UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

☑ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2021

Or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to

Commission File Number 001-36198

INTERCONTINENTAL EXCHANGE, INC.

(Exact name of registrant as specified in its charter)

Delaware	**46-2286804**
(State or other jurisdiction of incorporation or organization)	*(IRS Employer Identification Number)*
5660 New Northside Drive, Atlanta, Georgia	**30328**
(Address of principal executive offices)	*(Zip Code)*

(770) 857-4700
Registrant's telephone number, including area code

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	**Trading Symbol(s)**	**Name of Each Exchange on Which Registered**
Common Stock, $0.01 par value per share	ICE	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☑ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☑

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports); and (2) has been subject to such filing requirements for the past 90 days. Yes ☑ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☑ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. Yes ☑ No ☐

Large accelerated filer	☑	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☑

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☑

The aggregate market value of the registrant's voting and non-voting common equity held by non-affiliates computed by reference to the price at which the common equity was last sold as of the last business day of the registrant's most recently completed second fiscal quarter was $66,221,973,288.

As of February 1, 2022, the number of shares of the registrant's Common Stock outstanding was 561,852,310 shares.

DOCUMENTS INCORPORATED BY REFERENCE

Certain information contained in the registrant's Proxy Statement for the 2022 Annual Meeting of Stockholders is incorporated herein by reference in Part III of this Annual Report on Form 10-K. The Proxy Statement will be filed with the Securities and Exchange Commission within 120 days after the end of the registrant's fiscal year to which this report relates.

Intercontinental Exchange, Inc.

ANNUAL REPORT ON FORM 10-K
For the Fiscal Year Ended December 31, 2021

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PART I

In this Annual Report on Form 10-K, or Annual Report, and unless otherwise indicated, the terms "Intercontinental Exchange," "ICE," "we," "us," "our," "our company," and "our business" refer to Intercontinental Exchange, Inc., together with its consolidated subsidiaries. References to "ICE products" mean products listed on one or more of our markets. All references to "options" or "options contracts" in the context of our futures products refer to options on futures contracts. Solely for convenience, references in this Annual Report to any trademarks, service marks and trade names owned by ICE are listed without the ®, ™ and © symbols, but we will assert, to the fullest extent under applicable law, our rights to these trademarks, service marks and trade names.

We also include references to third-party trademarks, trade names and service marks in this Annual Report. Except as otherwise expressly noted, our use or display of any such trademarks, trade names or service marks is not an endorsement or sponsorship and does not indicate any relationship between us and the parties that own such marks and names.

The following discussion should be read in conjunction with our consolidated financial statements and related notes included elsewhere in this Annual Report. Due to rounding, figures in tables may not sum exactly.

Forward-Looking Statements

This Annual Report, including the sections entitled "Business," "Legal Proceedings," "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations," contains "forward-looking statements" as defined in the Private Securities Litigation Reform Act of 1995. Any statements contained herein that are not statements of historical fact may be forward-looking statements.

These forward-looking statements relate to future events or our future financial performance and are based on our present beliefs and assumptions, as well as the information currently available to us. They involve known and unknown risks, uncertainties and other factors that may cause our results, levels of activity, performance, cash flows, financial position or achievements to differ materially from those expressed or implied by these statements.

Forward-looking statements may be introduced by or contain terminology such as "may," "will," "should," "could," "would," "targets," "goal," "expect," "intend," "plan," "anticipate," "believe," "estimate," "predict," "potential," "continue," or the antonyms of these terms or other comparable terminology. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance, cash flows, financial position or achievements. Accordingly, we caution you not to place undue reliance on any forward-looking statements we may make.

Factors that may affect our performance and the accuracy of any forward-looking statements include, but are not limited to, those listed below:

- conditions in global financial markets and domestic and international economic and social conditions, political uncertainty and discord;
- the impact of the introduction of or any changes in laws, regulations, rules or government policies with respect to financial markets, climate change, increased regulatory scrutiny or enforcement actions and our ability to comply with these requirements;
- volatility in commodity prices, equity prices and price volatility of financial benchmarks and instruments such as interest rates, credit spreads, equity indices, foreign exchange rates, and mortgage origination trends;
- the impact of climate change and the transition to renewable energy and a net zero economy;
- the business environment in which we operate and trends in our industry, including trading volumes, prevalence of clearing, demand for data services, mortgage lending activity, fees, changing regulations, competition and consolidation;
- our ability to minimize the risks associated with operating clearing houses in multiple jurisdictions;
- our exchanges' and clearing houses' compliance with their respective regulatory and oversight responsibilities;
- the resilience of our electronic platforms and soundness of our business continuity and disaster recovery plans;
- our ability to execute our growth strategy, identify and effectively pursue, implement and integrate acquisitions and strategic alliances and realize the synergies and benefits of such transactions within the expected time frame;
- the performance and reliability of our trading, clearing and mortgage technologies and those of third-party service providers;
- our ability to keep pace with technological developments and client preferences;
- our ability to ensure that the technology we utilize is not vulnerable to cyberattacks, hacking and other cybersecurity risks or other disruptive events or to minimize the impact of any such events;
- our ability to keep information and data relating to the customers of the users of the software and services provided by our ICE Mortgage Technology business confidential;

- the impacts of the COVID-19 pandemic on our business, results of operations and financial condition as well as the broader business environment;
- our ability to identify trends and adjust our business to benefit from such trends, including trends in the United States, or U.S., mortgage industry such as interest rates, new home purchases, refinancing activity, and home builder and buyer sentiment, among others;
- our ability to evolve our benchmarks and indices in a manner that maintains or enhances their reliability and relevance;
- the accuracy of our cost and other financial estimates and our belief that cash flows from operations will be sufficient to service our debt and to fund our operational and capital expenditure needs;
- our ability to incur additional debt and pay off our existing debt in a timely manner;
- our ability to maintain existing market participants and data and mortgage technology customers, and to attract new ones;
- our ability to offer additional products and services, leverage our risk management capabilities and enhance our technology in a timely and cost-effective fashion;
- our ability to attract, develop and retain key talent;
- our ability to protect our intellectual property rights and to operate our business without violating the intellectual property rights of others;
- potential adverse results of threatened or pending litigation and regulatory actions and proceedings; and
- our ability to realize the expected benefits of our acquisitions and our investments.

These risks and other factors include, among others, those set forth in Item 1(A) under the caption "Risk Factors" and elsewhere in this Annual Report, as well as in other filings we make with the Securities and Exchange Commission, or SEC. Due to the uncertain nature of these factors, management cannot assess the impact of each factor on the business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements.

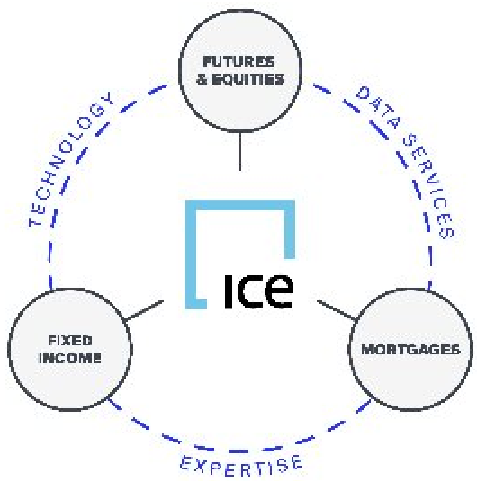
Any forward-looking statement speaks only as of the date on which such statement is made, and we undertake no obligation to update any of these statements to reflect events or circumstances occurring after the date of this Annual Report. New factors may emerge and it is not possible to predict all factors that may affect our business and prospects.

ITEM 1. BUSINESS

Introduction

We are a provider of market infrastructure, data services and technology solutions to a broad range of customers including financial institutions, corporations and government entities. These products, which span major asset classes including futures, equities, fixed income and U.S. residential mortgages, provide our customers with access to mission critical tools that are designed to increase asset class transparency and workflow efficiency. While we report our results in three reportable business segments, we operate as one business, leveraging the collective expertise, particularly in data services and technology, that exists across our platforms to inform and enhance our operations.

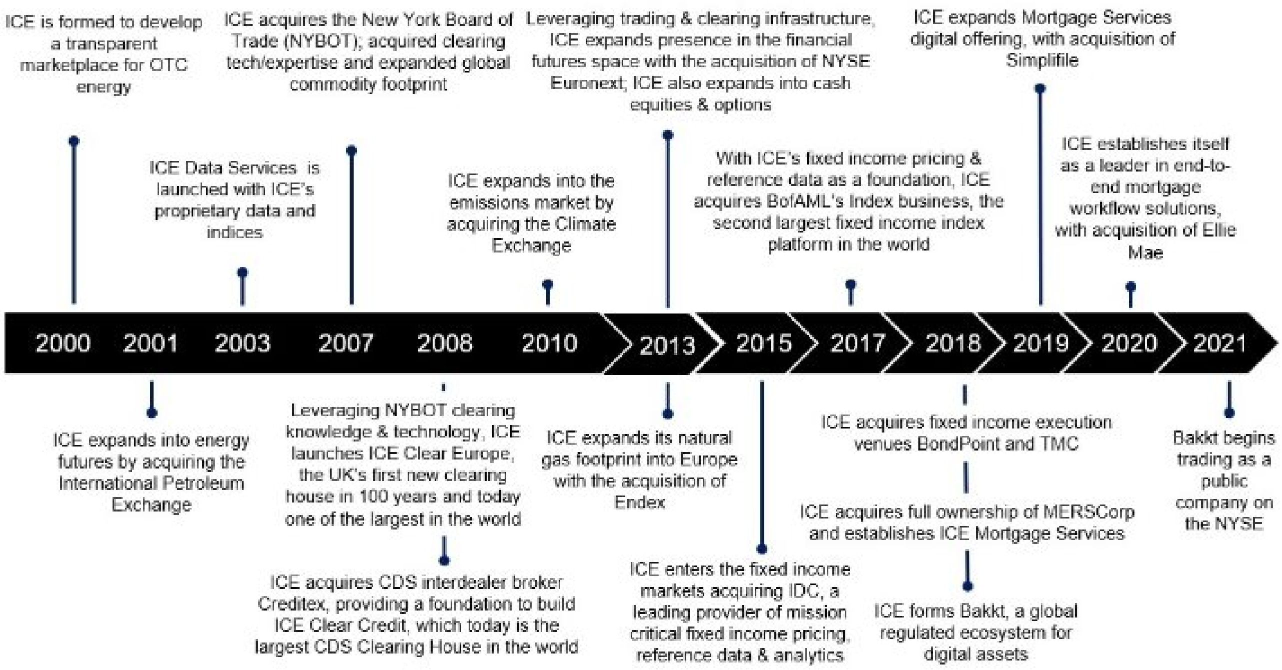
- In our Exchanges segment, we operate regulated marketplaces for the listing, trading and clearing of a broad array of derivatives contracts and financial securities.
- In our Fixed Income and Data Services segment, we provide fixed income pricing, reference data, indices, analytics and execution services as well as global credit default swaps, or CDS, clearing and multi-asset class data delivery solutions.
- In our Mortgage Technology segment, we provide an end-to-end technology platform that offers customers comprehensive, digital workflow tools that aim to address the inefficiencies that exist in the U.S. residential mortgage market.



Our History

In 2000, ICE was founded with the idea of transforming energy markets by creating a network that removed barriers and provided greater transparency, efficiency and access. By staying close to our customers, we have expanded into new asset classes and services, while retaining a core mission of reducing friction in markets, bringing efficiency to our customers' workflows and, ultimately, connecting our customers to opportunity.

Today, we are a Fortune 500 company, providing our customers with an array of market infrastructure, data services and technology solutions that span a diverse set of asset classes.



Our Business Segments

Our business is conducted through three reportable business segments:

- Exchanges;
- Fixed Income and Data Services; and
- Mortgage Technology.

The majority of our identifiable assets are located in the U.S. and the United Kingdom, or U.K. For a summary of our revenues, net assets and net property and equipment by geographic region, see Note 18 to our consolidated financial statements included in this Annual Report.

Exchanges Segment

We operate regulated marketplaces for the listing, trading and clearing of a broad array of derivatives contracts and financial securities, such as commodities, interest rates, foreign exchange and equities as well as corporate and exchange-traded funds, or ETFs. We operate multiple trading venues, including 13 regulated exchanges and 6 clearing houses, which are strategically positioned in major market centers around the world, including the U.S., U.K., European Union, or EU, Canada, Asia Pacific and the Middle East.

Our Exchanges segment includes trading and listings revenue from our global futures network and the New York Stock Exchange and other registered securities exchanges, or collectively, the NYSE, and various data and connectivity services that are directly related to those exchange platforms. Revenues reflect a mix of both diversified transaction revenues and recurring data and listings revenues. Our Exchanges segment generated revenues, less transaction-based expenses of $3.9 billion and accounted for 54% of our consolidated revenues, less transaction-based expenses in 2021. Our Exchanges business can experience moderate seasonal fluctuations, although such seasonal impacts have been somewhat muted in periods of high volume trading. Key asset classes include:

- **Energy Futures and Options:** We offer a range of futures and options products that are designed to enable our customers to manage their risk across global energy markets. Our flagship Brent crude oil contract serves as the cornerstone of a global oil network that today includes nearly 700 related crude and refined oil products including locational and refined spreads. In addition, as natural gas and Liquefied Natural Gas, or LNG, continue to globalize, we offer the broadest footprint of regional and global natural gas benchmarks, which span North America, Europe and Asia. Our leading environmental and power markets round out our diverse global energy network. For nearly two decades, our environmental markets have provided customers risk management tools to meet carbon cap and trade program requirements and renewable fuel standards. Increasingly, market participants are turning to our global environmental markets to help navigate and manage risk related to climate change, the energy transition and the move to net zero emissions.

