs that are designed and undertaken to enhance the Company's risk culture, embed this culture deeply within the organization, and give employees tools to make sound and ethical risk decisions and to escalate issues appropriately. The risk governance framework has been developed in alignment with the expectations of the Office of the Comptroller of the Currency

(OCC) Heightened Standards. It is also aligned with the relevant components of the Basel Committee on Banking Supervision's corporate governance principles for banks and relevant components of the Federal Reserve's Enhanced Prudential Standards for Bank Holding Companies and Foreign Banking Organizations.

Four key principles—common purpose, responsible finance, ingenuity and leadership—guide Citi as it performs its mission. Citi's risk appetite, which is approved by the Citigroup Board of Directors, specifies the aggregate levels and types of risk the Board and management are willing to assume to achieve Citi's strategic objectives and business plan, consistent with applicable capital, liquidity and other regulatory requirements.

Citi selectively takes risks in support of its underlying business strategy, while striving to ensure it operates within its mission and value proposition and risk appetite.

Citi's risks are generally categorized and summarized as follows:

- *Credit risk* is the risk of loss resulting from the decline in credit quality (or downgrade risk) or failure of a borrower, counterparty, third party or issuer to honor its financial or contractual obligations.
- *Liquidity risk* is the risk that the Company will not be able to meet efficiently both expected and unexpected current and future cash flow and collateral needs without adversely affecting either daily operations or financial conditions of the Company. The risk may be exacerbated by the inability of the Company to access funding sources or monetize assets and the composition of liability funding and liquid assets.
- *Market risk* is the risk of loss arising from changes in the value of Citi's assets and liabilities resulting from changes in market variables, such as interest rates, exchange rates or credit spreads. Losses can be exacerbated by the presence of basis or correlation risks.
- *Operational risk* is the risk of loss resulting from inadequate or failed internal processes, systems or human factors, or from external events. It includes risk of failing to comply with applicable laws and regulations, but excludes strategic risk (see below). It also includes the reputation and franchise risk associated with business practices or market conduct in which Citi is involved, as well as compliance, conduct and legal risks. Operational risk is inherent in Citi's global business activities, as well as related support, and can result in losses arising from events related to fraud, theft and unauthorized activity; employment practices and workplace environment; clients, products and business practices; physical assets and infrastructure, and execution, delivery and process management.
- *Compliance risk* is the risk to current or projected financial condition and resilience arising from violations of laws or regulations, or from nonconformance with prescribed practices, internal policies and procedures, or ethical standards. This risk exposes a bank to fines, civil money penalties, payment of damages and the voiding of contracts. Compliance risk is not limited to risk from failure to comply with consumer protection laws; it encompasses the risk of noncompliance with all laws and regulations, as well as prudent ethical standards and contractual obligations. It also includes the exposure to litigation (known as legal risk) from all aspects of banking, traditional and nontraditional. Compliance risk spans across all risk types outlined in the risk governance framework.
- *Reputational risk* is the risk to current or anticipated earnings, capital, or franchise or enterprise value and resilience arising from negative public opinion.
- *Strategic risk* is the risk to current or anticipated earnings, capital, or franchise or enterprise value arising from poor, but authorized business decisions (in compliance with regulations, policies and procedures), an inability to adapt to changes in the operating environment or other external factors that may impair the ability to carry out a business strategy. Strategic risk also includes:
 - *Country risk*, which is the risk that an event in a country (precipitated by developments within or external to a country) will impair the value of Citi's franchise or will adversely affect the ability of obligors within that country to honor their obligations. Country risk events may include sovereign defaults, banking crises, currency crises, currency convertibility and/or transferability restrictions, or political events.

Citi manages its risks through each of its three lines of defense: (i) business management, (ii) independent control functions and (iii) internal audit. The three lines of defense collaborate with each other in structured forums and processes to bring various perspectives together and to lead the organization toward outcomes that are in clients' interests, create economic value and are systemically responsible.

CREDIT RISK

Overview

Credit risk is the risk of loss resulting from the decline in credit quality or the failure of a borrower, counterparty, third party or issuer to honor its financial or contractual obligations. Credit risk arises in many of Citigroup's business activities, including:

- consumer, commercial and corporate lending;
- capital markets derivative transactions;
- structured finance; and
- securities financing transactions (repurchase and reverse repurchase agreements, securities loaned and borrowed).

Credit risk also arises from settlement and clearing activities, when Citi transfers an asset in advance of receiving its counter-value or advances funds to settle a transaction on behalf of a client. Concentration risk, within credit risk, is the risk associated with having credit exposure concentrated within a specific client, industry, region or other category.

Credit risk is one of the most significant risks Citi faces as an institution. For additional information, see "Risk Factors—Credit Risk" above. As a result, Citi has a well-established framework in place for managing credit risk across all businesses. This includes a defined risk appetite, credit limits and credit policies, both at the business level as well as at the Company-wide level. Citi's credit risk management also includes processes and policies with respect to problem recognition, including "watch lists," portfolio reviews, stress tests, updated risk ratings and classification triggers.

With respect to Citi's settlement and clearing activities, intraday client usage of lines is monitored against limits, as well as against usage patterns. To the extent a problem develops, Citi typically moves the client to a secured (collateralized) operating model. Generally, Citi's intraday settlement and clearing lines are uncommitted and cancellable at any time.

To manage concentration of risk within credit risk, Citi has in place a correlation framework consisting of industry limits, an idiosyncratic framework consisting of single name concentrations for each business and across Citigroup and a specialized framework consisting of product limits.

Credit exposures are generally reported in notional terms for accrual loans, reflecting the value at which the loans as well as loan and other off-balance sheet commitments are carried on the Consolidated Balance Sheet. Credit exposure arising from capital markets activities is generally expressed as the current mark-to-market, net of margin, reflecting the net value owed to Citi by a given counterparty.

The credit risk associated with these credit exposures is a function of the idiosyncratic creditworthiness of the obligor, as well as the terms and conditions of the specific obligation. Citi assesses the credit risk associated with its credit exposures on a regular basis through its loan loss reserve process, as well as through regular stress testing at the company, business, geography and product levels. These stress-testing processes typically estimate potential incremental credit costs that would occur as a result of either downgrades in the credit quality or defaults of the obligors or counterparties.

LIQUIDITY RISK

Overview

Adequate and diverse sources of funding and liquidity are essential to Citi's businesses. Funding and liquidity risks arise from several factors, many of which are mostly or entirely outside Citi's control, such as disruptions in the financial markets, changes in key funding sources, credit spreads, changes in Citi's credit ratings and geopolitical and macroeconomic conditions. For additional information, see "Risk Factors" above.

Citi's funding and liquidity objectives are aimed at (i) funding its existing asset base, (ii) growing its core businesses, (iii) maintaining sufficient liquidity, structured appropriately, so that Citi can operate under a variety of adverse circumstances, including potential Company-specific and/or market liquidity events in varying durations and severity, and (iv) satisfying regulatory requirements, including, among other things, those related to resolution planning. Citigroup's primary liquidity objectives are established by entity, and in aggregate, across two major categories:

- Citibank (including Citibank Europe plc, Citibank Singapore Ltd. and Citibank (Hong Kong) Ltd.); and
- the non-bank and other, which includes the parent holding company (Citigroup), Citi's primary intermediate holding company (Citicorp LLC), Citi's broker-dealer subsidiaries (including Citigroup Global Markets Inc., Citigroup Global Markets Ltd. and Citigroup Global Markets Japan Inc.) and other bank and non-bank subsidiaries that are consolidated into Citigroup (including Citibanamex).

At an aggregate level, Citigroup's goal is to maintain sufficient funding in amount and tenor to fully fund customer assets and to provide an appropriate amount of cash and high-quality liquid assets (as discussed below), even in times of stress. The liquidity risk management framework provides that in addition to the aggregate requirements, certain entities be self-sufficient or net providers of liquidity, including in conditions established under their designated stress tests.

Citi's primary sources of funding include (i) deposits via Citi's bank subsidiaries, which are Citi's most stable and lowest cost source of long-term funding, (ii) long-term debt (primarily senior and subordinated debt) primarily issued at the parent and certain bank subsidiaries, and (iii) stockholders' equity. These sources may be supplemented by short-term borrowings, primarily in the form of secured funding transactions.

As referenced above, Citi works to ensure that the tenor of these funding sources is sufficiently long in relation to the tenor of its asset base. The goal of Citi's asset/liability management is to ensure that there is excess liquidity and tenor in the liability structure relative to the liquidity profile of the assets. This reduces the risk that liabilities will become due before asset maturities or monetizations through sale. This excess liquidity is held primarily in the form of high-quality liquid assets (HQLA).

Citi's Treasurer has overall responsibility for management of Citi's HQLA. Citi's liquidity is managed via a centralized treasury model by Corporate Treasury, in conjunction with regional and in-country treasurers. Pursuant to this approach, Citi's HQLA are managed with emphasis on asset-liability management and entity-level liquidity adequacy throughout Citi.

Citi's Chief Risk Officer is responsible for the overall liquidity risk profile of Citi. The Chief Risk Officer and Citi's CFO co-chair Citi's Asset Liability Management Committee (ALCO), which includes Citi's Treasurer and other senior executives. ALCO sets the strategy of the liquidity portfolio and monitors its performance. Significant changes to portfolio asset allocations need to be approved by ALCO.

MARKET RISK

Overview

Market risk is the potential for losses arising from changes in the value of Citi's assets and liabilities resulting from changes in market variables such as interest rates, foreign exchange rates, equity prices, commodity prices and credit spreads, as well as their implied volatilities. For additional information on market risk, see "Risk Factors" above.

Each business is required to establish, with approval from Citi's market risk management, a market risk limit framework for identified risk factors that clearly defines approved risk profiles and is within the parameters of Citi's overall risk appetite. These limits are monitored by the Risk organization, Citi's country and business Asset and Liability Committees and the Citigroup Asset and Liability Committee. In all cases, the businesses are ultimately responsible for the market risks taken and for remaining within their defined limits.

Market Risk of Trading Portfolios

Trading portfolios include positions resulting from market making activities, the CVA relating to derivative counterparties and all associated hedges, fair value option loans, hedges to the loan portfolio within capital markets origination within CGMHI.

The market risk of CGMHI's trading portfolios is monitored using a combination of quantitative and qualitative measures, including but not limited to:

- factor sensitivities;
- value at risk (VAR); and
- stress testing.

Each trading portfolio across CGMHI's businesses has its own market risk limit framework encompassing these measures and other controls, including trading mandates, new product approval, permitted product lists, and pre-trade approval for larger, more complex and less liquid transactions.

Factor Sensitivities

Factor sensitivities are expressed as the change in the value of a position for a defined change in a market risk factor, such as a change in the value of a U.S. Treasury bill for a one-basis-point change in interest rates. Citi's market risk management, within the Risk organization, works to ensure that factor sensitivities are calculated, monitored and limited for all material risks taken in the trading portfolios.

Value at Risk (VAR)

VAR estimates, at a 99% confidence level, the potential decline in the value of a position or a portfolio under normal market conditions assuming a one-day holding period. VAR statistics, which are based on historical data, can be materially different across firms due to differences in portfolio composition, differences in VAR methodologies and differences in model parameters. As a result, Citi believes VAR statistics can be used more effectively as indicators of trends in risk-taking within a firm, rather than as a basis for inferring differences in risk-taking across firms.

Citi uses a single, independently approved Monte Carlo simulation VAR model (see "VAR Model Review and Validation" below), which has been designed to capture material risk sensitivities (such as first- and second-order sensitivities of positions to changes in market prices) of various asset classes/risk types (such as interest rate, credit spread, foreign exchange, equity and commodity risks). Citi's VAR includes positions which are measured at fair value.

Citi believes its VAR model is conservatively calibrated to incorporate fat-tail scaling and the greater of short-term (approximately the most recent month) and long-term (three years) market volatility. The Monte Carlo simulation involves approximately 450,000 market factors, making use of approximately 350,000 time series, with sensitivities updated daily, volatility parameters updated intra-month and correlation parameters updated monthly. The conservative features of the VAR calibration contribute an approximate 20% add-on to what would be a VAR estimated under the assumption of stable and perfectly, normally distributed markets.

The table below presents CGMHI's year-end and average trading VAR for 2018 and 2017:

<i>In millions of dollars</i>	December 31,	2018	December 31,	2017
	2018	Average	2017	Average
Interest rate	\$ 43	\$ 47	\$ 53	\$ 46
Equity	27	22	19	16
Commodity	21	17	15	19
Foreign exchange	13	15	19	14
Covariance adjustment ⁽¹⁾	(47)	(46)	(48)	(46)
Total trading VAR—all market risk factors, including general and specific risk (excluding credit portfolios) ⁽²⁾	57	55	58	49
Specific risk-only component ⁽³⁾	8	8	4	5
Total trading VAR—general market risk factors only (excluding credit portfolios)	49	47	54	44
Incremental impact of the credit portfolio ⁽⁴⁾	(1)	—	1	1
Total trading and credit portfolio VAR	\$ 56	\$ 55	\$ 59	\$ 50

- (1) Covariance adjustment (also known as diversification benefit) equals the difference between the total VAR and the sum of the VARs tied to each individual risk type. The benefit reflects the fact that the risks within each and across risk types are not perfectly correlated and, consequently, the total VAR on a given day will be lower than the sum of the VARs relating to each individual risk type. The determination of the primary drivers of changes to the covariance adjustment is made by an examination of the impact of both model parameter and position changes.
- (2) The total trading VAR includes mark-to-market and certain fair value option trading positions recorded in CGMHI, with the exception of fair value option loans and all CVA exposures.
- (3) The specific risk-only component represents the level of equity and fixed income issuer-specific risk embedded in VAR.
- (4) The credit portfolio is composed of mark-to-market positions associated with the CVA relating to derivative counterparties and all associated CVA hedges. FVA and DVA are not included. The credit portfolio also includes fair value option loans and hedges within capital markets origination in CGMHI.

The table below provides the range of market factor VARs associated with CGMHI's total trading VAR, inclusive of specific risk:

<i>In millions of dollars</i>	2018		2017	
	Low	High	Low	High
Interest rate	\$ 38	\$ 66	\$ 38	\$ 70
Equity	13	46	6	218
Commodity	13	23	12	27
Foreign exchange	7	23	7	22
Total trading	\$ 42	\$ 77	\$ 38	\$ 224
Total trading and credit portfolio	41	75	37	224

Note: No covariance adjustment can be inferred as the high and low for each market factor will be from different close-of-business dates

VAR Model Review and Validation

Generally, Citi's VAR review and model validation process entails reviewing the model framework, major assumptions and implementation of the mathematical algorithm. In addition, as part of the model validation process, product specific back-testing on portfolios is periodically completed and reviewed with Citi's U.S. banking regulators.

Significant VAR model and assumption changes must be independently validated within Citi's risk management organization. This validation process includes a review by model validation group within Citi's Model Risk Management. In the event of significant model changes, parallel model runs are undertaken prior to implementation. In

addition, significant model and assumption changes are subject to the periodic reviews and approval by Citi's U.S. banking regulators.

VAR Back-testing

VAR back-testing is the process in which the daily one-day VAR, at a 99% confidence interval, is compared to the buy-and-hold profit and loss (i.e., the profit and loss impact if the portfolio is held constant at the end of the day and re-priced the following day). Buy-and-hold profit and loss represents the daily mark-to-market profit and loss attributable to price movements in covered positions from the close of the previous business day. Buy-and-hold profit and loss excludes realized trading revenue, net interest, fees and commissions, intra-day trading profit and loss and changes in reserves.

Based on a 99% confidence level, Citi would expect two to three days in any one year where buy-and-hold losses exceeded the VAR. Given the conservative calibration of Citi's VAR model (as a result of taking the greater of short- and long-term volatilities and fat-tail scaling of volatilities), Citi would expect fewer exceptions under normal and stable market conditions. Periods of unstable market conditions could increase the number of back-testing exceptions.

Stress Testing

Citi performs market risk stress testing on a regular basis to estimate the impact of extreme market movements. It is performed on individual positions and trading portfolios, as well as in aggregate, inclusive of multiple trading portfolios. Citi's market risk management, after consultations with the businesses, develops both systemic and specific stress scenarios, reviews the output of periodic stress testing exercises, and uses the information to assess the ongoing appropriateness of exposure levels and limits. Citi uses two complementary approaches to market risk stress testing across all major risk factors (i.e., equity, foreign exchange, commodity, interest rate and credit spreads): top-down systemic stresses and bottom-up business-specific stresses. Systemic stresses are designed to quantify the potential impact of extreme market movements on an institution-wide basis, and are constructed using both historical periods of market stress and projections of adverse economic scenarios. Business-specific stresses are designed to probe the risks of particular portfolios and market segments, especially those risks that are not fully captured in VAR and systemic stresses.

The systemic stress scenarios and business-specific stress scenarios at Citi are used in several reports reviewed by senior management and also to calculate internal risk capital for trading market risk. In general, changes in market values are defined over a one-year horizon. For the most liquid positions and market factors, changes in market values are defined over a shorter two-month horizon. The limited set of positions and market factors whose market value changes are defined over a two-month horizon are those that in management's judgment have historically remained very liquid during financial crises, even as the trading liquidity of most other positions and market factors materially declined.

OPERATIONAL RISK

Operational risk is the risk of loss resulting from inadequate or failed internal processes, systems or human factors, or from external events. It includes risk of failing to comply with applicable laws and regulations, but excludes strategic risk. Operational risk includes the reputation and franchise risk associated with business practices or market conduct in which Citi is involved, as well as compliance, conduct and legal risks.

Operational risk is inherent in Citi's global business activities, as well as related support functions, and can result in losses arising from events associated with the following, among others:

- fraud, theft and unauthorized activity;
- employment practices and workplace environment;
- clients, products and business practices;
- physical assets and infrastructure; and
- execution, delivery and process management.

The Company's goal is to keep operational risk at appropriate levels relative to the characteristics of Citi's businesses, the markets in which it operates, its capital and liquidity and the competitive, economic and regulatory environment.

To anticipate, mitigate and control operational risk, Citi has established policies and a global framework for assessing, monitoring and communicating operational risks and the overall operating effectiveness of the internal control environment across Citigroup. As part of this framework, Citi has defined its operational risk appetite and has established a manager's control assessment (MCA) process (a process through which managers at Citi identify, monitor, measure, report on and manage risks and the related controls) to help managers self-assess significant operational risks and key controls and identify and address weaknesses in the design and/or operating effectiveness of internal controls that mitigate significant operational risks.

Each major business segment must implement an operational risk process consistent with the requirements of this framework. The process for operational risk management includes the following steps:

- identify and assess key operational risks;
- design controls to mitigate identified risks;
- establish key risk indicators;
- implement a process for early problem recognition and timely escalation;
- produce comprehensive operational risk reporting; and
- ensure that sufficient resources are available to actively improve the operational risk environment and mitigate emerging risks.

As new products and business activities are developed, processes are designed, modified or sourced through alternative means and operational risks are considered.

An Operational Risk Management Committee has been established to provide oversight for operational risk across Citigroup and to provide a forum to assess Citi's operational risk profile and ensure actions are taken so that Citi's operational risk exposure is actively managed consistent with Citi's risk appetite. The Committee seeks to ensure that these actions address the root causes that persistently lead to operational risk losses and create lasting solutions to minimize these losses. Members include Citi's Chief Risk Officer and Citi's Head of Operational Risk and senior members of their organizations. These members cover multiple dimensions of risk management and include business and regional Chief Risk Officers and senior operational risk managers.

In addition, risk management, including Operational Risk Management, works proactively with the businesses and other independent control functions to embed a strong operational risk management culture and framework across Citi. Operational Risk Management engages with the businesses to ensure effective implementation of the Operational Risk Management framework by focusing on (i) identification, analysis and assessment of operational risks, (ii) effective challenge of key control issues and operational risks and (iii) anticipation and mitigation of operational risk events.

Information about the businesses' operational risk, historical operational risk losses and the control environment is reported by each major business segment and functional area. The information is summarized and reported to senior management, as well as to the Audit Committee of Citi's Board of Directors.

Operational risk is measured and assessed through risk capital. Projected operational risk losses under stress scenarios are also required as part of the Federal Reserve Board's CCAR process.

For additional information on Citi's operational risks, see "Risk Factors—Operational Risk" above.

Cybersecurity Risk

Cybersecurity risk is the business risk associated with the threat posed by a cyber attack, cyber breach or the failure to protect Citi's most vital business information assets or operations, resulting in a financial or reputational loss (for additional information, see the operational systems and cybersecurity risk factors in "Risk Factors—Operational Risks" above). With an evolving threat landscape, ever increasing sophistication of cybersecurity attacks and use of new technologies to conduct financial transactions, Citi and its clients, customers and third parties are and will continue to be at risk for cyber attacks and information security incidents. Citi recognizes the significance of these risks and, therefore,

employs an intelligence-led strategy to prevent, detect, respond to, and recover from cyber attacks. Further, Citi actively participates in financial industry, government, and cross-sector knowledge sharing groups to enhance individual and collective cyber resilience.

Citi's technology and cybersecurity risk management program is built on three lines of defense. Citi's first line of defense includes its Information Protection Directorate and Global Information Security group, which provides frontline business, operational and technical controls and capabilities to protect against cybersecurity risks, and to respond to cyber incidents and data breaches. Citi manages these threats through state-of-the-art Fusion Centers, which serve as central command for monitoring and coordinating responses to cyber threats. The enterprise information security team is responsible for infrastructure defense and security controls, performing vulnerability assessments and third-party information security assessments, employee awareness and training programs, and security incident management, in each case working in coordination with a network of information security officers that are embedded within the businesses and functions on a global basis.

Citi's Operational Risk Management-Technology and Cyber (ORM-T/C) and Independent Compliance Risk Management-Technology and Information Security (ICRM-T) groups serve as the second line of defense, and actively evaluate, anticipate and challenge Citi's risk mitigation practices and capabilities. Internal audit serves as the third line of defense and independently provides assurance on how effectively the organization as a whole manages cybersecurity risk. Citi's Information Security Risk Operating Committee (ISROC) has overall responsibility for information security across Citi, and facilitates communication, discussion, escalation and management of cyber risks across these functions.

Citi seeks to proactively identify and remediate technology and cybersecurity risks before they materialize as incidents that negatively affect business operations. Accordingly, the ORM-T/C team independently challenges and monitors capabilities in accordance with Citi's defined Technology and Cyber Risk Appetite statements. To address evolving cybersecurity risks and corresponding regulations, ORM-T/C also monitors cyber legal and regulatory requirements, defines and identifies emerging risks, executes strategic cyber threat assessments, performs new products and initiative reviews, performs data management risk oversight, and conducts cyber risk assurance reviews (inclusive of third-party assessments). In addition, ORM-T/C employs and develops tools and metrics that are both tailored to cybersecurity and technology, and aligned with Citi's overall operational risk management framework to effectively track, identify and manage risk.

COMPLIANCE RISK

Compliance risk is the risk to current or projected financial condition and resilience arising from violations of laws or regulations, or from nonconformance with prescribed practices, internal policies and procedures, or ethical standards. This risk exposes a bank to fines, civil money penalties, payment of damages, and the voiding of contracts. Compliance risk is not limited to risk from failure to comply with consumer protection laws; it encompasses the risk of noncompliance with all laws and regulations, as well as prudent ethical standards and contractual obligations. It also includes the exposure to litigation (known as legal risk) from all aspects of banking, traditional and nontraditional.

Compliance risk spans across all risk types in Citi's risk governance framework and the risk categories outlined in the Governance, Risk, Compliance (GRC) taxonomy. Citi seeks to operate with integrity, maintain strong ethical standards, and adhere to applicable policies, regulatory and legal requirements. Citi must maintain and execute a proactive Compliance Risk Management (CRM) Framework that is designed to change the way in which compliance risk is managed across Citi, with a view to fundamentally strengthen the compliance risk management culture across the lines of defense, taking into account Citi's risk governance framework and regulatory requirements. Independent Compliance Risk Management's (ICRM) primary objectives are to:

- Establish, manage and oversee the execution of the CRM Framework that facilitates enterprise-wide compliance with local, national or cross-border laws, rules or regulations, Citi's internal policies, standards and procedures and relevant standards of conduct;
- Support Citi's operations by assisting in the management of compliance risk across products, business lines, functions and geographies, supported by globally consistent systems and processes; and

- Drive and embed a risk culture of compliance, control and ethical conduct throughout Citi.

To anticipate, control and mitigate compliance risk, Citi has established the CRM Framework to achieve standardization and centralization of methodologies and processes, and to enable more consistent and comprehensive execution of compliance risk management.

Citi has a commitment, as well as an obligation, to identify, assess, and mitigate compliance risks associated with its businesses and functions. ICRM is responsible for Citi's CRM Framework, while each business and global control functions are responsible for managing their compliance risks and ensure they are operating within the Compliance Risk Appetite.

Citi carries out its objectives and fulfills its responsibilities through the integrated CRM Framework, which is based upon four components: (i) governance and organization; (ii) compliance risk ethics and conduct risk; (iii) processes and activities; and (iv) resources and capabilities. To achieve this, Citi follows the following CRM Framework process steps:

- Identifying regulatory changes and performing the impact assessment, as well as capturing and monitoring adherence to existing regulatory requirements.
- Establishing, maintaining and adhering to policies, standards and procedures for the management of compliance risk, in accordance with policy governance requirements.
- Developing and providing training to support the effective execution of roles and responsibilities related to the identification, control, reporting and escalation of matters related to compliance risks.
- Self-assessment (e.g., Managers Control Assessment) of compliance risk.
- ICRM and other independent control functions are responsible for independently assessing the management of compliance risks.
- Independently testing and monitoring that Citi is operating within the Compliance Risk Appetite. Identifying instances of non-conformance with Laws, regulations, rules and breaches of internal policies.
- Escalating through the appropriate channels, which may include governance forums, the results of monitoring, testing, reporting or other oversight activities that may represent a violation of law, regulation, policy or other significant compliance risk and take reasonable action to see that the matter is appropriately identified, tracked and resolved, including through the issuance of corrective action plans against the first line of defense.

REPUTATIONAL RISK

Citi's reputation is a vital asset in building trust with its stakeholders and Citi is diligent in communicating its corporate values to its employees, customers and investors. To support this, Citi has defined a reputational risk appetite approach. Under this approach, each major business segment has implemented a risk appetite statement and related key indicators to monitor and address weaknesses that may result in significant reputational risks. The approach requires that each business segment or region escalate significant reputational risks that require review or mitigation through its business practice committee or equivalent.

The business practices committees are part of the governance infrastructure that Citi has in place to properly review business activities, sales practices, product design, perceived conflicts of interest and other potential franchise or reputational risks. These committees may also raise potential franchise, reputational or systemic risks for due consideration by the business practices committee at the corporate level. All of these committees, which are composed of Citi's most senior executives, provide the guidance necessary for Citi's business practices to meet the highest standards of professionalism, integrity and ethical behavior consistent with Citi's mission and value proposition.

Further, the responsibility for maintaining Citi's reputation is shared by all employees, who are guided by Citi's code of conduct. Employees are expected to exercise sound judgment and common sense in decision and action. They are also expected to promptly and appropriately escalate all issues that present potential franchise, reputational and/or systemic risk.

STRATEGIC RISK

Overview

Citi senior management, led by Citi's CEO, is responsible for the development and execution of the strategy of the Company. Significant strategic actions are reviewed and approved by, or notified to, the Citigroup and Citibank Boards of Directors, as appropriate. The Citigroup Board of Directors holds an annual strategic meeting and annual regional strategic meetings, and receives business presentations at its regular meetings, in order to monitor management's execution of Citi's strategy. At the business level, business heads are accountable for the interpretation and execution of the Company-wide strategy, as it applies to their area, including decisions on new business and product entries.

The management of strategic risk rests upon the foundational elements that include an annual financial operating plan encompassing all businesses, products and geographies and defined financial and operating targets, derived from the operating plan, which can be monitored throughout the year in order to assess strategic and operating performance. Strategic risk is monitored through various mechanisms, including regular updates to senior management and the Board of Directors on performance against the operating plan, quarterly business reviews between the Citi CEO and business and regional CEOs in which the performance and risks of each major business and region are discussed, ongoing reporting to senior management and executive management scorecards.

Potential Exit of U.K. from EU

As a result of a 2016 U.K. referendum, Citi has reorganized certain U.K. and EU operations and implemented contingency plans to address the U.K.'s potential exit from the EU, regardless of outcome. In addition, Citi has established a formal program with senior level sponsorship and governance to deliver a coordinated response to the U.K.'s potential exit.

As widely reported, the U.K. and EU agreed to extend the U.K.'s scheduled exit from the EU to October 31, 2019. Citi's strategy focuses on providing continuity of services to its EU and U.K. clients with minimal disruption. Consequently, Citi has been migrating certain business activities to alternative legal entities and branches with appropriate regulatory permissions to carry out such activity and establishing required capabilities in the EU and U.K. Citi's plans for a U.K. exit from the EU are well progressed for implementation and primarily cover:

- enhancement of Citi's European bank in Ireland supported by its substantial European branch network to ensure business continuity for its EU clients;
- conversion of Citi's banking subsidiary in Germany into Citi's EU investment firm to support broker-dealer activities with EU clients;
- establishment of a new U.K. consumer bank to focus on servicing consumer business clients in the U.K.; and
- amendments to existing U.K. legal entities or branches, where required, to ensure continuity of services to U.K. and non-EU clients.

Citi continues to work closely with clients, regulators and other relevant stakeholders in execution of its plans to prepare for the U.K.'s potential exit from the EU. In addition, Citi continues to monitor macroeconomic scenarios and market events and has been undertaking stress testing to assess potential impacts on its businesses. For additional information, see "Risk Factors—Strategic Risk" above.

UNREGISTERED SALES OF EQUITY, PURCHASES OF EQUITY SECURITIES, DIVIDENDS

(Extracted from (i) Citigroup's Quarterly Report on Form 10-Q for the fiscal quarter ended 30 September 2018, filed with the U.S. Securities and Exchange Commission on the 30th day of October, 2018, and (ii) Citigroup's Annual Report on Form 10-K for the fiscal year ended 31 December 2018, filed by Citigroup Inc. with the U.S. Securities and Exchange Commission on the 22nd day of February 2019.)

Unregistered Sales of Equity Securities

None.

Equity Security Repurchases

The following table summarizes Citi's common stock repurchases during the three months ended September 30, 2018:

<i>In millions, except per share amounts</i>	Total shares purchased	Average price paid per share	Approximate dollar value of shares that may yet be purchased under the plan or programs
July 2018			
Open market repurchases ⁽¹⁾	21.0	\$ 69.06	\$ 16,146
Employee transactions ⁽²⁾	—	—	N/A
August 2018			
Open market repurchases ⁽¹⁾	30.0	71.05	14,018
Employee transactions ⁽²⁾	—	—	N/A
September 2018			
Open market repurchases ⁽¹⁾	23.6	71.62	12,330
Employee transactions ⁽²⁾	—	—	N/A
Total for 3Q18 and remaining program balance as of September 30, 2018	74.6	\$ 70.67	\$ 12,330

(1) Represents repurchases under the \$17.6 billion 2018 common stock repurchase program (2018 Repurchase Program) that was approved by Citigroup's Board of Directors and announced on June 28, 2018. The 2018 Repurchase Program was part of the planned capital actions included by Citi in its 2018 Comprehensive Capital Analysis and Review (CCAR). The 2018 Repurchase Program expires on June 30, 2019. Shares repurchased under the 2018 Repurchase Program were added to treasury stock.

(2) Consisted of shares added to treasury stock related to (i) certain activity on employee stock option program exercises where the employee delivers existing shares to cover the option exercise, or (ii) under Citi's employee restricted share awards where shares are withheld to satisfy tax requirements.

N/A Not applicable

Equity Security Repurchases

The following table summarizes Citi's common stock repurchases during the three months ended December 31, 2018:

<i>In millions, except per share amounts</i>	Total shares purchased	Average price paid per share	Approximate dollar value of shares that may yet be purchased under the plan or programs
October 2018			
Open market repurchases ⁽¹⁾	32.0	\$ 68.78	\$ 10,127
Employee transactions ⁽²⁾	—	—	N/A
November 2018			
Open market repurchases ⁽¹⁾	20.7	64.81	8,784
Employee transactions ⁽²⁾	—	—	N/A
December 2018			
Open market repurchases ⁽¹⁾	21.1	54.87	7,630
Employee transactions ⁽²⁾	—	—	N/A
Total for 4Q18 and remaining program balance as of December 31, 2018			
	73.8	\$ 63.70	\$ 7,630

(1) Represents repurchases under the \$17.6 billion 2018 common stock repurchase program (2018 Repurchase Program) that was approved by Citigroup's Board of Directors and announced on June 28, 2018. The 2018 Repurchase Program was part of the planned capital actions included by Citi in its 2018 Comprehensive Capital Analysis and Review (CCAR). The 2018 Repurchase Program expires on June 30, 2019. Shares repurchased under the 2018 Repurchase Program were added to treasury stock.