- **Agricultural & Metals Futures and Options:** We offer futures and options on the leading global soft commodity markets including coffee, cocoa, cotton and sugar. Our benchmark contracts offer the most globally relevant price markers for these agricultural markets and provide our customers with the tools to manage price and counterparty risk and facilitate price discovery.

- **Financial Futures and Options:** We offer a diverse suite of equity futures and options contracts based on our own indices as well as those created by MSCI® and FTSE®. These contracts range from established global benchmarks, such as the MSCI® Emerging Market Index, to newer products, such as MSCI®'s suite of Environmental, Social and Governance, or ESG, indices and the NYSE FAANG+ Index. Our global interest rate complex spans geographies, currencies and tenors, providing participants around the world with tools to manage risk in a capital efficient manner. Key products during 2021 included: Short Sterling, Euribor, Gilts, Sterling Overnight Index Average, or SONIA, and Secured Overnight Financing Rates, or SOFR, among others.

- **Cash Equities and Equity Options:** We offer securities trading services through our five registered securities exchanges, including the NYSE. Our securities exchanges are leading providers of transparent, efficient, and high quality markets for the securities issued by large and small companies, ETFs and equity options. These markets serve issuers, investors and other market participants across five cash equity and two options markets.

- **Listings:** The NYSE has been the venue of choice for innovators, visionaries and leaders for over 225 years. The NYSE offers a unique hybrid market model that combines leading technology with an accountable market maker to provide human judgment, a community of the world's greatest companies and premium brand visibility. With over 70% of S&P 500 companies listed on the NYSE as of December 31, 2021, we are the leading listing venue across a range of sectors from technology and healthcare, to financials and energy. In addition to corporate listings, the NYSE is the global leader in ETF listings with 75%, or roughly $5.45 trillion, of ETF assets under management, or AUM, as of December 31, 2021. Revenues from listing fees are largely recurring in nature.

- **Data and Connectivity Services:** Our exchange data services include, among other offerings, proprietary real-time and historical pricing data, as well as order book and transaction information related to our global futures markets and the NYSE exchanges. In addition, we receive a share of revenue from the sale of consolidated U.S. equity and options market data by the National Market System Plans, or NMS Plans.

  Separately, we also provide connectivity services directly related to our futures, cash equity and options exchanges and clearing houses. Revenues from data and connectivity services fees are largely recurring in nature.

- **OTC and Other:** Our over-the-counter, or OTC, markets include bilateral energy markets that offer electronic trading of contracts based on physically-settled natural gas, power and refined oil contracts. Our other revenues primarily include interest income on certain clearing margin deposits related to our futures business, as well as revenue related to our digital asset initiative, Bakkt, until it merged with VPC Impact Acquisition Holdings, or VIH, in October 2021.

We operate six clearing houses, each of which acts as a central counterparty, or CCP, that, for its clearing members, becomes the buyer to every seller and the seller to every buyer. Through this CCP function, our clearing houses provide financial security for each transaction, for the duration of the position, by limiting counterparty credit risk. Our clearing houses are responsible for providing clearing services to each of our futures exchanges and certain of our clearing houses clear contracts traded outside of our execution venues.

Mechanisms have been created, called guaranty funds, to provide partial protection in the event of a clearing member default. With the exception of ICE NGX Canada Inc., or ICE NGX, each of the ICE Clearing Houses (as defined below) requires that each clearing member make deposits into a guaranty fund maintained by the relevant ICE Clearing House. In addition, we have contributed $398 million of our own cash to the guaranty funds which is one component of the table below, and such amounts are at risk and could be used in the event of a clearing member default. We also maintain default insurance as an additional layer of clearing member default protection, which is also reflected in the table below. The default insurance was added in September 2019 and has a three-year term that commenced on September 17, 2019 for the following clearing houses in the following amounts: ICE Clear Europe - $75 million; ICE Clear US - $25 million; and ICE Clear Credit - $50 million. In addition, the table below includes a guaranty fund of $115 million maintained by ICE NGX funded by the following: (1) a $100 million letter of credit issued by a major Canadian chartered bank, and backed by default insurance underwritten by Export Development Canada, a Crown corporation operated at arm's length from the

Canadian government, and (2) $15 million, which is included in our total cash contribution of $398 million, held as restricted cash to fund the first loss amount ICE NGX is responsible for under the default insurance policy.
Our contributions to each clearing house as of December 31, 2021 are listed below and our clearing houses are referred to herein collectively as "the ICE Clearing Houses":

Clearing House	Products Cleared	Location	Exchange where Executed	Reporting Segment	ICE's Contribution
ICE Clear Europe	Energy, agricultural, interest rates and equity index futures and options contracts and OTC European CDS instruments	U.K.	ICE Futures Europe, ICE Futures U.S., ICE Endex, ICE Futures Abu Dhabi and third-party venues	Exchanges	$322 million
ICE Clear U.S.	Agricultural, metals and foreign exchange, or FX, index futures and options contracts, equity futures contracts and digital assets futures contracts	U.S.	ICE Futures U.S.	Exchanges	$108 million[1]
ICE Clear Credit[2]	OTC North American, European, Asian-Pacific and Emerging Market CDS instruments	U.S.	Creditex and third-party venues	Fixed Income and Data Services	$100 million
ICE Clear Netherlands	Derivatives on equities and equity indices traded on regulated markets	The Netherlands	ICE Endex	Exchanges	$2 million
ICE Clear Singapore	Energy, metals and financial futures products and digital assets futures contracts	Singapore	ICE Futures Singapore	Exchanges	$1 million
ICE NGX	Physical North American natural gas, electricity and oil futures	Canada	ICE NGX	Exchanges	$115 million

[1] Of our total contribution to ICE Clear U.S. above, $15 million is solely applicable to any losses associated with a default in digital asset contracts.

[2] Although ICE Clear Credit is included in the Fixed Income and Data Services reporting segment, it is included in the table as a part of our suite of global clearing houses.

Fixed Income and Data Services Segment

Our Fixed Income and Data Services segment includes our fixed income data and analytics offerings, fixed income execution, or ICE Bonds, CDS clearing and other multi-asset class data and network services. Our leading fixed income pricing and reference data offerings serve as the foundation for a broader fixed income network that provides our customers solutions that span the full workflow including pre- and post-trade analytics, a range of execution protocols and indices. In addition, our multi-asset class connectivity, feeds and desktop solutions, which comprise our Other Data and Network Services business leverage a common sales force, which can enhance cross-selling opportunities across the Fixed Income and Data Services segment. The Fixed Income and Data Services segment generated revenues of $1.9 billion in 2021 and accounted for 26% of our consolidated revenues, less transaction-based expenses.

- **Fixed Income Data and Analytics:** We are a leading provider of evaluated end-of-day and real-time pricing services on approximately three million fixed income securities spanning approximately 150 countries and 80 currencies including sovereign, corporate and municipal bonds, mortgage and asset-backed securities as well as leveraged loans. Our reference data offering complements our evaluated pricing by providing our clients a broad range of descriptive information, covering millions of financial instruments that, when coupled with our pricing services, act as the foundation for our leading fixed income index complex, ICE Data Indices, LLC, or ICE Data Indices. We also offer a range of fixed income analytics and other workflow solutions including: best execution services, liquidity indicators, fixed income portfolio analytics and our ETF Hub. Our fixed income customers rely on our data, indices and analytics to inform pre-trade decision making, support post-trade regulatory and compliance needs and improve operational efficiency. In addition, our newer offerings in this area include a variety of ESG data and analytics offerings. Fixed Income Data and Analytics revenues are largely recurring in nature.

- **Fixed Income Execution:** Alongside our leading Fixed Income Data and Analytics offerings, ICE Bonds is focused on providing tools to improve efficiency in customers' workflows across fixed income markets. ICE Bonds provides customers with electronic markets that support multiple fixed income trading protocols including: click-to-trade, request for quotation, or RFQ, and auctions, including portfolio auctions/trading.

- **CDS Clearing:** As of December 31, 2021, we provide clearing services to over 90% of the global CDS market, as measured by CDS gross notional cleared. ICE Clear Credit currently supports Single Names CDS on over 550 reference entities and 175 Index CDS instruments. Revenues also include interest income on certain clearing margin deposits related to our CDS clearing business.

- **Other Data and Network Services:** We offer a multi-asset class connectivity solution called the ICE Global Network. The ICE Global Network offers highly secure, low latency connectivity solutions to reach over 150 trading venues and over 750 data sources. In addition, our consolidated feeds business provides data from a broad array of trading venues and news feeds through a common application programming interface, or API. Finally, our desktop solutions support commodity and energy traders, risk managers, financial advisors, wealth managers and retail traders, and include a robust instant messaging, or IM, system that protects the privacy of nearly 110,000 users, while also enabling greater collaboration. Other Data and Network Service revenues are largely recurring in nature.

Mortgage Technology Segment

Over the last five years, ICE has constructed an end-to-end network aimed at identifying and solving the inefficiencies that exist in the U.S. residential mortgage market. From application through closing and the secondary market, our network is intended to connect the key stakeholders across the mortgage origination workflow and provide our customers with data services and technology that deliver greater transparency and enable significant customer efficiency gains. Our Mortgage Technology segment generated revenues of $1.4 billion in 2021 and accounted for 20% of our consolidated revenues, less transaction-based expenses.

- **Origination Technology:** Our proprietary and comprehensive mortgage origination platform, Encompass, acts as a system of record for the mortgage origination, automating the gathering, reviewing, and verifying of mortgage-related information and enabling automated enforcement of rules and business practices designed to help ensure that each completed loan transaction is of high quality and adheres to secondary market standards. These revenues are based on recurring Software as a Service, or SaaS, subscription fees, with an additive Success-Based Pricing fee as lenders exceed the number of loans closed that is included with their monthly base subscription.

  In addition, the ICE Mortgage Technology Partner Network provides originators connectivity to the mortgage supply chain and facilitates the secure exchange of information between our customers and a broad ecosystem of proprietary offerings, third-party service providers and lenders and investors that are critical to consummating the millions of loan transactions that occur on our origination network each year. Revenue from the ICE Mortgage Technology Partner Network is largely transaction-based.

- **Closing Solutions:** Our closing solutions uniquely connect key participants, such as lenders, title and settlement agents and individual county recorders, to digitize the traditionally manual and paper-based closing and recording process. Our closing solutions also include revenues from the Mortgage Electronic Registration Systems, Inc., or MERS, database, which provides a leading system for recording and tracking changes in mortgage servicing rights and beneficial ownership interests in loans secured by U.S. residential real estate as well as Simplifile LC, a leading provider of electronic signing and recording technology and services. Revenues from closing solutions are largely transaction-based.

- **Data and Analytics:** ICE Mortgage Technology's Automation, Intelligence, Quality, or AIQ, offering applies machine learning and artificial intelligence, or AI, to the entire loan origination process, offering customers greater efficiency by streamlining data collection and validation through our automated document recognition and data extraction capabilities. AIQ also enables a series of AI-driven origination tasks and real-time risk analysis using tools called analyzers that are intended to further improve customer workflow efficiency. AIQ aims to help investors make loan purchases faster, by reducing operational costs and lowering buy-back risk through the application of AI to the purchase review process. AIQ revenues can be both recurring and transaction-based in nature. In addition, our Mortgage Technology's data offerings include real-time industry and peer benchmarking tools, which provide originators a granular view into the real-time trends of nearly half the U.S. residential mortgage market. We also provide a Data as a Service, or DaaS, offering through private data clouds for lenders to access their own data and origination information. Revenues related to our data products are largely subscription based and recurring in nature.

- **Other:** Other revenues include professional services fees and ancillary products. These revenues can be both recurring and transaction-based in nature.

Product and Services Development

We leverage our customer relationships, global distribution, technology infrastructure and software development capabilities to diversify our products and services. We are continually developing, evaluating and testing new products to better serve our client base. The majority of our product development relates to evaluating new contracts, new data sets, new analytic offerings or new mortgage technologies. New contracts often must be reviewed and approved by relevant regulators. We expect to continue to invest in improving our data distribution and software services to meet the needs of our customers and improve their trading and connectivity experience by reducing latency, improving security and providing the most relevant information and data.

While we primarily develop our products and services internally, we also periodically evaluate and enter into strategic partnerships and licensing arrangements to develop new products and services. We intend to continue to invest to expand our exchanges, fixed income and data services, and mortgage technology offerings to serve the evolving needs of our global customer base.

Technology

Technology is a key component of our business strategy and competitive position and we regard effective execution of our technology initiatives as crucial to our sustainable business operations, market competitiveness, compliance and risk management and overall success. Our technology solutions support our customers' workflows: trading and clearing technology, multi-asset class analytics, risk assessment tools, robust data offerings, mortgage technology, instant messaging capabilities and flexible connectivity and delivery solutions. Where feasible, we design and build our own systems and write our own software programs since we believe that having control over our technology allows us to be more responsive to our customers’ needs, better support the dynamic nature of our business, provide the highest quality technology and deliver relevant, timely and actionable data to the markets and customers we serve.