(2) Consisted of shares added to treasury stock related to (i) certain activity on employee stock option program exercises where the employee delivers existing shares to cover the option exercise, or (ii) under Citi's employee restricted or deferred stock programs where shares are withheld to satisfy tax requirements.

N/A Not applicable

Dividends

In addition to Board of Directors' approval, Citi's ability to pay common stock dividends substantially depends on regulatory approval, including an annual regulatory review of the results of the CCAR process required by the Federal Reserve Board and the supervisory stress tests required under the Dodd-Frank Act. For additional information regarding Citi's capital planning and stress testing, see "Risk Factors—Strategic Risks" above. Any dividend on Citi's outstanding common stock would also need to be made in compliance with Citi's obligations to its outstanding preferred stock.

For information on the ability of Citigroup's subsidiary depository institutions to pay dividends, see Note 18 to Citigroup's Consolidated Financial Statements.

**CITIGROUP GLOBAL MARKETS HOLDINGS INC.
AND SUBSIDIARIES**

**CONSOLIDATED FINANCIAL STATEMENTS
AS OF DECEMBER 31, 2018 AND 2017
AND FOR EACH OF THE YEARS
IN THE THREE YEAR PERIOD ENDED
DECEMBER 31, 2018**

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
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New York, NY 10154-0102

Independent Auditors' Report

The Board of Directors
Citigroup Global Markets Holdings Inc.:

We have audited the accompanying consolidated financial statements of Citigroup Global Markets Holdings Inc. and its subsidiaries, which comprise the consolidated statement of financial condition as of December 31, 2018 and 2017, and the related consolidated statements of operations, comprehensive income, changes in stockholder's equity and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes to the consolidated financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair representation of these consolidated financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these consolidated financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the organization's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Citigroup Global Markets Holdings Inc. and its subsidiaries as of December 31, 2018 and 2017, and the results of its operations and cash flows for each of the years in the three-year period ended December 31, 2018 in accordance with U.S. generally accepted accounting principles.

KPMG LLP

New York, New York
April 30, 2019

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF INCOME

<i>In millions of dollars</i>	Years ended December 31,		
	2018	2017	2016
Revenues:			
Investment banking	\$ 3,750	\$ 3,957	\$ 3,183
Principal transactions	2,927	2,808	2,876
Commissions and fees	1,633	1,590	1,599
Fiduciary fees	253	197	188
Other	622	825	469
Total non-interest revenues	9,185	9,377	8,315
Interest and dividend income	10,391	6,457	5,135
Interest expense	8,969	4,638	3,076
Net interest and dividends	1,422	1,819	2,059
Revenues, net of interest expense	10,607	11,196	10,374
Non-interest expenses:			
Compensation and benefits	4,484	4,403	4,719
Brokerage, clearing and exchange fees	1,232	1,110	995
Communications	853	801	770
Professional services	161	302	276
Occupancy and equipment	191	182	216
Advertising and market development	193	163	157
Other operating and administrative expenses	1,906	2,266	1,062
Total non-interest expenses	9,020	9,227	8,195
Income before income taxes	1,587	1,969	2,179
Provision for income taxes	562	1,319	848
Net income before attribution of noncontrolling interests	1,025	650	1,331
Net income (loss) attributable to noncontrolling interests	—	(1)	(13)
CGMHI's net income	\$ 1,025	\$ 651	\$ 1,344

The Notes to the Consolidated Financial Statements are an integral part of these Consolidated Financial Statements.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

<i>In millions of dollars</i>	Years ended December 31,		
	2018	2017	2016
CGMHI's net income	\$ 1,025	\$ 651	\$ 1,344
Add: CGMHI's other comprehensive income (loss)			
Net change in debt valuation adjustment (DVA), net of taxes ⁽¹⁾	512	(219)	(20)
Benefit plans liability adjustment, net of taxes	(50)	(18)	35
Foreign currency translation adjustment, net of taxes and hedges	(206)	73	(45)
CGMHI's total other comprehensive income (loss) ⁽²⁾	256	(164)	(30)
CGMHI's total comprehensive income	1,281	487	1,314
Add: Net income (loss) attributable to noncontrolling interests	—	(1)	(13)
Total comprehensive income	\$ 1,281	\$ 486	\$ 1,301

(1) See Note 1 to the Consolidated Financial Statements.

(2) Includes the impact of ASU 2018-02, adopted in 2017. See Note 1 to the Consolidated Financial Statements.

The Notes to the Consolidated Financial Statements are an integral part of these Consolidated Financial Statements.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF FINANCIAL CONDITION

<i>In millions of dollars</i>	December 31, 2018	December 31, 2017
Assets		
Cash and cash equivalents	\$ 7,368	\$ 5,271
Cash segregated under federal and other regulations	8,312	7,425
Securities borrowed and purchased under agreements to resell (including \$145,321 and \$130,118 as of December 31, 2018 and 2017, respectively, at fair value)	232,793	198,775
Trading account assets (including \$110,300 and \$96,874 pledged to creditors at December 31, 2018 and 2017, respectively):		
Equity securities	33,891	36,467
Foreign government securities	31,371	31,056
Mortgage-backed securities	26,441	25,069
U.S. Treasury and federal agency securities	18,847	14,221
Corporate	14,464	13,935
Derivatives	15,007	13,329
State and municipal securities	3,132	3,531
Asset-backed securities	2,873	2,758
Other trading assets	1,928	1,723
	147,954	142,089
Securities received as collateral, at fair value (all pledged to counterparties)	15,912	14,629
Receivables:		
Loans to affiliates	43,791	42,960
Customers	14,427	19,092
Brokers, dealers and clearing organizations	16,692	12,299
Other	2,290	1,645
	77,200	75,996
Goodwill	2,193	2,193
Other assets (including \$1,254 and \$923 as of December 31, 2018 and 2017, respectively, at fair value)	10,424	9,823
Total assets	\$502,156	\$456,201

The Notes to the Consolidated Financial Statements are an integral part of these Consolidated Financial Statements.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF FINANCIAL CONDITION

<i>In millions of dollars, except shares</i>	December 31, 2018	December 31, 2017
Liabilities		
Short-term borrowings (including \$2,878 and \$2,857 as of December 31, 2018 and 2017, respectively, at fair value)	\$ 14,998	\$ 36,439
Securities loaned and sold under agreements to repurchase (including \$44,482 and \$40,638 as of December 31, 2018 and 2017, respectively, at fair value)	176,938	153,485
Trading account liabilities:		
Foreign government securities	34,508	32,065
Equity securities	18,207	10,364
Derivatives	18,100	17,741
U.S. Treasury and federal agency securities	18,066	16,457
Corporate and other debt securities	<u>8,088</u>	<u>6,356</u>
	96,969	82,983
Payables and accrued liabilities:		
Customers	52,110	47,294
Obligations to return securities received as collateral, at fair value	15,912	15,598
Brokers, dealers and clearing organizations	5,770	3,625
Other	<u>6,799</u>	<u>5,348</u>
	80,591	71,865
Long-term debt (including \$25,086 and \$16,851 as of December 31, 2018 and 2017, respectively, at fair value)	99,870	78,813
Total liabilities	469,366	423,585
CGMHI stockholder's equity		
Common stock (par value \$.01 per share, 1,000 shares authorized; 1,000 shares issued and outstanding)	—	—
Additional paid-in capital	28,691	29,707
Retained earnings	4,452	3,518
Accumulated other comprehensive loss	(354)	(610)
Total CGMHI stockholder's equity	32,789	32,615
Noncontrolling interest	1	1
Total equity	32,790	32,616
Total liabilities and equity	\$502,156	\$456,201

The Notes to the Consolidated Financial Statements are an integral part of these Consolidated Financial Statements.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDER'S EQUITY

<i>In millions of dollars</i>	Years ended December 31,		
	2018	2017	2016
Common stock and additional paid-in capital			
Balance, beginning of year	\$ 29,707	\$ 30,343	\$ 25,495
Capital contributions from Citigroup	—	108	5,010
Capital distributions to Citigroup	(1,016)	(748)	(177)
Employee benefit plans	—	4	15
Balance, end of year	28,691	29,707	30,343
Retained earnings (accumulated deficit)			
Balance, beginning of year	3,518	2,850	1,434
Adjustment to opening balance, net of taxes ⁽¹⁾	—	—	90
Adjusted balance, beginning of period	3,518	2,850	1,524
Net income (loss)	1,025	651	1,344
Dividends	(91)	(28)	(18)
Impact of Tax Reform related to AOCI reclassification ⁽²⁾	—	45	—
Balance, end of year	4,452	3,518	2,850
Accumulated other comprehensive income (loss)			
Balance, beginning of year	(610)	(446)	(326)
Adjustment to opening balance, net of taxes ⁽¹⁾	—	—	(90)
Adjusted balance, beginning of period	(610)	(446)	(416)
Impact of Tax Reform related to AOCI reclassification ⁽²⁾ :			
Debt valuation adjustment (DVA)	—	(36)	—
Benefit plans liability adjustment	—	(9)	—
Total Impact of Tax Reform related to AOCI reclassification	—	(45)	—
Other comprehensive income:			
Net change in debt valuation adjustment (DVA), net of taxes ⁽¹⁾	512	(183)	(20)
Benefit plans liability adjustment, net of taxes	(50)	(9)	35
Foreign currency translation adjustment, net of taxes and hedges	(206)	73	(45)
Total other comprehensive income	256	(119)	(30)
Net change in Accumulated other comprehensive income (loss)	256	(164)	(30)
Balance, end of year	(354)	(610)	(446)
Total CGMHI stockholder's equity	32,789	32,615	32,747
Noncontrolling interest			
Balance, beginning of year	1	56	95
Net income attributable to noncontrolling-interest shareholders	—	(1)	(13)
Distributions to noncontrolling-interest shareholders	—	(56)	(15)
All other	—	2	(11)
Net change in noncontrolling interests	—	(55)	(39)
Balance, end of year	1	1	56
Total equity	\$ 32,790	\$ 32,616	\$ 32,803

(1) See Note 1 to the Consolidated Financial Statements for additional details.

(2) Includes the impact of ASU 2018-02, which transferred those amounts from AOCI to *Retained earnings*. See Note 1 to the Consolidated Financial Statements.

The Notes to the Consolidated Financial Statements are an integral part of these Consolidated Financial Statements.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS

<i>In millions of dollars</i>	Years ended December 31,		
	2018	2017	2016
Cash flows from operating activities:			
Net income before attribution of noncontrolling interests	\$ 1,025	\$ 650	\$ 1,331
Net income (loss) attributable to noncontrolling interests	—	(1)	(13)
CGMHI's net income	1,025	651	1,344
Adjustments to reconcile net income to net cash provided by (used in) operating activities:			
Deferred tax provision (benefit)	439	(109)	995
Depreciation and amortization	58	70	88
Net change in:			
Trading account assets	(5,865)	(19,798)	(5,043)
Securities received as collateral, at fair value	(1,283)	(5,232)	(136)
Receivables	(373)	(10,272)	184
Other assets	(3,397)	442	44
Trading account liabilities	13,986	(5,599)	24,155
Payables and accrued liabilities	8,726	6,485	(1,075)
Net cash provided by (used in) operating activities	13,316	(33,362)	20,556
Cash flows from investing activities:			
Securities borrowed or purchased under agreements to resell	(34,018)	9,731	(15,294)
Loans to affiliates ⁽²⁾	(831)	9,755	(5,574)
Other, net	(8)	2	100
Net cash provided by (used in) investing activities	(34,857)	19,488	(20,768)
Cash flows from financing activities:			
Dividends paid	(91)	(28)	(18)
Securities loaned or sold under agreements to repurchase	23,453	5,748	3,236
Capital distributions to Citigroup	(798)	(748)	—
Capital contributions from Citigroup	—	—	5,010
Employee benefit plans	—	4	15
Proceeds from issuance of long-term debt ⁽²⁾	40,264	12,389	11,069
Repayment of long-term debt	(19,279)	(9,511)	(14,606)
Short-term borrowings, net ⁽²⁾	(19,024)	(6,403)	1,848
Net cash provided by (used in) financing activities	24,525	1,451	6,554
Change in cash and cash segregated under federal and other regulations ⁽³⁾	2,984	(12,423)	6,342
Cash and cash segregated under federal and other regulations at beginning of period ⁽³⁾	12,696	25,119	18,777
Cash and cash segregated under federal and other regulations at end of period ⁽³⁾	\$ 15,680	\$ 12,696	\$ 25,119
Cash and cash equivalents	\$ 7,368	\$ 5,271	\$ 13,808
Cash segregated under federal and other regulations	8,312	7,425	4,969
Cash and cash segregated under federal and other regulations at end of period	\$ 15,680	\$ 12,696	\$ 18,777
Cash paid during the year for interest	\$ 8,671	\$ 4,513	\$ 3,115
Change in tenor of long-term debt ⁽¹⁾	\$ 2,417	\$ 7,400	\$ —

- (1) During 2018 and 2017, the Company changed the tenor of \$2.4 billion and \$7.4 billion, respectively, in debt with affiliates from short-term to long-term, as the composition of CGMHI's debt is adjusted dynamically based on the structural liquidity needs of the Company.
- (2) During 2017, Citigroup restructured its intercompany borrowing arrangements. As a result certain intercompany borrowings by CGMHI subsidiaries were novated to a Citigroup entity outside of the CGMHI consolidated group, resulting in noncash changes to loans to affiliates, long-term debt and short-term borrowings during 2017 of \$26.6 billion, \$14.1 billion and \$12.5 billion, respectively.
- (3) Includes the impact of ASU 2016-18, *Restricted Cash*. See Note 1 to the Consolidated Financial Statements.

The Notes to the Consolidated Financial Statements are an integral part of these Consolidated Financial Statements.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Principles of Consolidation

The Consolidated Financial Statements include the accounts of Citigroup Global Markets Holdings Inc. (CGMHI) and its subsidiaries prepared in accordance with U.S. generally accepted accounting principles (GAAP). The Company is a direct wholly owned subsidiary of Citigroup Inc. (Citigroup or Citi). The Company consolidates subsidiaries in which it holds, directly or indirectly, more than 50% of the voting rights or where it exercises control. Entities where the Company holds 20% to 50% of the voting rights and/or has the ability to exercise significant influence, other than investments of designated venture capital subsidiaries or investments accounted for at fair value under the fair value option, are accounted for under the equity method, and the pro rata share of their income (loss) is included in *Other revenue*. Income from investments in less-than-20%-owned companies is recognized when dividends are received. As discussed in more detail in Note 9 to the Consolidated Financial Statements, CGMHI also consolidates entities deemed to be variable interest entities when CGMHI is determined to be the primary beneficiary.

Throughout these Notes, “CGMHI” and the “Company” refer to Citigroup Global Markets Holdings Inc. and its consolidated subsidiaries.

The Company is a New York Corporation and provides corporate, institutional, public sector and high-net-worth clients around the world with a full range of brokerage products and services, including fixed income and equity sales and trading, foreign exchange, prime brokerage, derivative services, equity and fixed income research, investment banking and advisory services, cash management, trade finance and securities services. CGMHI transacts with clients in both cash instruments and derivatives, including fixed income, foreign currency, equity and commodity products.

Certain reclassifications have been made to the prior periods’ financial statements and Notes to conform to the current period’s presentation.

Use of Estimates

Management must make estimates and assumptions that affect the Consolidated Financial Statements and the related Notes to the Consolidated Financial Statements. Such estimates are used in connection with certain fair value measurements. See Note 12 to the Consolidated Financial Statements for further discussions on estimates used in the determination of fair value. Moreover, estimates are significant in determining the amounts of other-than-temporary impairments, impairments of goodwill and other intangible assets, provisions for probable losses that may arise from credit-related exposures and probable and estimable losses related to litigation and regulatory proceedings, and income taxes. While management makes its best judgment, actual amounts or results could differ from those estimates.

Variable Interest Entities (VIEs)

An entity is a variable interest entity (VIE) if it meets either of the criteria outlined in Accounting Standards Codification (ASC) Topic 810, *Consolidation*, which are (i) the entity has equity that is insufficient to permit the entity to finance its activities without additional subordinated financial support from other parties, or (ii) the entity has equity investors that cannot make significant decisions about the entity’s operations or that do not absorb their proportionate share of the entity’s expected losses or expected returns.

The Company consolidates a VIE when it has both the power to direct the activities that most significantly impact the VIE’s economic performance and a right to receive benefits or the obligation to absorb losses of the entity that could be potentially significant to the VIE (that is, CGMHI is the primary beneficiary). In addition to variable interests held in consolidated VIEs, the Company has variable interests in other VIEs that are not consolidated because the Company is not the primary beneficiary.

All unconsolidated VIEs are monitored by the Company to assess whether any events have occurred to cause its primary beneficiary status to change. All entities not deemed to be VIEs with which the Company has involvement are evaluated for consolidation under other subtopics of ASC 810. See Note 9 to the Consolidated Financial Statements for more detailed information.

Foreign Currency Translation

Assets and liabilities of CGMHI’s foreign operations are translated from their respective functional currencies into U.S. dollars using period-end spot foreign exchange rates. The effects of those translation adjustments are reported in *Accumulated other comprehensive income (loss)*, a component of stockholder’s equity, net of any related tax effects, until realized upon sale or substantial liquidation of the foreign operation, at which point such amounts related to the foreign entity are reclassified into earnings. Revenues and expenses of CGMHI’s foreign operations are translated monthly from their respective functional currencies into U.S. dollars at amounts that approximate weighted average exchange rates.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

For transactions that are denominated in a currency other than the functional currency, including transactions denominated in the local currencies of foreign operations that use the U.S. dollar as their functional currency, the effects of changes in exchange rates are primarily included in *Principal transactions*, along with the related effects of any economic hedges. Foreign operations in countries with highly inflationary economies designate the U.S. dollar as their functional currency, with the effects of changes in exchange rates primarily included in *Other revenue*.

Cash and Cash Equivalents

The Company defines cash and cash equivalents as highly liquid investments with original maturities of three months or less at the time of purchase, other than those held for sale in the ordinary course of business.

Cash Segregated under Federal and Other Regulations

Certain U.S. and non-U.S. broker-dealer subsidiaries are subject to various securities and commodities regulations promulgated by the regulatory and exchange authorities of the countries in which they operate. CGMHI's broker-dealer subsidiaries are required by its primary regulators, including the Securities and Exchange Commission, the Commodities Future Trading Commission and the United Kingdom's Prudential Regulation Authority, to segregate cash to satisfy rules regarding the protection of customer assets.

Trading Account Assets and Liabilities

Trading account assets include debt and marketable equity securities, derivatives in a net receivable position and residual interests in securitizations. *Trading account liabilities* include securities sold, not yet purchased (short positions) and derivatives in a net payable position.

All trading account assets and liabilities are carried at fair value. Revenues generated from trading assets and trading liabilities are generally reported in *Principal transactions* and include realized gains and losses as well as unrealized gains and losses resulting from changes in the fair value of such instruments. Interest income on trading assets is recorded in *Interest revenue* reduced by interest expense on trading liabilities. Certain dividends paid on short positions for equity securities are recorded in *Principal transactions*.

Derivatives used for trading purposes include interest rate, currency, equity, credit and commodity swap agreements, options, caps and floors, warrants, and financial and commodity futures and forward contracts. Derivative asset and liability positions are presented net by counterparty on the Consolidated Statement of Financial Condition when a valid master netting agreement exists and the other conditions set out in ASC Topic 210-20, *Balance Sheet—Offsetting*, are met. See Note 10 to the Consolidated Financial Statements.

The Company uses a number of techniques to determine the fair value of trading assets and liabilities, which are described in Note 12 to the Consolidated Financial Statements.

Securities Borrowed and Securities Loaned

Securities borrowing and lending transactions do not constitute a sale of the underlying securities for accounting purposes and are treated as collateralized financing transactions. Such transactions are recorded at the amount of proceeds advanced or received plus accrued interest. As described in Note 13 to the Consolidated Financial Statements, the Company has elected to apply fair value accounting to a number of securities borrowing and lending transactions. Fees paid or received for all securities lending and borrowing transactions are recorded in *Interest expense* or *Interest revenue* at the contractually specified rate.

The Company monitors the fair value of securities borrowed or loaned on a daily basis and obtains or posts additional collateral in order to maintain contractual margin protection.

As described in Note 12 to the Consolidated Financial Statements, the Company uses a discounted cash flow technique to determine the fair value of securities lending and borrowing transactions.

Repurchase and Resale Agreements

Securities sold under agreements to repurchase (repos) and securities purchased under agreements to resell (reverse repos) do not constitute a sale (or purchase) of the underlying securities for accounting purposes and are treated as collateralized financing transactions. As described in Note 13 to the Consolidated Financial Statements, the Company has elected to apply fair value accounting to the majority of such transactions, with changes in fair value reported in earnings. Any transactions for which fair value accounting has not been elected, including all repo and reverse repo transactions with related parties, are recorded at the amount of cash advanced or received plus accrued interest. Irrespective of whether the Company has elected fair value accounting, interest paid or received on all repo and reverse repo transactions is recorded in *Interest expense* or *Interest revenue* at the contractually specified rate.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Where the conditions of ASC 210-20-45-11, *Balance Sheet—Offsetting: Repurchase and Reverse Repurchase Agreements*, are met, repos and reverse repos are presented net on the Consolidated Statement of Financial Condition.

The Company's policy is to take possession of securities purchased under reverse repurchase agreements. The Company monitors the fair value of securities subject to repurchase or resale on a daily basis and obtains or posts additional collateral in order to maintain contractual margin protection.

As described in Note 12 to the Consolidated Financial Statements, the Company uses a discounted cash flow technique to determine the fair value of repo and reverse repo transactions.

Securities Received as Collateral and Obligations to Return Securities Received as Collateral

In transactions where the Company acts as a lender in securities lending agreements and receives securities that can be pledged or sold as collateral (securities-for-securities lending transactions), the Company is required to record the securities received and related obligation to return securities received as collateral on its Consolidated Statement of Financial Condition.

Receivables and Payables – Customers, Brokers, Dealers and Clearing Organizations

The Company has receivables and payables for financial instruments sold to and purchased from brokers, dealers and customers, which arise in the ordinary course of business. The Company is exposed to risk of loss from the inability of brokers, dealers or customers to pay for purchases or to deliver the financial instruments sold, in which case the Company would have to sell or purchase the financial instruments at prevailing market prices. Credit risk is reduced to the extent that an exchange or clearing organization acts as a counterparty to the transaction and replaces the broker, dealer or customer in question.

The Company seeks to protect itself from the risks associated with customer activities by requiring customers to maintain margin collateral in compliance with regulatory and internal guidelines. Margin levels are monitored daily, and customers deposit additional collateral as required. Where customers cannot meet collateral requirements, the Company may liquidate sufficient underlying financial instruments to bring the customer into compliance with the required margin level.

Exposure to credit risk is impacted by market volatility, which may impair the ability of clients to satisfy their obligations to the Company. Credit limits are established and closely monitored for customers and for brokers and dealers engaged in forwards, futures and other transactions deemed to be credit sensitive. Brokerage receivables and payables are accounted for in accordance with the AICPA Accounting Guide for Brokers and Dealers in Securities as codified in ASC 940-320.

Goodwill

Goodwill represents the excess of acquisition cost over the fair value of net tangible and intangible assets acquired in a business combination. *Goodwill* is subject to annual impairment testing and between annual tests if an event occurs or circumstances change that would more-likely-than-not reduce the fair value of a reporting unit below its carrying amount. The Company performed its annual goodwill impairment test as of July 1, 2018 resulting in no impairment for either of the Company's two reporting units.

Securitizations

There are two key accounting determinations that must be made relating to securitizations. The Company first makes a determination as to whether the securitization entity must be consolidated. Second, it determines whether the transfer of financial assets to the entity is considered a sale under GAAP. If the securitization entity is a VIE, the Company consolidates the VIE if it is the primary beneficiary (as discussed in "Variable Interest Entities" above). For all other securitization entities determined not to be VIEs in which the Company participates, consolidation is based on which party has voting control of the entity, giving consideration to removal and liquidation rights in certain partnership structures. Only securitization entities controlled by the Company are consolidated.

Interests in the securitized and sold assets may be retained in the form of subordinated or senior interest-only strips, subordinated tranches and residuals. In the case of consolidated securitization entities, these retained interests are not reported on the Company's Consolidated Statement of Financial Condition. The securitized loans remain on the balance sheet. Retained interests in non-consolidated mortgage securitization trusts are classified as *Trading account assets*.

Debt

Short-term borrowings and *Long-term debt* are accounted for at amortized cost, except where the Company has elected to report the debt instruments, including certain structured notes, at fair value.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Transfers of Financial Assets

For a transfer of financial assets to be considered a sale: (i) the assets must be legally isolated from the Company, even in bankruptcy or other receivership, (ii) the purchaser must have the right to pledge or sell the assets transferred (or, if the purchaser is an entity whose sole purpose is to engage in securitization and asset-backed financing activities through the issuance of beneficial interests and that entity is constrained from pledging the assets it receives, each beneficial interest holder must have the right to sell or pledge their beneficial interests) and (iii) the Company may not have an option or obligation to reacquire the assets.

If these sale requirements are met, the assets are removed from the Company's Consolidated Statement of Financial Condition. If the conditions for sale are not met, the transfer is considered to be a secured borrowing, the assets remain on the Consolidated Statement of Financial Condition and the sale proceeds are recognized as the Company's liability. A legal opinion on a sale generally is obtained for complex transactions or where the Company has continuing involvement with assets transferred or with the securitization entity. For a transfer to be eligible for sale accounting, that opinion must state that the asset transfer would be considered a sale and that the assets transferred would not be consolidated with the Company's other assets in the event of the Company's insolvency.

For a transfer of a portion of a financial asset to be considered a sale, the portion transferred must meet the definition of a participating interest. A participating interest must represent a pro rata ownership in an entire financial asset; all cash flows must be divided proportionately, with the same priority of payment; no participating interest in the transferred asset may be subordinated to the interest of another participating interest holder, and no party may have the right to pledge or exchange the entire financial asset unless all participating interest holders agree. Otherwise, the transfer is accounted for as a secured borrowing.

See Note 9 to the Consolidated Financial Statements for further discussion.

Risk Management Activities—Derivatives Used for Hedging Purposes

The Company manages its exposures to market rate movements outside of its trading activities through the use of derivative financial products, including interest rate swaps and commodity futures. These end-user derivatives are carried at fair value in *Trading account assets* and *Trading account liabilities*.

See Note 10 to the Consolidated Financial Statements for a further discussion of the Company's hedging and derivative activities.

Employee Benefits Expense

Employee benefits expense includes current service costs of pension and other postretirement benefit plans (which are accrued on a current basis), contributions and unrestricted awards under other employee plans, the amortization of restricted stock awards and costs of other employee benefits. See Note 4 to the Consolidated Financial Statements.

Stock-Based Compensation

The Company recognizes compensation expense related to Citigroup stock and option awards over the requisite service period, generally based on the instruments' grant-date fair value, reduced by actual forfeitures as they occur. Compensation cost related to awards granted to employees who meet certain age plus years-of-service requirements (retirement-eligible employees) is accrued in the year prior to the grant date, in the same manner as the accrual for cash incentive compensation. Certain stock awards with performance conditions or certain clawback provisions are subject to variable accounting, pursuant to which the associated compensation expense fluctuates with changes in Citigroup's common stock price. See Note 4 to the Consolidated Financial Statements.

Income Taxes

The Company is subject to the income tax laws of the U.S. and its states and municipalities, as well as the non-U.S. jurisdictions in which it operates. These tax laws are complex and may be subject to different interpretations by the taxpayer and the relevant governmental taxing authorities. In establishing a provision for income tax expense, the Company must make judgments and interpretations about these tax laws. The Company must also make estimates about when in the future certain items will affect taxable income in the various tax jurisdictions, both domestic and foreign.

Disputes over interpretations of the tax laws may be subject to review and adjudication by the court systems of the various tax jurisdictions, or may be settled with the taxing authority upon examination or audit. The Company treats interest and penalties on income taxes as a component of *Provision for income taxes*.

Deferred taxes are recorded for the future consequences of events that have been recognized in financial statements or tax returns, based upon enacted tax laws and rates. Deferred tax assets are recognized subject to management's judgment about

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whether realization is more-likely-than-not. ASC 740, *Income Taxes*, sets out a consistent framework to determine the appropriate level of tax reserves to maintain for uncertain tax positions. This interpretation uses a two-step approach wherein a tax benefit is recognized if a position is more-likely-than-not to be sustained. The amount of the benefit is then measured to be the highest tax benefit that is more than 50% likely to be realized. ASC 740 also sets out disclosure requirements to enhance transparency of an entity's tax reserves.

The Tax Cuts and Jobs Act (Tax Reform) introduced the Base Erosion Anti-abuse Tax (BEAT) effective January 1, 2018. BEAT seeks to impose a base erosion minimum tax in addition to a taxpayer's regular tax liability where the taxpayer is an "applicable taxpayer" and to the extent that the BEAT tax liability exceeds the regular tax liability. BEAT applies to "applicable taxpayers" which are corporations, part of a group with at least \$500 million average annual domestic receipts, and which have a "base erosion percentage" of 2% or higher. If these conditions are met, the BEAT liability is computed on a taxpayer level. The relevant group for the purposes of determining the base erosion percentage is the "controlled group," which includes the consolidated U.S. federal income tax group parented by Citigroup ("consolidated group") of which CGMHI is a member. Thus, like all members of the consolidated group, CGMHI is not an applicable taxpayer under federal income tax law. CGMHI's ASC 740 policy for determining whether it is an applicable taxpayer for BEAT purposes is by looking to federal income tax law which makes the determination at the consolidated group level. BEAT did not affect CGMHI's 2018 tax provision either directly or through the tax sharing agreement with Citigroup.

See Note 5 to the Consolidated Financial Statements for a further description of the Company's tax provision and related income tax assets and liabilities.

Investment Banking

Investment banking fees are substantially composed of underwriting and advisory revenues. Such fees are recognized at the point in time when CGMHI's performance under the terms of a contractual arrangement is completed, which is typically at the closing of a transaction. Reimbursed expenses related to these transactions are recorded as revenue and are included within investment banking fees. In certain instances for advisory contracts, CGMHI will receive amounts in advance of the deal's closing. In these instances, the amounts received will be recognized as a liability and not recognized in revenue until the transaction closes. The contract liability amount for the periods presented was negligible. Out-of-pocket expenses associated with underwriting activity are deferred and recognized at the time the related revenue is recognized, while out-of-pocket expenses associated with advisory arrangements are expensed as incurred. In general, expenses incurred related to investment banking transactions, whether consummated or not, are recorded in *Other operating and administrative expenses*. The Company has determined that it acts as principal in the majority of these transactions and therefore presents expenses gross within *Other operating and administrative expenses*.

Principal Transactions

CGMHI's *Principal transactions* revenues are recognized in income on a trade-date basis and consist of realized and unrealized gains and losses from trading activities. See Note 3 to the Consolidated Financial Statements for details of the Company's *Principal transactions* revenue.

Commissions and Fees

Commissions and fees primarily include brokerage commissions from the following: executing transactions for clients on exchanges and over-the-counter markets; sales of mutual funds and other annuity products; and assisting clients in clearing transactions, providing brokerage services and other such activities. Brokerage commissions are recognized in *Commissions and fees* at the point in time the associated service is fulfilled, generally on the trade execution date. Gains or losses, if any, on these transactions are included in *Principal transactions* (see Note 3 to the Consolidated Financial Statements). Sales of certain investment products include a portion of variable consideration associated with the underlying product. In these instances, a portion of the revenue associated with the sale of the product is not recognized until the variable consideration becomes fixed. The Company recognized \$117 million, \$99 million and \$98 million of revenue related to such variable consideration for the years ended December 31, 2018, 2017 and 2016, respectively. These amounts primarily relate to performance obligations satisfied in prior periods.

Fiduciary Fees

Fiduciary fees consist of trust services and investment management services. As an escrow agent, CGMHI receives, safekeeps, services and manages clients' escrowed assets such as cash, securities, property (including intellectual property), contracts or other collateral. CGMHI performs its escrow agent duties by safekeeping the funds during the specified time period agreed upon by all parties and therefore earns its revenue evenly during the contract duration.