- **Trading Platforms and Technology:** The ICE trading platform supports trading in our cleared futures and options markets as well as our bilateral OTC markets. We also offer voice brokers a facility for submitting block trades for products that are eligible for clearing. Speed, reliability, resilience, capacity and security are critical performance criteria for electronic trading platforms. Connectivity to our trading platform for our markets is available through our web-based front-end applications, as well as independent software vendors, or ISVs, and APIs.

  The NYSE electronic trading platform features an open system architecture that allows users to access our system via front-end trading applications developed by ISVs. We developed core technology and architecture known as NYSE Pillar and have migrated all our Cash Equity Securities markets, Security Information Processor, or SIP, and Options Price Reporting Authority, or OPRA, platforms to this architecture. For equity options, we offer a hybrid model of electronic and open outcry trading through NYSE American Options and NYSE Arca Options. We also expect to migrate our equity options markets to NYSE Pillar, which have historically operated on distinct platforms. This integrated platform is expected to improve performance and reduce the complexity of operating multiple trading systems.

- **Clearing Technology:** A broad range of clearing and risk management services are offered through the integrated technology infrastructure that serves our clearing houses. ICE clearing technology is an integrated service-oriented platform that enables post-trade management, position management, management of the clearing house risk waterfall, contract settlement and treasury management functions. The primary focus of our derivatives clearing houses is the risk management of clearing members throughout all facets of the position management and settlement lifecycles. Our extensive technology and rules-based risk systems provide analytical tools that allow us to determine margin, evaluate credit risk and monitor the trading activities and overall risk of clearing members.

- **Data Services Technology:** ICE Data Services technology uses integrated platforms to capture, store and process information, perform analytics and maintain connectivity solutions using a single configurable data capture mechanism and flexible delivery capability. Together, the platforms are intended to enable real-time processing and delivery of information, accelerate new product development and improve production reliability. Our data and analytics are delivered via real-time messaging, files, web services and other on-demand facilities and state-of-the-art front-ends. In addition, the technology underpinning our ICE Global Network supports scalable bandwidth and a wide variety of connectivity options including fiber, wireless, colocation and hosting.

- **Mortgage Technology**: The ICE Mortgage Technology platform enables lenders to originate, process, fund and deliver residential mortgages using various applications, APIs, data products and other services offered. The platform is developed using industry-leading software technologies and third-party services, including hosting with a combination of public cloud and private data centers. The platform is integrated with multiple services necessary for loan origination, such as credit reporting and other services that lenders leverage through our network, which is offered through the platform. The platform includes industry leading information security infrastructure to protect the confidentiality and integrity of our customers' data.

Operations

We operate regionally diverse primary and backup data centers and maintain comprehensive business continuity and disaster recovery plans and facilities. These are designed to enable nearly continuous availability of our markets and other services in the event of a business disruption or disaster. We maintain incident and crisis management plans that address responses to disruptive events at any of our locations worldwide.

Cybersecurity

Our business activities rely extensively on technology and software, including the systems used by our business partners, regulators and customers. In addition, our activities involve the use and retention of confidential data and information. These activities make us susceptible to cyberattacks. We employ the following activities, processes and strategies to evaluate, manage and address these risks.

- **Strategy:** We maintain a Cybersecurity Strategy, or CSS, which emphasizes consideration of the nature of our business, ongoing intelligence collection regarding cybersecurity threats, and initiatives to specifically address prominent areas of cybersecurity risk. The CSS outlines the key priorities for our cybersecurity program and the methods by which our Information Security department seeks to accomplish those goals. The CSS is ratified by the Risk Committee of our Board of Directors and when applicable, also by the corporate governance committees of our regulated subsidiaries.

- **Risk Management:** Thematic threats such as sabotage, fraud, and theft of assets or customer data are used to frame our risk management activities. Asset theft often involves organized crime or financially motivated nations staging sophisticated, well-planned campaigns to steal significant cash, cryptocurrency, or equivalent assets. Our thematic threats, along with others, are evaluated by our Board of Directors as well as our Risk Committee, Chief Risk Officer and Chief Information Security Officer, or CISO. The CSS provides the framework we use for assessing risk, prioritizing testing, identifying remedial actions and validating improvements. The CSS also provides for the deployment of external and internal teams of ethical hackers that operate alongside our traditional vulnerability detection processes.

- **Information Sharing:** We recognize the importance of collaboration and information sharing among private sector firms in the financial services sector, across sectors, and with global public-sector agencies, when appropriate. Our cybersecurity leaders hold positions within the Financial Services Information Sharing and Analysis Center, or FS-ISAC, and the cross-sector Analysis and Resiliency Center, or ARC, in the U.S., the Financial Sector Cyber Collaboration Centre, or FSCCC, in the U.K., and similar organizations across the Europe, Middle East and Africa, or EMEA, and Asia Pacific, or APAC, regions.

- **Governance and Leadership:** Our Information Security department is led by our CISO, who provides comprehensive reports to a dedicated internal governance committee at least quarterly outlining threat assessment, control performance, and ongoing enhancements. Additionally, cybersecurity matters are reported to and discussed with a cross-subsidiary leadership committee, the Risk Committee of our Board of Directors, and when applicable, subsidiary boards. Our CISO and other senior security leaders conduct periodic cybersecurity education sessions with our employees and directors. These sessions cover general cybersecurity topics as well as specific details regarding our cybersecurity program.

- **Third-Party Review:** Our Information Security department utilizes extensive penetration testing, vulnerability scanning, ethical hacking and maturity assessment services from global leaders in these practices. The results of these reviews alongside frequent regulatory and customer examinations are assessed, with any resulting mitigation activity assigned and tracked to remediation.

- **Controls**: Our identification of risks and selection of cyber-related controls is performed in the context of the critical financial infrastructure we maintain and operate. Our ongoing threat assessments are intended to identify changes in external events and in our activities, infrastructure and processes that could necessitate reprioritization of risks and controls. The nature of our business activities mandates an emphasis on sabotage and asset theft as primary threats in addition to contemporary themes of data theft. Our focus on these threats leads to an emphasis on network security, social engineering controls, behavioral detection of insider threat, and deliberate and rehearsed recovery strategies.

Intellectual Property

We rely on a wide range of intellectual property, both owned and licensed, in connection with the operation of our various businesses. We own the rights to a large number of trademarks, service marks, domain names and trade names in the U.S., Europe and in other parts of the world. We have registered many of our trademarks in the U.S. and in certain other countries. We hold the rights to a number of patents and have made a number of patent applications in the U.S. and other countries. We also own the copyright to a variety of material. Those copyrights, some of which are registered, include software code, printed and online publications, websites, advertisements, educational material, graphic presentations and other literature, both textual and electronic. We attempt to protect our intellectual property rights by relying on trademarks, patents, copyrights, database rights, trade secrets, restrictions on disclosure and other methods.

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Human Capital Resources

As of December 31, 2021, we had a total of 8,858 employees with 1,618 in New York, 1,092 in Georgia, 989 in California, 337 in Massachusetts and 276 in Illinois, as well as 1,986 in India, 799 in the U.K., 416 in continental Europe and a total of 1,345 employees across our other offices around the world. Of our total employee base, less than 1% is subject to collective bargaining agreements, and such relations are considered to be good.

Our culture is driven by a common set of values that provide the foundation for everything we do and we use employee surveys to ensure that we are holding true to these values.

We strive to provide comprehensive packages of competitive compensation and benefits in each market in which we operate, which we believe is important to ensure our employees' health, well-being and financial security. We review the competitiveness of our compensation and benefits frequently. As an equal opportunity employer, all qualified applicants receive consideration without regard to race, color, religion, gender, sexual orientation, gender identity, national origin or ancestry, age, disability or veteran status, or other protected status.

We are committed to diversity on our Board of Directors and in our employee population. We believe that our employee population should reflect the broader communities within which we operate. We hold ourselves accountable via quarterly and annual data reporting to senior management, data reporting to our Board of Directors, and transparency in reporting data to our stakeholders via our annual Sustainability Report.

Employee development is an important element of our human capital management program. Career development and training opportunities are available throughout our ranks, including both structured course work across a variety of topics and situations, and self-directed learning from a wide array of available resources. Through employee assistance plans, in most of our locations we provide free and discounted counseling services for dealing with traumatic life events, mental health issues and stress, as well as general wellness programs.

We monitor voluntary attrition rates carefully, and over the past three years, our attrition rates have remained lower than the benchmarks in the finance and technology sectors. We review this data frequently and transparently report this information to our stakeholders via our Sustainability Report.

Financial education is the cornerstone of our corporate giving efforts, which include support for several organizations. We also underwrite a digital financial education and data sciences curriculum that is delivered at no cost to grade school and high school students in the U.S. We make additional charitable contributions throughout the communities where we have offices and our employees are encouraged to do the same, including through an annual match to employees for charities of their choice. We offer an annual match of $3,500 per employee to encourage and reward our employees' charitable contributions.

Corporate Citizenship

We strive to create long-term value for our stockholders and meet sustainability goals for all of our stakeholders. That includes maintaining high ethical and business standards, giving back in the communities where we live and work and using our unique resources to bring together a network of the world's leading companies to learn from each other and exchange ideas on a broad range of issues, including those related to environmental, social and governance matters.

For additional information, please refer to the ESG section of our website at www.ice.com/esg.

Our Competitive Strengths

We believe we compete on the basis of a number of factors, including:

- depth and liquidity of markets;
- price transparency;
- reliability and speed of trade execution and processing;
- technological capabilities and innovation;
- breadth of products and services;
- proprietary nature of many of our data services offerings;
- broad distribution and end-to-end design of our mortgage technology offering;
- rate and quality of new product development;
- quality and stability of services;
- distribution and ease of connectivity;
- mid- and back-office service offerings, including differentiated and value-added services;
- transaction costs; and
- reputation.

We believe that we compete favorably with respect to these factors, and that our deep, liquid markets, technology offerings, breadth of product offerings, new product development, customer relationships and efficient, secure settlement, clearing and other support services distinguish us from our competitors. We believe that to maintain our competitive position, we must continue to develop new and innovative products and services, enhance our technology infrastructure, maintain liquidity and offer competitive pricing.

We believe our key strengths include our:

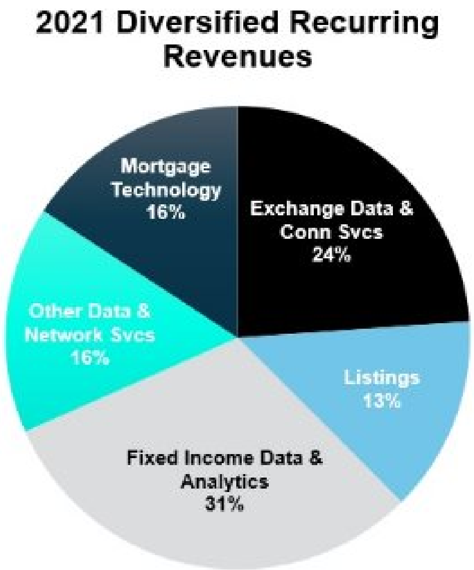
- **Data Services:** Across all three of our segments and our various networks, our data services aim to address the rising demand for independent, real-time information, which is being driven by regulation, market fragmentation and competition, increasing technology and data demands, increasing automation, as well as passive investing and indexation. We also believe our data services are uniquely relevant to our clients' business operations and provide tools and services that enable greater workflow efficiency and, regardless of market conditions, are relied upon to serve the need for continuous information and analysis.
    - In our Exchanges segment, we offer proprietary real-time and historical pricing data, as well as order book and transaction information related to our global futures markets and the NYSE. We also provide connectivity services directly related to those exchange platforms and clearing houses.
    - In our Fixed Income and Data Services segment, we are a leading provider of evaluated end-of-day and real-time pricing services on roughly three million fixed income securities spanning approximately 150 countries and 80 currencies including sovereign, corporate and municipal bonds, mortgage and asset-backed securities, as well as leveraged loans. Our reference data offering complements our evaluated pricing by providing our clients with a broad range of descriptive information, covering millions of financial instruments that, when coupled with our pricing services, act as the foundation for our leading fixed income index complex.
    - In our Mortgage Technology segment, our AIQ offering applies machine learning and artificial intelligence to the entire loan origination process, offering customers greater efficiency by streamlining data collection and validation through our automated document recognition and data extraction capabilities. AIQ also enables a series of artificial intelligence-driven origination tasks and real-time risk analysis using tools called analyzers that are intended to further improve customer workflow efficiency. In addition, our Mortgage Technology's data offerings include real-time industry and peer benchmarking tools, which provide originators a granular view into the real-time trends of nearly half the U.S. residential mortgage market.
- **World Class Technology:** Our proprietary systems are built using state-of-the-art technology and are designed to support our customers' workflows across the networks we operate. We employ a significant number of employees in technology-related activities, including product management, system architecture, software development, network

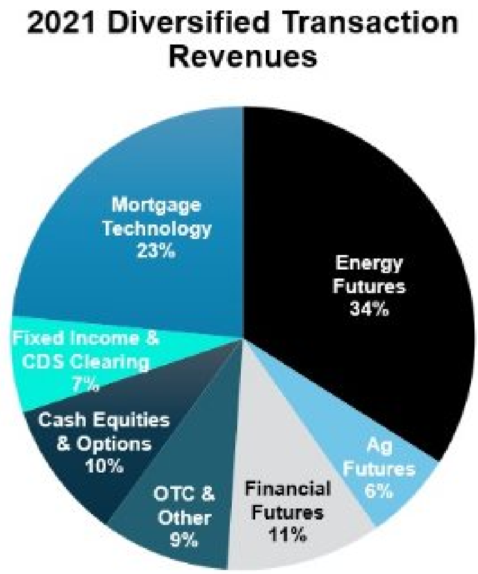
engineering, server maintenance and continuity, cybersecurity, system and data performance, systems analysis, quality assurance, database administration and customer technical support. Speed, reliability, resilience, capacity and security are critical performance criteria for our electronic networks.