Investment management services consist of managing assets on behalf of CGMHI's retail and institutional clients. Revenue from these services primarily consists of asset-based fees for advisory accounts, which are based on the market value of

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the client's assets and recognized monthly, when the market value is fixed. In some instances, the Company contracts with third-party advisors and with third-party custodians. The Company has determined that it acts as principal in the majority of these transactions and therefore presents the amounts paid to third parties gross within *Other operating and administrative expenses*.

Related Party Transactions

The Company has related party transactions with certain of its subsidiaries and affiliates. These transactions, which are primarily short-term in nature, include cash accounts, collateralized financing transactions, margin accounts, derivative transactions, charges for operational support and the borrowing and lending of funds, and are entered into in the ordinary course of business. See Note 15 to the Consolidated Financial Statements for details on the Company's related party transactions.

ACCOUNTING CHANGES

SEC Staff Accounting Bulletin 118

On December 22, 2017, the SEC issued Staff Accounting Bulletin (SAB) 118, which set forth the accounting for the changes in tax law caused by the enactment of Tax Reform. SAB 118 provided guidance where the accounting under ASC 740 was incomplete for certain income tax effects of Tax Reform, at the time of the issuance of an entity's financial statements for the period in which Tax Reform was enacted (provisional items). CGMHI disclosed several provisional items recorded as part of its \$754 million 2017 charge related to Tax Reform.

CGMHI completed its accounting for Tax Reform under SAB 118 during 2018 and recorded a one-time, non-cash tax charge of \$46 million in *Provision for income taxes* related to amounts that were considered provisional pursuant to SAB 118. The adjustments relating to the provisional amounts consisted of a \$30 million charge relating to the impact of deemed repatriation of undistributed earnings of non-U.S. subsidiaries, an additional \$14 million charge relating to the impact of a change to a "quasi-territorial tax system" including state and local, and a \$2 million charge relating to an increase of the valuation allowance against CGMHI's foreign tax credit (FTC) for the residual U.S. DTAs relating to non-U.S. branches.

Also, CGMHI has made a policy election to account for taxes on GILTI as incurred.

Revenue Recognition

In May 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2014-09, *Revenue from Contracts with Customers* (Revenue Recognition), which outlines a single comprehensive model for entities to use in accounting for revenue arising from contracts with customers. The core principle of the revenue model is that an entity recognizes revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. The ASU defines the promised good or service as the performance obligation under the contract.

While the guidance replaces most existing revenue recognition guidance in GAAP, the ASU is not applicable to financial instruments and, therefore, does not impact a majority of the Company's revenues, including net interest income and mark-to-market accounting.

In accordance with the new revenue recognition standard, CGMHI has identified the specific performance obligation (promised services) associated with the contract with the customer and has determined when that specific performance obligation has been satisfied, which may be at a point in time or over time depending on how the performance obligation is defined. The contracts with customers also contain the transaction price, which consists of fixed consideration and/or consideration that may vary (variable consideration), and is defined as the amount of consideration an entity expects to be entitled to when or as the performance obligation is satisfied, excluding amounts collected on behalf of third parties (including transaction taxes). The amounts recognized at the point in time the performance obligation is satisfied may differ from the ultimate transaction price associated with that performance obligation when a portion of it is based on variable consideration. For example, some consideration is based on the client's month-end balance or market values which are unknown at the time the contract is executed. The remaining transaction price amount, if any, will be recognized as the variable consideration becomes determinable. In certain transactions, the performance obligation is considered satisfied at a point in time in the future. In this instance, CGMHI defers revenue on the balance sheet that will only be recognized upon completion of the performance obligation.

The new revenue recognition standard further clarified the guidance related to reporting revenue gross as principal versus net as an agent. In many cases, CGMHI outsources a component of its performance obligations to third parties. The Company has

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determined that it acts as principal in the majority of these transactions and therefore presents the amounts paid to these third parties gross within operating expenses.

The Company has retrospectively adopted this standard as of January 1, 2018 and as a result was required to report amounts paid to third parties where CGMHI is principal to the contract within *Non-interest expenses*. The adoption resulted in an increase in both revenue and expenses of approximately \$0.3 billion for each of the years ended December 31, 2018 and 2017 with similar amounts for prior years. Prior to adoption, these expense amounts were reported as contra revenue primarily within *Investment banking* and *Fiduciary fees* revenues. Accordingly, prior periods have been reclassified to conform to the new presentation.

Income Tax Impact of Intra-Entity Transfers of Assets

In October 2016, the FASB issued ASU No. 2016-16, *Income Taxes—Intra-Entity Transfers of Assets Other Than Inventory*, which requires an entity to recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs. The ASU was effective January 1, 2018 and was adopted as of that date. The ASU did not have a significant impact on the Company's Consolidated Financial Statements and related disclosures.

Clarifying the Definition of a Business

In January 2017, the FASB issued ASU No. 2017-01, *Business Combinations (Topic 805): Clarifying the Definition of a Business*. The definition of a business directly and indirectly affects many areas of accounting (e.g., acquisitions, disposals, goodwill and consolidation). The ASU narrows the definition of a business by introducing a quantitative screen as the first step, such that if substantially all of the fair value of the gross assets acquired is concentrated in a single identifiable asset or a group of similar identifiable assets, then the set of transferred assets and activities is not a business. If the set is not scoped out from the quantitative screen, the entity then evaluates whether the set meets the requirement that a business include, at a minimum, an input and a substantive process that together significantly contribute to the ability to create outputs.

CGMHI adopted the ASU upon its effective date on January 1, 2018, prospectively. The ongoing impact of the ASU will depend upon the acquisition and disposal activities of CGMHI. If fewer transactions qualify as a business, there could be less initial recognition of *Goodwill*, but also less goodwill allocated to disposals. There was no impact during 2018 from the adoption of this ASU.

Hedging

In August 2017, the FASB issued ASU No. 2017-12, *Targeted Improvements to Accounting for Hedging Activities*, which better aligns an entity's risk management activities and financial reporting for hedging relationships through changes to the designation and measurement guidance for qualifying hedging relationships and the presentation of hedge results. The ASU requires the change in the fair value of the hedging instrument to be presented in the same income statement line as the hedged item and also requires expanded disclosures. CGMHI adopted this standard on January 1, 2018 and the adoption of this standard did not have a material impact on the Company.

Recognition and Measurement of Financial Assets and Financial Liabilities

In January 2016, the FASB issued ASU No. 2016-01, *Financial Instruments—Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities*, which addresses certain aspects of recognition, measurement, presentation and disclosure of financial instruments. In February 2018, the FASB issued ASU No. 2018-03, *Technical Corrections and Improvements to Financial Instruments—Overall (Subtopic 825-10)*, to clarify certain provisions in ASU 2016-01.

The ASUs require entities to present separately in *Accumulated other comprehensive income (loss)* (AOCI) the portion of the total change in the fair value of a liability resulting from a change in the instrument-specific credit risk when the entity has elected to measure the liability at fair value in accordance with the fair value option for financial instruments. The ASUs also require equity investments (except those accounted for under the equity method of accounting or those that result in consolidation of the investee) to be measured at fair value with changes in fair value recognized in net income.

CGMHI early adopted the provisions of ASU 2016-01 related to presentation of the change in fair value of liabilities for which the fair value option was elected, related to changes in Citigroup's own credit spreads in AOCI effective January 1, 2016. Accordingly, these amounts have been reflected as a component of AOCI, whereas these amounts were previously recognized in CGMHI's revenues and net income. The impact of adopting this amendment resulted in a cumulative catch-up reclassification from *Retained earnings* to AOCI of an accumulated after-tax loss of approximately \$90 million at January 1, 2016. Financial statements for periods prior to 2016 were not subject to restatement under the provisions of this ASU. For additional information, see Notes 12 and 13 to the Consolidated Financial Statements.

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CGMHI adopted the other provisions of ASU 2016-01 and ASU 2018-03 as of January 1, 2018. Accordingly, as of the first quarter of 2018, the changes to accounting for equity securities and fair value disclosures have been reflected in the Company's financial statements. Financial statements for periods prior to 2018 were not subject to restatement under the provisions of the ASUs. The ASUs did not have a significant impact on the Company's Consolidated Financial Statements and related disclosures.

Statement of Cash Flows

In November 2016, the FASB issued ASU No. 2016-18, *Restricted Cash*, which requires that companies present cash, cash equivalents and amounts generally described as restricted cash or restricted cash equivalents (restricted cash) when reconciling beginning-of-period and end-of-period totals on the Statement of Cash Flows. The Company has retrospectively adopted this ASU as of January 1, 2018. The ASU did not have a significant impact on the Company's Consolidated Financial Statements and related disclosures.

In August 2016, the FASB issued ASU No. 2016-15, *Classification of Certain Cash Receipts and Cash Payments*, which provides guidance on the classification and presentation of certain cash receipts and payments on the Statement of Cash Flows. The Company has retrospectively adopted this ASU as of January 1, 2018, which resulted in immaterial changes to CGMHI's Consolidated Statement of Cash Flows.

Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income

On February 14, 2018, the FASB issued ASU No. 2018-02, *Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income*. The ASU allows a reclassification from AOCI to *Retained earnings* for the deferred taxes previously recorded in AOCI that exceed the current federal tax rate of 21% resulting from the newly enacted corporate tax rate in Tax Reform and other stranded tax amounts related to the application of Tax Reform that CGMHI elects to reclassify. The ASU allows adjustments to reclassification amounts in subsequent periods as a result of changes to the amounts recorded under SAB 118. CGMHI elected to early adopt the ASU effective December 31, 2017, which affected only the period that the effects related to the one-time Tax Reform charge were recognized. In addition to the reclassification of deferred taxes recorded in AOCI that exceed the current federal tax rate, CGMHI also reclassified amounts recorded in AOCI related to the effects of the shift to a territorial system related to the application of Tax Reform using the portfolio method.

The effect of adopting the ASU resulted in an increase of \$45 million to *Retained earnings* at December 31, 2017 due to the reclassification of AOCI to *Retained earnings*.

Premium Amortization on Purchased Callable Debt Securities

In March 2017, the FASB issued ASU No. 2017-08, *Receivables—Nonrefundable Fees and Other Costs (Subtopic 310-20): Premium Amortization on Purchased Callable Debt Securities*, which amends the amortization period for certain purchased callable debt securities held at a premium. The ASU requires entities to amortize premiums on debt securities by the first call date when the securities have fixed and determinable call dates and prices.

CGMHI early adopted the ASU in the second quarter of 2017, with an effective date of January 1, 2017. The ASU did not have a significant impact on CGMHI's Consolidated Financial Statements and related disclosures.

Accounting for Stock-Based Compensation

In March 2016, the FASB issued ASU No. 2016-09, *Compensation—Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting* in order to simplify certain complex aspects of the accounting for income taxes and forfeitures related to employee stock-based compensation. The guidance became effective for CGMHI beginning on January 1, 2017. Under the new standard, excess tax benefits and deficiencies related to employee stock-based compensation are recognized directly within income tax expense or benefit in CGMHI's Consolidated Statement of Income, rather than within additional paid-in capital. The impact of this change was not material in 2017 as the majority of employees' deferred stock-based compensation awards are granted within the first quarter of each year and, therefore, vest within the first quarter of each year, commensurate with vesting in equal annual installments.

Additionally, as permitted under the new guidance, CGMHI made an accounting policy election to account for forfeitures of awards as they occur, which represents a change from the previous requirement to estimate forfeitures when recognizing compensation expense. The ASU did not have a significant impact on CGMHI's Consolidated Financial Statements and related disclosures.

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Fair Value Measurement

In August 2018, the FASB issued ASU No. 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework—Changes to the Disclosure Requirements for Fair Value Measurement*. The amendments modify certain disclosure requirements for fair value measurements and are effective January 1, 2020, with early adoption permitted. The Company early adopted this ASU as of December 31, 2018 in its entirety. The adoption of this standard did not have a material impact on the Company.

FUTURE APPLICATION OF ACCOUNTING STANDARDS

Accounting for Financial Instruments—Credit Losses

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments—Credit Losses (Topic 326)*. The ASU introduces a new credit loss methodology, the Current Expected Credit Losses (CECL) methodology, which requires earlier recognition of credit losses, while also providing additional transparency about credit risk.

The CECL methodology utilizes a lifetime “expected credit loss” measurement objective for the recognition of credit losses for loans and other receivables measured at amortized cost at the time the financial asset is originated or acquired. The allowance for credit losses is adjusted each period for changes in expected lifetime credit losses. This methodology replaces the multiple existing impairment methods in current GAAP, which generally require that a loss be incurred before it is recognized. Within the life cycle of a loan or other financial asset, the ASU will generally result in the earlier recognition of the provision for credit losses and the related allowance for credit losses than current practice.

The Company does not expect this ASU to have a significant impact on CGMHI’s Consolidated Financial Statements and related disclosures. The ASU will be effective for the Company as of January 1, 2020.

Lease Accounting

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*, which is intended to increase transparency and comparability of accounting for lease transactions. The ASU will require lessees to recognize leases on the balance sheet as right-of-use assets and lease liabilities and will require both quantitative and qualitative disclosures regarding key information about leasing arrangements. Lessor accounting is largely unchanged. On January 1, 2019, CGMHI recognized a lease liability and a corresponding right-of-use asset, related to its future minimum lease commitments. The Company adopted the guidance prospectively and recorded an adjustment to *Retained earnings* due to the cumulative effect of recognizing previously deferred gains on sale/leaseback transactions.

Subsequent Measurement of Goodwill

In January 2017, the FASB issued ASU No. 2017-04, *Intangibles—Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment*. The ASU simplifies the subsequent measurement of goodwill impairment by eliminating the requirement to calculate the implied fair value of goodwill (i.e., the current Step 2 of the goodwill impairment test) to measure a goodwill impairment charge. Under the ASU, the impairment test is the comparison of the fair value of a reporting unit with its carrying amount (the current Step 1), with the impairment charge being the deficit in fair value but not exceeding the total amount of goodwill allocated to that reporting unit. The simplified one-step impairment test applies to all reporting units (including those with zero or negative carrying amounts).

The ASU will be effective for CGMHI as of January 1, 2020. The impact of the ASU will depend upon the performance of CGMHI’s reporting units and the market conditions impacting the fair value of each reporting unit going forward.

2. SIGNIFICANT DISPOSALS

Sale of Fixed Income Analytics and Index Businesses

On August 31, 2017, Citi completed the sale of a fixed income analytics business and a fixed income index business that were part of *Markets and securities services* within *Institutional Clients Group*. As part of the sale, the Company derecognized *Total assets* of \$112 million, including goodwill of \$72 million, while the derecognized liabilities were \$18 million. The transaction resulted in a pretax gain on sale of \$580 million (\$355 million after-tax) recorded in *Other revenue* during 2017.

Income before taxes excluding the pretax gain on sale for the divested businesses was immaterial for the periods presented.

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3. PRINCIPAL TRANSACTIONS

CGMHI's *Principal transactions* revenue consists of realized and unrealized gains and losses from trading activities. Trading activities include revenues from fixed income, equities, credit and commodities products and foreign exchange transactions that are managed on a portfolio basis characterized by primary risk. Not included in the table below is the impact of net interest revenue related to trading activities, which is an integral part of trading activities' profitability. Principal transactions include CVA (credit valuation adjustments on derivatives), FVA (funding valuation adjustments) on over-the-counter derivatives. These adjustments are discussed further in Note 12 to the Consolidated Financial Statements.

The following table presents principal transactions revenue:

<i>In millions of dollars</i>	2018	2017	2016
Interest rate risks ⁽¹⁾	\$ 897	\$ 1,001	\$ 853
Credit products and risks ⁽²⁾	720	1,211	920
Commodity and other risks ⁽³⁾	661	287	625
Equity risks ⁽⁴⁾	591	249	457
Foreign exchange risks ⁽⁵⁾	58	60	21
Total principal transactions revenue	\$ 2,927	\$ 2,808	\$ 2,876

(1) Includes revenues from government securities and corporate debt, municipal securities, mortgage securities and other debt instruments. Also includes spot and forward trading of currencies and exchange-traded and over-the-counter (OTC) currency options, options on fixed income securities, interest rate swaps, currency swaps, swap options, caps and floors, financial futures, OTC options and forward contracts on fixed income securities.

(2) Includes revenues from structured credit products.

(3) Primarily includes revenues from crude oil, refined oil products, natural gas and other commodities trades.

(4) Includes revenues from common, preferred and convertible preferred stock, convertible corporate debt, equity-linked notes and exchange-traded and OTC equity options and warrants.

(5) Includes revenues from foreign exchange spot, forward, option and swap contracts, as well as foreign currency translation gains and losses.

4. INCENTIVE PLANS AND EMPLOYEE BENEFITS

Discretionary Annual Incentive Awards

The Company participates in various Citigroup stock-based and other deferred incentive programs. Citigroup grants immediate cash bonus payments and various forms of immediate and deferred awards as part of its discretionary annual incentive award program involving a large segment of Citigroup's employees worldwide, including employees of the Company.

Discretionary annual incentive awards are generally awarded in the first quarter of the year based on the previous year's performance. Awards valued at less than U.S. \$100,000 (or the local currency equivalent) are generally paid entirely in the form of an immediate cash bonus. Pursuant to Citigroup policy and/or regulatory requirements, certain employees and officers are subject to mandatory deferrals of incentive pay and generally receive 25%–60% of their awards in a combination of restricted or deferred stock, deferred cash stock units or deferred cash. Discretionary annual incentive awards to many employees in the EU are subject to deferral requirements regardless of the total award value, with at least 50% of the immediate incentive delivered in the form of a stock payment award subject to a restriction on sale or transfer (generally, for 12 months).

Deferred annual incentive awards may be delivered in the form of one or more award types: a restricted or deferred stock award under Citigroup's Capital Accumulation Program (CAP), or a deferred cash stock unit award and/or a deferred cash award under Citigroup's Deferred Cash Award Plan. The applicable mix of awards may vary based on the employee's minimum deferral requirement and the country of employment.

Subject to certain exceptions (principally, for retirement-eligible employees), continuous employment within Citigroup is required to vest in CAP, deferred cash stock unit and deferred cash awards. Post employment vesting by retirement-eligible employees and participants who meet other conditions is generally conditioned upon their refraining from competition with Citigroup during the remaining vesting period, unless the employment relationship has been terminated by Citigroup under certain conditions.

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Generally, the deferred awards vest in equal annual installments over three- or four-year periods. Vested CAP awards are delivered in shares of Citigroup common stock. Deferred cash awards are payable in cash and, except as prohibited by applicable regulatory guidance, earn a fixed notional rate of interest that is paid only if and when the underlying principal award amount vests. Deferred cash stock unit awards are payable in cash at the vesting value of the underlying stock. Generally, in the EU, vested CAP shares are subject to a restriction on sale or transfer after vesting, and vested deferred cash awards and deferred cash stock units are subject to hold back (generally, for 12 months in each case).

Unvested CAP, deferred cash stock units and deferred cash awards are subject to one or more clawback provisions that apply in certain circumstances, including gross misconduct. CAP and deferred cash stock unit awards, made to certain employees, are subject to a formulaic performance-based vesting condition pursuant to which amounts otherwise scheduled to vest will be reduced based on the amount of any pretax loss in the participant's business in the calendar year preceding the scheduled vesting date. A minimum reduction of 20% applies for the first dollar of loss for CAP and deferred cash stock unit awards.

In addition, deferred cash awards are subject to a discretionary performance-based vesting condition under which an amount otherwise scheduled to vest may be reduced in the event of a "material adverse outcome" for which a participant has "significant responsibility." These awards are also subject to an additional clawback provision pursuant to which unvested awards may be canceled if the employee engaged in misconduct or exercised materially imprudent judgment, or failed to supervise or escalate the behavior of other employees who did.

Sign-on and Long-Term Retention Awards

Stock awards and deferred cash awards may be made at various times during the year as sign-on awards to induce new hires to join the Company or to high-potential employees as long-term retention awards.

Vesting periods and other terms and conditions pertaining to these awards tend to vary by grant. Generally, recipients must remain employed through the vesting dates to vest in the awards, except in cases of death, disability or involuntary termination other than for gross misconduct. These awards do not usually provide for post employment vesting by retirement-eligible participants.

Performance Share Units

Certain executive officers were awarded a target number of performance share units (PSUs) each February from 2015 to 2018, for performance in the year prior to the award date. For grants prior to 2016, PSUs will be earned only to the extent that Citigroup attains specified performance goals relating to Citigroup's return on assets and relative total shareholder return against peers over the three-year period beginning with the year of award. The actual dollar amounts ultimately earned could vary from zero, if performance goals are not met, to as much as 150% of target, if performance goals are meaningfully exceeded.

The PSUs granted in February 2016 are earned over a three-year performance period based on Citigroup's relative total shareholder return as compared to peers. The actual dollar amounts ultimately earned could vary from zero, if performance goals are not met, to as much as 150% of target, if performance goals are meaningfully exceeded.

The PSUs granted in February 2017 are earned over a three-year performance period based half on return on tangible common equity performance in 2019, and the remaining half on cumulative earnings per share over 2017 to 2019.

The PSUs granted in February 2018 are earned over a three-year performance period based half on return on tangible common equity performance in 2020, and the remaining half on cumulative earnings per share over 2018 to 2020.

For the PSUs awarded in 2016, 2017 and 2018, if the total shareholder return is negative over the three-year performance period, executives may earn no more than 100% of the target PSUs, regardless of the extent to which Citigroup outperforms peer firms.

For all award years, the value of each PSU is equal to the value of one share of Citigroup common stock. Dividend equivalents will be accrued and paid on the number of earned PSUs after the end of the performance period.

PSUs are subject to variable accounting, pursuant to which the associated value of the award will fluctuate with changes in Citigroup's stock price and the attainment of the specified performance goals for each award, until the award is settled solely in cash after the end of the performance period.

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Stock Option Programs

All outstanding stock options are fully vested, with the related expense recognized as a charge to income in prior periods. Generally, the stock options outstanding have a six-year term, with some stock options subject to various transfer restrictions.

Other Variable Incentive Compensation

Employees of CGMHI participate in various incentive plans globally that are used to motivate and reward performance primarily in the areas of sales, operational excellence and customer satisfaction. Participation in these plans is generally limited to employees who are not eligible for discretionary annual incentive awards. Other forms of variable compensation include monthly commissions paid to financial advisors.

Summary

Except for awards subject to variable accounting, the total expense recognized for stock awards represents the grant date fair value of such awards, which is generally recognized as a charge to income ratably over the vesting period, other than for awards to retirement-eligible employees and immediately vested awards. Whenever awards are made or are expected to be made to retirement-eligible employees, the charge to income is accelerated based on when the applicable conditions to retirement eligibility were or will be met. If the employee is retirement eligible on the grant date, or the award is vested at the grant date, the entire expense is recognized in the year prior to grant.

Recipients of Citigroup stock awards generally do not have any stockholder rights until shares are delivered upon vesting or exercise, or after the expiration of applicable required holding periods. Recipients of restricted or deferred stock awards and deferred cash stock unit awards, however, may be entitled to receive dividends or dividend-equivalent payments during the vesting period. Recipients of restricted stock awards generally are entitled to vote the shares in their award during the vesting period. Once a stock award vests, the shares are freely transferable, unless they are subject to a restriction on sale or transfer for a specified period.

The Company recognized compensation expense of \$602 million, \$622 million, and \$608 million in 2018, 2017 and 2016, respectively, relating to its stock-based and deferred compensation programs.

Pension, Postretirement, Post Employment and Defined Contribution Plans

The Company participates in several non-contributory defined benefit pension plans sponsored by Citigroup Inc. covering certain U.S. employees and has various defined benefit pension and termination indemnity plans covering employees outside the United States.

Citigroup's U.S. qualified defined benefit plan was frozen effective January 1, 2008 for most employees. Accordingly, no additional compensation-based contributions have been credited to the cash balance portion of the plan for existing plan participants after 2007. However, certain employees covered under the prior final pay plan formula continue to accrue benefits.

The Company also participates in a number of non-contributory, nonqualified pension plans. These plans, which are unfunded, provide supplemental defined pension benefits to certain U.S. employees. With the exception of certain employees covered under the prior final pay formula, the benefits under these plans were frozen in prior years.

The Company also participates in postretirement health care and life insurance benefits offered by Citigroup to certain eligible U.S. retired employees, as well as to certain eligible employees outside the United States.

The Company participates in post employment plans sponsored by Citigroup that provide income continuation and health and welfare benefits to certain eligible U.S. employees on long-term disability.

The Company participates in several defined contribution plans in the U.S. and certain non-U.S. locations, all of which are administered in accordance with local laws. The most significant defined contribution plan is the Citigroup Retirement Savings Plan (formerly known as the Citigroup 401(k) Plan) sponsored by Citigroup Inc. in the U.S.

Under the Citigroup Retirement Savings Plan, eligible U.S. employees receive matching contributions of up to 6% of their eligible compensation for 2018 and 2017, subject to statutory limits. Additionally, for eligible employees whose compensation is \$100,000 or less, a fixed contribution of up to 2% of compensation is provided. All contributions made by the plan sponsor are invested according to each participant's individual elections.

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The Company's allocated pretax expense associated with the Citigroup pension, postretirement, post employment and defined contribution plans amounted to approximately \$127 million, \$116 million, and \$130 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Health Care and Life Insurance Plans

The Company, through Citigroup, offers certain health care and life insurance benefits to its employees. The Company's allocated share of the related pretax expense associated with Citigroup health care and life insurance benefits amounted to approximately \$69 million, \$66 million, and \$77 million for the years ended December 31, 2018, 2017 and 2016, respectively.

5. INCOME TAXES

The operations of the Company are subject to income tax laws of the U.S. and its state and municipalities, and the foreign jurisdictions in which it operates. The Company's U.S. federal, state and local income taxes, and state and local unitary deferred taxes are provided for based on an income tax sharing agreement with Citigroup. Under the tax sharing agreement with Citigroup, the Company settles its current tax liability with Citigroup throughout the year except for any tax liabilities expected to be payable as a separate taxpayer. The Company is included in the consolidated U.S. federal income tax return and unitary and combined state returns of Citigroup and combined subsidiaries.

The components of the Company's income tax provision for the years ended December 31 are presented in the table below:

In millions of dollars

Year Ended December 31,	2018	2017	2016
Current tax provision (benefit):			
Federal	\$ (154)	\$ 334	\$ (61)
Foreign	338	288	101
State	(61)	806	(187)
Total current tax provision (benefit)	123	1,428	(147)
Deferred tax provision (benefit):			
Federal	226	628	539
Foreign	(25)	9	17
State	238	(746)	439
Total deferred tax provision (benefit)	439	(109)	995
Provision (benefit) for income taxes before noncontrolling interests	562	1,319	848
Income tax expense (benefit) reported in stockholder's equity related to:			
Foreign currency translation	(3)	(11)	20
Benefit plans	(1)	(3)	20
FVO DVA	115	(108)	(12)
Income taxes before noncontrolling interests	\$ 673	\$ 1,197	\$ 876

The Company paid taxes of \$455 million, \$679 million and \$93 million in 2018, 2017 and 2016, respectively.

The reconciliation of the federal statutory income tax rate to the Company's effective income tax rate applicable to income (before noncontrolling interests) for the years ended December 31 was as follows:

	2018	2017	2016
Federal statutory rate	21%	35%	35%
State income taxes, net of federal benefit	8	—	7
Non-U.S. income tax rate differential	3	—	—
Tax advantaged investments	(3)	(4)	(3)
Meals and entertainment	1	—	1
Legal expense	—	—	(2)
Effect of tax law changes ⁽¹⁾	3	38	—
Other, net	2	(2)	1
Effective income tax rate	35%	67%	39%

(1) 2018 includes one-time Tax Reform charge of \$46 million for amounts that were considered provisional pursuant to SAB 118. 2017 includes the one-time \$754 million charge for Tax Reform.

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Deferred income taxes at December 31 related to the following:

<i>In millions of dollars</i>	2018	2017
Deferred tax assets		
Tax credit and net operating loss carry-forwards	\$ 2,065	\$ 2,851
Allocated deferred state taxes	426	447
Deferred compensation and employee benefits	523	353
Investments	342	246
Fixed assets and leases	110	75
Litigation and other reserves	21	26
Credit loss deduction	9	2
Unremitted foreign earnings	5	—
Other deferred tax assets	41	—
Gross deferred tax assets	3,542	4,000
Valuation allowance	(235)	(123)
Deferred tax assets after valuation allowance	3,307	3,877
Deferred tax liabilities		
Intangibles	(187)	(184)
Unremitted foreign earnings	—	(30)
Intercompany debt underwriting fees	(66)	(66)
Federal impact on state taxes	(450)	(502)
Other deferred tax liabilities	(43)	(27)
Gross deferred tax liabilities	(746)	(809)
Net deferred tax assets	\$ 2,561	\$ 3,068

The following is a roll-forward of the Company's unrecognized tax benefits.

<i>In millions of dollars</i>	2018	2017	2016
Total unrecognized tax benefits at January 1	\$ 58	\$ 51	\$ 55
Net amount of increases for current year's tax positions	6	5	3
Gross amount of increases for prior years' tax positions	1	4	—
Gross amount of decreases for prior years' tax positions	(3)	(1)	(5)
Amounts of decreases relating to settlements	(1)	(1)	(2)
Total unrecognized tax benefits at December 31	\$ 61	\$ 58	\$ 51

The total amounts of unrecognized tax benefits at December 31, 2018, 2017 and 2016 that, if recognized, would affect CGMHI's effective tax rate, are \$61 million, \$58 million and \$51 million, respectively.

Interest and penalties (not included in "unrecognized tax benefits" above) are a component of the *Provision for income taxes*.

<i>In millions of dollars</i>	2018		2017		2016	
	Pretax	Net of tax	Pretax	Net of tax	Pretax	Net of tax
Total interest and penalties in the Consolidated Statement of Financial Condition at January 1	\$ —	\$ —	\$ 1	\$ 1	\$ 3	\$ 2
Total interest and penalties in the Consolidated Statement of Income	1	1	(1)	(1)	(2)	(1)
Total interest and penalties in the Consolidated Statement of Financial Condition at December 31	1	1	—	—	1	1

The Company is currently under audit by the Internal Revenue Service and other major taxing jurisdictions around the world. It is therefore reasonably possible that significant changes in the gross balance of unrecognized tax benefits may occur within the next 12 months, although the Company does not expect such audits to result in amounts that would cause a significant change to its effective tax rate.

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The following are the major tax jurisdictions in which the Company and its affiliates operate and the earliest tax year subject to examination:

<u>Jurisdiction</u>	<u>Tax year</u>
United States	2014
New York State	2012
New York City	2012
California	2013
United Kingdom	2015

Non-U.S. Earnings

Non-U.S. pretax earnings approximated \$1,031 million in 2018 and \$765 million in 2017. As a U.S. corporation, the Company and its U.S. subsidiaries are currently subject to U.S. taxation on all non-U.S. pretax earnings of a non-U.S. branch. Beginning in 2018, there is a separate FTC basket for branches. Also, dividends from a non-U.S. subsidiary or affiliate are effectively exempt from U.S. taxation. The Company provides income taxes on the book over tax basis differences of non-U.S. subsidiaries except to the extent that such differences are indefinitely reinvested outside the U.S.

At December 31, 2018, there was no basis difference on non-U.S. subsidiaries and no tax would need to be provided.

Foreign tax credit carry-forwards expire in 2028 and state and local net operating loss carryforwards expire in 2034.

Deferred Tax Assets

At December 31, 2018, the Company had a valuation allowance of \$235 million, an increase of \$112 million from the balance at December 31, 2017. The increase in the valuation allowance balance mainly relates to the non-U.S. branch FTC carry-forwards and the U.S. residual DTAs on the non-U.S. branches. The December 31, 2018 valuation allowance is composed of a valuation allowance of \$151 million on its U.S. residual DTAs related to its non-U.S. branches, \$72 million on its FTC carry-forwards and \$12 million on state net operating losses and capital loss carry-forwards. The valuation allowance against U.S. residual DTAs on non-U.S. branches and FTCs results from the impact of the lower tax rate and the new separate FTC basket for non-U.S. branches, as well as the diminished ability under Tax Reform to generate income from sources outside the U.S. to support utilization. The absolute amount of the Company's post-Tax Reform-related valuation allowance may change in future years since the separate FTC basket for non-U.S. branches will result in additional DTAs (for FTCs) requiring a valuation allowance, given that the local tax rate for these branches exceeds on average the U.S. tax rate of 21%. Although it is not assured, the Company believes that the realization of the recognized net deferred tax asset of \$2.6 billion is more-likely-than-not to be realized based on expectations as to future taxable income in jurisdictions in which it operates and available tax planning strategies (as defined in ASC 740, *Income Taxes*) that would be implemented, if necessary, to prevent a carry-forward from expiring.