- **Risk Management Expertise:** We offer a range of central clearing and related risk management services to promote the liquidity and security of our markets in jurisdictions around the world and to meet local regulatory and operational needs in key financial market centers. The credit and performance assurance provided by our clearing houses to clearing members is designed to substantially reduce counterparty risk and is a critical component of our exchanges' identities as reliable and secure marketplaces for global transactions. Our clearing houses are designed to protect the financial integrity of our markets by maintaining strong governance and rules, managing collateral, facilitating payments and collections, enhancing capital efficiency and limiting counterparty credit risk. In our Fixed Income and Data Services segment, we provide mission critical price transparency for nearly three million fixed income securities globally. Our fixed income customers rely on our data, indices and analytics to inform pre-trade decision making, support post-trade regulatory and compliance needs and improve operational efficiency. In our Mortgage Technology segment, our origination technology network acts as a system of record for mortgage transactions, automating the gathering, reviewing, and verifying of mortgage-related information, that in addition to other benefits, is intended to enable automated enforcement of rules and business practices that are designed to adhere to secondary market standards.

- **Broad Distribution:** We operate multiple trading venues, including 13 regulated exchanges, as well as 6 clearing houses, which are strategically positioned in major market centers around the world, including the U.S., U.K., EU, Canada, Asia Pacific and the Middle East. Our ICE Global Network provides connectivity to over 150 trading venues and data from over 750 data sources, including ICE-operated markets and data services. Through our fixed income execution, data and analytics offerings, we serve thousands of customers across global fixed income markets. In our Mortgage Technology segment, we have at least one product relationship with nearly every key industry participant from loan originators to settlement agents and local jurisdictions within the U.S., that represent over 85% of the U.S. population.

- **Diverse Product Offerings:** In our Exchanges segment, many of our futures contracts serve as global benchmarks for managing risk relating to exposure to price movements in the underlying products, including financial, energy and agricultural commodities. For example, we are a leading provider of global energy risk management products, ranging from global crude and refined oil products, to an array of global natural gas benchmarks and environmental markets. In our Fixed Income and Data Services segment, we offer customer solutions that span their workflows including pre-trade analytics, an array of execution protocols, and post-trade services all designed to improve asset class transparency and bring efficiency to customers' workflows. In our Mortgage Technology segment, we provide customers with a comprehensive loan origination platform and network of third-party service providers, which we believe are critical to the underwriting, processing and closing of U.S. residential mortgage loans.





Competitors

The markets in which we operate are highly competitive. We face competition in all aspects of our business from a number of different enterprises, both domestic and international, including traditional exchanges, electronic trading platforms, investment banks, data vendors, voice brokers, and mortgage and other technology providers.

Exchanges Segment

- We face competition from other exchanges, electronic trading systems, third-party clearing houses, technology firms, market data vendors and trading facilities in the U.S. and globally. Some of the exchanges are consortiums formed by banks and exchanges.
- We face significant competition with respect to equities trading, and this competition is expected to remain intense. Our current and prospective competitors include regulated markets, dark pools and other alternative trading systems, or ATSs, market makers and other execution venues. We also face competition from large investment banks, brokers and customers that may assume the role of principal and act as counterparty to orders originating from retail customers, or match their respective order flows through bilateral trading arrangements, including through internalization of order flow. NYSE Arca Options and NYSE American Options face considerable competition in the equity options markets; their principal U.S. competitors are Nasdaq, Inc., or Nasdaq, and Cboe Global Markets, Inc., or Cboe.
- Our principal competitor for corporate listings in the U.S. is Nasdaq. For ETF listings, we compete with Nasdaq and Cboe. We also face competition for foreign issuer listings from a number of stock exchanges outside the U.S. As other liquidity venues and new entrants seek exchange status, we may face more competition for listings.

Fixed Income and Data Services Segment

- Our fixed income trading venues, or ICE Bonds, compete with other electronic trading venues. Our platforms also compete for volume traded bilaterally or trading activity that is not done through an electronic venue.
- Our data services offerings face intense competition in all aspects of the business. We broadly compete with purchased third-party information and services from large global suppliers of financial market data. Our Fixed Income Data and Analytics services compete with information obtained from informal industry relationships and sources, such as broker quotes, as well as other index and portfolio analytics providers. Our ICE Global Network business competes with other extranet providers.

Mortgage Technology Segment

- In our ICE Mortgage Technology business, we compete with other digital mortgage solution providers and proprietary systems that lenders have put in place. We also compete for mortgage activity that does not utilize digital solutions.

Our Growth Strategy

We seek to advance our leadership position by focusing our efforts on the following key strategies for growth:

- innovate and expand the networks we serve to address the rising demand for transparency and efficiency;
- further develop our technology and risk management infrastructure while also increasing our distribution; and
- strengthen our competitive position through select acquisitions and strategic relationships.

The record consolidated revenues, less transaction-based expenses, we achieved in 2021 reflect our focus on the implementation and execution of our long-term growth strategy.

Innovate and Expand the Networks We Serve to Address the Rising Demand for Transparency and Efficiency

Our growth strategy has been to expand the networks we serve by, in part, adding new data, technology, connectivity and other workflow tools. By bringing together leading technology with a wide range of data and analytics, as well as an array of delivery mechanisms, we offer customers a comprehensive and flexible solution to address the need for more transparency, efficiency and information across their respective workflows. Our growth has been driven by many factors, such as increased automation, regulation and demand for independent, secure, real-time information.

We will continue to look for strategic opportunities to grow our networks and expect to also continue to pursue opportunities in asset classes we do not currently serve.

Further Develop Our Technology and Risk Management Infrastructure While Also Increasing Our Distribution

We develop and maintain our own infrastructure, electronic trading platforms, clearing systems, mortgage platforms and data and analytics platforms, which are designed to ensure scalability and the delivery of technology that meets our expanding customer base’s demands for price transparency, reliability, risk management and transaction efficiency. The systems that we operate support trading, clearing, mortgage originations, data and analytics across many data centers.

We expect to continue to develop our exchange technologies, including rolling out NYSE Pillar, our new integrated equities trading platform and matching engine, to our equity options markets to improve performance and reduce the complexity of operating multiple trading systems. We also expect to continue to invest in mortgage technology to streamline and automate more workflows and build new capabilities, such as eClose and AIQ analyzers. Finally, we expect to add content and build new analytics to enable further electronification in fixed income markets.

Our customer base has grown and diversified as a result of several drivers, including the addition of new asset classes and products, the move toward increased risk management and increased automation, regulation and demand for independent, secure, real-time information. We continue to add new participants to our platforms, which bring additional demand for new products and services. We develop new products, but have also increased our capabilities through licenses and acquisitions of companies and intellectual property. We intend to continue to increase the ease of access and connectivity with our existing and prospective customers and expand our customer base by leveraging our existing relationships and our global sales and marketing team to promote participation on our platform, and by expanding our range of products and services.

Strengthen Our Competitive Position Through Select Acquisitions and Strategic Relationships

We were an early consolidator in global markets and we intend to continue to explore and pursue acquisitions and other strategic opportunities to strengthen our competitive position globally, broaden our product offerings and services and support the growth of our company while enhancing stockholder value as measured by return on invested capital, earnings accretion and cash flow growth. We may enter into business combinations, make acquisitions or enter into strategic partnerships, joint ventures or other alliances, any of which may be material. In addition to growing our business, we may enter into these transactions for a variety of additional reasons, including leveraging our existing strengths to enter new markets or related asset classes, expanding our products and services, diversifying our business, addressing underserved markets, advancing our technology and anticipating or responding to regulatory or other potential changes in our industry or other industries. For example, in September 2020, we acquired Ellie Mae, Inc., or Ellie Mae, to expand our mortgage technology portfolio. Through its digital lending platform, Ellie Mae (now known as ICE Mortgage Technology), provides technology services to participants in the mortgage supply chain, including its over 3,000 customers and thousands of partners and investors who provide market liquidity on its open network.

Information About Our Executive Officers

Information relating to our executive officers is included under “Executive Officers” in Part III, Item 10, “Directors, Executive Officers and Corporate Governance” of this Annual Report.

Regulation

Our activities and the markets in which we operate are subject to regulations that impact us as well as our customers, and, in turn, meaningfully influence our activities, the manner in which we operate and our strategy. We are primarily subject to the jurisdiction of regulatory agencies in the U.S., U.K., EU, Canada, Singapore and Abu Dhabi. Failure to satisfy regulatory requirements can or may give rise to sanctions by the applicable regulator. See the discussion below and Item 1(A) "-Risk Factors" in this Annual Report for additional descriptions of regulatory and legislative risks and uncertainties.

Regulation of our Derivatives Business

Our regulated derivatives markets and clearing houses are based primarily in the U.S., U.K., EU, Canada, Singapore and Abu Dhabi.

- Our U.S. futures exchange, ICE Futures U.S., is subject to extensive regulation by the Commodity Futures Trading Commission, or CFTC, under the Commodity Exchange Act, or CEA. The CEA generally requires that futures trading in the U.S. be conducted on a commodity exchange registered as a Designated Contract Market, or DCM. As a registered DCM, ICE Futures U.S. is a self-regulatory organization, or SRO, that has implemented rules and procedures to comply with the core principles applicable to it under the CEA.
- In the U.K., ICE Futures Europe is a Recognized Investment Exchange, or RIE, in accordance with the Financial Services and Markets Act 2000. Like U.S. regulated derivatives markets, RIEs are SROs with surveillance and compliance responsibilities.
- In the EU, ICE Endex is a regulated market in the Netherlands and its derivative markets are licensed under the Dutch Financial Services Act and supervised by the Dutch National Bank, or DNB, and the Netherlands Authority for the Financial Markets, or AFM.
- In Singapore, ICE Futures Singapore is an approved exchange supervised by the Monetary Authority of Singapore, or MAS.
- In Abu Dhabi, ICE Futures Abu Dhabi is an RIE and regulated by the Financial Services Regulatory Authority, or FSRA.
- In Canada, ICE NGX is recognized as an exchange and clearing house by the Alberta Securities Commission and is also registered by the CFTC as a Foreign Board of Trade and as a Derivatives Clearing Organization, or DCO.
- ICE Clear Credit and ICE Clear U.S. are regulated by the CFTC as DCOs. DCOs are subject to extensive regulation by the CFTC under the CEA. The Financial Stability Oversight Council, or FSOC, has designated ICE Clear Credit as a systemically-important financial market utility under Title VIII of the Dodd-Frank Wall Street Reform and Consumer Protection Act, or Dodd-Frank Act. As such, ICE Clear Credit has access to the Federal Reserve System and holds deposits of $37.3 billion of its U.S. dollar cash in its cash accounts at the Federal Reserve as of December 31, 2021.
- ICE Clear Europe, which is primarily regulated in the U.K. by the Bank of England, or BOE, as a Recognized Clearing House, is also subject to regulation by the CFTC as a DCO and by the European Securities and Markets Authority, or ESMA. Both ICE Clear Credit and ICE Clear Europe are also regulated by the SEC as clearing agencies because they clear security-based swaps.
- In the EU, ICE Clear Netherlands is an authorized CCP and is regulated by the DNB and AFM.
- In Singapore, ICE Clear Singapore is an approved clearing house supervised by the MAS.

Regulation of our Securities Business

- In our cash equities and options markets, NYSE, NYSE Arca, NYSE American, NYSE National and NYSE Chicago are national securities exchanges and, as such, are SROs and subject to oversight by the SEC. Accordingly, our U.S. securities exchanges are regulated by the SEC and, in turn, are the regulators of their members. As national securities exchanges, NYSE, NYSE Arca, NYSE American, NYSE National and NYSE Chicago must comply with, and enforce compliance by their members with, the Securities Exchange Act of 1934, or the Exchange Act.

- Our U.S.-based execution-oriented fixed income markets are operated by our SEC-registered broker-dealers, ICE Bonds Securities Corporation, or ICE Bonds, which operates three SEC registered ATSs, ICE BondPoint, ICE Credit Trade, and ICE TMC. ICE Bonds is subject to oversight by the SEC and is a member of the Financial Industry Regulatory Authority, or FINRA, and the Municipal Securities Rulemaking Board, or MSRB. FINRA and MSRB are SROs that regulate broker-dealers in the U.S. ICE Securities Execution & Clearing, LLC, a full clearing member of the National Securities Clearing Corporation, the Fixed Income Clearing Corporation and The Depository Trust Corporation, provides correspondent clearing for ICE Bonds and is subject to oversight by the SEC, FINRA and the MSRB.

- Our U.K.-based execution-oriented fixed income market is operated by Creditex Brokerage, L.L.P., which is an operator of a multilateral trading facility, or MTF, and ICE Markets Limited, which acts as the matched principal counterparty to bond transactions arranged on the MTF operated by Creditex Brokerage. Both Creditex Brokerage and ICE Markets Limited are regulated and authorized by the U.K.'s Financial Conduct Authority, or FCA. Creditex Brokerage is authorized to provide automated trading services in Hong Kong, Singapore and Switzerland and is subject to regulatory oversight by national competent authorities in each jurisdiction.

Regulation of our Data Business

We have a U.S. subsidiary that is registered with the SEC under the Investment Advisers Act of 1940, or the Investment Advisers Act, for its evaluated pricing and other advisory services. The Investment Advisers Act imposes numerous regulatory obligations on registered investment advisers, including those relating to the management and distribution of products and services, record-keeping, compliance oversight, operational and marketing requirements, disclosure obligations and prohibitions on fraudulent activities. Investment advisers also are subject to certain state securities laws and regulations. ICE Data Services (Australia) Pty. Ltd. provides financial services in Australia and is licensed by the Australian Securities and Investment Commission, or ASIC. ICE Data Desktop Solutions (Europe) Limited provides certain financial services throughout Europe and is regulated by the FCA. ICE Data Indices applies the International Organization of Securities Commissions, or IOSCO, Principles for Financial Benchmarks to its indices. ICE Data Indices is recognized as a third-country benchmark administrator by the FCA under the U.K. Benchmarks Regulation, or U.K. BMR. ICE Benchmark Administration Limited, or IBA, is authorized and regulated by the FCA for the regulated activity of administering a benchmark, and is authorized as a benchmark administrator under the U.K. BMR. See "Regulatory Changes" below for more information.

Regulation of our Mortgage Business

We have a mortgage technology business, ICE Mortgage Technology (formerly known as Ellie Mae), that is subject to examination by the Federal Financial Institutions Examination Council, or the FFIEC, and its member agencies because it is a third-party service provider to financial institutions directly regulated by the FFIEC and its member agencies, including, among others, the Consumer Financial Protection Bureau, or CFPB. In addition, our mortgage technology business processes a significant amount of consumer financial information on behalf of mortgage lenders and as a result is subject to a variety of U.S. state and federal regulations governing the protection of consumer financial information.

Regulatory Changes

Domestic and foreign policy makers continue to review their legal frameworks governing financial markets, and periodically change the laws and regulations that apply to our business and to our customers' businesses. Our key areas of focus on these evolving efforts are:

- **Continued access by EU market participants to U.K. CCPs and exchanges**. The European Commission adopted an 18-month temporary equivalence decision for U.K. CCPs, which began to apply as of January 1, 2021. Based on this temporary equivalence, ICE Clear Europe has been recognized by ESMA as a third-country CCP in accordance with the European Markets Infrastructure Regulation, or EMIR. In November 2021, the European Commission announced that it will propose an extension of the equivalence decision applying to U.K. CCPs in early 2022. In December 2021, ESMA published its comprehensive review of the systemic importance of ICE Clear Europe, currently designated as a Tier 2 CCP, and determined not to issue a recommendation for derecognition. ESMA instead proposed that measures be considered by relevant EU institutions and authorities to mitigate risks related to Tier 2 CCP clearing services identified as being of substantial systemic importance to the EU (including services provided by ICE Clear Europe). ESMA also proposed regulatory and supervisory measures that incentivize EU clearing participants and clients to reduce their exposures towards Tier 2 CCPs and enhancements to ESMA’s supervisory powers.

Separately, ICE Futures Europe will continue to be able to permit access to its platform from relevant EU jurisdictions and ICE Endex will continue to be able to permit access to its platform from the U.K. The absence of an equivalence decision by the EU for U.K. trading venues, however, may result in increased costs for certain EU market participants, which could impact trading on ICE Futures Europe. Additional impacts to our business and the potential for regulatory changes remain uncertain at this time.

- **Regulatory structure applicable to non-EU clearing houses.** On January 1, 2020, EMIR 2.2 became effective, which revises the EU's current regulatory and supervisory structure for EU and non-EU clearing houses. ESMA has recognized ICE Clear Europe as a third-country CCP under EMIR and determined that it is a Tier 2 CCP on the basis that it is systemically important to the financial stability of the EU or one or more of its Member States. ESMA has recognized all other ICE clearing houses as third-country CCPs and determined that they are Tier 1 CCPs on the basis that they are not systemically-important to the financial stability of the EU or one or more of its Member States. ESMA's continuing implementation of these delegated regulations could still impact one or more of our other non-EU clearing houses.
- **Requirement that European and U.K. exchanges and CCPs offer non-discriminatory access.** The non-discriminatory access provisions of the U.K.'s Markets in Financial Instruments Directive II, or U.K. MiFID II, and the EU Markets in Financial Instruments Directive II, or EU MiFID II, required both our U.K. and EU exchanges and CCPs to offer access to third parties on commercially reasonable terms. In May 2021, the U.K. Treasury concluded that the non-discriminatory access requirements for exchange-traded derivatives were not suitable in a U.K.-only context and the requirements were removed. With regard to EU MiFID II, in November 2021, the European Commission proposed that non-discriminatory access for exchange traded derivatives be removed from Markets in Financial Instruments, or MiFIR, regulation.
- **Brexit implications.** As of January 1, 2021, EU law no longer applies in and to the U.K. In connection with the completion of the U.K.'s withdrawal from the EU, the U.K. and EU finalized a trade and cooperation agreement, which is now in force. The trade and cooperation agreement does not cover financial services. The EU and U.K. declared an intention to continue discussions to agree on a memorandum of understanding, or MoU, on financial services cooperation. This MoU, once signed and ratified by both parties, will establish a Joint U.K.-EU Financial Regulatory forum, which will serve as a platform to facilitate dialogue on financial services issues. There continues to be uncertainty surrounding specific terms that may impact the financial services industry and our business operations.
- **Capital requirements for investment firms acting as market makers.** EU and U.K. policy makers are developing a framework for prudential requirements for EU and U.K. investment firms. The proposed rules introduce new prudential requirements tailored to the activities and risks faced by investment firms. We are monitoring the potential impact of these new rules on investment firms acting as market makers on certain markets operated by ICE Futures Europe and ICE Endex.
- **Financial transaction and similar taxes.** A number of EU Member States have considered a financial transaction tax, but many details remain to be discussed and agreed, including how to assess the tax at a Member State level. Implementation of a financial transaction tax could result in a reduction in volumes and liquidity, which would have a negative impact on our EU operations.

  In the U.S., financial transaction taxes and other similar changes to tax laws are being considered in several states, and a federal financial transaction tax on stocks, bonds and derivatives has been introduced in the U.S. House of Representatives. As in the EU, these types of taxes in the U.S. could result in reduced volumes and liquidity on our exchanges that trade instruments to which the tax applies.
- **Benchmarks Regulation.** The FCA is using its legal powers under the U.K. BMR to require the London Interbank Offered Rate, or LIBOR's, administrator, IBA, to publish certain Sterling and Japanese Yen LIBOR settings under a changed "synthetic" methodology until the end of 2022. Any settings published under a “synthetic” methodology may no longer be representative of the underlying market or economic reality the setting is intended to measure as those terms are used in the U.K. BMR. The FCA confirmed that it expects that certain U.S. Dollar LIBOR settings will continue to be published on a representative basis until the end of June 2023. The FCA will continue to consider requiring IBA to publish certain U.S. Dollar LIBOR settings beyond June 30, 2023 under a changed “synthetic” methodology. Usage of the synthetic LIBOR and U.S. Dollar LIBOR settings may be restricted or prohibited in certain circumstances under applicable law.

The European Commission is using its powers under the EU Benchmarks Regulation, or EU BMR, to designate replacement benchmarks for certain Swiss franc LIBOR settings and the Euro Overnight Index Average, or EONIA, which cover all references to the relevant benchmark. The European Commission has also announced that it plans to designate replacement benchmarks for certain Sterling and Japanese Yen LIBOR settings. The transition period for the use of benchmarks provided by third-country administrators has been extended until at least December 31, 2023.

In April 2021, New York State enacted a law designed to reduce uncertainty and economic impacts of the permanent cessation of LIBOR for specified contracts, securities and other agreements that are economically linked to LIBOR that are governed by New York state law. The New York law generally tracks the legislation proposed by the Alternative Reference Rates Committee and received broad industry support.

- **U.S. Listing and Trading Prohibitions on Certain Foreign Companies.** On December 18, 2020, the Holding Foreign Companies Accountable Act became U.S. law. For each company required to file periodic reports with the SEC, this Act requires the SEC to identify any company that retains a registered public accounting firm that is located in a foreign jurisdiction and that the Public Company Accounting Oversight Board, or PCAOB, is unable to inspect or investigate because of a position taken in such foreign jurisdiction. On December 16, 2021, the PCAOB designated China and Hong Kong as the jurisdictions where the PCAOB is not allowed to conduct full and complete audit inspections. Pursuant to the PCAOB's determinations, the SEC will identify issuers that have used non-inspected audit firms. If the SEC determines that an identified company has used a non-inspected audit firm for three consecutive years, it is required to prohibit such company's securities from trading on a U.S. securities exchange or in any "over-the-counter" market in the U.S. As a consequence, the NYSE is likely to be required to suspend trading in certain of its listed companies.

  On June 3, 2021, President Biden signed an Executive Order, or the June Order, that prohibits U.S. persons from purchasing or selling the publicly traded securities of companies determined to be Chinese Military Industrial Complex Companies, or CMICs, because they (i) operate in defense and related material sector, or the surveillance technology sector, of China, or (ii) own or control, or are owned or controlled by, an individual or entity that operates in such sectors. Although there are no companies currently listed on the NYSE securities exchanges determined to be CMICs, in the future, there may be listed companies covered by the prohibitions.

See the discussion below and Item 1(A) "- Risk Factors" in this Annual Report for additional description of regulatory and legislative risks and uncertainties.

Available Information

Our principal executive offices are located at 5660 New Northside Drive, 3rd Floor, Atlanta, Georgia 30328. Our main telephone number is 1-770-857-4700, and our website is www.ice.com.

We are required to file reports and other information with the SEC. A copy of this Annual Report on Form 10-K, as well as any future Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to such reports are available free of charge, on our website as soon as reasonably practicable after we file such reports with, or furnish such reports to, the SEC. A copy of these filings is also available at the SEC's website (www.sec.gov). The reference to our website address and to the SEC's website address do not constitute incorporation by reference of the information contained on the website and should not be considered part of this report. From time to time, we may use our website and/or social media, including Twitter, as distribution channels of material information. The website to access our Twitter account is https://twitter.com/ICE_Markets.

In addition, we have posted on our website the charters for our (i) Audit Committee, (ii) Compensation Committee, (iii) Nominating and Corporate Governance Committee and (iv) Risk Committee, as well as our Global Code of Business Conduct, which includes information regarding our whistleblower hotline information, Board of Directors Governance Guidelines and Board Communication Policy. We will provide a copy of these documents without charge to stockholders upon request.

ITEM 1(A). RISK FACTORS

The risks and uncertainties described below are those that we currently believe could materially adversely affect us. Other risks and uncertainties that we do not presently consider to be material or of which we are not presently aware may become important factors that affect us in the future. If any of the risks discussed below actually occur, our business, financial condition, operating results or cash flows could be materially adversely affected. Accordingly, you should carefully consider the following risk factors, as well as other information contained in or incorporated by reference in this Annual Report.

SUMMARY

The following summarizes some of the key risks and uncertainties that could materially adversely affect us. You should read this summary together with the more detailed description of each risk factor contained below.

Business and Industry

- Global economic, political and financial market events or conditions may negatively impact our business.
- Owning clearing houses exposes us to risks, including risks related to defaults by clearing members, risks related to investing margin and guaranty funds and the cost of operating the clearing houses.
- A decline in the value of securities held as margin or guaranty fund contributions by our clearing houses or default by a sovereign government issuer could pose additional risks of default by clearing members.
- Owning and operating cash equity and options exchanges exposes us to additional risks, including the regulatory responsibilities to which these businesses are subject.
- Our business is subject to the impact of interest rate levels, inflation and financial markets volatility, which may be caused by conditions that are beyond our control.
- Systems failures in the derivatives and securities trading industry and mortgage technology industry could negatively impact us.
- We may be at greater risk from terrorism, including cyberterrorism, than other companies.
- Fluctuations in foreign currency exchange rates could adversely affect our financial results.
- We may have difficulty executing our growth strategy and maintaining our growth effectively.
- We may not be successful in offering new products or technologies or in identifying opportunities.
- Climate change and the transition to renewable energy and a net zero economy pose operational, commercial and regulatory risks.
- The COVID-19 pandemic could adversely affect our business, results of operations and financial condition.
- We may be required to recognize impairments of our goodwill, other intangible assets or investments.
- We may not realize the expected benefits of our majority investment in Bakkt and the investment may introduce additional risks to our business due to its evolving business model.