6. SECURITIES BORROWED, LOANED AND SUBJECT TO REPURCHASE AGREEMENTS

Securities borrowed and purchased under agreements to resell, at their respective carrying values, consisted of the following:

<i>In millions of dollars</i>	2018	2017
Securities purchased under agreements to resell (including \$107,657 and \$84,049 as of December 31, 2018 and 2017, respectively, at fair value)	\$ 135,871	\$ 104,421
Deposits paid for securities borrowed (including \$37,664 and \$46,069 as of December 31, 2018 and 2017, respectively, at fair value)	96,922	94,354
Total	\$ 232,793	\$ 198,775

Securities loaned and sold under agreements to repurchase, at their respective carrying values, consisted of the following:

<i>In millions of dollars</i>	2018	2017
Securities sold under agreements to repurchase (including \$43,866 and \$39,978 as of December 31, 2018 and 2017, respectively, at fair value)	\$ 165,333	\$ 140,051
Deposits received for securities loaned (including \$616 and \$660 as of December 31, 2018 and 2017, respectively, at fair value)	11,605	13,434
Total	\$ 176,938	\$ 153,485

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The resale and repurchase agreements represent collateralized financing transactions. The Company executes these transactions primarily through its broker-dealer subsidiaries to facilitate customer matched-book activity and to efficiently fund a portion of the Company's trading inventory.

To maintain reliable funding under a wide range of market conditions, including under periods of stress, CGMHI manages these activities by taking into consideration the quality of the underlying collateral and stipulating financing tenor. CGMHI manages the risks in its collateralized financing transactions by conducting daily stress tests to account for changes in capacity, tenors, haircut, collateral profile and client actions. Additionally, CGMHI maintains counterparty diversification by establishing concentration triggers and assessing counterparty reliability and stability under stress.

It is the Company's policy to take possession of the underlying collateral, monitor its market value relative to the amounts due under the agreements and, when necessary, require prompt transfer of additional collateral in order to maintain contractual margin protection. For resale and repurchase agreements, when necessary, the Company posts additional collateral in order to maintain contractual margin protection.

Collateral typically consists of government and government-agency securities, corporate and municipal bonds, equities and mortgage- and other asset-backed securities.

The resale and repurchase agreements are generally documented under industry standard agreements that allow the prompt close-out of all transactions (including the liquidation of securities held) and the offsetting of obligations to return cash or securities by the non-defaulting party, following a payment default or other type of default under the relevant master agreement. Events of default generally include (i) failure to deliver cash or securities as required under the transaction, (ii) failure to provide or return cash or securities as used for margining purposes, (iii) breach of representation, (iv) cross-default to another transaction entered into among the parties, or, in some cases, their affiliates, and (v) a repudiation of obligations under the agreement. The counterparty that receives the securities in these transactions is generally unrestricted in its use of the securities, with the exception of transactions executed on a tri-party basis, where the collateral is maintained by a custodian and operational limitations may restrict its use of the securities.

A substantial portion of the resale and repurchase agreements is recorded at fair value, as described in Notes 12 and 13 to the Consolidated Financial Statements. The remaining portion is carried at the amount of cash initially advanced or received, plus accrued interest, as specified in the respective agreements.

The securities borrowing and lending agreements also represent collateralized financing transactions similar to the resale and repurchase agreements. Collateral typically consists of government and government-agency securities and corporate debt and equity securities.

Similar to the resale and repurchase agreements, securities borrowing and lending agreements are generally documented under industry standard agreements that allow the prompt close-out of all transactions (including the liquidation of securities held) and the offsetting of obligations to return cash or securities by the non-defaulting party, following a payment default or other default by the other party under the relevant master agreement. Events of default and rights to use securities under the securities borrowing and lending agreements are similar to the resale and repurchase agreements referenced above.

A substantial portion of securities borrowing and lending agreements is recorded at the amount of cash advanced or received. The remaining portion is recorded at fair value as the Company elected the fair value option for certain securities borrowed and loaned portfolios, as described in Note 13 to the Consolidated Financial Statements. With respect to securities loaned, the Company receives cash collateral in an amount generally in excess of the market value of the securities loaned. The Company monitors the market value of securities borrowed and securities loaned on a daily basis and obtains or posts additional collateral in order to maintain contractual margin protection.

The enforceability of offsetting rights incorporated in the master netting agreements for resale and repurchase agreements, and securities borrowing and lending agreements, is evidenced to the extent that a supportive legal opinion has been obtained from counsel of recognized standing that provides the requisite level of certainty regarding the enforceability of these agreements. Also, the exercise of rights by the non-defaulting party to terminate and close out transactions on a net basis under these agreements will not be stayed or avoided under applicable law upon an event of default including bankruptcy, insolvency or similar proceeding.

A legal opinion may not have been sought or obtained for certain jurisdictions where local law is silent or sufficiently ambiguous to determine the enforceability of offsetting rights or where adverse case law or conflicting regulation may cast doubt on the enforceability of such rights. In some jurisdictions and for some counterparty types, the insolvency law for a particular counterparty type may be nonexistent or unclear as overlapping regimes may exist. For example, this may be the case for certain sovereigns, municipalities, central banks and U.S. pension plans.

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The following tables present the gross and net resale and repurchase agreements and securities borrowing and lending agreements and the related offsetting amount permitted under ASC 210-20-45. The tables also include amounts related to financial instruments that are not permitted to be offset under ASC 210-20-45, but would be eligible for offsetting to the extent that an event of default occurred and a legal opinion supporting enforceability of the offsetting rights has been obtained. Remaining exposures continue to be secured by financial collateral, but the Company may not have sought or been able to obtain a legal opinion evidencing enforceability of the offsetting right.

As of December 31, 2018					
<i>In millions of dollars</i>	Gross amounts of recognized assets	Gross amounts offset on the Consolidated Balance Sheet ⁽¹⁾	Net amounts of assets included on the Consolidated Balance Sheet	Amounts not offset on the Consolidated Balance Sheet but eligible for offsetting upon counterparty default ⁽²⁾	Net amounts ⁽³⁾
Securities purchased under agreements to resell	\$ 221,184	\$ 85,313	\$ 135,871	\$ 114,981	\$ 20,890
Deposits paid for securities borrowed	96,922	—	96,922	21,792	75,130
Total	\$ 318,106	\$ 85,313	\$ 232,793	\$ 136,773	\$ 96,020

<i>In millions of dollars</i>	Gross amounts of recognized liabilities	Gross amounts offset on the Consolidated Balance Sheet ⁽¹⁾	Net amounts of liabilities included on the Consolidated Balance Sheet	Amounts not offset on the Consolidated Balance Sheet but eligible for offsetting upon counterparty default ⁽²⁾	Net amounts ⁽³⁾
Securities sold under agreements to repurchase	\$ 250,646	\$ 85,313	\$ 165,333	\$ 97,555	\$ 67,778
Deposits received for securities loaned	11,605	—	11,605	3,343	8,262
Total	\$ 262,251	\$ 85,313	\$ 176,938	\$ 100,898	\$ 76,040

As of December 31, 2017					
<i>In millions of dollars</i>	Gross amounts of recognized assets	Gross amounts offset on the Consolidated Balance Sheet ⁽¹⁾	Net amounts of assets included on the Consolidated Balance Sheet	Amounts not offset on the Consolidated Balance Sheet but eligible for offsetting upon counterparty default ⁽²⁾	Net amounts ⁽³⁾
Securities purchased under agreements to resell	\$ 176,783	\$ 72,362	\$ 104,421	\$ 90,257	\$ 14,164
Deposits paid for securities borrowed	94,354	—	94,354	15,565	78,789
Total	\$ 271,137	\$ 72,362	\$ 198,775	\$ 105,822	\$ 92,953

<i>In millions of dollars</i>	Gross amounts of recognized liabilities	Gross amounts offset on the Consolidated Balance Sheet ⁽¹⁾	Net amounts of liabilities included on the Consolidated Balance Sheet	Amounts not offset on the Consolidated Balance Sheet but eligible for offsetting upon counterparty default ⁽²⁾	Net amounts ⁽³⁾
Securities sold under agreements to repurchase	\$ 212,413	\$ 72,362	\$ 140,051	\$ 86,800	\$ 53,251
Deposits received for securities loaned	13,434	—	13,434	4,214	9,220
Total	\$ 225,847	\$ 72,362	\$ 153,485	\$ 91,014	\$ 62,471

- (1) Includes financial instruments subject to enforceable master netting agreements that are permitted to be offset under ASC 210-20-45.
- (2) Includes financial instruments subject to enforceable master netting agreements that are not permitted to be offset under ASC 210-20-45, but would be eligible for offsetting to the extent that an event of default has occurred and a legal opinion supporting enforceability of the offsetting right has been obtained.
- (3) Remaining exposures continue to be secured by financial collateral, but the Company may not have sought or been able to obtain a legal opinion evidencing enforceability of the offsetting right.

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The following tables present the gross amount of liabilities associated with repurchase agreements and securities lending agreements, by remaining contractual maturity:

<i>In millions of dollars</i>	As of December 31, 2018				
	Open and overnight	Up to 30 Days	31-90 Days	Greater than 90 Days	Total
Securities sold under agreements to repurchase	\$ 111,108	\$ 63,153	\$ 32,023	\$ 44,362	\$ 250,646
Deposits received for securities loaned	7,516	769	2,187	1,133	11,605
Total	\$ 118,624	\$ 63,922	\$ 34,210	\$ 45,495	\$ 262,251

<i>In millions of dollars</i>	As of December 31, 2017				
	Open and overnight	Up to 30 Days	31-90 Days	Greater than 90 Days	Total
Securities sold under agreements to repurchase	\$ 85,708	\$ 59,153	\$ 35,740	\$ 31,812	\$ 212,413
Deposits received for securities loaned	10,323	260	1,791	1,060	13,434
Total	\$ 96,031	\$ 59,413	\$ 37,531	\$ 32,872	\$ 225,847

The following tables present the gross amount of liabilities associated with repurchase agreements and securities lending agreements, by class of underlying collateral:

<i>In millions of dollars</i>	As of December 31, 2018		
	Repurchase agreements	Securities lending agreements	Total
U.S. Treasury and federal agency securities	\$ 97,957	\$ 41	\$ 97,998
State and municipal securities	2,605	—	2,605
Foreign government securities	87,735	179	87,914
Corporate bonds	21,668	749	22,417
Equity securities	12,922	10,591	23,513
Mortgage-backed securities	18,768	—	18,768
Asset-backed securities	6,208	—	6,208
Other trading assets	2,783	45	2,828
Total	\$ 250,646	\$ 11,605	\$ 262,251

<i>In millions of dollars</i>	As of December 31, 2017		
	Repurchase agreements	Securities lending agreements	Total
U.S. Treasury and federal agency securities	\$ 69,676	\$ —	\$ 69,676
State and municipal securities	1,605	—	1,605
Foreign government securities	76,309	105	76,414
Corporate bonds	20,148	657	20,805
Equity securities	20,724	12,035	32,759
Mortgage-backed securities	17,033	—	17,033
Asset-backed securities	5,479	—	5,479
Other trading assets	1,439	637	2,076
Total	\$ 212,413	\$ 13,434	\$ 225,847

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7. DEBT

Short-Term Borrowings

Short-term borrowings consist primarily of borrowings with affiliates, banks and other borrowings. Short-term borrowings with affiliates totaled \$11.3 billion and \$32.9 billion at December 31, 2018 and 2017, respectively. The following table presents the weighted average interest rates on short-term borrowings at December 31:

<i>In millions of dollars</i>	2018		2017	
	Balance	Weighted average	Balance	Weighted average
Short-term borrowings	\$ 14,998	2.9%	\$ 36,439	2.2%

Borrowings under bank lines of credit may be at interest rates based on LIBOR, CD rates, the prime rate or bids submitted by the banks. CGMHI pays commitment fees for its lines of credit. CGMHI has borrowing agreements consisting of facilities that CGMHI has been advised are available, but where no contractual lending obligation exists. These arrangements are reviewed on an ongoing basis to ensure flexibility in meeting CGMHI's short-term requirements.

Long-Term Debt

<i>In millions of dollars</i>	Weighted average coupon ⁽¹⁾	Maturities	Balances at December 31,	
			2018	2017
Senior notes	4.0%	2019-2058	\$ 87,122	\$ 75,658
Subordinated notes	4.6%	2020-2039	12,748	3,155
Total			\$ 99,870	\$ 78,813

(1) The weighted average contractual rates exclude structured notes accounted for at fair value.

Included in term debt at December 31, 2018 was \$73.9 billion of long-term debt with affiliates. This debt matures on various dates from 2019 to 2039.

The Company issues both fixed- and variable-rate debt in a range of currencies. It uses interest rate swaps to effectively convert a portion of its fixed-rate debt to variable-rate debt. The maturity structure of the interest rate swaps generally corresponds to the maturity structure of the debt being hedged. At December 31, 2018, the Company's overall weighted average interest rate for long-term debt, excluding structured notes accounted for at fair value, was 4.1% on a contractual basis.

Aggregate annual maturities of long-term debt obligations (based on final maturity dates) are as follows:

<i>In millions of dollars</i>	
2019	\$11,485
2020	12,884
2021	4,758
2022	9,052
2023	11,168
Thereafter	50,523
Total	\$99,870

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8. CAPITAL REQUIREMENTS

Certain U.S. and non-U.S. broker/dealer subsidiaries are subject to various securities and commodities regulations and capital adequacy requirements promulgated by the regulatory and exchange authorities of the countries in which they operate. These regulatory restrictions may impose regulatory capital requirements and limit the amounts that these subsidiaries can pay in dividends or advance to the Company.

Capital requirements related to the Company's principal regulated subsidiaries at December 31, 2018 are as follows:

In millions of dollars

Subsidiary	Jurisdiction	Net capital or equivalent	Excess over minimum requirement
Citigroup Global Markets Inc.	U.S. Securities and Exchange Commission Uniform Net Capital Rule (Rule 15c3-1)	\$ 8,201	\$ 5,573
Citigroup Global Markets Limited	United Kingdom's Prudential Regulation Authority	\$ 10,287	\$ 4,222

Citigroup Global Markets Inc. (CGMI) has elected to compute net capital in accordance with the provisions of Appendix E of SEC Rule 15c3-1 (Net Capital Rule). This methodology allows CGMI to compute market risk capital charges using internal value-at-risk models. Under Appendix E of the Net Capital Rule, CGMI is required to hold tentative net capital in excess of \$1 billion and net capital in excess of \$500 million. CGMI is also required to notify the SEC in the event that its tentative net capital is less than \$5 billion. As of December 31, 2018, CGMI had tentative net capital in excess of both the minimum and the notification requirements.

9. SECURITIZATIONS AND VARIABLE INTEREST ENTITIES

Uses of Special Purpose Entities

A special purpose entity (SPE) is an entity designed to fulfill a specific limited need of the company that organized it. The principal uses of SPEs by the Company are to obtain liquidity and favorable capital treatment by securitizing certain financial assets, to assist clients in securitizing their financial assets and to create investment products for clients. SPEs may be organized in various legal forms, including trusts, partnerships or corporations. In a securitization, through the SPE's issuance of debt and equity instruments, certificates, commercial paper or other notes of indebtedness, the company transferring assets to the SPE converts all (or a portion) of those assets into cash before they would have been realized in the normal course of business. These issuances are recorded on the balance sheet of the SPE, which may or may not be consolidated onto the balance sheet of the company that organized the SPE.

Investors usually have recourse only to the assets in the SPE, but may also benefit from other credit enhancements, such as a collateral account, a line of credit or a liquidity facility, such as a liquidity put option or asset purchase agreement. Because of these enhancements, the SPE issuances typically obtain a more favorable credit rating than the transferor could obtain for its own debt issuances. This results in less expensive financing costs than unsecured debt. The SPE may also enter into derivative contracts in order to convert the yield or currency of the underlying assets to match the needs of the SPE investors or to limit or change the credit risk of the SPE. The Company may be the provider of certain credit enhancements as well as the counterparty to any related derivative contracts.

Most of the Company's SPEs are variable interest entities (VIEs), as described below.

Variable Interest Entities

VIEs are entities that have either a total equity investment that is insufficient to permit the entity to finance its activities without additional subordinated financial support or whose equity investors lack the characteristics of a controlling financial interest (i.e., ability to make significant decisions through voting rights or similar rights and a right to receive the expected residual returns of the entity or an obligation to absorb the expected losses of the entity). Investors that finance the VIE through debt or equity interests or other counterparties providing other forms of support, such as guarantees, certain fee arrangements or certain types of derivative contracts, are variable interest holders in the entity.

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The variable interest holder, if any, that has a controlling financial interest in a VIE is deemed to be the primary beneficiary and must consolidate the VIE. The Company would be deemed to have a controlling financial interest and be the primary beneficiary if it has both of the following characteristics:

- power to direct the activities of the VIE that most significantly impact the entity's economic performance; and
- an obligation to absorb losses of the entity that could potentially be significant to the VIE, or a right to receive benefits from the entity that could potentially be significant to the VIE.

The Company must evaluate each VIE to understand the purpose and design of the entity, the role the Company had in the entity's design and its involvement in the VIE's ongoing activities. The Company then must evaluate which activities most significantly impact the economic performance of the VIE and who has the power to direct such activities.

For those VIEs where the Company determines that it has the power to direct the activities that most significantly impact the VIE's economic performance, the Company must then evaluate its economic interests, if any, and determine whether it could absorb losses or receive benefits that could potentially be significant to the VIE. When evaluating whether the Company has an obligation to absorb losses that could potentially be significant, it considers the maximum exposure to such loss without consideration of probability. Such obligations could be in various forms, including, but not limited to, debt and equity investments, guarantees, liquidity agreements and certain derivative contracts.

In various other transactions, the Company may (i) act as a derivative counterparty (for example, interest rate swap, cross-currency swap or purchaser of credit protection under a credit default swap or total return swap where the Company pays the total return on certain assets to the SPE), (ii) act as underwriter or placement agent, (iii) provide administrative, trustee or other services or (iv) make a market in debt securities or other instruments issued by VIEs. The Company generally considers such involvement, by itself, not to be variable interests and thus not an indicator of power or potentially significant benefits or losses.

The Company's involvement with consolidated and unconsolidated VIEs with which the Company holds significant variable interests is presented below:

	As of December 31, 2018							
	Total involvement with SPE assets	Consolidated VIE / SPE assets ⁽³⁾	Significant unconsolidated VIE assets ⁽⁴⁾	Maximum exposure to loss in significant unconsolidated VIEs ⁽¹⁾				
				Funded exposures ⁽²⁾		Unfunded exposures		
				Debt investments	Equity investments	Funding commitments	Derivatives	Total
<i>In millions of dollars</i>								
Mortgage securitizations ⁽⁵⁾								
U.S. agency-sponsored	\$ 70,940	\$ —	\$ 70,940	\$ 2,494	\$ —	\$ —	\$ —	\$ 2,494
Non-agency-sponsored	23,200	—	23,200	295	—	—	—	295
Collateralized loan obligations	9,382	—	9,382	183	—	—	9	192
Other	935	3	932	177	—	—	3	180
Total	\$ 104,457	\$ 3	\$ 104,454	\$ 3,149	\$ —	\$ —	\$ 12	\$ 3,161

	As of December 31, 2017							
	Total involvement with SPE assets	Consolidated VIE / SPE assets ⁽³⁾	Significant unconsolidated VIE assets ⁽⁴⁾	Maximum exposure to loss in significant unconsolidated VIEs ⁽¹⁾				
				Funded exposures ⁽²⁾		Unfunded exposures		
				Debt investments	Equity investments	Funding commitments	Derivatives	Total
<i>In millions of dollars</i>								
Mortgage securitizations ⁽⁵⁾								
U.S. agency-sponsored	\$ 68,318	\$ —	\$ 68,318	\$ 2,135	\$ —	\$ —	\$ —	\$ 2,135
Non-agency-sponsored	16,290	—	16,290	296	—	—	—	296
Collateralized loan obligations	7,016	—	7,016	189	—	—	9	198
Other	1,564	41	1,523	139	3	—	57	199
Total	\$ 93,188	\$ 41	\$ 93,147	\$ 2,759	\$ 3	\$ —	\$ 66	\$ 2,828

(1) The definition of maximum exposure to loss is included in the text that follows this table.

(2) Included on the Company's December 31, 2018 and 2017 Consolidated Statement of Financial Condition.

(3) The asset balances for consolidated VIEs represent the carrying amounts of the assets consolidated by the Company.

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- (4) A significant unconsolidated VIE is an entity in which the Company has any variable interest considered to be significant, regardless of the likelihood of loss.
- (5) CGMHI mortgage securitizations also include agency and non-agency (private-label) re-securitization activities. These SPEs are not consolidated. See “Re-securitizations” below for further discussion.

The previous tables do not include the following:

- certain VIEs structured by third parties in which the Company holds securities in inventory, as these investments are made on arm’s-length terms;
- certain positions in mortgage- and asset-backed securities held by the Company, which are classified as *Trading account assets*, in which the Company has no other involvement with the related securitization entity deemed to be significant (for more information on these positions, see Note 12 to the Consolidated Financial Statements); and
- certain representations and warranties exposures in legacy CGMHI-sponsored mortgage- and asset-backed securitizations, in which the Company has no variable interest or continuing involvement as servicer. The outstanding balance of mortgage loans securitized during 2005 to 2008 in which the Company has no variable interest or continuing involvement as servicer was approximately \$7 billion and \$9 billion at December 31, 2018 and 2017, respectively.

The asset balances for unconsolidated VIEs in which the Company has significant involvement represent the most current information available to the Company. In most cases, the asset balances represent an amortized cost basis without regard to impairments, unless fair value information is readily available to the Company.

The maximum funded exposure represents the balance sheet carrying amount of the Company’s investment in the VIE. It reflects the initial amount of cash invested in the VIE adjusted for any accrued interest and cash principal payments received. The carrying amount may also be adjusted for increases or declines in fair value or any impairment in value recognized in earnings. The maximum exposure of unfunded positions represents the notional amount of a derivative instrument considered to be a variable interest. In certain transactions, the Company has entered into derivative instruments or other arrangements that are not considered variable interests in the VIE (e.g., interest rate swaps, cross-currency swaps or where the Company is the purchaser of credit protection under a credit default swap or total return swap where the Company pays the total return on certain assets to the SPE). Receivables under such arrangements are not included in the maximum exposure amounts.

Significant Interests in Unconsolidated VIEs—Balance Sheet Classification

The following table presents the carrying amounts and classification of significant variable interests in unconsolidated VIEs:

<i>In millions of dollars</i>	December 31, 2018	December 31, 2017
Cash	\$ —	\$ 4
Trading account assets	2,922	2,643
Other assets	230	125
Total assets	\$ 3,152	\$ 2,772

Mortgage Securitizations

The Company’s mortgage securitizations represent government-sponsored agency and private label (non-agency-sponsored mortgages) re-securitization activities. These SPEs are not consolidated. See “Re-securitizations” below for further discussion. The Company’s mortgage securitizations are primarily non-recourse, thereby effectively transferring the risk of future credit losses to the purchasers of the securities issued by the trust.

The Company is not the primary beneficiary of its mortgage securitization entities because the Company does not have the power to direct the activities of the VIE that most significantly impact the entity’s economic performance. Therefore, CGMHI does not consolidate these mortgage securitization entities.

The following table includes information about loan delinquencies and liquidation losses for assets held in non-consolidated, non-agency-sponsored securitization entities as of December 31, 2018 and 2017:

<i>In millions of dollars</i>	Securitized assets		90 days past due		Liquidation losses	
	2018	2017	2018	2017	2018	2017
Residential mortgage	\$ 410	\$ 653	\$ 9	\$ 17	\$ —	\$ —

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Re-securitizations

The Company engages in re-securitization transactions in which debt securities are transferred to a VIE in exchange for new beneficial interests. CGMHI did not transfer non-agency (private label) securities to re-securitization entities during the years ended December 31, 2018 and 2017. These securities are backed by either residential or commercial mortgages and are often structured on behalf of clients.

As of December 31, 2018, the fair value of CGMHI-retained interests in private label re-securitization transactions structured by CGMHI totaled approximately \$16 million (all related to re-securitization transactions executed prior to 2016), which has been recorded in *Trading account assets*. Of this amount, all was related to subordinated beneficial interests. As of December 31, 2017, the fair value of CGMHI-retained interests in private label re-securitization transactions structured by CGMHI totaled approximately \$79 million (all related to re-securitization transactions executed prior to 2016). Of this amount, substantially all was related to subordinated beneficial interests. The original par value of private label re-securitization transactions in which CGMHI holds a retained interest as of December 31, 2018 and 2017 was approximately \$271 million and \$887 million, respectively.

The Company also re-securitizes U.S. government-agency guaranteed mortgage-backed (agency) securities. During the years ended December 31, 2018 and 2017, CGMHI transferred agency securities with a fair value of approximately \$26.3 billion and \$26.6 billion, respectively, to re-securitization entities.

As of December 31, 2018, the fair value of CGMHI-retained interests in agency re-securitization transactions structured by CGMHI totaled approximately \$2.5 billion (including \$1.4 billion related to re-securitization transactions executed in 2018) compared to \$2.1 billion as of December 31, 2017 (including \$854 million related to re-securitization transactions executed in 2017), which is recorded in *Trading account assets*. The original fair value of agency re-securitization transactions in which CGMHI holds a retained interest as of December 31, 2018 and 2017 was approximately \$70.9 billion and \$68.3 billion, respectively.

As of December 31, 2018 and 2017, the Company did not consolidate any private-label or agency re-securitization entities.

Collateralized Loan Obligations (CLOs)

A collateralized loan obligation (CLO) is a VIE that purchases a portfolio of assets consisting primarily of non-investment grade corporate loans. CLOs issue multiple tranches of debt and equity to investors to fund the asset purchases and pay upfront expenses associated with forming the CLO. A third-party asset manager is contracted by the CLO to purchase the underlying assets from the open market and monitor the credit risk associated with those assets. Over the term of a CLO, the asset manager directs purchases and sales of assets in a manner consistent with the CLO's asset management agreement and indenture. In general, the CLO asset manager will have the power to direct the activities of the entity that most significantly impact the economic performance of the CLO. Investors in a CLO, through their ownership of debt and/or equity in it, can also direct certain activities of the CLO, including removing its asset manager under limited circumstances, optionally redeeming the notes, voting on amendments to the CLO's operating documents and other activities. A CLO has a finite life, typically 12 years.

The Company serves as a structuring and placement agent with respect to the CLOs. Typically, the debt and equity of the CLOs are sold to third-party investors. On occasion, certain CGMHI entities may purchase some portion of a CLO's liabilities for investment purposes. In addition, CGMHI may purchase, typically in the secondary market, certain securities issued by the CLOs to support its market making activities.

The Company does not generally have the power to direct the activities that most significantly impact the economic performance of the CLOs, as this power is generally held by a third-party asset manager of the CLO. As such, those CLOs are not consolidated.

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10. DERIVATIVES ACTIVITIES

In the ordinary course of business, the Company enters into various types of derivative transactions, which include:

- *Futures and forward contracts*, which are commitments to buy or sell at a future date a financial instrument, commodity or currency at a contracted price and may be settled in cash or through delivery of an item readily convertible to cash.
- *Swap contracts*, which are commitments to settle in cash at a future date or dates that may range from a few days to a number of years, based on differentials between specified indices or financial instruments, as applied to a notional principal amount.
- *Option contracts*, which give the purchaser, for a premium, the right, but not the obligation, to buy or sell within a specified time a financial instrument, commodity or currency at a contracted price that may also be settled in cash, based on differentials between specified indices or prices.

Swaps, forwards and some option contracts are over-the-counter (OTC) derivatives that are bilaterally negotiated with counterparties and settled with those counterparties, except for swap contracts that are novated and "cleared" through central clearing parties (CCPs). Futures contracts and other option contracts are standardized contracts that are traded on an exchange with a CCP as the counterparty from the inception of the transaction. The Company enters into derivative contracts relating to interest rate, foreign currency, commodity and other market/credit risks for the following reasons:

- *Trading Purposes*: The Company trades derivatives as an active market maker. The Company offers its customers derivatives in connection with their risk management actions to transfer, modify or reduce their interest rate, foreign exchange and other market/credit risks or for their own trading purposes. The Company also manages its derivative risk positions through offsetting trade activities, controls focused on price verification and daily reporting of positions to senior managers.
- *Hedging*: The Company uses derivatives in connection with its own risk management activities to hedge certain risks. Hedging may be accomplished by applying hedge accounting in accordance with ASC 815, *Derivatives and Hedging*. For example, CGMHI issues fixed-rate long-term debt and then enters into a receive-fixed, pay-variable-rate interest rate swap with the same tenor and notional amount to synthetically convert the interest payments to a net variable-rate basis. This strategy is the most common form of an interest rate hedge, as it minimizes net interest cost in certain yield curve environments. Derivatives are also used to manage market risks inherent in specific groups of on-balance sheet assets and liabilities, including commodities and borrowings.

Derivatives may expose the Company to market, credit or liquidity risks in excess of the amounts recorded on the Consolidated Statement of Financial Condition. Market risk on a derivative product is the exposure created by potential fluctuations in interest rates, market prices, foreign exchange rates and other factors and is a function of the type of product, the volume of transactions, the tenor and terms of the agreement and the underlying volatility. Credit risk is the exposure to loss in the event of nonperformance by the other party to satisfy a derivative liability where the value of any collateral held by CGMHI is not adequate to cover such losses. The recognition in earnings of unrealized gains on derivative transactions is subject to management's assessment of the probability of counterparty default. Liquidity risk is the potential exposure that arises when the size of a derivative position may affect the ability to monetize the position in a reasonable period of time and at a reasonable cost in periods of high volatility and financial stress.

Derivative transactions are customarily documented under industry standard master netting agreements, which provide that following an event of default, the non-defaulting party may promptly terminate all transactions between the parties and determine the net amount due to be paid to, or by, the defaulting party. Events of default include (i) failure to make a payment on a derivative transaction that remains uncured following applicable notice and grace periods, (ii) breach of agreement that remains uncured after applicable notice and grace periods, (iii) breach of a representation, (iv) cross default, either to third-party debt or to other derivative transactions entered into between the parties, or, in some cases, their affiliates, (v) the occurrence of a merger or consolidation that results in a party's becoming a materially weaker credit and (vi) the cessation or repudiation of any applicable guarantee or other credit support document. Obligations under master netting agreements are often secured by collateral posted under an industry standard credit support annex to the master netting agreement. An event of default may also occur under a credit support annex if a party fails to make a collateral delivery that remains uncured following applicable notice and grace periods.

The netting and collateral rights incorporated in the master netting agreements are considered to be legally enforceable if a supportive legal opinion has been obtained from counsel of recognized standing that provides (i) the requisite level of certainty regarding enforceability, and (ii) that the exercise of rights by the non-defaulting party to terminate and close-out

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transactions on a net basis under these agreements will not be stayed or avoided under applicable law upon an event of default, including bankruptcy, insolvency or similar proceeding.

A legal opinion may not be sought for certain jurisdictions where local law is silent or unclear as to the enforceability of such rights or where adverse case law or conflicting regulation may cast doubt on the enforceability of such rights. In some jurisdictions and for some counterparty types, the insolvency law may not provide the requisite level of certainty. For example, this may be the case for certain sovereigns, municipalities, central banks and U.S. pension plans.

Exposure to credit risk on derivatives is affected by market volatility, which may impair the ability of counterparties to satisfy their obligations to the Company. Credit limits are established and closely monitored for customers engaged in derivatives transactions. CGMHI considers the level of legal certainty regarding enforceability of its offsetting rights under master netting agreements and credit support annexes to be an important factor in its risk management process. Specifically, CGMHI generally transacts much lower volumes of derivatives under master netting agreements where CGMHI does not have the requisite level of legal certainty regarding enforceability, because such derivatives consume greater amounts of single counterparty credit limits than those executed under enforceable master netting agreements.

Cash collateral and security collateral in the form of G10 government debt securities are often posted by a party to a master netting agreement to secure the net open exposure of the other party; the receiving party is free to commingle/rehypothecate such collateral in the ordinary course of its business. Nonstandard collateral such as corporate bonds, municipal bonds, U.S. agency securities and/or MBS may also be pledged as collateral for derivative transactions. Security collateral posted to open and maintain a master netting agreement with a counterparty, in the form of cash and/or securities, may from time to time be segregated in an account at a third-party custodian pursuant to a tri-party account control agreement.