Legal and Regulatory

- Our businesses and those of many of our clients have been and continue to be subject to extensive legislation and regulatory scrutiny, and we face the risk of changes to our regulatory environment and business in the future.
- Our compliance and risk management methods, as well as our fulfillment of our regulatory obligations, might not be effective, which could lead to enforcement actions by our regulators.
- Regulatory changes or court rulings may have an adverse impact on our ability to derive revenue from market data and connectivity fees.
- The uncertainty surrounding the terms of the U.K.'s exit from the EU, commonly referred to as Brexit, could adversely impact our business, results of operations and financial condition.
- Risks relating to the administration of benchmarks and indices, including LIBOR, and the potential for changes to, cessations of, and the replacement of, or transition from, benchmarks and indices, including LIBOR, may result in legal risks and could adversely affect our business.
- We may face liability for content contained in our data products and services.
- We are subject to significant litigation and liability risks.

Operational and Liquidity

- Our systems and those of our third-party service providers may be vulnerable to cyberattacks, hacking and other cybersecurity risks, which could result in wrongful manipulation, disclosure, destruction, or use of our information or that of a third party, or which could make our participants unable or reluctant to use our electronic platforms.
- Our business may be harmed by computer and communication systems failures and delays.
- An interruption or cessation of an important service, data or content supplied by any third party, or the loss of an exclusive license, could have a material adverse effect on our business.

- Our success largely depends on key personnel, including our senior management, and having adequate succession plans in place. We may not be able to attract, retain and develop the highly skilled employees we need to support our business, which could harm our business.
- We currently have a substantial amount of outstanding indebtedness which could adversely affect our financial condition and operations and restrict our activities or satisfy our debt service obligations.

Competition

- We face intense competition; failure to keep up with rapid changes in technology and client preferences could negatively impact our competitive position.
- Damage to our reputation could damage our business.

Intellectual Property

- Our use of "open source" software could negatively impact our ability to sell our products and services and subject us to litigation.
- A failure to protect our intellectual property rights, or allegations that we have infringed the intellectual property rights of others, could adversely affect our business.

Common Stock

- We are a holding company and depend on our subsidiaries for dividends, distributions and other payments.
- We may fail to complete or realize the anticipated cost savings, growth opportunities and synergies and other benefits anticipated from our acquisitions or anticipated growth opportunities or expected benefits of our strategic investments, which could adversely affect the value of our common stock.
- Provisions of our organizational documents and Delaware law may delay or deter a change of control of ICE.

BUSINESS AND INDUSTRY

Global economic, political and financial market events or conditions may negatively impact our business.

Adverse macroeconomic conditions, including recessions, inflation, supply chain issues, labor shortages, government shutdowns, currency fluctuations, interest rate changes, increased mortgage foreclosure volume, geopolitical events or conflicts, international trade disputes, including the imposition of tariffs or other protectionist measures, actual or anticipated large-scale defaults or failures or slowdown of global trade have in the past negatively impacted consumer and corporate confidence and resulted in reductions in consumer, government and corporate spending, and could have such effects in the future, and in turn impact our business. If our customers reduce spending, workforce, mortgage origination activity, trading activity or demand for financial data as a result of challenges in the prevailing economic markets, our revenues could decline.

A substantial portion of our revenues are derived from data services fees and fees for transactions executed and cleared in our markets. Our market data-based revenues are largely subscription-based, or recurring, and are generated from a range of global financial and commodity markets, including pricing and reference data, exchange data, analytics, feeds, index services, desktops and connectivity solutions. For our transaction-based revenues, we derive a significant percentage from trading in global energy and agricultural-related futures and options contracts, as well as equity transactions and global interest rate contracts. The market data subscriptions and trading volumes in our markets could decline substantially if our market participants reduce their level of spending or trading activity for any reason, including:

- adverse market conditions that curtail the addition of new customers or cause a decrease in purchases by our existing customers for our subscription-based products and services;
- weakness in the macroeconomic environment that causes our customers to delay or cancel existing orders or subscriptions;
- cost-cutting pressures across the industry or decrease in demand for our subscription-based products and services that lead to a reduction in price;
- consolidation in our markets or the markets of our customers that results in a reduction in the number of market participants;
- a reduction in trading demand by customers or a decision to curtail or cease hedging or speculative trading;

- regulatory or legislative changes impacting our business, our customers and financial markets;
- political uncertainty and discord could negatively impact us if we are viewed as taking a political stance that is contrary to our customers' beliefs or principles;
- the impact of climate change and the transition to renewable energy and away from crude oil;
- a prolonged decrease in volatility in the financial markets;
- heightened capital and margin requirements or mandated reductions in leverage resulting from new regulations;
- defaults by clearing or exchange members or the inability of participants to pay out contractual obligations;
- changes to our contract specifications that are not viewed favorably by our market participants; or
- reduced access to, or availability of, capital required to fund trading activities.

A reduction in our overall trading volume could render our markets less attractive to market participants as a source of liquidity, which could result in further loss of trading volume and associated transaction-based revenues. A reduction in trading volumes could also result in a corresponding decrease in the demand for our market data, which would further reduce our overall revenue.

Further, NYSE’s revenue increases when more companies are seeking access to public markets, and on the NYSE specifically. A stagnation or a decline in the initial public offering, or IPO, market, or issuers choosing to list on venues other than the NYSE, could have an adverse effect on our revenues.

U.S. trade and diplomatic tensions, U.S. government policies toward China, including sanctions laws, executive orders and other regulations, and Chinese government policies toward U.S. companies and Chinese companies listed on U.S. exchanges are likely to impact our existing business and future opportunities. For example, in response to a 2020 executive order by President Trump and the June Order by President Biden in 2021, the NYSE delisted four Chinese telecommunications companies identified in those executive orders. In addition, the Holding Foreign Companies Accountable Act, enacted in December 2020, requires the SEC to suspend trading in the U.S. of any company whose accounting firm the PCAOB is unable to inspect or investigate for three consecutive years. The NYSE anticipates that the SEC could suspend trading in a number of NYSE-listed companies under this Act. In the future, there may be other listed companies that the NYSE will be required to take similar action against to comply with U.S. government policies, which could impact our business.

In addition, adverse conditions in the residential mortgage lending industry, including a substantial or prolonged decline in mortgage lending volume or an increase in mortgage foreclosure volume, may increase our costs or have an adverse effect on our revenues. Mortgage lending volume has decreased substantially in certain years in the past, and could again decrease in the future. Factors that could adversely impact mortgage lending volumes include increased mortgage interest rates, reduced consumer and investor demand for mortgages, more stringent underwriting guidelines, decreased liquidity in the secondary mortgage market, high levels of unemployment, high levels of consumer debt, lower consumer confidence, changes in tax and other regulatory policies, the number of existing mortgages eligible for refinancing, the available inventory of housing, affordability of housing and other macroeconomic factors.

Owning clearing houses exposes us to risks, including risks related to defaults by clearing members, risks related to investing margin and guaranty funds and the cost of operating the clearing houses.

There are risks inherent in operating clearing houses, including exposure to the market and counterparty risk of clearing members, market liquidity risks, defaults by clearing members and risks associated with custody and investing margin or guaranty fund assets provided by clearing members to our clearing houses, which could subject our business to substantial losses. For example, clearing members in ICE Clear Europe have provided margin and guaranty funds with an aggregate cash balance of $98.2 billion as of December 31, 2021 and a total of $150.4 billion for all of our clearing houses as of December 31, 2021. In addition to the use of Sovereign Central Bank access when applicable, the ICE Clearing Houses may use third-party investment advisors for investment of cash assets, subject to the guidelines provided by each clearing house, and may add or change the investment managers from time to time. To the extent available, ICE Clear Credit holds the U.S. dollar cash and U.S. Treasuries that clearing members transfer to satisfy their original margin and guaranty fund requirements at its account at the Federal Reserve. With respect to other clearing member cash posted, ICE Clear Credit currently self-manages and uses external investment managers to invest such cash margin and guaranty fund deposits.

We have an obligation to return margin payments and guaranty fund contributions to clearing members to the extent that the relevant member’s risk based on its open contracts to the clearing house is reduced. If a number of clearing members substantially reduce their open interest or default, the concentration of risks within our clearing houses will be spread among a smaller pool of clearing members, which would make it more difficult to absorb and manage risk in the event of a further clearing member's default.

Although our clearing houses have policies and procedures to help ensure that clearing members can satisfy their obligations, such policies and procedures may not succeed in preventing losses after a member's or counterparty's default. In addition, although we believe that we have carefully analyzed the process for setting margins and our financial safeguards, it is a complex process and there is no guarantee that our procedures will adequately protect us from the risks related to clearing these products. We cannot assure you these measures and safeguards will be sufficient to protect us from a default or that we will not be materially and adversely affected in the event of a significant default. We have contributed our own capital to the front of the guaranty fund of the clearing houses that could be used in the event of a default. We also have default insurance that resides after and in addition to the ICE Clear Credit, ICE Clear Europe, and ICE Clear U.S. 'Skin In The Game' contributions and before the guaranty fund contributions of the non-defaulting clearing members. Notwithstanding these actions, the default of any one of the clearing members could subject our business to substantial losses and cause our customers to lose confidence in the guaranty of our clearing houses.

A decline in the value of securities held as margin or guaranty fund contributions by our clearing houses or default by a sovereign government issuer could pose additional risks of default by clearing members.

Our clearing houses hold a substantial amount of assets as margin or guaranty fund contributions, which comprise U.S. and other sovereign treasury securities. As of December 31, 2021, our clearing houses held $85.0 billion of non-cash margin or guaranty fund contributions in U.S. and other sovereign treasury securities: $64.5 billion of this amount was comprised of U.S. Treasury securities, $1.5 billion of French Treasury securities, $1.4 billion of German Treasury securities, $2.2 billion of U.K. Treasury securities and $15.4 billion of other European, Japanese, Canadian and Tri-Party Treasury securities. Sovereign treasury securities have historically been viewed as one of the safest and most liquid securities for clearing houses to hold due to the perceived credit worthiness of major governments. If there is a collapse in a specific currency relied upon by our clearing houses, our clearing houses will face significant expenses in changing their systems and such an event could cause a credit contraction and major swings in asset prices and exchange rates. To mitigate this risk, our clearing houses currently apply a discount or "haircut" to the market values for all sovereign securities held as margin or guaranty fund contributions; however, market conditions could change more quickly than we adjust the amount of the haircuts and the haircuts could be insufficient in the event of a sudden market event.

If the value of these securities declines significantly, our clearing houses will need to collect additional margin or guaranty fund contributions from their clearing members, which may be difficult for the members to supply in a time of financial stress affected by an actual or threatened default by a sovereign government. If a clearing member cannot supply the additional margin or guaranty fund contributions, which may include cash in a currency acceptable to the clearing house, the clearing house would deem the clearing member in default. If any clearing members default as a result of the reduction in the value of margin or guaranty fund contributions, our clearing houses and trading business could suffer substantial losses as a result of the loss of any capital that has been contributed to the clearing house's guaranty funds and a loss of confidence by clearing members in the clearing house, resulting in a reduction in volumes of future cleared transactions.

Further, our clearing houses invest large sums through reverse repo transactions in connection with their clearing operations and hold sovereign securities as security in connection with such investment transactions. In the event that a reverse repo counterparty defaults, the value of the sovereign securities we hold as collateral might not be sufficient to cover our losses. Our clearing houses may also make demand deposits with banks that are secured only to the value of FDIC insurance or other national deposit guarantee schemes, which is small, and therefore, the deposits may in significant part be lost in the event one of these banks becomes insolvent.

Owning and operating cash equity and options exchanges exposes us to additional risks, including the regulatory responsibilities to which these businesses are subject.

Owning and operating cash equity and options exchanges for which the revenues are primarily derived from trading activity, market data and listing fees, exposes us to additional risks. Adverse economic conditions and legal and regulatory changes similar to those discussed elsewhere in this section could result in decreased trading volume on our exchanges, discourage or prohibit market participants from listing on our exchanges or cause them to forgo new offerings. Any of these could reduce our revenues, including market data and listing fee revenue.

Our cash equity and options exchanges also have certain regulatory responsibilities that must be fulfilled. For example, these exchanges are responsible for enforcing listed company compliance with applicable listing standards, enforcing our members' compliance with exchange rules and federal securities laws, complying with terms of NMS Plans, filing of all material changes to exchanges' rules with the SEC, and operating our exchanges consistent with exchange rules, federal securities laws, and other applicable laws. Any failure by one of our exchanges to comply with, and enforce compliance by their members with, exchange rules and securities laws could significantly harm our reputation, prompt regulatory scrutiny, result in the payment of fines or penalties and adversely affect our business, financial condition and operating results. Our ability to do this could be impaired by, for example, SEC amendments to NMS Plans for the consolidation of market data that impede the ability of the exchanges and FINRA to discharge their legal obligations by restricting the flow of information and constraining the decision-making authority of the exchanges and FINRA.

We must allocate significant resources to fulfill our regulatory and self-regulatory responsibilities. The for-profit exchanges' goal of maximizing stockholder value might contradict the exchanges' regulatory and self-regulatory responsibilities. In addition, the listing of our common stock on the NYSE could potentially create a conflict between the exchange's regulatory responsibilities to vigorously oversee the listing and trading of securities, on the one hand, and our commercial and economic interest, on the other hand. While we have structural protections to minimize these potential conflicts, we cannot be sure that such measures will be successful.

Further, changes in the rules of our securities markets must be reviewed and approved by the SEC. Approval of such changes by the SEC cannot be guaranteed, and the SEC could delay either the approval process or the initiation of the public comment process. Any denial or delay in approving changes could have an adverse effect on our business, financial condition and operating results.

See Item 1 "- Business - Regulation" above for additional information regarding regulatory changes impacting our cash equities and options exchanges, including risks to our business associated with possible regulation of services offered by non-exchange affiliates and U.S. listing and trading prohibitions on certain foreign companies.

Our business is subject to the impact of interest rate levels, inflation and financial markets volatility, which may be caused by conditions that are beyond our control.

Trading volume in our markets and products is largely driven by the degree of volatility - the magnitude and frequency of fluctuations - in prices and levels of the underlying commodities, securities, indices, financial benchmarks or other instruments. Volatility increases the need to hedge price risk and creates opportunities for investment and speculative or arbitrage trading. Were there to be a sustained period of stability in the prices or levels of the underlying commodities, securities, indices, benchmarks or other instruments of our products, we could experience lower trading volumes, slower growth or declines in revenues.

In addition, interest rates are a significant factor influencing mortgage loan production volumes. Rising interest rates are likely to reduce mortgage loan production volumes, which could potentially impact our transaction-based revenues.

In the event that inflation increases significantly and persistently, this would likely increase the cost of capital, resulting in a slowdown of the growth of early stage companies, causing companies to stay private longer. Credit health of market participants may also be impacted, increasing the risk of default or companies inability to comply with listing standards. An inflationary environment may also reduce consumer optimism resulting in lower demand for mortgage loans.

Factors that are particularly likely to affect price and interest rate levels and volatility, and thus trading and mortgage loan production volumes, include:

- global economic, political and market conditions; and
- concerns over inflation, deflation, legislative and regulatory changes, government fiscal and monetary policy - including actions by the Federal Reserve and other foreign monetary units' governing bodies, and investor and consumer confidence levels.

Factors that are particularly likely to affect trading volumes include:

- weather conditions including hurricanes and other significant events, natural and unnatural disasters like large oil spills that impact the production of commodities and, in the case of energy commodities, production, refining and distribution facilities for oil and natural gas;
- war, acts of terrorism and any unforeseen market closures or disruptions in trading;
- political developments impacting international trade, including trade disputes and increased tariffs, particularly between the U.S. and China, and imposition of protectionist measures;

- real and perceived changes in the supply and demand of commodities underlying our products, particularly energy and agricultural products, including changes as a result of technological improvements or the development of alternative energy sources; and
- credit quality of market participants, the availability of capital and the levels of assets under management.

Any one or more of these factors, which are beyond our control, may reduce volumes and trading activity. Further, lower market volatility could also result in more exchanges competing for trading volumes to maintain their growth. If any of these unfavorable conditions were to persist over a lengthy period of time and trading volumes were to decline substantially and for a long enough period, the critical mass of transaction volume necessary to support viable markets could be jeopardized. Because our cost structure is largely fixed, if demand for our current products and services declines for any reason, we may not be able to adjust our cost structure to counteract the associated decline in revenues, which would cause our net income to decline.

Systems failures in the derivatives and securities trading industry and mortgage technology industry could negatively impact us.

High-profile system failures in the derivatives and securities trading industry and mortgage technology industry have in the past, and could in the future, negatively impact our business and result in a loss of confidence in our technology and our markets, regulatory investigations, fines and penalties and business activity slowdown or interruptions. Further, regulators have imposed requirements for trading platforms that have been costly for us to implement and could result in a decrease in demand for some of our services. In particular, the SEC's Regulation Systems Compliance and Integrity, or Regulation SCI, and the CFTC's system safeguards regulations subject portions of our securities and derivatives trading platforms and other technological systems related to our clearing houses, trade repositories and the U.S. Swap Execution Facility, or SEF, to extensive regulation and oversight. Ensuring our compliance with the requirements of Regulation SCI and the CFTC's system safeguards regulations requires significant ongoing administrative and compliance expenses and burdens. In addition, the SEC's expansion of the ICE systems that are determined to be in scope for Regulation SCI could result in significant additional expenditures.

We may be at greater risk from terrorism, including cyberterrorism, than other companies.

Given our prominence in the global securities industry and the location of many of our properties and personnel in U.S. and European financial centers, including lower Manhattan, and our presence in India, Abu Dhabi and Israel, we may be more likely than other companies to be a direct target of, or an indirect casualty of, attacks by terrorists or terrorist organizations, or other extremist organizations that employ threatening or harassing means to achieve their social or political objectives.

It is impossible to predict the likelihood or impact of any terrorist attack on the securities industry generally, or on our business. In the event of an attack or a threat of an attack, our security measures and contingency plans may be inadequate to prevent significant disruptions in our business, technology or access to the infrastructure necessary to maintain our business. Damage to our facilities due to terrorist attacks may be significantly in excess of insurance coverage, and we may not be able to insure against some damage at a reasonable price or at all. The threat of terrorist attacks may also negatively affect our ability to attract and retain employees. In addition, terrorist attacks may cause instability or decreased trading in the securities markets, including trading on exchanges. Any of these events could adversely affect our business, financial condition and operating results.

Fluctuations in foreign currency exchange rates could adversely affect our financial results.

Since we conduct operations in a number of countries and regions, including the U.S., U.K., EU, Canada, Asia Pacific and the Middle East, substantial portions of our revenues, expenses, assets and liabilities are denominated in currencies other than the U.S. dollar. Because our consolidated financial statements are presented in U.S. dollars, we must translate non-U.S. dollar denominated revenues, income and expenses, as well as assets and liabilities, into U.S. dollars at exchange rates in effect during or at the end of each reporting period. Therefore, increases or decreases in the value of the U.S. dollar against the other currencies could affect our net operating revenues, operating income and the value of balance sheet items denominated in foreign currencies.

External events such as Brexit have caused, and may in the future cause, significant volatility in currency exchange rates, especially among the U.S. dollar, the British pound sterling and the euro. If global economic and market conditions, or economic conditions in the U.K., EU, the U.S. or other key markets deteriorate, the value of the pound sterling, euro or U.S. dollar may weaken. Further, financial instability in a particular country could have a contagion effect on the region in which it is located and contribute to general instability and uncertainty in that region. Events that adversely affect our clients and suppliers in a region could in turn have a materially adverse effect on our international business results and our operating results.

For additional information on our foreign currency exchange rate risk, refer to “- Foreign Currency Exchange Rate Risk” in Item 7A “- Quantitative and Qualitative Disclosures About Market Risk", which is included in this Annual Report.

We may have difficulty executing our growth strategy and maintaining our growth effectively.

We have achieved significant growth since becoming a public company in 2005. Our growth is highly dependent on customer demand for our core products and services, favorable economic conditions and our ability to invest in our personnel, facilities, infrastructure and financial and management systems and controls. Adverse economic conditions could reduce customer demand for our products and services, which may place a significant strain on our management and resources and could force us to defer existing or future planned opportunities. We regularly evaluate our existing operations, service capacity and business efficiencies and, as a result of such evaluations, we may undertake strategic initiatives outside of and within our businesses. We may not be successful in executing on our strategies to support our growth organically or through acquisitions, other investments or strategic alliances.

We may not be successful in offering new products or technologies or in identifying opportunities.

We from time to time launch, and intend in the future to launch, new products, services and business ventures and continue to explore and pursue other opportunities to strengthen our business and grow our company. We have spent and may continue to spend substantial time and money developing new product or service offerings or improving current product or service offerings. If these offerings are not successful, we may miss a potential market opportunity and not be able to recover the costs of such initiatives. Obtaining any required regulatory approval associated with these offerings may also result in delays or restrictions on our ability to benefit fully from these offerings. Further, we have entered into and may seek in the future to enter into or increase our presence in markets that already possess established competitors who may enjoy the protection of high barriers to entry, among other advantages.

In addition, in light of consolidation in the exchange, data services, clearing and mortgage technology sectors and competition for opportunities, we may be unable to identify strategic opportunities or we may be unable to negotiate or finance any future acquisition successfully. Our competitors could merge, making it more difficult for us to find appropriate entities to acquire or merge with and making it more difficult to compete in our industry due to the increased resources of our merged competitors. Also, offering new products and services and pursuing acquisitions requires substantial time and attention of our management team, which could prevent them from successfully overseeing other initiatives that are necessary for our success.

Climate change and the transition to renewable energy and a net zero economy pose operational, commercial and regulatory risks.

Climate change may increase the frequency or severity of extreme weather events, and if we are not adequately resilient to deal with acute climate events, our operations, either in a particular location or globally, may be impacted. Extreme weather events could also impact the activities of our customers or third-party vendors or suppliers. The physical commodities and assets underlying certain of our markets may also be impacted by climate change.

In addition, the transition to renewable energy and a net zero economy involves changes to consumer and institutional preferences around energy consumption, and the possible failure of our products or services to facilitate the needs of customers during the transition to renewable energy could adversely impact our business and revenues. Changing preferences could also have an adverse impact on the operations or financial condition of our customers, which could result in reduced revenues from those customers. We are also subject to risks relating to new or heightened climate change-related regulations or legislation, which could impact us and our customers and result in increased regulatory, compliance or operational costs. We are also subject to reputational risks relating to the perception of whether or not we are facilitating a migration away from fossil fuels. For example, our reputation could be damaged as a result of our offering certain products or services associated with causing or exacerbating climate change, or by any decision by us to continue to conduct or change our activities in response to considerations relating to climate change.

The risks associated with climate change and the transition to renewable energy and a net zero economy are continuing to evolve rapidly, and we expect that climate change-related risks may increase over time.

The COVID-19 pandemic could adversely affect our business, results of operations and financial condition.

The coronavirus (COVID-19) pandemic has created economic and financial disruptions globally and has led governmental authorities to take unprecedented measures to mitigate the spread of the disease, including travel bans, border closings, business closures, quarantines and shelter-in-place orders, and to take actions designed to stabilize markets and promote economic growth.

From an operational perspective, the spread of COVID-19 has resulted in, and could again result in, temporary closures of our office facilities and the office facilities of our customers and our third-party vendors. We have taken preventive measures and implemented contingency plans, and currently many of our employees are working remotely. However, we cannot assure you that such measures will adequately protect our business, and an extended period of remote work arrangements could heighten existing and introduce new operational risks, including, but not limited to, cybersecurity risk, and could strain our technological resources and business continuity plans. If one or more of the third-party vendors to whom we outsource certain material activities claim that they cannot perform due to a force majeure or experience operational failures as a result of the COVID-19 pandemic, it could have a material adverse effect on our business, results of operations and financial condition. Further, although we maintain contingency plans for events such as pandemic outbreaks, the further spread of COVID-19 could impact the availability of our executive officers and other key employees who are necessary to conduct our business. The emergence of new COVID-19 variant strains that are resistant to vaccines or a decrease in the effectiveness of vaccines over the long term could impact, among other things, the availability of our staff and primary facilities, and the viability of our customers.

While governmental organizations continue to engage in efforts to combat the spread and severity of COVID-19, these measures may not be effective. Moreover, actions taken by U.S. or other governmental authorities that were intended to ameliorate the macroeconomic or other effects of COVID-19, or delays in the announcement or implementation of regulatory measures that had been pending prior to the COVID-19 pandemic resulted in and may in the future result in regulatory uncertainty and could in turn impact our business.

In addition, the spread of COVID-19 variants, along with other factors, such as restrictions and limitations on business activities, labor shortages at ports and for long-haul transportation, rising fuel costs and raw material shortages, have resulted in disruptions to global supply chains, which has impacted the availability of critical hardware and extended lead times for certain components and systems we require for our operations. The COVID-19 pandemic could continue to negatively affect the flow or availability of certain hardware and related products for technology that we need to operate our business effectively and efficiently. Our inability to acquire suitable hardware and related products on acceptable terms or the loss of key suppliers could negatively affect our business. Pandemic-related restrictions could also impact third-party providers' abilities to meet their contractual obligations to us, potentially impacting our operations.

The extent of the impact of the COVID-19 pandemic on our business, financial condition and results of operations will depend on future developments, including, among other things, the effectiveness of vaccines over the long term and against emerging variant strains. A prolonged economic downturn could have an adverse effect on our revenues related to certain activities such as a decline in demand for certain data products and a decline in IPOs. The COVID-19 pandemic could also have an adverse impact on our customers' businesses, risk management needs and ability to trade. In addition, to the extent that COVID-19 may adversely affect our business, financial condition or results of operations, it may also heighten other risks described in this section.

We may be required to recognize impairments of our goodwill, other intangible assets or investments.

The determination of the value of goodwill and other intangible assets requires the use of estimates and assumptions that affect our consolidated financial statements. As of December 31, 2021, we had goodwill of $21.1 billion and net other intangible assets of $13.7 billion relating to our acquisitions and our purchase of trademarks and Internet domain names from various third parties.

During 2021, we did not record any impairments of our goodwill, intangible assets or investments. We cannot assure you that we will not experience future events that may result in these types of impairments. An impairment of the value of our existing goodwill, other intangible assets and other investments and assets could have a significant negative impact on our future operating results.

For additional information on our goodwill, other intangible assets and investments, refer to Notes 3, 4 and 8 to our consolidated financial statements and "- Critical Accounting Policies - Goodwill and Other Identifiable Intangible Assets" in Item 7 "- Management's Discussion and Analysis of Financial Condition and Results of Operations," which are included in this Annual Report.

We may not realize the expected benefits of our majority investment in Bakkt and the investment may introduce additional risks to our business due to its evolving business model.