Information pertaining to the Company's derivative activities, based on notional amounts, is presented in the following table. Derivative notional amounts are reference amounts from which contractual payments are derived and do not represent a complete and accurate measure of CGMHI's exposure to derivative transactions. Rather, CGMHI's derivative exposure arises primarily from market fluctuations (i.e., market risk), counterparty failure (i.e., credit risk) and/or periods of high volatility or financial stress (i.e., liquidity risk), as well as any market valuation adjustments that may be required on the transactions. Moreover, notional amounts do not reflect the netting of offsetting trades. For example, if CGMHI enters into a receive-fixed interest rate swap with \$100 million notional, and offsets this risk with an identical but opposite pay-fixed position with a different counterparty, \$200 million in derivative notional is reported, although these offsetting positions may result in de minimis overall market risk. Aggregate derivative notional amounts can fluctuate from period to period in the normal course of business based on CGMHI's market share, levels of client activity and other factors. All derivatives are recorded in *Trading account assets/Trading account liabilities* on the Consolidated Statement of Financial Condition.

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Derivative Notionals

<i>In millions of dollars</i>	Hedging instruments under ASC 815		Trading derivative instruments	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Interest rate contracts				
Swaps	\$ 347	\$ 339	\$ 5,657,050	\$ 5,311,921
Futures and forwards	—	—	1,310,899	1,455,646
Written options	—	—	1,429,257	1,755,400
Purchased options	—	—	1,397,485	1,849,220
Total interest rate contract notionals	347	339	9,794,691	10,372,187
Foreign exchange contracts				
Swaps	—	—	851,001	900,920
Futures, forwards and spot	—	1,482	796,856	857,404
Written options	—	—	145,407	156,585
Purchased options	—	—	145,852	156,999
Total foreign exchange contract notionals	—	1,482	1,939,116	2,071,908
Equity contracts				
Swaps	—	—	139,746	133,269
Futures and forwards	—	—	41,705	60,174
Written options	—	—	398,155	342,285
Purchased options	—	—	403,718	352,564
Total equity contract notionals	—	—	983,324	888,292
Commodity and other contracts				
Swaps	—	—	66,024	66,901
Futures and forwards	802	23	58,877	76,131
Written options	—	—	12,381	11,745
Purchased options	—	—	11,897	11,407
Total commodity and other contract	802	23	149,179	166,184
Credit derivatives ⁽¹⁾				
Protection sold	—	—	773,504	609,677
Protection purchased	—	—	781,197	619,227
Total credit derivatives	—	—	1,554,701	1,228,904
Total derivative notionals	\$ 1,149	\$ 1,844	\$ 14,421,011	\$ 14,727,475

(1) Credit derivatives are arrangements designed to allow one party (protection buyer) to transfer the credit risk of a “reference asset” to another party (protection seller). These arrangements allow a protection seller to assume the credit risk associated with the reference asset without directly purchasing that asset. The Company enters into credit derivative positions for purposes such as risk management, yield enhancement, reduction of credit concentrations and diversification of overall risk.

The following table presents the gross and net fair values of the Company’s derivative transactions and the related offsetting amounts as of December 31, 2018 and 2017. Gross positive fair values are offset against gross negative fair values by counterparty, pursuant to enforceable master netting agreements. Under ASC 815-10-45, payables and receivables in respect of cash collateral received from or paid to a given counterparty pursuant to a credit support annex are included in the offsetting amount, if a legal opinion supporting the enforceability of netting and collateral rights has been obtained. GAAP does not permit similar offsetting for security collateral.

In addition, the following table reflects rule changes adopted by clearing organizations that require or allow entities to treat derivative assets, liabilities and the related variation margin as settlement of the related derivative fair value for legal and accounting purposes, as opposed to presenting gross derivative assets and liabilities that are subject to collateral, whereby the counterparties would record a related collateral payable or receivable. As a result, the table reflects a reduction of approximately \$8.3 billion and \$4.6 billion as of December 31, 2018 and 2017, respectively, of derivative assets and derivative liabilities that previously would have been reported on a gross basis, but are now settled and not subject to collateral. The tables also present amounts that are not permitted to be offset, such as security collateral or cash collateral posted at third-party custodians, but which would be eligible for offsetting to the extent that an event of default occurred and a legal opinion supporting enforceability of the netting and collateral rights has been obtained.

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Derivative Mark-to-Market (MTM) Receivables/Payables

<i>In millions of dollars</i>	Derivatives classified in			
	Trading account assets / liabilities ^{(1) (2)}			
	December 31, 2018		December 31, 2017	
	Assets	Liabilities	Assets	Liabilities
Derivative instruments designated as ASC 815 hedges				
Over-the-counter interest rate contracts	\$ 37	\$ —	\$ 41	\$ —
Over-the-counter foreign exchange contracts	—	—	—	42
Total derivatives instruments designated as ASC 815 hedges	37	—	41	42
Derivatives instruments not designated as ASC 815 hedges				
Over-the-counter	112,766	111,390	106,927	98,319
Cleared	7,421	5,619	4,886	8,026
Exchange traded	51	90	99	93
Interest rate contracts	120,238	117,099	111,912	106,438
Over-the-counter	29,027	28,738	26,355	25,559
Cleared	—	—	731	992
Foreign exchange contracts	29,027	28,738	27,086	26,551
Over-the-counter	18,329	19,807	14,369	17,387
Cleared	17	32	22	27
Exchange traded	10,665	10,462	7,882	8,232
Equity contracts	29,011	30,301	22,273	25,646
Over-the-counter	13,670	16,168	10,286	12,049
Exchange traded	123	73	149	78
Commodity and other contracts	13,793	16,241	10,435	12,127
Over-the-counter	12,283	12,151	14,729	14,456
Cleared	675	721	3,077	4,037
Credit derivatives	12,958	12,872	17,806	18,493
Total derivatives instruments not designated as				
ASC 815 hedges	205,027	205,251	189,512	189,255
Total derivatives	205,064	205,251	189,553	189,297
Cash collateral paid/received ⁽³⁾	3,031	2,895	2,742	2,524
Less: Netting agreements ⁽⁴⁾	(177,104)	(177,104)	(162,558)	(162,558)
Less: Netting cash collateral received/paid ⁽⁵⁾	(15,984)	(12,942)	(16,408)	(11,522)
Net receivables / payables included on the				
Consolidated Statement of Financial Condition	\$ 15,007	\$ 18,100	\$ 13,329	\$ 17,741
Additional amounts subject to an enforceable master netting agreement,				
but not offset on the Consolidated Statement of Financial Condition				
Less: Cash collateral received/paid	(5)	—	(3)	—
Less: Non-cash collateral received/paid	(4,347)	(1,756)	(3,710)	(1,895)
Total net receivables/payables	\$ 10,655	\$ 16,344	\$ 9,616	\$ 15,846

(1) The derivatives fair values are presented in Note 12 to the Consolidated Financial Statements.

(2) Over-the-counter (OTC) derivatives are derivatives executed and settled bilaterally with counterparties without the use of an organized exchange or central clearing house. Cleared derivatives include derivatives executed bilaterally with a counterparty in the OTC market, but then novated to a central clearing house, whereby the central clearing house becomes the counterparty to both of the original counterparties. Exchange traded derivatives include derivatives executed directly on an organized exchange that provides pre-trade price transparency.

(3) At December 31, 2018, reflects the net amount of the \$15,973 million and \$18,879 million of gross cash collateral paid and received, respectively. Of the gross cash collateral paid, \$12,942 million was used to offset trading derivative liabilities and, of the gross cash collateral received, \$15,984 million was used to offset trading derivative assets. At December 31, 2017, reflects the net amount of the \$14,264 million and \$18,932 million of gross cash collateral paid and received, respectively. Of the gross cash collateral paid, \$11,522 million was used to offset trading derivative liabilities and, of the gross cash collateral received, \$16,408 million was used to offset trading derivative assets.

(4) Represents the netting of derivative receivable and payable balances with the same counterparty under enforceable netting agreements.

(5) Represents the netting of cash collateral paid and received by counterparty under enforceable credit support agreements.

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For the years ended December 31, 2018, 2017 and 2016, the amounts recognized in *Principal transactions* in the Consolidated Statement of Income related to derivatives not designated in a qualifying hedging relationship, as well as the underlying non-derivative instruments, are presented in Note 3 to the Consolidated Financial Statements. The Company presents this disclosure by showing derivative gains and losses related to its trading activities together with gains and losses related to non-derivative instruments within the same trading portfolios, as this represents how these portfolios are risk managed.

Accounting for Derivative Hedging

The Company accounts for its hedging activities in accordance with ASC 815, *Derivatives and Hedging*. As a general rule, hedge accounting is permitted where the Company is exposed to a particular risk, such as interest rate or price risk, that causes changes in the fair value of an asset or liability that may affect earnings.

Derivative contracts hedging the risks associated with changes in fair value are referred to as fair value hedges. Hedges that utilize derivatives to manage the foreign exchange risk associated with equity investments in non-U.S.-dollar-functional-currency foreign subsidiaries (net investment in a foreign operation) are net investment hedges.

To qualify as an accounting hedge under the hedge accounting rules, a hedging relationship must be highly effective in offsetting the risk designated as being hedged. The hedge relationship must be formally documented at inception, detailing the particular risk management objective and strategy for the hedge. This includes the item and risk(s) being hedged, the hedging instrument being used and how effectiveness will be assessed. The effectiveness of these hedging relationships is evaluated at hedge inception and on an ongoing basis both on a retrospective and prospective basis, typically using quantitative measures of correlation, with hedge ineffectiveness measured and recorded in current earnings. Hedge effectiveness assessment methodologies are performed in a similar manner for similar hedges, and are used consistently throughout the hedging relationships. The assessment of effectiveness may exclude changes in the value of the hedged item that are unrelated to the risks being hedged and the changes in fair value of the derivative associated with time value. These excluded items are amortized directly into earnings over the life of the hedge.

Discontinued Hedge Accounting

A hedging instrument must be highly effective in accomplishing the hedge objective of offsetting changes in the fair value of the hedged item for the risk being hedged. Management may voluntarily de-designate an accounting hedge at any time, but if a hedge relationship is not highly effective, it no longer qualifies for hedge accounting and must be de-designated. Subsequent changes in the fair value of the derivative are recognized in *Other revenue* or *Principal transactions*, similar to trading derivatives, with no offset recorded related to the hedged item.

For fair value hedges, any changes in the fair value of the hedged item remain as part of the basis of the asset or liability and are ultimately realized as an element of the yield on the item.

The foregoing criteria are applied on a decentralized basis, consistent with the level at which market risk is managed, but are subject to various limits and controls. The underlying asset or liability may be an individual item or a portfolio of similar items.

Fair Value Hedges

Hedging of Benchmark Interest Rate Risk

CGMHI hedges exposure to changes in the fair value of fixed-rate long-term debt. For qualifying fair value hedges of interest rate risk, the changes in the fair value of the derivative and the change in the fair value of the hedged item attributable to the hedged are presented within *Interest expense*. Prior to the adoption of ASU 2017-12, the fair value of the derivative was presented in *Other revenue* and the difference between the changes in the hedged item and the derivative was defined as ineffectiveness.

Hedging of Commodity Price Risk

The Company hedges the change in fair value attributable to spot price movements in physical commodities inventory. The hedging instrument is a futures contract to sell the underlying commodity. In this hedge, the change in the value of the hedged inventory is reflected in earnings, which offsets the change in the fair value of the futures contract that is also reflected in earnings. Although the change in the fair value of the hedging instrument recorded in earnings includes changes in forward rates, CGMHI excludes the differential between the spot and the contractual forward rates under the futures contract from the assessment of hedge effectiveness. Since the assessment is based on changes in fair value attributable to change in spot prices on both the physical commodity and the futures contract from the assessment of hedge effectiveness and amortizes it directly into earnings over the life of the hedge.

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The following table summarizes the gains (losses) on the Company's fair value hedges:

<i>In millions of dollars</i>	Gains / (losses) on fair value hedges ⁽¹⁾		
	Year ended December 31,		
	2018	2017	2016
Gain (loss) on the derivatives in designated and qualifying fair value hedges:			
Interest rate contracts	\$ (4)	\$ (5)	\$ (6)
Commodity contracts	(137)	(17)	181
Total gain (loss) on the derivatives in designated and qualifying fair value hedges	\$ (141)	\$ (22)	\$ 175
Gain (loss) on the hedged item in designated and qualifying fair value hedges:			
Interest rate hedges	\$ 4	\$ 5	\$ 6
Commodity hedges	122	19	(207)
Total gain (loss) on the hedged item in designated and qualifying fair value hedges	\$ 126	\$ 24	\$ (201)
Hedge ineffectiveness recognized in earnings on designated and qualifying fair value hedges	\$ —	\$ —	\$ —
Net gain (loss) excluded from assessment of the effectiveness of fair value hedges:			
Commodity hedges ⁽²⁾	\$ 5	\$ 2	\$ (26)

(1) Amounts are included in *Other revenue* on the Consolidated Statement of Income. The accrued interest income on fair value hedges is recorded in *Net interest and dividends* and is excluded from this table.

(2) Amounts relate to the premium associated with forward contracts (differential between spot and contractual forward rates). These amounts are excluded from the assessment of hedge effectiveness and are reflected directly in earnings.

Net Investment Hedges

Consistent with ASC 830-20, *Foreign Currency Matters—Foreign Currency Transactions*, ASC 815 allows the hedging of the foreign currency risk of a net investment in a foreign operation. Citigroup uses foreign currency forwards to manage the foreign exchange risk associated with CGMHI's equity investments in several non-U.S.-dollar-functional-currency foreign subsidiaries. CGMHI records the change in the carrying amount of these investments in the *Foreign currency translation adjustment* account within AOCI. Prior to the second quarter of 2018, the effective portion of the hedge of this exposure was also recorded in CGMHI's *Foreign currency translation adjustment* account and any ineffective portion was immediately recorded in earnings. Beginning in the second quarter of 2018, these hedges of CGMHI foreign exchange risk are executed by a non-consolidated CGMHI affiliate.

The pretax loss recorded in the *Foreign currency translation adjustment* account within AOCI, related to the effective portion of the net investment hedges, is \$17 million, \$97 million and \$23 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Credit Derivatives

The Company is a market maker and trades a range of credit derivatives. Through these contracts, CGMHI either purchases or writes protection on either a single name or a portfolio of reference credits. CGMHI also uses credit derivatives to help mitigate credit risk in its trading account portfolios and other cash positions and to facilitate client transactions.

CGMHI monitors its counterparty credit risk in credit derivative contracts. As of both December 31, 2018 and December 31, 2017, approximately 98% of the gross receivables are from counterparties with which CGMHI maintains collateral agreements. A majority of CGMHI's top 15 counterparties (by receivable balance owed to CGMHI) are banks, financial institutions or other dealers. Contracts with these counterparties do not include ratings-based termination events. However, counterparty ratings downgrades may have an incremental effect by lowering the threshold at which CGMHI may call for additional collateral.

The range of credit derivatives entered into includes credit default swaps, total return swaps, credit options and credit-linked notes.

A credit default swap is a contract in which, for a fee, a protection seller agrees to reimburse a protection buyer for any losses that occur due to a predefined credit event on a reference entity. These credit events are defined by the terms of the derivative contract and the reference credit and are generally limited to the market standard of failure to pay on indebtedness and bankruptcy of the reference credit and, in a more limited range of transactions, debt restructuring. Credit derivative transactions that reference emerging market entities also typically include additional credit events to cover the acceleration

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of indebtedness and the risk of repudiation or a payment moratorium. In certain transactions, protection may be provided on a portfolio of reference entities or asset-backed securities. If there is no credit event, as defined by the specific derivative contract, then the protection seller makes no payments to the protection buyer and receives only the contractually specified fee. However, if a credit event occurs as defined in the specific derivative contract sold, the protection seller will be required to make a payment to the protection buyer. Under certain contracts, the seller of protection may not be required to make a payment until a specified amount of losses has occurred with respect to the portfolio and/or may only be required to pay for losses up to a specified amount.

A total return swap typically transfers the total economic performance of a reference asset, which includes all associated cash flows, as well as capital appreciation or depreciation. The protection buyer receives a floating rate of interest and any depreciation on the reference asset from the protection seller and, in return, the protection seller receives the cash flows associated with the reference asset plus any appreciation. Thus, according to the total return swap agreement, the protection seller will be obligated to make a payment any time the floating interest rate payment plus any depreciation of the reference asset exceeds the cash flows associated with the underlying asset. A total return swap may terminate upon a default of the reference asset or a credit event with respect to the reference entity, subject to the provisions of the related total return swap agreement between the protection seller and the protection buyer.

A credit option is a credit derivative that allows investors to trade or hedge changes in the credit quality of a reference entity. For example, in a credit spread option, the option writer assumes the obligation to purchase or sell credit protection on the reference entity at a specified “strike” spread level. The option purchaser buys the right to sell credit default protection on the reference entity to, or purchase it from, the option writer at the strike spread level. The payments on credit spread options depend either on a particular credit spread or the price of the underlying credit-sensitive asset or other reference entity. The options usually terminate if a credit event occurs with respect to the underlying reference entity.

A credit-linked note is a form of credit derivative structured as a debt security with an embedded credit default swap. The purchaser of the note effectively provides credit protection to the issuer by agreeing to receive a return that could be negatively affected by credit events on the underlying reference credit. If the reference entity defaults, the note may be cash settled or physically settled by delivery of a debt security of the reference entity. Thus, the maximum amount of the note purchaser’s exposure is the amount paid for the credit-linked note.

The following tables summarize the key characteristics of the Company’s credit derivatives portfolio by counterparty and derivative form:

<i>In millions of dollars at December 31, 2018</i>	Fair values		Notionals	
	Receivable	Payable	Protection purchased	Protection sold
By industry/counterparty:				
Banks	\$ 10,041	\$ 10,016	\$ 546,928	\$ 555,344
Broker-dealers	703	688	27,824	28,231
Non-financial	27	40	1,281	98
Insurance and other financial institutions	2,187	2,128	205,164	189,831
Total by industry/counterparty	12,958	12,872	781,197	773,504
By instrument:				
Credit default swaps and options	12,719	12,610	758,377	745,963
Total return swaps and other	239	262	22,820	27,541
Total by instrument	12,958	12,872	781,197	773,504
By rating:				
Investment grade	6,878	6,655	635,700	631,092
Non-investment grade	6,080	6,217	145,497	142,412
Total by rating	12,958	12,872	781,197	773,504
By maturity:				
Within 1 year	1,047	1,128	134,895	134,617
From 1 to 5 years	9,911	9,929	595,643	591,358
After 5 years	2,000	1,815	50,659	47,529
Total by maturity	\$ 12,958	\$ 12,872	\$ 781,197	\$ 773,504

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<i>In millions of dollars at December 31, 2017</i>	Fair values		Notionals	
	Receivable	Payable	Protection purchased	Protection sold
By industry/counterparty:				
Banks	\$ 12,468	\$ 12,256	\$ 425,504	\$ 436,600
Broker-dealers	854	724	25,124	31,148
Non-financial	27	13	256	116
Insurance and other financial institutions	4,457	5,500	168,343	141,813
Total by industry/counterparty	17,806	18,493	619,227	609,677
By instrument:				
Credit default swaps and options	17,512	17,782	606,338	598,292
Total return swaps and other	294	711	12,889	11,385
Total by instrument	17,806	18,493	619,227	609,677
By rating:				
Investment grade	9,388	9,471	465,884	457,201
Non-investment grade	8,418	9,022	153,343	152,476
Total by rating	17,806	18,493	619,227	609,677
By maturity:				
Within 1 year	1,187	1,643	124,097	120,666
From 1 to 5 years	14,989	15,227	458,859	454,387
After 5 years	1,630	1,623	36,271	34,624
Total by maturity	\$ 17,806	\$ 18,493	\$ 619,227	\$ 609,677

Fair values included in the above tables are prior to application of any netting agreements and cash collateral. For notional amounts, CGMHI generally has a mismatch between the total notional amounts of protection purchased and sold, and it may hold the reference assets directly rather than entering into offsetting credit derivative contracts as and when desired. The open risk exposures from credit derivative contracts are largely matched after certain cash positions in reference assets are considered and after notional amounts are adjusted, either to a duration-based equivalent basis or to reflect the level of subordination in tranching structures. The ratings of the credit derivatives portfolio presented in the tables and used to evaluate payment/performance risk are based on the assigned internal or external ratings of the reference asset or entity. Where external ratings are used, investment-grade ratings are considered to be “Baa/BBB” and above, while anything below is considered non-investment grade. CGMHI’s internal ratings are in line with the related external rating system.

The Company evaluates the payment/performance risk of the credit derivatives for which it stands as a protection seller based on the credit rating assigned to the underlying reference credit. Credit derivatives written on an underlying non-investment grade reference credit represent greater payment risk to the Company. The non-investment grade category in the table above also includes credit derivatives where the underlying reference entity has been downgraded subsequent to the inception of the derivative.

The maximum potential amount of future payments under credit derivative contracts presented in the table above is based on the notional value of the derivatives. The Company believes that the notional amount for credit protection sold is not representative of the actual loss exposure based on historical experience. This amount has not been reduced by the value of the reference assets and the related cash flows. In accordance with most credit derivative contracts, should a credit event occur, the Company usually is liable for the difference between the protection sold and the value of the reference assets. Furthermore, the notional amount for credit protection sold has not been reduced for any cash collateral paid to a given counterparty, as such payments would be calculated after netting all derivative exposures, including any credit derivatives with that counterparty in accordance with a related master netting agreement. Due to such netting processes, determining the amount of collateral that corresponds to credit derivative exposures alone is not possible. The Company actively monitors open credit-risk exposures and manages this exposure by using a variety of strategies, including purchased credit derivatives, cash collateral or direct holdings of the referenced assets. This risk mitigation activity is not captured in the table above.

Credit-Risk-Related Contingent Features in Derivatives

Certain derivative instruments contain provisions that require the Company to either post additional collateral or immediately settle any outstanding liability balances upon the occurrence of a specified event related to the credit risk of

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the Company. These events, which are defined by the existing derivative contracts, are primarily downgrades in the credit ratings of the Company and its affiliates.

The fair value (excluding CVA) of all derivative instruments with credit-risk-related contingent features that were in a net liability position at both December 31, 2018 and December 31, 2017 was \$8.8 billion and \$6.2 billion, respectively. The Company posted \$8.4 billion and \$7.2 billion as collateral for this exposure in the normal course of business as of December 31, 2018 and December 31, 2017, respectively.

A downgrade could trigger additional collateral or cash settlement requirements for the Company and certain affiliates. In the event that each legal entity were downgraded a single notch by all three major rating agencies as of December 31, 2018, the Company could be required to post an additional \$159 million as either collateral or settlement of the derivative transactions. Additionally, the Company could be required to segregate with third-party custodians collateral previously received from existing derivative counterparties in the amount of \$71 million upon the single notch downgrade, resulting in aggregate cash obligations and collateral requirements of approximately \$230 million.

Derivatives Accompanied by Financial Asset Transfers

The Company executes total return swaps that provide it with synthetic exposure to substantially all of the economic return of the securities or other financial assets referenced in the contract. In certain cases, the derivative transaction is accompanied by the Company's transfer of the referenced financial asset to the derivative counterparty, most typically in response to the derivative counterparty's desire to hedge, in whole or in part, its synthetic exposure under the derivative contract by holding the referenced asset in funded form. In certain jurisdictions these transactions qualify as sales, resulting in derecognition of the securities transferred (see Note 1 to the Consolidated Financial Statements for further discussion of the related sale conditions for transfers of financial assets). For a significant portion of the transactions, the Company has also executed another total return swap where the Company passes on substantially all of the economic return of the referenced securities to a different third party seeking the exposure. In those cases, the Company is not exposed, on a net basis, to changes in the economic return of the referenced securities.

These transactions generally involve the transfer of the Company's liquid government bonds, convertible bonds or publicly traded corporate equity securities from the trading portfolio and are executed with third-party financial institutions. The accompanying derivatives are typically total return swaps. The derivatives are cash settled and subject to ongoing margin requirements.

When the conditions for sale accounting are met, the Company reports the transfer of the referenced financial asset as a sale and separately reports the accompanying derivative transaction. These transactions generally do not result in a gain or loss on the sale of the security, because the transferred security was held at fair value in the Company's trading portfolio. For transfers of financial assets accounted for as a sale by the Company, and for which the Company has retained substantially all of the economic exposure to the transferred asset through a total return swap executed with the same counterparty in contemplation of the initial sale and still outstanding, both the asset amounts derecognized and gross cash proceeds received as of the date of derecognition were \$4.1 billion and \$3.0 billion as of December 31, 2018 and 2017, respectively.

At December 31, 2018, the fair value of these previously derecognized assets was \$4.1 billion. The fair value of the total return swaps as of December 31, 2018 was \$55 million recorded as gross derivative assets and \$9 million recorded as gross derivative liabilities. At December 31, 2017, the fair value of these previously derecognized assets was \$3.1 billion, and the fair value of the total return swaps was \$89 million recorded as gross derivative assets and \$15 million recorded as gross derivative liabilities.

The balances for the total return swaps are on a gross basis, before the application of counterparty and cash collateral netting, and are included primarily as equity derivatives in the tabular disclosures in this Note.

11. CONCENTRATIONS OF CREDIT RISK

Concentrations of credit risk exist when changes in economic, industry or geographic factors similarly affect groups of counterparties whose aggregate credit exposure is material in relation to the Company's total credit exposure. Although the Company's portfolio of financial instruments is broadly diversified along product and geographic lines, material transactions are completed with other financial institutions, particularly in the securities trading, derivatives and foreign exchange businesses.

In connection with the Company's efforts to maintain a diversified portfolio, the Company limits its exposure to any one geographic region, country or individual creditor and monitors this exposure on a continuous basis. At December 31, 2018,

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the Company's most significant concentration of credit risk was with the U.S. government and its agencies. The Company's exposure, which primarily results from trading assets issued by the U.S. government and its agencies, amounted to \$43.0 billion and \$37.2 billion at December 31, 2018 and 2017, respectively. With the addition of U.S. government and U.S. government agency securities pledged as collateral by counterparties in connection with collateralized financing activity, the Company's total holdings of U.S. government securities were approximately \$164 billion or 28% of the Company's total assets before netting at December 31, 2018, and approximately \$142 billion or 27% of the Company's total assets before netting at December 31, 2017. Concentrations with foreign governments totaled approximately \$137 billion and \$129 billion at December 31, 2018 and 2017, respectively. These consist predominantly of securities issued by the governments of major industrialized nations.

12. FAIR VALUE MEASUREMENT

ASC 820-10 *Fair Value Measurement*, defines fair value, establishes a consistent framework for measuring fair value and requires disclosures about fair value measurements. 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, and therefore represents an exit price. Among other things, the standard requires the Company to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value.

Under ASC 820-10, the probability of default of a counterparty is factored into the valuation of derivative and other positions as well as the impact of the Company's own credit risk on derivatives and other liabilities measured at fair value.

Fair Value Hierarchy

ASC 820-10 specifies a hierarchy of inputs based on whether the inputs are observable or unobservable. Observable inputs are developed using market data and reflect market participant assumptions, while unobservable inputs reflect the Company's market assumptions. These two types of inputs have created the following fair value hierarchy:

- Level 1: Quoted prices for *identical* instruments in active markets.
- Level 2: Quoted prices for *similar* instruments in active markets, quoted prices for identical or similar instruments in markets that are not active and model-derived valuations in which all significant inputs and significant value drivers are *observable* in active markets.
- Level 3: Valuations derived from valuation techniques in which one or more significant inputs or significant value drivers are *unobservable*.

As required under the fair value hierarchy, the Company considers relevant and observable market inputs in its valuations where possible. The frequency of transactions, the size of the bid-ask spread and the amount of adjustment necessary when comparing similar transactions are all factors in determining the relevance of observed prices in those markets.

Determination of Fair Value

For assets and liabilities carried at fair value, the Company measures fair value using the procedures set out below, irrespective of whether the assets and liabilities are measured at fair value as a result of an election or whether they are required to be measured at fair value.

When available, the Company uses quoted market prices to determine fair value and classifies such items as Level 1. In some specific cases where a market price is available, the Company will make use of acceptable practical expedients (such as matrix pricing) to calculate fair value, in which case the items are classified as Level 2.

The Company may also apply a price-based methodology, which utilizes, where available, quoted prices or other market information obtained from recent trading activity in positions with the same or similar characteristics to the position being valued. The frequency and size of transactions are among the factors that are driven by the liquidity of markets and determine the relevance of observed prices in those markets. If relevant and observable prices are available, those valuations may be classified as Level 2. When that is not the case, and there are one or more significant unobservable "price" inputs, then those valuations will be classified as Level 3. Furthermore, when less liquidity exists for a security or loan, a quoted price is stale, a significant adjustment to the price of a similar security is necessary to reflect differences in the terms of the actual security or loan being valued, or prices from independent sources are insufficient to corroborate the valuation, the "price" inputs are considered unobservable and the fair value measurements are classified as Level 3.

If quoted market prices are not available, fair value is based upon internally developed valuation techniques that use, where possible, current market-based parameters, such as interest rates, currency rates and option volatilities. Items valued using such internally generated valuation techniques are classified according to the lowest level input or value driver that is

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significant to the valuation. Thus, an item may be classified as Level 3 even though there may be some significant inputs that are readily observable.

Fair value estimates from internal valuation techniques are verified, where possible, to prices obtained from independent vendors or brokers. Vendors' and brokers' valuations may be based on a variety of inputs ranging from observed prices to proprietary valuation models, and the Company assesses the quality and relevance of this information in determining the estimate of fair value. The following section describes the valuation methodologies used by the Company to measure various financial instruments at fair value, including an indication of the level in the fair value hierarchy in which each instrument is generally classified. Where appropriate, the description includes details of the valuation models, the key inputs to those models and any significant assumptions.

Market Valuation Adjustments

Generally, the unit of account for a financial instrument is the individual financial instrument. The Company applies market valuation adjustments that are consistent with the unit of account, which does not include adjustment due to the size of the Company's position, except as follows. ASC 820-10 permits an exception, through an accounting policy election, to measure the fair value of a portfolio of financial assets and financial liabilities on the basis of the net open risk position when certain criteria are met. CGMHI has elected to measure certain portfolios of financial instruments that meet those criteria, such as derivatives, on the basis of the net open risk position. The Company applies market valuation adjustments, including adjustments to account for the size of the net open risk position, consistent with market participant assumptions.

Valuation adjustments are applied to items classified as Level 2 or Level 3 in the fair value hierarchy to ensure that the fair value reflects the price at which the net open risk position could be exited. These valuation adjustments are based on the bid/offer spread for an instrument in the market. When CGMHI has elected to measure certain portfolios of financial investments, such as derivatives, on the basis of the net open risk position, the valuation adjustment may take into account the size of the position.

Credit valuation adjustments (CVA) and funding valuation adjustments (FVA) are applied to the relevant population of over-the-counter (OTC) derivative instruments where adjustments to reflect counterparty credit risk, own credit risk and term funding risk are required to estimate fair value. This principally includes derivatives with a base valuation (e.g., discounted using overnight indexed swap (OIS)) requiring adjustment for these effects, such as uncollateralized interest rate swaps. The CVA represents a portfolio-level adjustment to reflect the risk premium associated with the counterparty's (assets) or CGMHI's (liabilities) non-performance risk.

FVA reflect a market funding risk premium inherent in the uncollateralized portion of a derivative portfolio and in certain collateralized derivative portfolios that do not include standard credit support annexes (CSAs), such as where the CSA does not permit the reuse of collateral received. CGMHI's FVA methodology leverages the existing CVA methodology to estimate a funding exposure profile. The calculation of this exposure profile considers collateral agreements in which the terms do not permit the Company to reuse the collateral received, including where counterparties post collateral to third-party custodians.

CGMHI's CVA and FVA methodology consists of two steps:

- First, the exposure profile for each counterparty is determined using the terms of all individual derivative positions and a Monte Carlo simulation or other quantitative analysis to generate a series of expected cash flows at future points in time. The calculation of this exposure profile considers the effect of credit risk mitigants and sources of funding, including pledged cash or other collateral and any legal right of offset that exists with a counterparty through arrangements such as netting agreements. Individual derivative contracts that are subject to an enforceable master netting agreement with a counterparty are aggregated as a netting set for this purpose, since it is those aggregate net cash flows that are subject to nonperformance risk. This process identifies specific, point-in-time future cash flows that are subject to nonperformance risk and unsecured funding, rather than using the current recognized net asset or liability as a basis to measure the CVA and FVA.
- Second, for CVA, market-based views of default probabilities derived from observed credit spreads in the credit default swap (CDS) market are applied to the expected future cash flows determined in step one. CGMHI's own-credit CVA is determined using Citi-specific CDS spreads for the relevant tenor. Generally, counterparty CVA is determined using CDS spread indices for each credit rating and tenor. For certain identified netting sets where individual analysis is practicable (e.g., exposures to counterparties with liquid CDSs), counterparty-specific CDS spreads are used. For FVA, a term structure of future liquidity spreads is applied to the expected future funding requirement.

The CVA and FVA are designed to incorporate a market view of the credit and funding risk, respectively, inherent in the derivative portfolio. However, most unsecured derivative instruments are negotiated bilateral contracts and are not

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commonly transferred to third parties. Derivative instruments are normally settled contractually or, if terminated early, are terminated at a value negotiated bilaterally between the counterparties. Thus, the CVA and FVA may not be realized upon a settlement or termination in the normal course of business. In addition, all or a portion of these adjustments may be reversed or otherwise adjusted in future periods in the event of changes in the credit or funding risk associated with the derivative instruments.

The table below summarizes the CVA and FVA applied to the fair value of derivative instruments at December 31, 2018 and 2017:

<i>In millions of dollars</i>	Credit and funding valuation adjustments contra-liability (contra-asset)	
	December 31, 2018	December 31, 2017
Counterparty CVA	\$ (152)	\$ (119)
Asset FVA	(53)	(35)
CGMHI (own-credit) CVA ⁽¹⁾	199	116
Liability FVA	25	11
Total CVA—derivative instruments ⁽²⁾	\$ 19	\$ (27)

(1) Determined using Citi-specific CDS spreads.

(2) FVA is included with CVA for presentation purposes.

The table below summarizes pretax gains (losses) related to changes in CVA on derivative instruments, net of hedges, FVA on derivatives and debt valuation adjustments (DVA) on the Company's own fair value option (FVO) liabilities for the years indicated:

<i>In millions of dollars</i>	Credit/funding/debt valuation adjustments gain (loss)		
	2018	2017	2016
Counterparty CVA	\$ (17)	\$ 39	\$ (15)
Asset FVA	(18)	(1)	11
Own-credit CVA ⁽¹⁾	82	(57)	1
Liability FVA	14	(5)	(14)
Total CVA—derivative instruments	61	(24)	(17)
DVA related to own FVO liabilities ⁽²⁾	630	(291)	(32)
Total CVA and DVA ⁽³⁾	\$ 691	\$ (315)	\$ (49)

(1) Determined using Citi-specific CDS spreads.

(2) See Note 1 to the Consolidated Financial Statements.

(3) FVA is included with CVA for presentation purposes.

Securities Borrowed and Purchased Under Agreements to Resell and Securities Loaned and Sold Under Agreements to Repurchase

No quoted prices exist for these instruments, so fair value is determined using a discounted cash flow technique. Cash flows are estimated based on the terms of the contract, taking into account any embedded derivative or other features. These cash flows are discounted using interest rates appropriate to the maturity of the instrument as well as the nature of the underlying collateral. Generally, when such instruments are recorded at fair value, they are classified within Level 2 of the fair value hierarchy, as the inputs used in the valuation are readily observable. However, certain long-dated positions are classified within Level 3 of the fair value hierarchy.

Trading Account Assets and Liabilities—Trading Securities and Trading Loans

When available, the Company uses quoted market prices in active markets to determine the fair value of trading securities; such items are classified as Level 1 of the fair value hierarchy. Examples include government securities and exchange-traded equity securities.

For bonds and secondary market loans traded over the counter, the Company generally determines fair value utilizing valuation techniques, including discounted cash flows, price-based and internal models. Fair value estimates from these internal valuation techniques are verified, where possible, to prices obtained from independent sources, including third-party vendors. Vendors compile prices from various sources and may apply matrix pricing for similar bonds or loans where

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no price is observable. A price-based methodology utilizes, where available, quoted prices or other market information obtained from recent trading activity of assets with similar characteristics to the bond or loan being valued. The yields used in discounted cash flow models are derived from the same price information. Trading securities and loans priced using such methods are generally classified as Level 2. However, when less liquidity exists for a security or loan, a quoted price is stale, a significant adjustment to the price of a similar security or loan is necessary to reflect differences in the terms of the actual security or loan being valued, or prices from independent sources are insufficient to corroborate valuation, a loan or security is generally classified as Level 3. The price input used in a price-based methodology may be zero for a security, such as a subprime CDO, that is not receiving any principal or interest and is currently written down to zero.

When the Company's principal market for a portfolio of loans is the securitization market, the Company uses the securitization price to determine the fair value of the portfolio. The securitization price is determined from the assumed proceeds of a hypothetical securitization in the current market, adjusted for transformation costs (i.e., direct costs other than transaction costs) and securitization uncertainties such as market conditions and liquidity. As a result of the severe reduction in the level of activity in certain securitization markets since the second half of 2007, observable securitization prices for certain directly comparable portfolios of loans have not been readily available. Therefore, such portfolios of loans are generally classified as Level 3 of the fair value hierarchy. However, for other loan securitization markets, such as commercial real estate loans, price verification of the hypothetical securitizations has been possible, since these markets have remained active. Accordingly, this loan portfolio is classified as Level 2 of the fair value hierarchy.

For most of the lending and structured direct subprime exposures, fair value is determined utilizing observable transactions where available, other market data for similar assets in markets that are not active and other internal valuation techniques. The valuation of certain asset-backed security (ABS) CDO positions utilizes prices based on the underlying assets of the ABS CDO.

Trading Account Assets and Liabilities—Derivatives

Exchange-traded derivatives, measured at fair value using quoted (i.e., exchange) prices in active markets, where available, are classified as Level 1 of the fair value hierarchy.

Derivatives without a quoted price in an active market and derivatives executed over the counter are valued using internal valuation techniques. These derivative instruments are classified as either Level 2 or Level 3 depending on the observability of the significant inputs to the model.

The valuation techniques depend on the type of derivative and the nature of the underlying instrument. The principal techniques used to value these instruments are discounted cash flows and internal models, such as derivative pricing models (e.g., Black-Scholes and Monte Carlo simulations).

The key inputs depend upon the type of derivative and the nature of the underlying instrument and include interest rate yield curves, foreign exchange rates, volatilities and correlation. The Company typically uses OIS curves as fair value measurement inputs for the valuation of certain derivatives.

Investments

The investments category includes nonpublic investments in private equity and real estate entities. Determining the fair value of nonpublic securities involves a significant degree of management judgment, as no quoted prices exist and such securities are generally thinly traded. In addition, there may be transfer restrictions on private equity securities. The Company's process for determining the fair value of such securities utilizes commonly accepted valuation techniques, including comparables analysis. In determining the fair value of nonpublic securities, the Company also considers events such as a proposed sale of the investee company, initial public offerings, equity issuances or other observable transactions. Private equity securities are generally classified as Level 3 of the fair value hierarchy.

Short-Term Borrowings and Long-Term Debt

Where fair value accounting has been elected, the fair value of non-structured liabilities is determined by utilizing internal models using the appropriate discount rate for the applicable maturity. Such instruments are generally classified as Level 2 of the fair value hierarchy when all significant inputs are readily observable.

The Company determines the fair value of hybrid financial instruments, including structured liabilities, using the appropriate derivative valuation methodology (described above in "Trading Account Assets and Liabilities—Derivatives") given the nature of the embedded risk profile. Such instruments are classified as Level 2 or Level 3 depending on the observability of significant inputs to the model.

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Items Measured at Fair Value on a Recurring Basis

The following tables present for each of the fair value hierarchy levels the Company's assets and liabilities that are measured at fair value on a recurring basis at December 31, 2018 and December 31, 2017. The Company may hedge positions that have been classified in the Level 3 category with other financial instruments (hedging instruments) that may be classified as Level 3, but also with financial instruments classified as Level 1 or Level 2 of the fair value hierarchy. The effects of these hedges are presented gross in the following tables:

Fair Value Levels

<i>In millions of dollars at December 31, 2018</i>	Level 1	Level 2	Level 3	Gross inventory	Netting ⁽¹⁾	Net balance
Assets						
Securities borrowed and purchased under agreements to resell						
	\$ —	\$ 212,190	\$ 115	\$ 212,305	\$ (66,984)	\$ 145,321
Trading non-derivative assets						
Trading mortgage-backed securities						
U.S. government-sponsored agency guaranteed	—	23,953	156	24,109	—	24,109
Residential	—	663	268	931	—	931
Commercial	—	1,324	77	1,401	—	1,401
Total trading mortgage-backed securities	—	25,940	501	26,441	—	26,441
U.S. Treasury and federal agency securities	14,868	3,979	—	18,847	—	18,847
State and municipal securities	—	3,106	26	3,132	—	3,132
Foreign government securities	27,541	3,799	31	31,371	—	31,371
Corporate	1,011	13,036	417	14,464	—	14,464
Equity securities	32,648	1,110	133	33,891	—	33,891
Asset-backed securities	—	1,394	1,479	2,873	—	2,873
Other trading assets	1	1,925	2	1,928	—	1,928
Total trading non-derivative assets	76,069	54,289	2,589	132,947	—	132,947
Trading derivatives						
Interest rate contracts	69	119,651	555	120,275		
Foreign exchange contracts	—	28,961	66	29,027		
Equity contracts	263	28,373	375	29,011		
Commodity contracts	—	12,809	984	13,793		
Credit derivatives	—	12,596	362	12,958		
Total trading derivatives	332	202,390	2,342	205,064		
Cash collateral paid ⁽²⁾				3,031		
Netting agreements					(177,104)	
Netting of cash collateral received					(15,984)	
Total trading derivatives	332	202,390	2,342	208,095	(193,088)	15,007
Securities received as collateral	15,845	67	—	15,912	—	15,912
Investments - Non-marketable equity securities	4	46	141	191	—	191
Other financial assets measured on a recurring basis	—	1,058	5	1,063	—	1,063
Total assets	\$ 92,250	\$ 470,040	\$ 5,192	\$ 570,513	\$ (260,072)	\$ 310,441
Total as a percentage of gross assets ⁽³⁾	16.3%	82.8%	0.9%			

See footnotes on the next page.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
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Items Measured at Fair Value on a Recurring Basis (continued)

<i>In millions of dollars at December 31, 2018</i>	Level 1	Level 2	Level 3	Gross inventory	Netting ⁽¹⁾	Net balance
Liabilities						
Securities loaned and sold under						
agreements to repurchase	\$ —	\$ 110,483	\$ 983	\$ 111,466	\$ (66,984)	\$ 44,482
Trading account liabilities						
Securities sold, not yet purchased	68,853	9,842	174	78,869	—	78,869
Trading derivatives						
Interest rate contracts	61	116,386	652	117,099		
Foreign exchange contracts	2	28,593	143	28,738		
Equity contracts	122	29,548	631	30,301		
Commodity contracts	—	15,515	726	16,241		
Credit derivatives	—	12,513	359	12,872		
Total trading derivatives	185	202,555	2,511	205,251		
Cash collateral received ⁽⁴⁾				2,895		
Netting agreements					(177,104)	
Netting of cash collateral paid					(12,942)	
Total trading derivatives	185	202,555	2,511	208,146	(190,046)	18,100
Obligations to return securities						
received as collateral	15,845	67	—	15,912	—	15,912
Short-term borrowings	—	2,841	37	2,878	—	2,878
Long-term debt	—	20,784	4,302	25,086	—	25,086
Total liabilities	\$ 84,883	\$ 346,572	\$ 8,007	\$ 442,357	\$ (257,030)	\$ 185,327
Total as a percentage of gross liabilities ⁽³⁾	19.3%	78.8%	1.9%			

- (1) Represents netting of (i) the amounts due under securities purchased under agreements to resell and the amounts owed under securities sold under agreements to repurchase; and (ii) derivative exposures covered by a qualifying master netting agreement and cash collateral offsetting.
- (2) Reflects the net amount of \$15,973 million of gross cash collateral paid, of which \$12,942 million was used to offset derivative liabilities.
- (3) Because the amount of the cash collateral paid/received has not been allocated to the Level 1, 2 and 3 subtotals, these percentages are calculated based on total assets and liabilities measured at fair value on a recurring basis, excluding the cash collateral paid/received on derivatives.
- (4) Reflects the net amount of \$18,879 million of gross cash collateral received, of which \$15,984 million was used to offset derivative assets.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Items Measured at Fair Value on a Recurring Basis (continued)

Fair Value Levels

<i>In millions of dollars at December 31, 2017</i>	Level 1	Level 2	Level 3	Gross inventory	Netting ⁽¹⁾	Net balance
Assets						
Securities borrowed and purchased under agreements to resell	\$ —	\$ 185,740	\$ 16	\$ 185,756	\$ (55,638)	\$ 130,118
Trading non-derivative assets						
Trading mortgage-backed securities						
U.S. government-sponsored agency guaranteed	—	22,778	162	22,940	—	22,940
Residential	—	598	165	763	—	763
Commercial	—	1,309	57	1,366	—	1,366
Total trading mortgage-backed securities	—	24,685	384	25,069	—	25,069
U.S. Treasury and federal agency securities	10,593	3,628	—	14,221	—	14,221
State and municipal securities	—	3,447	84	3,531	—	3,531
Foreign government securities	24,479	6,561	16	31,056	—	31,056
Corporate	297	13,349	289	13,935	—	13,935
Equity securities	34,893	1,471	103	36,467	—	36,467
Asset-backed securities	—	1,169	1,589	2,758	—	2,758
Other trading assets	1	1,662	60	1,723	—	1,723
Total trading non-derivative assets	70,263	55,972	2,525	128,760	—	128,760
Trading derivatives						
Interest rate contracts	141	111,172	640	111,953		
Foreign exchange contracts	19	26,941	126	27,086		
Equity contracts	2,147	19,667	459	22,273		
Commodity contracts	56	9,906	473	10,435		
Credit derivatives	—	17,237	569	17,806		
Total trading derivatives	2,363	184,923	2,267	189,553		
Cash collateral paid ⁽²⁾				2,742		
Netting agreements					(162,558)	
Netting of cash collateral received					(16,408)	
Total trading derivatives	2,363	184,923	2,267	192,295	(178,966)	13,329
Securities received as collateral	14,572	57	—	14,629	—	14,629
Investments - Non-marketable equity securities	—	49	94	143	—	143
Other financial assets measured on a recurring basis	—	729	51	780	—	780
Total assets	\$ 87,198	\$ 427,470	\$ 4,953	\$ 522,363	\$ (234,604)	\$ 287,759
Total as a percentage of gross assets ⁽³⁾	16.8%	82.3%	0.9%			

See footnotes on the next page.

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Items Measured at Fair Value on a Recurring Basis (continued)

<i>In millions of dollars at December 31, 2017</i>	Level 1	Level 2	Level 3	Gross inventory	Netting ⁽¹⁾	Net balance
Liabilities						
Securities loaned and sold under						
agreements to repurchase	\$ —	\$ 95,550	\$ 726	\$ 96,276	\$ (55,638)	\$ 40,638
Trading account liabilities						
Securities sold, not yet purchased	56,282	8,943	17	65,242	—	65,242
Trading derivatives						
Interest rate contracts	133	105,642	663	106,438		
Foreign exchange contracts	9	26,408	176	26,593		
Equity contracts	2,189	21,737	1,720	25,646		
Commodity contracts	21	9,676	2,430	12,127		
Credit derivatives	—	17,899	594	18,493		
Total trading derivatives	2,352	181,362	5,583	189,297		
Cash collateral received ⁽⁴⁾				2,524		
Netting agreements					(162,558)	
Netting of cash collateral paid					(11,522)	
Total trading derivatives	2,352	181,362	5,583	191,821	(174,080)	17,741
Obligations to return securities						
received as collateral	15,541	57	—	15,598	—	15,598
Short-term borrowings	—	2,839	18	2,857	—	2,857
Long-term debt	—	11,604	5,247	16,851	—	16,851
Total liabilities	\$ 74,175	\$ 300,355	\$ 11,591	\$ 388,645	\$ (229,718)	\$ 158,927
Total as a percentage of gross liabilities ⁽³⁾	19.2%	77.8%	3.0%			

- (1) Represents netting of (i) the amounts due under securities purchased under agreements to resell and the amounts owed under securities sold under agreements to repurchase; and (ii) derivative exposures covered by a qualifying master netting agreement and cash collateral offsetting.
- (2) Reflects the net amount of \$14,264 million of gross cash collateral paid, of which \$11,522 million was used to offset derivative liabilities.
- (3) Because the amount of the cash collateral paid/received has not been allocated to the Level 1, 2 and 3 subtotals, these percentages are calculated based on total assets and liabilities measured at fair value on a recurring basis, excluding the cash collateral paid/received on derivatives.
- (4) Reflects the net amount of \$18,932 million of gross cash collateral received, of which \$16,408 million was used to offset derivative assets.

Changes in Level 3 Fair Value Category

The following tables present the changes in the Level 3 fair value category for the years ended December 31, 2018 and 2017. The gains and losses presented below include changes in the fair value related to both observable and unobservable inputs.

The Company often hedges positions with offsetting positions that are classified in a different level. For example, the gains and losses for assets and liabilities in the Level 3 category presented in the tables below do not reflect the effect of offsetting losses and gains on hedging instruments that may be classified in the Level 1 and Level 2 categories. In addition, the Company hedges items classified in the Level 3 category with instruments also classified in Level 3 of the fair value hierarchy. The hedged items and related hedges are presented gross in the following tables:

CITIGROUP GLOBAL MARKETS HOLDINGS INC. AND SUBSIDIARIES
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<i>In millions of dollars</i>	Dec. 31, 2017	Net realized/unrealized gains (losses) incl. in				Purchases	Issuances	Sales	Settlements	Dec. 31, 2018	Unrealized gains (losses) still held ⁽¹⁾
		Principal transactions	Other	Transfers into out of Level 3 Level 3							
Assets											
Securities borrowed and purchased under agreements to resell	\$ 16	\$ 16	\$ —	\$ 52	\$ —	\$ 94	\$ 16	\$ —	\$ (79)	\$ 115	\$ 9
Trading non-derivative assets											
Trading mortgage-backed securities											
U.S. government-sponsored											
agency guaranteed	162	5	—	92	(98)	275	—	(280)	—	156	186
Residential	165	114	—	124	(134)	154	—	(155)	—	268	4
Commercial	57	(10)	—	24	(48)	112	—	(58)	—	77	(1)
Total trading mortgage-backed securities	384	109	—	240	(280)	541	—	(493)	—	501	189
U.S. Treasury and federal											
agency securities	—	—	—	6	(6)	—	—	—	—	—	—
State and municipal	84	11	—	—	(44)	19	—	(44)	—	26	9
Foreign government	16	(2)	—	5	(13)	57	—	(32)	—	31	(1)
Corporate debt	289	(72)	—	143	(43)	553	(40)	(413)	—	417	(32)
Equity securities	103	(13)	—	25	(58)	281	—	(205)	—	133	(60)
Asset-backed securities	1,589	36	—	77	(90)	1,229	—	(1,362)	—	1,479	(21)
Other trading assets	60	(45)	—	88	(21)	94	—	(174)	—	2	(9)
Total trading non-derivative assets	2,525	24	—	584	(555)	2,774	(40)	(2,723)	—	2,589	75
Investments in non-marketable equity securities	94	—	(6)	—	—	94	—	(37)	(4)	141	38
Other financial assets measured on a recurring basis	51	—	(106)	—	—	60	—	—	—	5	4
Liabilities											
Securities loaned and sold under agreements to repurchase	\$ 726	\$ (6)	\$ —	\$ 1	\$ —	\$ —	\$ 281	\$ (31)	\$ —	\$ 983	\$ 24
Trading account liabilities											
Securities sold, not yet purchased	17	(56)	—	166	(128)	—	226	(64)	(99)	174	(176)
Derivatives, net ⁽²⁾											
Interest rate contracts	23	(58)	—	10	(27)	—	—	—	33	97	(52)
Foreign exchange contracts	50	(60)	—	1	(1)	—	—	—	(33)	77	(37)
Equity contracts	1,261	(104)	—	119	(1,265)	(26)	5	17	41	256	(275)
Commodity contracts	1,957	(234)	—	8	(2,170)	(63)	—	20	(244)	(258)	36
Credit derivatives	25	34	—	—	(1)	—	—	—	7	(3)	(27)
Total derivatives, net ⁽²⁾	3,316	(422)	—	138	(3,464)	(89)	5	37	(196)	169	(355)
Short-term borrowings	18	14	—	35	(50)	—	86	—	(38)	37	25
Long-term debt	5,247	(1,029)	—	1,290	(3,235)	—	(12)	3	(20)	4,302	(1,647)

(1) Represents the amount of total gains or losses for the period, included in earnings, attributable to the change in fair value relating to assets and liabilities classified as Level 3 that are still held at December 31, 2018.

(2) Total Level 3 trading derivative assets and liabilities have been netted in these tables for presentation purposes only.

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<i>In millions of dollars</i>	Dec. 31, 2016	Net realized/unrealized gains (losses) incl. in		Transfers		Purchases	Issuances	Sales	Settlements	Dec. 31, 2017	Unrealized gains (losses) still held ⁽¹⁾
		Principal transactions	Other	into Level 3	out of Level 3						
Assets											
Securities borrowed and purchased under agreements to resell	\$ 489	\$ 33	\$ —	\$ —	\$ (491)	\$ —	\$ —	\$ —	\$ (15)	\$ 16	\$ 1
Trading non-derivative assets											
Trading mortgage-backed securities											
U.S. government-sponsored											
agency guaranteed	176	19	—	176	(176)	461	—	(496)	2	162	2
Residential	234	29	—	95	(101)	127	—	(221)	2	165	14
Commercial	206	(203)	—	48	(62)	449	—	(381)	—	57	(6)
Total trading mortgage-backed securities	616	(155)	—	319	(339)	1,037	—	(1,098)	4	384	10
U.S. Treasury and federal agency securities	1	—	—	—	—	—	—	(1)	—	—	—
State and municipal	173	(1)	—	—	(48)	94	—	(134)	—	84	7
Foreign government	20	4	—	12	(13)	61	—	(68)	—	16	—
Corporate debt	342	210	—	143	(196)	497	—	(707)	—	289	82
Equity securities	62	(91)	—	199	(34)	45	—	(78)	—	103	—
Asset-backed securities	1,867	202	—	44	(194)	1,392	—	(1,722)	—	1,589	36
Other trading assets	33	14	—	73	(305)	377	—	(132)	—	60	11
Total trading non-derivative assets	3,114	183	—	790	(1,129)	3,503	—	(3,940)	4	2,525	146
Investments in non-marketable equity securities	250	—	(121)	—	—	14	—	(18)	(31)	94	19
Other financial assets measured on a recurring basis	11	—	112	—	—	3	—	(75)	—	51	44
Liabilities											
Securities loaned and sold under agreements to repurchase	\$ 849	\$ (24)	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ (147)	\$ 726	\$ 10
Trading account liabilities											
Securities sold, not yet purchased	62	(19)	—	1	(20)	—	—	54	(99)	17	8
Derivatives, net ⁽²⁾											
Interest rate contracts	(762)	(136)	—	(1)	550	(35)	—	52	83	23	(90)
Foreign exchange contracts	(1)	(236)	—	6	3	—	—	—	(194)	50	(82)
Equity contracts	911	252	—	619	60	(50)	—	61	(88)	1,261	57
Commodity contracts	2,051	(332)	—	(74)	15	—	—	—	(367)	1,957	(66)
Credit derivatives	23	(26)	—	(14)	2	—	—	—	(12)	25	(18)
Total derivatives, net ⁽²⁾	2,222	(478)	—	536	630	(85)	—	113	(578)	3,316	(199)
Short-term borrowings	42	30	—	4	(7)	—	30	—	(21)	18	(2)
Long-term debt	2,304	(1,853)	—	730	(590)	—	1,094	—	(144)	5,247	(195)

(1) Represents the amount of total gains or losses for the period, included in earnings, attributable to the change in fair value relating to assets and liabilities classified as Level 3 that are still held at December 31, 2017.

(2) Total Level 3 trading derivative assets and liabilities have been netted in these tables for presentation purposes only.

Level 3 Fair Value Rollforward

The following were the significant Level 3 transfers for the period December 31, 2017 to December 31, 2018:

- Transfers of *Equity Contract Derivatives* of \$1.3 billion from Level 3 to Level 2 related to equity derivatives where the unobservable components were deemed insignificant.
- Transfers of *Commodity Contract Derivatives* of \$2.2 billion from Level 3 to Level 2 related to commodity derivatives where the unobservable component of the derivatives were deemed insignificant.

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- Transfers of *Long-Term Debt* of \$1.3 billion from Level 2 to Level 3, and of \$3.2 billion from Level 3 to Level 2, mainly related to structured debt, reflecting changes in the significance of unobservable inputs as well as certain underlying market inputs becoming less or more observable.

The following were the significant Level 3 transfers for the period December 31, 2016 to December 31, 2017:

- Transfers of *Securities borrowed and purchased under agreements* to resell of \$0.5 billion from Level 3 to Level 2, related to the significance of unobservable inputs as well as certain underlying market inputs becoming more observable and shortening of the remaining tenor of certain reverse repos. There is more transparency and observability for repo curves used in the valuation of structured reverse repos with tenors up to five years.
- Transfers of Long-term debt of \$0.7 billion from Level 2 to Level 3, and of \$0.6 billion from Level 3 to Level 2, mainly related to structured debt, reflecting changes in the significance of unobservable inputs as well as certain underlying market inputs becoming less or more observable.

Valuation Techniques and Inputs for Level 3 Fair Value Measurements

The Company's Level 3 inventory consists of both cash instruments and derivatives of varying complexity. The valuation methodologies used to measure the fair value of these positions include discounted cash flow analysis, internal models and comparative analysis. A position is classified within Level 3 of the fair value hierarchy when at least one input is unobservable and is considered significant to its valuation. The specific reason an input is deemed unobservable varies; for example, at least one significant input to the pricing model is not observable in the market, at least one significant input has been adjusted to make it more representative of the position being valued or the price quote available does not reflect sufficient trading activities.

The following tables present the valuation techniques covering the majority of Level 3 inventory and the most significant unobservable inputs used in Level 3 fair value measurements. Differences between this table and amounts presented in the Level 3 Fair Value Rollforward table represent individually immaterial items that have been measured using a variety of valuation techniques other than those listed.

<i>As of December 31, 2018</i>	Fair Value ⁽¹⁾ <i>(in millions)</i>	Methodology	Input	Low ^{(2) (3)}	High ^{(2) (3)}	Weighted Average ⁽⁴⁾
Assets						
Securities borrowed and purchased						
under agreements to resell	\$ 115	Model-based	Interest rate	2.52 %	7.43 %	5.08 %
Mortgage-backed securities	\$ 303	Price-based	Price	\$ 11.00	\$ 104.16	\$ 88.43
	198	Yield analysis	Yield	2.27 %	8.70 %	3.74 %
State and municipal, foreign government, corporate and other debt securities						
	\$ 399	Price-based	Price	\$ —	\$ 1,022.58	\$ 87.90
	73	Model-based	Interest rate	1.08 %	1.08 %	1.08 %
Equity securities ⁽⁵⁾	\$ 108	Price-based	Price	\$ —	\$ 20,255.00	\$ 1,247.85
	25	Model-based				
Asset-backed securities	\$ 1,478	Price-based	Price	\$ 2.75	\$ 99.58	\$ 62.82
Non-marketable equity	\$ 58	Price-based	Price	\$ —	\$ 1,073.80	\$ 542.65
	46	Comparables analysis	Revenue multiple	3.50x	16.50x	7.96x
	37	Model-based	Appraised value	\$ 2,285,949	\$ 31,428,638	\$ 17,413,822
Derivatives – Gross ⁽⁶⁾						
Interest rate contracts (gross)	\$ 1,190	Model-based	IR normal volatility	0.16 %	86.31 %	54.96 %
			Inflation volatility	0.22 %	2.65 %	0.75 %
			Mean reversion	1.00 %	20.00 %	10.50 %
Foreign exchange contracts (gross)	\$ 209	Model-based	IR normal volatility	0.16 %	86.31 %	92.05 %
			Foreign exchange (FX) volatility	3.15 %	17.35 %	12.73 %
			IR-FX correlation	40.00 %	60.00 %	50.00 %
			IR-IR correlation	40.00 %	40.00 %	40.00 %

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<i>As of December 31, 2018</i>	Fair Value ⁽¹⁾ <i>(in millions)</i>	Methodology	Input	Low ^{(2) (3)}	High ^{(2) (3)}	Weighted Average ⁽⁴⁾
Equity contracts (gross) ⁽⁷⁾	\$ 1,006	Model-based	Forward price	15.30 %	585.07 %	100.36 %
			Equity volatility	3.00 %	78.39 %	37.25 %
			Equity-IR correlation	(40.00)%	70.37 %	30.80 %
			Equity-Equity correlation	(81.39)%	100.00 %	34.04 %
			Equity-FX correlation	(86.27)%	70.00 %	(1.20)%
Commodity contracts (gross)	\$ 1,710	Model-based	Forward price	15.30 %	585.07 %	144.60 %
			Commodity volatility	8.92 %	59.86 %	20.34 %
			Commodity correlation	(51.90)%	92.11 %	40.71 %
Credit derivatives (gross)	\$ 423	Price-based	Upfront points	5.16 %	99.04 %	58.24 %
	297	Model-based	Price	\$ 14.25	\$ 98.00	\$ 74.69
			Credit spread	11 bps	296 bps	103 bps
			Credit correlation	5.00 %	85.00 %	39.36 %
Other financial assets measured on a recurring basis	\$ 5	Model-based	Forward price	29.97 %	179.57 %	304.56 %
Liabilities						
Securities loaned and sold under agreements to repurchase	\$ 983	Model-based	Interest rate	2.52 %	3.21 %	2.87 %
Trading account liabilities						
Securities sold, not yet purchased	\$ 153	Model-based	Forward price	15.30 %	585.07 %	100.49 %
	21	Price-based	Equity volatility	3.00 %	78.39 %	43.49 %
			Equity-Equity correlation	(81.39)%	100.00 %	34.04 %
			Equity-FX correlation	(86.27)%	70.00 %	(1.20)%
Short-term borrowings and long-term debt	\$ 3,902	Model-based	IR normal volatility	12.69 %	86.31 %	64.82 %
	436	Price-based	Forward price	15.30 %	585.07 %	100.31 %
			Mean reversion	1.00 %	20.00 %	10.50 %
			Equity volatility	3.00 %	78.39 %	43.28 %
			Equity-Equity correlation	(81.39)%	100.00 %	34.04 %
			Equity-FX correlation	(86.27)%	70.00 %	(1.20)%
Fair Value ⁽¹⁾						
<i>As of December 31, 2017</i>	Fair Value ⁽¹⁾ <i>(in millions)</i>	Methodology	Input	Low ^{(2) (3)}	High ^{(2) (3)}	Weighted Average ⁽⁴⁾
Assets						
Securities borrowed and purchased under agreements to resell	\$ 16	Model-based	Interest rate	1.43 %	2.16 %	2.09 %
Mortgage-backed securities	\$ 203	Price-based	Price	\$ 1.96	\$ 101.00	\$ 53.32
	181	Yield analysis	Yield	2.52 %	11.63 %	5.92 %
State and municipal, foreign government, corporate and other debt securities	\$ 298	Price-based	Price	\$ 3.65	\$ 184.04	\$ 92.19
	151	Model-based				
Equity securities ⁽⁵⁾	\$ 64	Price-based	Price	\$ —	\$ 25,450.00	\$ 2,587.22
	38	Model-based				
Asset-backed securities	\$ 1,584	Price-based	Price	\$ 2.16	\$ 101.38	\$ 61.59
Non-marketable equity	\$ 66	Price-based	Discount to price	— %	20.00 %	10.19 %
	14	Model-based	Price-to-book ratio	100.00 %	100.00 %	100.00 %
	10	Yield analysis	Price	\$ 8.76	\$ 45.59	\$ 25.91
			Fund NAV	\$394,620	\$10,000,000	\$9,635,343

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<i>As of December 31, 2017</i>	Fair Value ⁽¹⁾ <i>(in millions)</i>	Methodology	Input	Low ^{(2) (3)}	High ^{(2) (3)}	Weighted Average ⁽⁴⁾
Derivatives – Gross ⁽⁶⁾						
Interest rate contracts (gross)	\$ 1,299	Model-based	IR normal volatility	0.12 %	77.40 %	53.72 %
			Mean reversion	1.00 %	20.00 %	10.50 %
			Interest rate	2.39 %	2.75 %	2.40 %
Foreign exchange contracts (gross)	\$ 301	Model-based	IR normal volatility	0.12 %	66.20 %	53.01 %
			Credit spread	147 bps	237 bps	189 bps
			Foreign exchange (FX) volatility	4.58 %	15.02 %	10.96 %
			IR-FX correlation	40.00 %	60.00 %	50.00 %
			IR-IR correlation	40.00 %	40.00 %	40.00 %
Equity contracts (gross) ⁽⁷⁾	\$ 2,147	Model-based	Equity volatility	3.00 %	68.93 %	22.63 %
			Forward price	69.74 %	154.19 %	91.69 %
			Equity-IR correlation	35.00 %	35.00 %	35.00 %
Commodity contracts (gross)	\$ 2,847	Model-based	Forward price	3.66 %	290.59 %	114.45 %
			Commodity volatility	8.60 %	66.73 %	25.04 %
			Commodity correlation	(37.64)%	91.71 %	15.21 %
Credit derivatives (gross)	\$ 673	Model-based	Credit spread	24 bps	467 bps	227 bps
	490	Price-based	Upfront points	6.95 %	88.35 %	56.64 %
			Price	\$ 1.00	\$ 95.00	\$ 59.46
			Credit correlation	20.00 %	90.00 %	48.35 %
Other financial assets measured on a recurring basis	\$ 51	Model-based	Equity volatility	3.00 %	68.93 %	22.52 %
			Forward price	69.74 %	161.11 %	101.71 %
			Commodity volatility	8.60 %	66.73 %	25.04 %
			Commodity correlation	(37.64)%	91.71 %	15.21 %
Liabilities						
Securities loaned and sold under agreements to repurchase	\$ 726	Model-based	Interest rate	1.43 %	2.16 %	2.09 %
Trading account liabilities Securities sold, not yet purchased	\$ 16	Price-based	Price	\$ —	\$ 287.64	\$ 80.03
Short-term borrowings and long-term debt	\$ 5,265	Model-based	Forward price	69.74 %	161.11 %	100.74 %
			Equity volatility	3.00 %	68.93 %	22.41 %
			Commodity volatility	8.60 %	66.73 %	25.04 %
			Commodity correlation	(37.64)%	91.71 %	15.21 %

- (1) The fair value amounts presented in these tables represent the primary valuation technique or techniques for each class of assets or liabilities.
- (2) Some inputs are shown as zero due to rounding.
- (3) When the low and high inputs are the same, there is either a constant input applied to all positions or the methodology involving the input applies to only one large position.
- (4) Weighted averages are calculated based on the fair values of the instruments.
- (5) For equity securities, the price inputs are expressed on an absolute basis, not as a percentage of the notional amount.
- (6) Trading account derivatives—assets and liabilities—are presented on a gross absolute value basis.
- (7) Includes hybrid products.

Uncertainty of Fair Value Measurements Relating to Unobservable Inputs

Valuation uncertainty arises when there is insufficient or disperse market data to allow a precise determination of the exit value of a fair-valued position or portfolio in today's market. This is especially prevalent in Level 3 fair value instruments, where uncertainty exists in valuation inputs that may be both unobservable and significant to the instrument's (or portfolio's) overall fair value measurement. The uncertainties associated with key unobservable inputs on the Level 3 fair value measurements may not be independent of one another. In addition, the amount and direction of the uncertainty on a fair value measurement for a given change in an unobservable input depends on the nature of the instrument as well as whether the Company holds the instrument as an asset or a liability. For certain instruments, the pricing, hedging and risk management are sensitive to the correlation between various inputs rather than on the analysis and aggregation of the

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individual inputs.

The following section describes some of the most significant unobservable inputs used by the Company in Level 3 fair value measurements.

Correlation

Correlation is a measure of the extent to which two or more variables change in relation to each other. A variety of correlation-related assumptions are required for a wide range of instruments, including equity and credit baskets, foreign exchange options, CDOs backed by loans or bonds, mortgages, subprime mortgages and many other instruments. For almost all of these instruments, correlations are not directly observable in the market and must be calculated using alternative sources, including historical information. Estimating correlation can be especially difficult where it may vary over time, and calculating correlation information from market data requires significant assumptions regarding the informational efficiency of the market (e.g., swaptions markets). Uncertainty therefore exists when an estimate of the appropriate level of correlation as an input into some fair value measurements is required.

Changes in correlation levels can have a substantial impact, favorable or unfavorable, on the value of an instrument, depending on its nature. A change in the default correlation of the fair value of the underlying bonds comprising a CDO structure would affect the fair value of the senior tranche. For example, an increase in the default correlation of the underlying bonds would reduce the fair value of the senior tranche, because highly correlated instruments produce greater losses in the event of default and a portion of these losses would become attributable to the senior tranche. That same change in default correlation would have a different impact on junior tranches of the same structure.

Volatility

Volatility represents the speed and severity of market price changes and is a key factor in pricing options. Volatility generally depends on the tenor of the underlying instrument and the strike price or level defined in the contract. Volatilities for certain combinations of tenor and strike are not observable and need to be estimated using alternative methods, such as using comparable instruments, historical analysis or other sources of market information. This leads to uncertainty around the final fair value measurement of instruments with unobservable volatilities.

The general relationship between changes in the value of a portfolio to changes in volatility also depends on changes in interest rates and the level of the underlying index. Generally, long option positions (assets) benefit from increases in volatility, whereas short option positions (liabilities) will suffer losses. Some instruments are more sensitive to changes in volatility than others. For example, an at-the-money option would experience a greater percentage change in its fair value than a deep-in-the-money option. In addition, the fair value of an option with more than one underlying security (e.g., an option on a basket of bonds) depends on the volatility of the individual underlying securities as well as their correlations.

Yield

In some circumstances, the yield of an instrument is not observable in the market and must be estimated from historical data or from yields of similar securities. This estimated yield may need to be adjusted to capture the characteristics of the security being valued. In other situations, the estimated yield may not represent sufficient market liquidity and must be adjusted as well. Whenever the amount of the adjustment is significant to the value of the security, the fair value measurement is classified as Level 3.

Adjusted yield is generally used to discount the projected future principal and interest cash flows on instruments, such as asset-backed securities. Adjusted yield is impacted by changes in the interest rate environment and relevant credit spreads.

Prepayment

Voluntary unscheduled payments (prepayments) change the future cash flows for the investor and thereby change the fair value of the security. The effect of prepayments is more pronounced for residential mortgage-backed securities. An increase in prepayments—in speed or magnitude—generally creates losses for the holder of these securities. Prepayment is generally negatively correlated with delinquency and interest rate. A combination of low prepayment and high delinquencies amplifies each input's negative impact on mortgage securities' valuation. As prepayment speeds change, the weighted average life of the security changes, which impacts the valuation either positively or negatively, depending upon the nature of the security and the direction of the change in the weighted average life.

Recovery

Recovery is the proportion of the total outstanding balance of a bond or loan that is expected to be collected in a liquidation scenario. For many credit securities (such as asset-backed securities), there is no directly observable market input for recovery, but indications of recovery levels are available from pricing services. The assumed recovery of a security may differ from its actual recovery that will be observable in the future. The recovery rate impacts the valuation of credit

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securities. Generally, an increase in the recovery rate assumption increases the fair value of the security. An increase in loss severity, the inverse of the recovery rate, reduces the amount of principal available for distribution and, as a result, decreases the fair value of the security.

Credit Spread

Credit spread is a component of the security representing its credit quality. Credit spread reflects the market perception of changes in prepayment, delinquency and recovery rates, therefore capturing the impact of other variables on the fair value. Changes in credit spread affect the fair value of securities differently depending on the characteristics and maturity profile of the security. For example, credit spread is a more significant driver of the fair value measurement of a high yield bond as compared to an investment grade bond. Generally, the credit spread for an investment grade bond is also more observable and less volatile than its high yield counterpart.

Mean Reversion

A number of financial instruments require an estimate of the rate at which the interest rate reverts to its long-term average. Changes in this estimate can significantly affect the fair value of these instruments. However, sometimes there are insufficient external market data to calibrate this parameter, especially when pricing more complex instruments. The level of mean reversion affects the correlation between short- and long-term interest rates. The fair values of more complex instruments, such as Bermudan swaptions (options with multiple exercise dates) and constant maturity spread options or structured debts with these embedded features, are more sensitive to the changes in this correlation as compared to less complex instruments, such as caps and floors.

Estimated Fair Value of Financial Instruments not Carried at Fair Value

The following tables present the carrying value and fair value of the Company's financial instruments that are not carried at fair value. The tables below therefore exclude items measured at fair value on a recurring basis presented in the tables above.

The disclosure also excludes the effect of taxes, any premium or discount that could result from offering for sale at one time the entire holdings of a particular instrument and other expenses that would be incurred in a market transaction. In addition, the table excludes the values of non-financial assets and liabilities, as well as intangible values, which are integral to a full assessment of the Company's financial position and the value of its net assets.

Fair values vary from period to period based on changes in a wide range of factors, including interest rates, credit quality and market perceptions of value, and as existing assets and liabilities run off and new transactions are entered into.

<i>In billions of dollars</i>	December 31, 2018		Estimated fair value		
	Carrying value	Estimated fair value	Level 1	Level 2	Level 3
Assets					
Securities borrowed and purchased under agreements to resell	\$ 87.5	\$ 87.5	\$ —	\$ 87.5	\$ —
Receivables	77.2	77.2	—	52.7	24.5
Other financial assets ⁽¹⁾	19.3	19.3	15.7	—	3.6
Liabilities					
Securities loaned and sold under agreements to repurchase	\$ 132.5	\$ 132.5	\$ —	\$ 132.5	\$ —
Long-term debt	74.8	74.8	—	71.7	3.1
Other financial liabilities ⁽²⁾	71.5	71.5	—	12.1	59.4

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<i>In billions of dollars</i>	December 31, 2017		Estimated fair value		
	Carrying value	Estimated fair value	Level 1	Level 2	Level 3
Assets					
Securities borrowed and purchased under agreements to resell	\$ 68.7	\$ 68.7	\$ —	\$ 68.7	\$ —
Receivables	76.0	76.0	—	48.3	27.7
Other financial assets ⁽¹⁾	16.2	16.2	12.7	—	3.5
Liabilities					
Securities loaned and sold under agreements to repurchase	\$ 112.8	\$ 112.8	\$ —	\$ 112.8	\$ —
Long-term debt	62.0	62.0	—	58.9	3.1
Other financial liabilities ⁽²⁾	85.7	85.7	—	33.6	52.1

(1) Includes cash and cash equivalents, cash segregated under federal and other regulations and other financial instruments included in *Other assets* on the Consolidated Statement of Financial Condition, for all of which the carrying value is a reasonable estimate of fair value.

(2) Includes short-term borrowings (carried at cost), payables to customers and brokers, dealers and clearing organizations, and other financial instruments included in *Other payables and accrued liabilities* on the Consolidated Statement of Financial Condition, for all of which the carrying value is a reasonable estimate of fair value.

13. FAIR VALUE ELECTIONS

The Company may elect to report most financial instruments at fair value on an instrument-by-instrument basis with changes in fair value reported in earnings, other than DVA (see below). The election is made upon the initial recognition of an eligible financial asset or financial liability or when certain specified reconsideration events occur. The fair value election may not be revoked once an election is made. The changes in fair value are recorded in current earnings, other than DVA, which is reported in AOCI. Additional discussion regarding the applicable areas in which fair value elections were made is presented in Note 12 to the Consolidated Financial Statements.

The following table presents the changes in fair value of those items for which the fair value option has been elected:

<i>In millions of dollars</i>	Changes in fair value gains (losses) for the years ended December 31,	
	2018	2017
Assets		
Securities borrowed and purchased under agreements to resell	\$ (6)	\$ (72)
Investments	—	(3)
Other financial assets	(78)	(519)
Total assets	\$ (84)	\$ (594)
Liabilities		
Securities loaned and sold under agreements to repurchase	\$ (118)	\$ 222
Trading account liabilities	1	(2)
Short-term borrowings	114	(140)
Long-term debt	2,055	91
Total liabilities	\$ 2,052	\$ 171

Own Debt Valuation Adjustments (DVA)

Own debt valuation adjustments are recognized on the Company's liabilities for which the fair value option has been elected using Citi's credit spreads observed in the bond market. Effective January 1, 2016, changes in fair value of fair value option liabilities related to changes in Citigroup's own credit spreads (DVA) are reflected as a component of AOCI. See Note 1 to the Consolidated Financial Statements for additional information.

Among other variables, the fair value of liabilities for which the fair value option has been elected (other than non-recourse and similar liabilities) is impacted by the narrowing or widening of Citigroup's credit spreads.

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The estimated change in the fair value of these liabilities due to such changes in Citigroup's own credit spread (or instrument-specific credit risk) were a gain of \$630 million and a loss of \$291 million for the years ended December 31, 2018 and 2017, respectively. Changes in fair value resulting from changes in instrument-specific credit risk were estimated by incorporating Citigroup's current credit spreads observable in the bond market into the relevant valuation technique used to value each liability as described above.

The Fair Value Option for Financial Assets and Financial Liabilities

Selected Portfolios of Securities Purchased Under Agreements to Resell, Securities Borrowed, Securities Sold Under Agreements to Repurchase, Securities Loaned and Certain Non-Collateralized Short-Term Borrowings

The Company elected the fair value option for certain portfolios of fixed income securities purchased under agreements to resell and fixed income securities sold under agreements to repurchase, securities borrowed, securities loaned and certain non-collateralized short-term borrowings held primarily by broker-dealer entities in the United States and United Kingdom. In each case, the election was made because the related interest-rate risk is managed on a portfolio basis, primarily with offsetting derivative instruments that are accounted for at fair value through earnings.

Changes in fair value for transactions in these portfolios are recorded in *Principal transactions*. The related interest revenue and interest expense are measured based on the contractual rates specified in the transactions and are reported as *Interest revenue* and *Interest expense* in the Consolidated Statement of Income.

Certain Investments in Private Equity and Real Estate Ventures and Certain Equity Method and Other Investments

The Company invests in private equity and real estate ventures for the purpose of earning investment returns and for capital appreciation. The Company has elected the fair value option for certain of these ventures, because such investments are considered similar to many private equity or hedge fund activities in the Company's investment companies, which are reported at fair value. The fair value option brings consistency in the accounting and evaluation of these investments. All investments (debt and equity) in such private equity and real estate entities are accounted for at fair value. These investments are classified as *Other assets* on the Company's Consolidated Statement of Financial Condition.

Changes in the fair values of these investments are classified in *Other revenue* in the Company's Consolidated Statement of Income.

The Company also elected the fair value option for certain non-marketable equity securities whose risk is managed with derivative instruments that are accounted for at fair value through earnings. These securities are classified as *Trading account assets* on the Company's Consolidated Statement of Financial Condition. Changes in the fair value of these securities and the related derivative instruments are recorded in *Principal transactions*. Effective January 1, 2018 under ASU 2016-01 and ASU 2018-03, a fair value option election is no longer required to measure these non-marketable equity securities through earnings. See Note 1 to the Consolidated Financial Statements for additional details.

Other Financial Assets

The Company also elected the fair value option for certain securities financing agreements with embedded derivatives. Changes in fair value for these transactions are recorded in *Principal transactions*.

Certain Structured Liabilities

The Company has elected the fair value option for certain structured liabilities whose performance is linked to structured interest rates, inflation, currency, equity, referenced credit or commodity risks. The Company elected the fair value option, because these exposures are considered to be trading-related positions and, therefore, are managed on a fair value basis. These positions are classified as *Long-term debt* on the Company's Consolidated Statement of Financial Condition.

The following table provides information about the carrying value of structured notes, disaggregated by type of embedded derivative instrument:

<i>In millions of dollars</i>	December 31, 2018	December 31, 2017
Equity linked	\$ 13,827	\$ 11,209
Interest rate linked	6,636	3,122
Credit linked	1,725	1,298
Commodity linked	1,221	130
Foreign exchange linked	366	173
Total	\$ 23,775	\$ 15,932

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Prior to 2016, the total change in the fair value of these structured liabilities was reported in *Principal transactions* in the Company's Consolidated Statement of Income. Beginning in the first quarter of 2016, the portion of the changes in fair value attributable to changes in Citigroup's own credit spreads (DVA) are reflected as a component of AOCI while all other changes in fair value will continue to be reported in *Principal transactions*. Changes in the fair value of these structured liabilities include accrued interest, which is also included in the change in fair value reported in *Principal transactions*.

Certain Non-Structured Liabilities

The Company has elected the fair value option for certain non-structured liabilities with fixed and floating interest rates. The Company has elected the fair value option where the interest rate risk of such liabilities may be economically hedged with derivative contracts or the proceeds are used to purchase financial assets that will also be accounted for at fair value through earnings. The elections have been made to mitigate accounting mismatches and to achieve operational simplifications. These positions are reported in *Short-term borrowings* and *Long-term debt* on the Company's Consolidated Statement of Financial Condition. Prior to 2016, the total change in the fair value of these non-structured liabilities was reported in *Principal transactions* in the Company's Consolidated Statement of Income. The portion of the changes in fair value attributable to changes in Citigroup's own credit spreads (DVA) is reflected as a component of AOCI while all other changes in fair value will continue to be reported in *Principal transactions*.

Interest expense on non-structured liabilities is measured based on the contractual interest rates and reported as *Interest expense* in the Consolidated Statement of Income.

The following table provides information about long-term debt carried at fair value:

<i>In millions of dollars</i>	December 31, 2018	December 31, 2017
Carrying amount reported on the Consolidated Statement of Financial Condition	\$ 25,086	\$ 16,851
Aggregate unpaid principal balance in excess of (less than) fair value	2,512	(490)

The following table provides information about short-term borrowings carried at fair value:

<i>In millions of dollars</i>	December 31, 2018	December 31, 2017
Carrying amount reported on the Consolidated Statement of Financial Condition	\$ 2,878	\$ 2,857
Aggregate unpaid principal balance in excess of (less than) fair value	794	49

14. COLLATERAL, COMMITMENTS AND GUARANTEES

Collateral

At December 31, 2018 and 2017, the approximate fair value of collateral received by the Company that may be resold or repledged, excluding the impact of allowable netting, was \$492.2 billion and \$455.8 billion, respectively. This collateral was received in connection with resale agreements, securities borrowings and loans, securities-for-securities lending transactions, derivative transactions and margined broker loans.

At December 31, 2018 and 2017, a substantial portion of the collateral received by the Company had been sold or repledged in connection with repurchase agreements, securities sold, not yet purchased, securities borrowings and loans, securities-for-securities lending transactions, pledges to clearing organizations, segregation requirements under securities laws and regulations, derivative transactions and bank loans.

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Lease Commitments

Rental expense (principally for offices and branches) was \$216 million, \$218 million and \$265 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Future minimum annual rentals under non-cancelable leases, net of sublease income, are as follows:

<i>In millions of dollars</i>	
2019	\$ 54
2020	53
2021	51
2022	51
2023	49
Thereafter	616
Total	\$ 874

Guarantees

CGMHI provides a variety of guarantees and indemnifications to its customers to enhance their credit standing and enable them to complete a wide variety of business transactions. For certain contracts meeting the definition of a guarantee, the guarantor must recognize, at inception, a liability for the fair value of the obligation undertaken in issuing the guarantee.

In addition, the guarantor must disclose the maximum potential amount of future payments that the guarantor could be required to make under the guarantee, if there were a total default by the guaranteed parties. The determination of the maximum potential future payments is based on the notional amount of the guarantees without consideration of possible recoveries under recourse provisions or from collateral held or pledged. As such, CGMHI believes such amounts bear no relationship to the anticipated losses, if any, on these guarantees.

Derivative Instruments Considered to Be Guarantees

Derivatives are financial instruments whose cash flows are based on a notional amount and an underlying instrument, reference credit or index, where there is little or no initial investment, and whose terms require or permit net settlement. For a discussion of CGMHI's derivatives activities, see Note 10 to the Consolidated Financial Statements.

Derivative instruments considered to be guarantees include only those instruments that require CGMHI to make payments to the counterparty based on changes in an underlying instrument that is related to an asset, a liability or an equity security held by the guaranteed party. More specifically, derivative instruments considered to be guarantees include certain over-the-counter written put options where the counterparty is not a bank, hedge fund or broker-dealer (such counterparties are considered to be dealers in these markets and may, therefore, not hold the underlying instruments). Credit derivatives sold by CGMHI are excluded from the guarantees disclosure as they are disclosed separately in Note 10 to the Consolidated Financial Statements. In instances where CGMHI's maximum potential future payment is unlimited, the notional amount of the contract is disclosed.

As of December 31, 2018, the maximum potential amount of future payments on derivative instruments considered to be guarantees was \$7.7 billion, including \$1.1 billion expiring within one year. As of December 31, 2017, the maximum potential amount of future payments on derivative instruments considered to be guarantees was \$2.0 billion, including \$0.7 billion expiring within one year. The carrying amount of the liabilities related to these derivative instruments considered to be guarantees was \$235 million and \$35 million at December 31, 2018 and 2017, respectively, and is recorded at fair value in *Trading account liabilities*.

Other Guarantees and Indemnifications

Other Representation and Warranty Indemnifications

In the normal course of business, the Company provides standard representations and warranties to counterparties in contracts in connection with numerous transactions and also provides indemnifications, including indemnifications that protect the counterparties to the contracts in the event that additional taxes are owed, due either to a change in the tax law or an adverse interpretation of the tax law. Counterparties to these transactions provide the Company with comparable indemnifications. While such representations, warranties and indemnifications are essential components of many contractual relationships, they do not represent the underlying business purpose for the transactions. The indemnification clauses are often standard contractual terms related to the Company's own performance under the terms of a contract and are entered into in the normal course of business based on an assessment that the risk of loss is remote. Often these clauses are intended to ensure that terms of a contract are met at inception. No compensation is received for these standard

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representations and warranties, and it is not possible to determine their fair value because they rarely, if ever, result in a payment. In many cases, there are no stated or notional amounts included in the indemnification clauses, and the contingencies potentially triggering the obligation to indemnify have not occurred and are not expected to occur. As a result, there are no amounts reflected on the Consolidated Statement of Financial Condition as of December 31, 2018 or December 31, 2017 for potential obligations that could arise from these indemnifications provided by the Company.

Value-Transfer Networks (VTNs)

The Company is a member of, or shareholder in, a number of value-transfer networks (VTNs) (payment, clearing and settlement systems as well as exchanges) around the world. As a condition of membership, many of these VTNs require that members stand ready to pay a pro rata share of the losses incurred by the organization due to another member's default on its obligations. The Company's potential obligations may be limited to its membership interests in the VTNs, contributions to a VTN's funds, or, in limited cases, the obligation may be unlimited. At December 31, 2018 and December 31, 2017, CGMHI had \$7.8 billion and \$6.0 billion, respectively, in capped contingent liquidity facilities with VTNs. The maximum exposure cannot be estimated as this would require an assessment of future claims that have not yet occurred. Management believes the risk of loss is remote given historical experience with the VTNs. Accordingly, there are no amounts reflected on the Consolidated Statement of Financial Condition as of December 31, 2018 or December 31, 2017 for potential obligations that could arise from the Company's involvement with VTN associations.

Futures and Over-the-Counter Derivatives Clearing

CGMHI provides clearing services on CCPs for clients that need to clear exchange traded and over-the-counter (OTC) derivatives contracts. Based on all relevant facts and circumstances, CGMHI has concluded that it acts as an agent for accounting purposes in its role as clearing member for these client transactions. As such, CGMHI does not reflect the underlying exchange traded or OTC derivatives contracts in its Consolidated Financial Statements. See Note 10 for a discussion of CGMHI's derivatives activities that are reflected in its Consolidated Financial Statements.

As a clearing member, CGMHI collects and remits cash and securities collateral (margin) between its clients and the respective CCP. In certain circumstances, CGMHI collects a higher amount of cash (or securities) from its clients than it needs to remit to the CCPs. This excess cash is then held at depository institutions such as banks or carry brokers.

There are two types of margin: initial and variation. Where CGMHI obtains benefits from or controls cash initial margin (e.g., retains an interest spread), cash initial margin collected from clients and remitted to the CCP or depository institutions is reflected within *Payables to customers* and *Receivables from brokers, dealers and clearing organizations* or *Cash segregated under federal and other regulations*, respectively.

However, for exchange-traded and OTC-cleared derivatives contracts where CGMHI does not obtain benefits from or control the client cash balances, the client cash initial margin collected from clients and remitted to the CCP or depository institutions is not reflected on the Company's Consolidated Statement of Financial Condition. These conditions are met when CGMHI has contractually agreed with the client that (i) CGMHI will pass through to the client all interest paid by the CCP or depository institutions on the cash initial margin, (ii) CGMHI will not utilize its right as a clearing member to transform cash margin into other assets, (iii) CGMHI does not guarantee and is not liable to the client for the performance of the CCP or the depository institution and (iv) the client cash balances are legally isolated from CGMHI's bankruptcy estate. The total amount of cash initial margin collected and remitted in this manner was approximately \$12.5 billion and \$9.9 billion as of December 31, 2018 and December 31, 2017, respectively.

Variation margin due from clients to the respective CCP, or from the CCP to clients, reflects changes in the value of the client's derivative contracts for each trading day. As a clearing member, CGMHI is exposed to the risk of non-performance by clients (e.g., failure of a client to post variation margin to the CCP for negative changes in the value of the client's derivative contracts). In the event of non-performance by a client, CGMHI would move to close out the client's positions. The CCP would typically utilize initial margin posted by the client and held by the CCP, with any remaining shortfalls required to be paid by CGMHI as clearing member. CGMHI generally holds incremental cash or securities margin posted by the client, which would typically be expected to be sufficient to mitigate CGMHI's credit risk in the event that the client fails to perform.

As required by ASC 860-30-25-5, securities collateral posted by clients is not recognized on the Company's Consolidated Statement of Financial Condition.

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Other Commitments and Contingencies

CGMHI had other commitments and contingencies of \$1.0 billion and \$0.9 billion at December 31, 2018 and December 31, 2017, respectively, including \$1.0 billion and \$0.8 billion in margin loan indemnification agreements at December 31, 2018 and December 31, 2017, respectively. The commitments to potentially indemnify do not relate to a loan on CGMH's Consolidated Statement of Financial Condition, nor a commitment to extend a loan. The contingencies potentially triggering the obligation to indemnify have not occurred and are not expected to occur. As a result, there are no amounts reflected on the Consolidated Statement of Financial Condition as of December 31, 2018 or December 31, 2017 for potential obligations that could arise from these indemnifications provided by the Company.

Unsettled Reverse Repurchase and Securities Lending Agreements and Unsettled Repurchase and Securities Borrowing Agreements

In addition, in the normal course of business, the Company enters into reverse repurchase and securities borrowing agreements, as well as repurchase and securities lending agreements, which settle at a future date. At December 31, 2018 and December 31, 2017, the Company had \$39.8 billion and \$31.2 billion unsettled reverse repurchase and securities borrowing agreements, respectively, and \$34.3 billion and \$21.2 billion unsettled repurchase and securities lending agreements, respectively. For a further discussion of securities purchased under agreements to resell and securities borrowed, and securities sold under agreements to repurchase and securities loaned, including the Company's policy for offsetting repurchase and reverse repurchase agreements, see Note 6 to the Consolidated Financial Statements.

15. RELATED PARTY TRANSACTIONS

Citigroup Inc. owns 100% of the outstanding common stock of the Company. Pursuant to various intercompany agreements, a number of significant transactions are carried out between the Company and Citigroup and/or their affiliates, including the Citigroup parent company.

Detailed below is a summary of the Company's transactions with other Citigroup affiliates, which are included in the accompanying Consolidated Statement of Income and Consolidated Statement of Financial Condition. These amounts exclude intra-CGMHI balances that eliminate in consolidation.

STATEMENT OF INCOME ITEMS

<i>In millions of dollars</i>	<u>Years ended December 31</u>		
	2018	2017	2016
Revenues			
Principal transactions ⁽¹⁾	\$ 1,328	\$ 1,625	\$ (2,842)
Investment banking	237	182	246
All other revenues ⁽²⁾	165	153	467
Total non-interest revenues	1,730	1,960	(2,129)
Interest revenue	1,659	1,178	545
Interest expense	3,539	2,297	1,659
Net interest revenue (expense)	(1,880)	(1,119)	(1,114)
Total revenues, net of interest expense	\$ (150)	\$ 841	\$ (3,243)
Operating expenses			
Communications	\$ 464	\$ 449	\$ 399
All other expenses ⁽³⁾	1,848	2,190	1,094
Total non-interest expenses	\$ 2,312	\$ 2,639	\$ 1,493

(1) Includes mark-to-market valuation adjustments for derivatives or hedges executed with non-consolidated CGMHI affiliates, but does not include mark-to-market valuation adjustments related to any offsetting derivatives or hedges executed with third-parties external to CGMHI.

(2) Includes trade management and intermediation fees charged to affiliates.

(3) Includes expenses from affiliates for shared services and charges, as well as fees for the early termination of debt with affiliates.

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STATEMENT OF FINANCIAL CONDITION ITEMS

<i>In millions of dollars</i>	December 31, 2018	December 31, 2017
Assets		
Cash and cash equivalents	\$ 4,946	\$ 4,077
Cash segregated under federal and other regulations	5,130	4,893
Securities borrowed or purchased under agreements to resell	20,073	16,091
Derivatives	1,728	2,711
Receivables:		
Loans to affiliates	43,791	42,960
Customers, brokers, dealers and clearing organizations and other	5	564
Other assets	455	91
Total assets	\$ 76,128	\$ 71,387
Liabilities		
Short-term borrowings	\$ 11,343	\$ 32,871
Securities loaned or sold under agreements to repurchase	21,108	18,597
Derivatives	1,398	2,182
Payables and accrued liabilities:		
Customers and brokers, dealers and clearing organizations	12,413	8,663
Other	1,358	1,089
Long-term debt	73,884	60,765
Total liabilities	\$121,504	\$124,167

Stock-Based Compensation and Retirement Benefits

As discussed in Note 4 to the Consolidated Financial Statements, the Company participates in various Citigroup stock-based compensation programs under which Citigroup stock or stock options are granted to certain of the Company's employees. The Company has no stock-based compensation programs in which its own stock is granted. The Company pays Citigroup directly for participation in certain of its stock-based compensation programs, but receives a capital contribution for those awards related to participation in the employee incentive stock option program.

As discussed in Note 4 to the Consolidated Financial Statements, the Company participates in several non-contributory defined-benefit pension plans and a defined-contribution plan sponsored by Citigroup covering certain eligible employees.

CGMHI Tax-Sharing Agreement

As discussed in Note 5 to the Consolidated Financial Statements, the Company is included in the Citigroup consolidated federal tax return and is a party to a tax-sharing agreement with Citigroup. Under such agreement, the Company is entitled to a tax benefit for its losses and credits that are recognized in Citigroup's Consolidated Financial Statements. Settlements between the Company and Citigroup of current taxes occur throughout the year. The Company also files its consolidated and combined state income tax returns with Citigroup and/or others of its subsidiaries.

Other Intercompany Agreements

Citigroup and its subsidiaries engage in other transactions and servicing activities with the Company, including cash management, data processing, telecommunications, payroll processing and administration, facilities procurement, underwriting and others.

The Company recognized payroll tax expenses related to CGMHI employee salaries of approximately \$87 million, \$83 million, and \$92 million for the years ended December 31, 2018, 2017 and 2016, respectively, whereby affiliates manage CGMHI's payroll processes and CGMHI reimburses the affiliates for these payroll tax expenses.

16. CONTINGENCIES

Accounting and Disclosure Framework

ASC 450 governs the disclosure and recognition of loss contingencies, including potential losses from litigation and regulatory matters. ASC 450 defines a "loss contingency" as "an existing condition, situation, or set of circumstances involving uncertainty as to possible loss to an entity that will ultimately be resolved when one or more future events occur or fail to occur." It imposes different requirements for the recognition and disclosure of loss contingencies based on the

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likelihood of occurrence of the contingent future event or events. It distinguishes among degrees of likelihood using the following three terms: “probable,” meaning that “the future event or events are likely to occur”; “remote,” meaning that “the chance of the future event or events occurring is slight”; and “reasonably possible,” meaning that “the chance of the future event or events occurring is more than remote but less than likely.” These three terms are used below as defined in ASC 450. In establishing appropriate disclosure and recognition for loss contingencies, management assesses each matter including the role of the relevant Citigroup legal entity. Because specific loss contingency matters may involve multiple Citigroup legal entities and are not solely related to one legal entity, this process requires management to make certain estimates and judgments that affect the Company’s Consolidated Financial Statements.

Accruals. ASC 450 requires accrual for a loss contingency when it is “probable that one or more future events will occur confirming the fact of loss” and “the amount of the loss can be reasonably estimated.” In accordance with ASC 450, Citigroup establishes accruals for contingencies, including the litigation and regulatory matters disclosed herein, when Citigroup believes it is probable that a loss has been incurred and the amount of the loss can be reasonably estimated. When the reasonable estimate of the loss is within a range of amounts, the minimum amount of the range is accrued, unless some higher amount within the range is a better estimate than any other amount within the range. Once established, accruals are adjusted from time to time, as appropriate, in light of additional information. The amount of loss ultimately incurred in relation to those matters may be substantially higher or lower than the amounts accrued for those matters.

Disclosure. ASC 450 requires disclosure of a loss contingency if “there is at least a reasonable possibility that a loss or an additional loss may have been incurred” and there is no accrual for the loss because the conditions described above are not met or an exposure to loss exists in excess of the amount accrued. In accordance with ASC 450, if Citigroup has not accrued for a matter because Citigroup believes that a loss is reasonably possible but not probable, or that a loss is probable but not reasonably estimable, and the reasonably possible loss is material, it discloses the loss contingency. In addition, Citigroup discloses matters for which it has accrued if it believes a reasonably possible exposure to material loss exists in excess of the amount accrued. In accordance with ASC 450, Citigroup’s disclosure includes an estimate of the reasonably possible loss or range of loss for those matters as to which an estimate can be made. ASC 450 does not require disclosure of an estimate of the reasonably possible loss or range of loss where an estimate cannot be made. Neither accrual nor disclosure is required for losses that are deemed remote.

Litigation and Regulatory Contingencies

Overview. In addition to the matters described below, in the ordinary course of business, CGMHI, its parent entity Citigroup, its affiliates and subsidiaries, and current and former officers, directors and employees (for purposes of this section, sometimes collectively referred to as Citigroup and Related Parties) routinely are named as defendants in, or as parties to, various legal actions and proceedings. Certain of these actions and proceedings assert claims or seek relief in connection with alleged violations of consumer protection, securities, banking, antifraud, antitrust, anti-money laundering, employment and other statutory and common laws. Certain of these actual or threatened legal actions and proceedings include claims for substantial or indeterminate compensatory or punitive damages, or for injunctive relief, and in some instances seek recovery on a class-wide basis.

In the ordinary course of business, Citigroup and Related Parties also are subject to governmental and regulatory examinations, information-gathering requests, investigations and proceedings (both formal and informal), certain of which may result in adverse judgments, settlements, fines, penalties, restitution, disgorgement, injunctions or other relief. In addition, certain affiliates and subsidiaries of Citigroup are banks, registered broker-dealers, futures commission merchants, investment advisors or other regulated entities and, in those capacities, are subject to regulation by various U.S., state and foreign securities, banking, commodity futures, consumer protection and other regulators. In connection with formal and informal inquiries by these regulators, Citigroup and such affiliates and subsidiaries receive numerous requests, subpoenas and orders seeking documents, testimony and other information in connection with various aspects of their regulated activities. From time to time Citigroup and Related Parties also receive grand jury subpoenas and other requests for information or assistance, formal or informal, from federal or state law enforcement agencies including, among others, various United States Attorneys’ Offices, the Asset Forfeiture and Money Laundering Section and other divisions of the Department of Justice, the Financial Crimes Enforcement Network of the United States Department of the Treasury, and the Federal Bureau of Investigation relating to Citigroup and its customers.

Because of the global scope of Citigroup’s operations, and its presence in countries around the world, Citigroup and Related Parties are subject to litigation and governmental and regulatory examinations, information-gathering requests, investigations and proceedings (both formal and informal) in multiple jurisdictions with legal and regulatory regimes that may differ substantially, and present substantially different risks, from those Citigroup and Related Parties are subject to in the United States. In some instances, Citigroup and Related Parties may be involved in proceedings involving the same subject matter in multiple jurisdictions, which may result in overlapping, cumulative or inconsistent outcomes.

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Citigroup and CGMHI seek to resolve all litigation and regulatory matters in the manner management believes is in the best interests of Citigroup and its shareholders, and contests liability, allegations of wrongdoing and, where applicable, the amount of damages or scope of any penalties or other relief sought as appropriate in each pending matter.

Inherent Uncertainty of the Matters Disclosed. Certain of the matters disclosed below involve claims for substantial or indeterminate damages. The claims asserted in these matters typically are broad, often spanning a multi-year period and sometimes a wide range of business activities, and the plaintiffs' or claimants' alleged damages frequently are not quantified or factually supported in the complaint or statement of claim. Other matters relate to regulatory investigations or proceedings, as to which there may be no objective basis for quantifying the range of potential fine, penalty or other remedy. As a result, Citigroup is often unable to estimate the loss in such matters, even if it believes that a loss is probable or reasonably possible, until developments in the case or investigation have yielded additional information sufficient to support a quantitative assessment of the range of reasonably possible loss. Such developments may include, among other things, discovery from adverse parties or third parties, rulings by the court on key issues, analysis by retained experts and engagement in settlement negotiations. Depending on a range of factors, such as the complexity of the facts, the novelty of the legal theories, the pace of discovery, the court's scheduling order, the timing of court decisions and the adverse party's willingness to negotiate in good faith toward a resolution, it may be months or years after the filing of a case or commencement of an investigation before an estimate of the range of reasonably possible loss can be made.

Matters as to Which an Estimate Can Be Made. For some of the matters disclosed below, Citigroup is currently able to estimate a reasonably possible loss or range of loss in excess of amounts accrued (if any). For some of the matters included within this estimation, an accrual has been made because a loss is believed to be both probable and reasonably estimable, but an exposure to loss exists in excess of the amount accrued. In these cases, the estimate reflects the reasonably possible range of loss in excess of the accrued amount. For other matters included within this estimation, no accrual has been made because a loss, although estimable, is believed to be reasonably possible, but not probable; in these cases, the estimate reflects the reasonably possible loss or range of loss.

These estimates are based on currently available information. As available information changes, the matters for which Citigroup is able to estimate will change, and the estimates themselves will change. In addition, while many estimates presented in financial statements and other financial disclosures involve significant judgment and may be subject to significant uncertainty, estimates of the range of reasonably possible loss arising from litigation and regulatory proceedings are subject to particular uncertainties. For example, at the time of making an estimate, (i) Citigroup may have only preliminary, incomplete, or inaccurate information about the facts underlying the claim, (ii) its assumptions about the future rulings of the court or other tribunal on significant issues, or the behavior and incentives of adverse parties or regulators, may prove to be wrong and (iii) the outcomes it is attempting to predict are often not amenable to the use of statistical or other quantitative analytical tools. In addition, from time to time an outcome may occur that Citigroup had not accounted for in its estimate because it had deemed such an outcome to be remote. For all these reasons, the amount of loss in excess of accruals ultimately incurred for the matters as to which an estimate has been made could be substantially higher or lower than the range of loss included in the estimate.

Matters as to Which an Estimate Cannot Be Made. For other matters disclosed below, Citigroup is not currently able to estimate the reasonably possible loss or range of loss. Many of these matters remain in very preliminary stages (even in some cases where a substantial period of time has passed since the commencement of the matter), with few or no substantive legal decisions by the court or tribunal defining the scope of the claims, the class (if any) or the potentially available damages, and fact discovery is still in progress or has not yet begun. In many of these matters, Citigroup has not yet answered the complaint or statement of claim or asserted its defenses, nor has it engaged in any negotiations with the adverse party (whether a regulator or a private party). For all these reasons, Citigroup cannot at this time estimate the reasonably possible loss or range of loss, if any, for these matters.

Opinion of Management as to Eventual Outcome. Subject to the foregoing, it is the opinion of Citigroup's management, based on current knowledge and after taking into account its current legal accruals, that the eventual outcome of all matters described in this Note would not be likely to have a material adverse effect on the consolidated financial condition of CGMHI. Nonetheless, given the substantial or indeterminate amounts sought in certain of these matters, and the inherent unpredictability of such matters, an adverse outcome in certain of these matters could, from time to time, have a material adverse effect on CGMHI's consolidated results of operations or cash flows in particular quarterly or annual periods.

ANZ Underwriting Matter

On June 1, 2018, charges were filed by the Australian Commonwealth Director of Public Prosecutions (CDPP) against Citigroup Global Markets Australia Pty Limited (CGMA) for alleged criminal cartel offenses following a referral by the Australian Competition and Consumer Commission. CDPP alleges that the cartel conduct took place following an institutional

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share placement by Australia and New Zealand Banking Group Limited (ANZ) in August 2015, where CGMA acted as joint underwriter and lead manager with other banks. CDPD has also charged other banks and individuals, including current and former Citi employees. Charges relating to CGMA are captioned R v. CITIGROUP GLOBAL MARKETS AUSTRALIA PTY LIMITED (2018/00175168). The matter is before the Downing Centre Local Court in Sydney, Australia. Separately, the Australian Securities and Investments Commission is conducting an investigation, and CGMA is cooperating with the investigation.

Credit Crisis-Related Litigation and Other Matters

Citigroup and Related Parties were named as defendants in numerous legal actions and other proceedings asserting claims for damages and related relief for losses arising from the global financial credit crisis that began in 2007. Citigroup also received subpoenas and requests for information from various regulatory agencies and other government authorities concerning certain businesses impacted by the credit crisis. The vast majority of these matters have been resolved as of December 31, 2018.

Mortgage-Related Litigation and Other Matters

Mortgage-Backed Securities and CDO Investor Actions: Beginning in 2010, Citigroup and Related Parties were named as defendants in complaints filed by purchasers of mortgage-backed securities (MBS) and credit default obligations (CDOs) sold or underwritten by Citigroup. The complaints generally assert that defendants made material misrepresentations and omissions about the credit quality of the assets underlying the securities or the manner in which those assets were selected, and typically assert claims under Section 11 of the Securities Act of 1933, state blue sky laws, and/or common-law misrepresentation-based causes of action.

All but one of these matters have been resolved through motion practice or settlement. As of December 31, 2018, the aggregate original purchase amount of the purchases covered by a tolling agreement with an investor threatening litigation is approximately \$500 million.

Tribune Company Bankruptcy

Certain Citigroup affiliates (along with numerous other parties) have been named as defendants in adversary proceedings related to the Chapter 11 cases of Tribune Company (Tribune) filed in the United States Bankruptcy Court, asserting claims arising out of the approximately \$11 billion leveraged buyout of Tribune in 2007. The actions were consolidated as IN RE TRIBUNE COMPANY FRAUDULENT CONVEYANCE LITIGATION and transferred to the United States District Court for the Southern District of New York.

In the adversary proceeding captioned KIRSCHNER v. FITZSIMONS, ET AL., the litigation trustee, as successor plaintiff to the Official Committee of Unsecured Creditors, seeks to avoid and recover as actual fraudulent transfers the transfers of Tribune stock that occurred as a part of the leveraged buyout. Several Citigroup affiliates, along with numerous other parties, are named as shareholder defendants and are alleged to have tendered Tribune stock to Tribune as a part of the buyout. In 2017, the United States District Court for the Southern District of New York dismissed the actual fraudulent transfer claim against the shareholder defendants, including the Citigroup affiliates. On April 4, 2019, the litigation trustee filed a motion for leave to amend the complaint to avoid and recover as constructive fraudulent transfers the transfers of Tribune stock that occurred as a part of the leveraged buyout. The motion was denied on April 23, 2019.

Several Citigroup affiliates, along with numerous other parties, are named as defendants in certain actions brought by Tribune noteholders, which seek to recover the transfers of Tribune stock that occurred as a part of the leveraged buyout, as state law constructive fraudulent conveyances. The noteholders' claims were previously dismissed, which was affirmed on appeal. On May 15, 2018, the United States Court of Appeals for the Second Circuit withdrew its 2016 transfer of jurisdiction to the district court.

CGMI was named as a defendant in a separate action in connection with its role as advisor to Tribune. On January 23, 2019, the court dismissed the action. On February 21, 2019, the litigation trustee appealed to the United States Court of Appeals for the Second Circuit from the January 23, 2019 dismissal. Additional information concerning these actions is publicly available in court filings under the docket numbers 08-13141 (Bankr. D. Del.) (Carey, J.), 11 MD 02296 (S.D.N.Y.) (Cote, J.), 12 MC 2296 (S.D.N.Y.) (Cote, J.), 13-3992, 13-3875, 13-4196, 19-449 (2d Cir.) and 16-317 (U.S.).

Foreign Exchange Matters

Regulatory Actions: Government and regulatory agencies in the U.S. and in other jurisdictions are conducting investigations or making inquiries regarding Citigroup's foreign exchange business. Citigroup is fully cooperating with these and related investigations and inquiries.

Antitrust and Other Litigation: Numerous foreign exchange dealers and their affiliates, including Citigroup, Citibank, Citicorp and CGMI, were named as defendants in putative class actions consolidated in the United States District Court for the Southern

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District of New York under the caption IN RE FOREIGN EXCHANGE BENCHMARK RATES ANTITRUST LITIGATION. Plaintiffs allege that they suffered losses as a result of defendants' alleged manipulation of, and collusion with respect to, the foreign exchange market. Plaintiffs assert claims under the Commodity Exchange Act, Sherman Act, and Clayton Act, and seek compensatory damages, treble damages, and declaratory and injunctive relief.

On November 7, 2018, some of the institutional investors who opted out of an August 2018 settlement with Citi defendants filed a lawsuit against Citigroup, Citibank, CGMI, and other defendants under the caption ALLIANZ GLOBAL INVESTORS, ET AL. v. BANK OF AMERICA CORPORATION, ET AL. Plaintiffs allege that defendants manipulated, and colluded to manipulate, the foreign exchange market. Plaintiffs assert Sherman Act and unjust enrichment claims and seek consequential and punitive damages and other forms of relief. On March 1, 2019, plaintiffs filed an amended complaint. On April 1, 2019, Citigroup, Citibank, CGMI, and other defendants filed a motion to dismiss the amended complaint. Additional information concerning these actions is publicly available in court filings under the docket number 18 Civ. 10364 (S.D.N.Y.) (Schofield, J.).

On December 31, 2018, a group of institutional investors issued (but did not serve) a claim in the High Court in London against Citibank, Citigroup, and other defendants, alleging that defendants manipulated, and colluded to manipulate, the foreign exchange market. Claimants allege breaches of EU and UK competition law. The case is ALLIANZ GLOBAL INVESTORS GMBH AND OTHERS v. BARCLAYS BANK PLC AND OTHERS and on April 25, 2019, plaintiffs served their claim on Citigroup and Citibank. Additional information concerning this action is publicly available in court filings under the docket number CL-2018-000840.

In 2018, two motions for certification of class actions alleging manipulation of foreign exchange markets were filed in the Tel Aviv Central District Court in Israel against Citigroup and CGMI, and Citibank, respectively. The cases are LANUEL, ET AL. v. BANK OF AMERICA CORPORATION, ET AL., CA 29013-09-18, and GERTLER, ET AL. v. DEUTSCHE BANK AG, C1A 1657-10-18.

In 2015, an action captioned NYPL v. JPMORGAN CHASE & CO., ET AL. was brought in the United States District Court for the Northern District of California (later transferred to the United States District Court for the Southern District of New York) against Citigroup, as well as numerous other foreign exchange dealers. Subsequently, plaintiffs filed a third amended class action complaint, naming Citigroup, Citibank, and Citicorp as defendants. Plaintiffs seek to represent a putative class of "consumers and businesses in the United States who directly purchased supracompetitive foreign currency at Benchmark exchange rates" from defendants. Plaintiffs allege claims under federal and California antitrust and consumer protection laws, and are seeking compensatory damages, treble damages, and declaratory and injunctive relief. In January 2019, plaintiffs renewed their previous motion for leave to amend their complaint, which defendants have opposed. Additional information concerning these actions is publicly available in court filings under the docket numbers 15 Civ. 2290 (N.D. Cal.) (Chhabria, J.) and 15 Civ. 9300 (S.D.N.Y.) (Schofield, J.).

In 2017, certain plaintiffs filed a consolidated amended complaint on behalf of purported classes of indirect purchasers of foreign exchange instruments sold by defendants, including Citigroup, Citibank, Citicorp, and CGMI as defendants, captioned CONTANT, ET AL. v. BANK OF AMERICA CORPORATION, ET AL. Plaintiffs allege that defendants engaged in a conspiracy to fix currency prices in violation of the Sherman Act and various state antitrust laws. On November 15, 2018, the court denied plaintiffs' motion for preliminary approval of a proposed class settlement with the Citi defendants and requested plaintiffs to provide additional information. Additional information concerning these actions is publicly available in court filings under the docket numbers 16 Civ. 7512 (S.D.N.Y.) (Schofield, J.), 17 Civ. 4392 (S.D.N.Y.) (Schofield, J.), and 17 Civ. 3139 (S.D.N.Y.) (Schofield, J.).

Interbank Offered Rates-Related Litigation and Other Matters

Antitrust and Other Litigation: Citigroup and Citibank, along with other U.S. Dollar (USD) LIBOR panel banks, are defendants in a multi-district litigation proceeding before the United States District Court for the Southern District of New York captioned IN RE LIBOR-BASED FINANCIAL INSTRUMENTS ANTITRUST LITIGATION. Plaintiffs, on behalf of different putative classes and individually, assert claims under the Sherman Act, the Commodities Exchange Act, and state antitrust, unfair competition, and restraint-of-trade laws, as well as various common law claims, based on allegations that defendants suppressed or otherwise manipulated USD LIBOR. Plaintiffs seek compensatory damages, restitution, treble damages where authorized by statute, and injunctive relief.

On December 5, 2018, a court granted preliminary approval of a settlement among Citigroup, Citibank and a class of investors who purchased USD LIBOR debt securities from non-defendant sellers, pursuant to which the Citi defendants paid \$7.025 million. On December 20, 2018, a court granted final approval of a settlement among Citigroup, Citibank and a class of lending institutions with interests in loans tied to USD LIBOR, pursuant to which the Citi defendants paid \$23 million. On March 25, 2019, the court issued an opinion granting in part motions for leave to further amend complaints filed by certain

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plaintiffs asserting individual claims. Additional information concerning these actions and related actions and appeals is publicly available in court filings under the docket numbers 11 MD 2262 (S.D.N.Y.) (Buchwald, J.) and 17-1569 (2d Cir.).

In 2015, plaintiffs in the class action SULLIVAN v. BARCLAYS PLC, ET AL., pending in the United States District Court for the Southern District of New York, filed a fourth amended complaint naming Citigroup, Citibank, and various other banks as defendants. Plaintiffs claim to have suffered losses as a result of purported EURIBOR manipulation and assert claims under the Commodity Exchange Act, the Sherman Act, and the federal civil Racketeer Influenced and Corrupt Organizations (RICO) Act and for unjust enrichment. In 2017, the court granted in part and denied in part defendants' motion to dismiss. On December 19, 2018, the court preliminarily approved a settlement among the Citi and JPMorgan defendants and plaintiffs pursuant to which the settling defendants collectively agreed to pay a total of \$182.5 million. Additional information concerning this action is publicly available in court filings under the docket number 13 Civ. 2811 (S.D.N.Y.) (Castel, J.).

In 2016, a putative class action captioned FRONTPOINT ASIAN EVENT DRIVEN FUND, LTD., ET AL v. CITIBANK, N.A., ET AL. was filed in the United States District Court for the Southern District of New York against Citibank, Citigroup and various other banks. Plaintiffs assert claims for violations of the Sherman Act, Clayton Act, and RICO Act, as well as state law claims for alleged manipulation of the Singapore Interbank Offered Rate and Singapore Swap Offer Rate. On May 22, 2018, the Citi defendants and plaintiffs entered into a settlement under which Citi agreed to pay \$9.99 million. Additional information concerning this action is publicly available in court filings under the docket number 16 Civ. 5263 (S.D.N.Y.) (Hellerstein, J.).

In 2016, Banque Delubac filed a summons against Citigroup, Citigroup Global Markets Limited (CGML), and Citigroup Europe Plc with the Commercial Court of Aubenas, France, alleging that defendants suppressed LIBOR submissions between 2005 and 2012, and that Banque Delubac's EURIBOR-linked lending activity was negatively impacted as a result. Plaintiff is seeking compensatory damages for losses on LIBOR-linked loans to customers and for alleged consequential losses to its business. On November 6, 2018, the Aubenas Court found that it lacked subject matter jurisdiction and transferred the case to the Commercial Court of Marseille. On March 28, 2019, the Court of Appeal of Nîmes held that neither the Commercial Court of Aubenas nor the Commercial Court of Marseille has territorial jurisdiction over Banque Delubac's claims. The case is SCS BANQUE DELUBAC & CIE v. CITIGROUP INC. ET AL., Commercial Court of Marseille, RG no. 2018F02750, and was in the Court of Appeal of Nîmes, no. 18/04390.

On January 15, 2019, a putative class action captioned PUTNAM BANK v. INTERCONTINENTAL EXCHANGE, INC., ET AL., was filed in the United States District Court for the Southern District of New York against the Intercontinental Exchange, Inc. (ICE), Citigroup, Citibank, CGMI, and various other banks. Plaintiff asserts claims for violations of the Sherman Act and Clayton Act and unjust enrichment based on alleged suppression of the ICE LIBOR and seeks compensatory damages, disgorgement and treble damages where authorized by statute. Additional information relating to this action is publicly available in court filings under the docket number 19-cv-00439 (S.D.N.Y.) (Marrero, J.).

On January 31 and on March 4, 2019, two additional putative class actions, which have been consolidated with PUTNAM BANK v. INTERCONTINENTAL EXCHANGE, INC., ET AL., were filed in the United States District Court for the Southern District of New York against ICE, Citigroup, Citibank, CGMI, and various other banks. Each of these complaints asserts claims under the Sherman Act and for unjust enrichment based on alleged suppression of the ICE LIBOR and seeks disgorgement and treble damages where authorized by statute. Additional information relating to this action is publicly available in court filings under the docket number 19 Civ. 00439 (S.D.N.Y.) (Daniels, J.).

Interest Rate Swaps Matters

Regulatory Actions: The Commodity Futures Trading Commission is conducting an investigation into alleged anticompetitive conduct in the trading and clearing of interest rate swaps (IRS) by investment banks. Citigroup is cooperating with the investigation.

Antitrust and Other Litigation: Beginning in 2015, IRS market participants, including Citigroup, Citibank, CGMI, CGML and numerous other parties, were named as defendants in a number of industry-wide putative class actions. These actions have been consolidated in the United States District Court for the Southern District of New York under the caption IN RE INTEREST RATE SWAPS ANTITRUST LITIGATION. Plaintiffs in these actions allege that defendants colluded to prevent the development of exchange-like trading for IRS, thereby causing the putative classes to suffer losses in connection with their IRS transactions. Plaintiffs assert federal antitrust claims and claims for unjust enrichment. Also consolidated under the same caption are two individual actions filed by swap execution facilities, asserting federal and state antitrust claims as well as claims for unjust enrichment and tortious interference with business relations. Plaintiffs in all of these actions seek treble damages, fees, costs and injunctive relief. On October 25, 2018, the putative class plaintiffs moved for leave to file a fourth consolidated class action complaint. On November 20, 2018, the district court granted in part and denied in part defendants' motion to dismiss in TRUEEX LLC v. BANK OF AMERICA CORPORATION, ET AL. On February 20, 2019, the putative class plaintiffs in the action captioned IN RE: INTEREST RATE SWAPS ANTITRUST LITIGATION moved for class

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certification and appointment of class counsel. On March 13, 2019, the district court granted in part and denied in part the putative class plaintiffs' motion for leave to file a fourth consolidated class action complaint. Additional information concerning these actions is publicly available in court filings under the docket numbers 18-CV-5361 (S.D.N.Y.) (Engelmayer, J.) and 16-MD-2704 (S.D.N.Y.) (Engelmayer, J.).

Money Laundering Inquiries

Regulatory Actions: Citibank has received subpoenas from the United States Attorney for the Eastern District of New York in connection with its investigation of alleged bribery, corruption and money laundering associated with the Fédération Internationale de Football Association (FIFA), and the potential involvement of financial institutions in that activity. The subpoenas request information relating to, among other things, banking relationships and transactions at Citibank and its affiliates associated with certain individuals and entities identified as having had involvement with the alleged corrupt conduct. Citi is cooperating with the authorities in this matter.

Oceanografía Fraud and Related Matters

Regulatory Actions: On August 16, 2018, Citi resolved an SEC investigation into Citigroup's announcement in the first quarter of 2014 of a fraud discovered in a Petróleos Mexicanos (Pemex) supplier program involving Oceanografía S.A. de C.V. (OSA), a Mexican oil services company and a key supplier to Pemex. As part of the resolution, Citi agreed to pay a civil penalty of \$4.75 million.

Other Litigation: In 2016, a complaint was filed against Citigroup in the United States District Court for the Southern District of Florida alleging that it conspired with OSA and others with respect to receivable financings and other financing arrangements related to OSA in a manner that injured bondholders and other creditors of OSA. The complaint asserts claims on behalf of 39 plaintiffs that are characterized variously as trade creditors of, investors in, or lenders to OSA. Plaintiffs collectively claim to have lost \$1.1 billion as a result of OSA's bankruptcy. The complaint asserts claims under the federal civil RICO law and seeks treble damages and other relief pursuant to that statute. The complaint also asserts claims for fraud and breach of fiduciary duty.

Subsequently, plaintiffs filed an amended complaint adding common law claims for fraud, aiding and abetting fraud, and conspiracy on behalf of all plaintiffs. On January 30, 2018, the court granted Citigroup's motion to dismiss the amended complaint, which plaintiffs appealed. Additional information concerning this action is publicly available in court filings under the docket number 16-20725 (S.D. Fla.) (Gayles, J.).

In 2017, a complaint was filed against Citigroup in the United States District Court for the Southern District of New York by OSA and its controlling shareholder, Amado Yáñez Osuna. The complaint alleges that plaintiffs were injured when Citigroup made certain public statements about receivable financings and other financing arrangements related to OSA. The complaint asserts claims for malicious prosecution and tortious interference with existing and prospective business relationships. Plaintiffs later filed an amended complaint adding CGMI, Citibank and Banco Nacional de México, or Banamex, as defendants and adding causes of action for fraud and breach of contract. On September 28, 2018, the court granted defendants motion to dismiss, which plaintiffs have appealed. Additional information concerning this action is publicly available in court filings under the docket number 1:17-cv-01434 (S.D.N.Y.) (Sullivan, J.).

Sovereign Securities Matters

Regulatory Actions: Government and regulatory agencies in the United States and in other jurisdictions are conducting investigations or making inquiries regarding Citigroup's sales and trading activities in connection with sovereign and other government-related securities. Citigroup is fully cooperating with these investigations and inquiries.

Antitrust and Other Litigation: Beginning in 2015, CGMI and numerous other U.S. Treasury primary dealer banks were named as defendants in a number of substantially similar putative class actions involving allegations that they colluded to manipulate U.S. Treasury securities markets. The cases were later consolidated in the United States District Court for the Southern District of New York. Plaintiffs then filed a consolidated complaint, which alleges that CGMI and other primary dealer defendants colluded to fix Treasury auction bids by sharing competitively sensitive information ahead of the auctions, in violation of the antitrust laws. The consolidated complaint also alleges that CGMI and other primary dealer defendants colluded to boycott and prevent the emergence of an anonymous, all-to-all electronic trading platform in the Treasuries secondary market, and seeks damages, including treble damages where authorized by statute, and injunctive relief. Defendants filed motions to dismiss on February 23, 2018. Additional information relating to this action is publicly available in court filings under the docket number 15-MD-2673 (S.D.N.Y.) (Gardephe, J.).

Beginning in 2016, a number of substantially similar putative class action complaints were filed against a number of financial institutions and traders related to the supranational, sub-sovereign, and agency (SSA) bond market. The actions are based upon defendants' roles as market makers and traders of SSA bonds and assert claims of alleged collusion under the antitrust laws and unjust enrichment and seek damages, including treble damages where authorized by statute, and disgorgement. These

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actions were later consolidated in the United States District Court for the Southern District of New York. Subsequently, plaintiffs filed a consolidated complaint that names Citigroup, Citibank, CGMI and CGML among the defendants. Plaintiffs filed a second amended consolidated complaint on November 6, 2018, which defendants moved to dismiss. On February 7, 2019, a putative class action captioned *STACHON v. BANK OF AMERICA, N.A., ET AL.*, was filed in the United States District Court for the Southern District of New York against Citigroup, Citibank, CGMI, and CGML and other defendants, on behalf of indirect purchasers of SSA bonds. Plaintiffs assert claims under New York antitrust laws based on the same conduct alleged in the previously filed SSA bond lawsuits and seek treble damages and injunctive relief. The action is currently stayed pending a decision on the motion to dismiss in the consolidated direct purchaser action captioned *IN RE SSA BONDS ANTITRUST LITIGATION*. Additional information relating to these actions is publicly available in court filings under the docket numbers 19 Civ. 01205 (S.D.N.Y.) (Swain, J.), and 16-cv-03711 (S.D.N.Y.) (Ramos, J.).

In 2017, a class action related to the SSA bond market was filed in the Ontario Court of Justice against Citigroup, Citibank, CGMI, CGML, Citibank Canada and Citigroup Global Markets Canada, Inc., among other defendants, asserting claims for breach of contract, breach of the competition act, breach of foreign law, unjust enrichment, and civil conspiracy. Plaintiffs seek compensatory and punitive damages, as well as declaratory relief. Additional information relating to this action is publicly available in court filings under the docket number CV-17-586082-00CP (Ont. S.C.J.).

Also in 2017, a second similar action was initiated in Canadian Federal Court by the same law firm against the same Citi entities as the Ontario action, in addition to other defendants. The action asserts claims for breach of the competition act and breach of foreign law. On January 24, 2019, plaintiffs delivered an amended statement of claim, in which they continue to assert claims for breach of the competition law and breach of foreign law, while also asserting additional claims of civil conspiracy, unjust enrichment, waiver of tort and breach of contract. Additional information relating to this action is publicly available in court filings under the docket number T-1871-17 (Fed. Ct.).

Beginning in March 2018, six complaints (later consolidated) were filed in the United States District Court for the Southern District of New York against numerous defendants, including Citigroup, CGMI, Citigroup Financial Products Inc., CGMHI, Citibanamex, and Grupo Banamex, related to the Mexican sovereign bond market. The complaints allege a conspiracy to fix prices in the Mexican sovereign bond market from January 1, 2006 to April 19, 2017, and assert antitrust and unjust enrichment claims against the Citi defendants, as well as a number of other banks. Plaintiffs seek statutory treble damages, restitution, and injunctive relief. Defendants moved to dismiss the consolidated amended complaint. Additional information relating to this consolidated action is publicly available in court filings under the docket number 18 Civ. 2830 (S.D.N.Y.) (Oetken, J.).

Between February 22 and April 11, 2019, 12 putative class actions, which have been consolidated under the caption *IN RE GSE BONDS ANTITRUST LITIGATION*, were filed in the United States District Court for the Southern District of New York against Citigroup, CGMI, and numerous other defendants, on behalf of purported classes of persons or entities that transacted in bonds issued by United States government-sponsored entities with one or more of the defendants. Plaintiffs assert claims under the Sherman Act and for unjust enrichment based on defendants' alleged conspiracy to manipulate the market for such bonds, and seek treble damages and injunctive relief. Additional information relating to this action is publicly available in court filings under the docket number 19 Civ. 1704 (S.D.N.Y.) (Rakoff, J.).

Variable Rate Demand Obligation Litigation

In February and March 2019, certain financial institutions that served as remarketing agents for municipal bonds called variable rate demand obligations (VRDOs), including Citigroup, Citibank, CGMI, CGML and numerous other industry participants, were named as defendants in putative class actions filed by the City of Philadelphia and the City of Baltimore in the United States District Court for the Southern District of New York. Plaintiffs allege that defendants colluded to set artificially high VRDO interest rates. The complaints assert violations of the Sherman Act, as well as claims for breach of contract and unjust enrichment, and seek damages and injunctive relief. On April 5, 2019, the two suits were consolidated for pre-trial purposes. Additional information concerning these actions is publicly available in court filings under the docket numbers 19-CV-1608 (S.D.N.Y.) (Furman, J.) and 19-CV-2667 (S.D.N.Y.) (Furman, J.).

Settlement Payments

Payments required in settlement agreements described above have been made or are covered by existing litigation accruals.

17. SUBSEQUENT EVENTS

The Company has evaluated whether events or transactions have occurred after December 31, 2018 that would require recognition or disclosure in these financial statements through April 30, 2019, which is the date these financial statements were available to be issued. No such transactions required recognition or disclosure in the financial statements for the year ended December 31, 2018.