We have a majority ownership interest in Bakkt, which operates as a separate publicly-traded company listed on the NYSE. Due to our majority ownership interest in Bakkt, we have increased financial and reputational risks if there is a security or system failure, a failure to launch one or more products, or if Bakkt's business is unsuccessful. It may take longer than expected for us to realize the expected returns from this investment or such returns may ultimately be less than anticipated. Furthermore, our investment in Bakkt entails numerous risks, including risks relating to Bakkt's ability to:

- manage the complexity of its business model to stay current with the industry;
- successfully enter categories and markets in which it may have limited or no prior experience;
- apply distributed ledger technology to a global ecosystem for digital assets;
- successfully develop and integrate products, systems or personnel into its business operations;
- obtain and maintain required licenses and regulatory approvals for its business;
- maintain a risk management and compliance framework designed to detect illegal activity such as fraud, money laundering, tax evasion and ransomware scams and comply with anti-money laundering, counter-terrorist financing laws and regulations and anti-corruption laws globally;
- comply with existing or new laws, regulations or orders of any governmental authority related to the use of digital assets; and
- maintain technology systems and processes that prevent cyberattacks and security vulnerabilities.

As digital assets and blockchain technologies evolve, Bakkt may add, modify or discontinue certain aspects of its business model relating to the product mix and service offerings. Future additions and modifications to Bakkt's business will increase the complexity of its business and place significant strain on Bakkt's management, personnel, operations, systems, technical performance, financial resources and internal financial control and reporting functions. We cannot offer any assurance that these or any other additions or modifications will be successful or will not result in harm to Bakkt's business.

LEGAL AND REGULATORY

Our businesses and those of many of our clients have been and continue to be subject to extensive legislation and regulatory scrutiny, and we face the risk of changes to our regulatory environment and business in the future.

We are and will continue to be subject to extensive regulation in many jurisdictions around the world, and in particular in the U.S. and the U.K. We face the risk of significant actions by regulatory and taxing authorities in all jurisdictions in which we conduct our businesses and hold investments, which may affect our business, the activity of our market participants, and our results. Among other things, as a result of regulators and tax authorities enforcing existing laws and regulations, we could be censured, fined, prohibited from pursuing certain acquisitions or engaging in some of our business activities, subjected to limitations or conditions on our business activities, including fair, reasonable and nondiscriminatory pricing restrictions, also known as FRAND, or subjected to new or substantially higher taxes or other governmental charges in connection with the conduct of our business or with respect to our employees, including settlement payments, interest payments and penalty payments. In many cases, our activities may be subject to overlapping and divergent regulation in different jurisdictions.

The adoption of new laws or regulations or changes in enforcement practices applicable to our businesses or those of our clients could adversely affect our ability to compete effectively with other institutions that are not affected in the same way or impact our clients' overall trading volume through our exchanges and demand for our market data and connectivity offerings, mortgage technology and other services.

We are also subject to regulatory risks relating to the mortgage industry, which is heavily regulated in the U.S. Changes to existing laws or regulations or adoption of new laws or regulations that affect the residential mortgage industry could reduce residential mortgage volume or otherwise limit the ability of users and participants of our mortgage technology services to operate their businesses, resulting in decreased usage of our solutions. Alternatively, reduced regulatory requirements could also reduce the demand for certain of our products and services, which are intended to enable our customers to satisfy existing regulatory requirements. Potential structural changes in the U.S. residential mortgage industry, in particular, those involving the roles of Fannie Mae and Freddie Mac, could disrupt the residential mortgage market and have a material adverse effect on our business. Further, as a critical third-party service provider in the mortgage industry, we are subject to supervision and examination by certain regulators, which has resulted in, and will continue to result in, additional operating costs.

There is ongoing public concern regarding data privacy and data protection in many jurisdictions in which ICE operates. Many of those jurisdictions have passed data privacy legislation, with many more contemplating new laws. The laws and regulations related to privacy and data protection are increasing in complexity and number, change frequently and increasingly conflict among the various countries in which we operate, which has resulted in greater compliance risk and cost for us. Regulation of privacy and data protection often times require monitoring of, and changes to, our data practices in regard to the collection, use, disclosure, storage, transfer and/or security of personal and sensitive information, including the personal information of the customers of the users of the software and services provided by our ICE Mortgage Technology business.

These developments could impact our profitability in the affected jurisdictions, or even make it uneconomical for us to continue to conduct all or certain of our businesses in such jurisdictions, or could cause us to incur significant costs associated with changing our business practices, restructuring our businesses or moving all or certain of our businesses and our employees to other jurisdictions, including liquidating assets or raising capital in a manner that adversely increases our funding costs or otherwise adversely affects our stockholders and creditors.

U.S., U.K. and EU legal and regulatory developments, in particular EMIR, EMIR 2.2, U.K. MiFID II and EU MiFID II, the U.K BMR and the EU BMR, including each such regulation as incorporated into U.K. law, and the Dodd-Frank Act, have significantly altered and propose to further alter the regulatory framework within which we operate and may adversely affect our competitive position and profitability. These regulatory developments could also cause us to change our business practices, restructure our businesses or move certain of our businesses and employees. The enacted and proposed legal and regulatory changes most likely to affect our businesses are: non-discriminatory access provisions of U.K. MiFID II and EU MiFID II, interoperability and margin rules in EMIR, enhanced regulatory capital liquidity and leverage rules in Basel III and Capital Requirements Directive IV, access rules under the U.K. BMR and EU BMR, the non-harmonization of margin requirements, implementation of a financial transaction tax, access to our benchmarks and maintaining our exchanges' abilities to operate as SROs with related immunity for the discharge of their regulatory functions. As the operator of global businesses, the lack of harmonization in international financial reform efforts could impact our business as our clearing houses and exchanges are subject to regulation in multiple jurisdictions.

The Dodd-Frank Act established enhanced regulatory requirements for non-bank financial institutions designated as "systemically important" by the FSOC. ICE Clear Credit has been designated as a systemically important financial market utility by the FSOC and, as a result, is subject to additional oversight by the CFTC. Compliance with these requirements has resulted in, and will continue to result in, additional operating costs.

In 2016, the SEC approved a plan to establish a market-wide consolidated audit trail, or CAT, to improve regulators' ability to monitor trading activity. In 2018, the first phase of implementation went live and required SRO participants to begin reporting to the CAT. In addition to increased risk in connection with our regulatory obligations, implementation of the CAT could result in significant additional expenditures, which may not be reimbursed. Funding of the implementation and operation of the CAT is ultimately expected to be provided by both the SROs and broker-dealers. To date, however, funding has been provided solely by the SROs, partly in exchange for promissory notes, which increases the risk that SROs, including us, will not be reimbursed for costs expended to date. Due to the replacement of the original plan processor, we recorded promissory note impairment charges of $2 million and $16 million in 2020 and 2019, respectively. Because the SEC has not approved a funding model that shares the cost of the CAT between SROs and broker-dealers, we believe there is a risk that SROs are not reimbursed, resulting in this impairment. Until the SEC approves a funding model, the SROs will continue to incur additional costs, which may become significant and may not be reimbursed. As of December 31, 2021, we have accrued approximately $51 million as a receivable in connection with our portion of expenses related to the CAT implementation.

There is an increased focus on, and scrutiny of, ESG data and ratings providers by regulators and policymakers. Regulators and policymakers have indicated that extension of their regulatory oversight to ESG data service providers is possible. This could result in new or additional regulations applicable to our ESG data products and services which could result in additional operating costs.

We are subject to tax laws, regulations, rulings and audits in multiple U.S. and non-U.S. jurisdictions that could have a significant impact on our business and lead to additional expenditures for us or our customers. For example, there have been discussions in various jurisdictions around financial transaction or digital service tax frameworks. Changes to tax frameworks in jurisdictions where we operate significant business, for example in New Jersey, New York, the EU or federally in the U.S., have the potential to increase costs to us or to our market participants and discourage participation in the markets we operate. Furthermore, implementation of any new or amended tax laws or regulations could impact our global operations, trading volumes or financial results.

Other enacted and proposed legal and regulatory changes not discussed above may also adversely affect our competitive position and profitability. See Item 1 "- Business - Regulation" above for additional information regarding the current and proposed laws and regulations that impact our business, including risks to our business associated with these laws and regulations.

Our compliance and risk management methods, as well as our fulfillment of our regulatory obligations, might not be effective, which could lead to enforcement actions by our regulators.

Our ability to comply with existing and future rules, regulations and laws largely depends on our establishment and maintenance of compliance, audit and reporting systems that can quickly adapt and respond, as well as our ability to attract and retain qualified compliance and other risk management personnel. Regulators periodically review our ability to self-regulate and our compliance with a variety of laws and regulations including self-regulatory standards. Certain of our businesses associated with the NYSE are subject to public notice procedures prior to making changes in operations, policies and procedures. If we fail to comply with any of these obligations, regulators could take a variety of actions that could impair our ability to conduct our business.

Our acquisitions expose us to new regulatory requirements. For example, as a result of our acquisition of Interactive Data in 2015, we operate an investment adviser registered with the SEC under the Investment Advisers Act. In addition, our acquisition of the BondPoint ATS in January 2018 and our acquisition of TMC Bonds in July 2018 exposes us to increased exposure to regulatory scrutiny from the SEC, FINRA and MSRB. Our acquisition of Ellie Mae in 2020 exposes us to increased exposure to regulatory scrutiny from U.S. regulatory bodies which regulate the U.S. residential mortgage industry, including the FFIEC and its member agencies, including, among others, the CFPB. Compliance with any such regulatory requirements gives rise to costs and expenses that may be material.

Our regulators have broad enforcement powers to censure, fine, issue cease-and-desist orders, embargo future business activity or prohibit us from engaging in some of our businesses. We continue to face the risk of significant intervention by regulatory authorities, including extensive examination and surveillance activity of our business. Any such matters may result in material adverse consequences to our financial condition, operating results or ability to conduct our business, including adverse judgments, settlements, fines, penalties, injunctions, restrictions on our business activities or other relief. Our involvement in any such matters, even if the matters are ultimately determined to be in our favor, could also cause significant harm to our reputation and divert management attention from the operation of our business. Further, any settlement, consent order or adverse judgment in connection with any formal or informal proceeding or investigation by government or regulatory agencies may result in additional litigation, investigations or proceedings as other litigants and government or regulatory agencies begin independent reviews of the same businesses or activities. Finally, the implementation of new legislation or regulations, or changes in or unfavorable interpretations of existing regulations by courts or regulatory bodies, could require us to incur significant compliance costs and impede our ability to remain competitive and grow our business.

Regulatory changes or court rulings may have an adverse impact on our ability to derive revenue from market data and connectivity fees.

Regulatory developments or court rulings could reduce the amount of revenue that we obtain from exchange market data and connectivity fees related to our U.S. equity and options exchanges. With respect to our U.S. equities and equity options exchanges, our ability to assess fees for market data products and certain connectivity fees are subject to review by the SEC. There continue to be opposing industry viewpoints and litigation as to the extent that our U.S. equities and equity options exchanges should be able to charge for market data and market access, and the manner in which we set such exchange fees could be reassessed.

If new constraints are placed on our ability to charge for market data or market access in the U.S., it could have a negative impact on our revenues. We cannot predict whether, or in what form, any regulatory or other changes will take effect or their impact on our business. A determination by the SEC or a court, for example, that the SEC must link market data fees to marginal costs, take a more active role in the market data rate-setting process, or reduce the current levels of market data fees, could have an adverse effect on our market data revenues.

Separately, our European exchanges are currently authorized to sell trade information on a non-discriminatory basis at a reasonable cost. This regulatory position could be modified or interpreted by the European Commission, or EC, or future European court decisions in a manner that could have an adverse effect on our European market data revenues.

In addition, the FCA and IOSCO have both issued consultations to explore access to market data in financial markets. The results of these consultations may lead to a regulatory response that could affect our business. Similar to the U.S., if new constraints are placed on our ability to charge for market data or market access in the U.K. or other jurisdictions, it could have a negative impact on our revenues.

The uncertainty surrounding the terms of the U.K.'s exit from the EU, commonly referred to as Brexit, could adversely impact our business, results of operations and financial condition.

In 2016, voters in the U.K. approved an exit from the EU, commonly referred to as Brexit. Brexit has created political and economic uncertainty and instability in the global markets (including currency and credit markets), particularly in the U.K. and EU. In addition, political and economic uncertainty surrounding the future relationship of the U.K. and EU could lead to certain macroeconomic conditions that adversely affect our business. The long-term effects of Brexit will depend, in part, on the agreement the U.K. made to retain access to EU markets.

In December 2019, the U.K. withdrew from the EU on January 31, 2020 and completed its withdrawal on January 1, 2021. Prior to completing its withdrawal, in December 2020, the U.K. and EU agreed to a trade and cooperation agreement which was provisionally applied as of January 1, 2021. This agreement governs the EU-U.K. relationship after the completion of the U.K.'s exit from the EU. The U.K.-EU Brexit deal does not provide a transition period for financial services, or any new arrangements to replace the existing "passport." This leaves both the U.K. and EU to address matters of access in financial services through declarations of equivalence under existing equivalence regimes contained in U.K. and EU law and through domestic laws. The EC has, however, adopted an 18-month temporary equivalence decision for U.K. CCPs, which began to apply as of January 1, 2021. ICE Clear Europe has been recognized by ESMA as a third-country CCP in accordance with EMIR. In November 2021, the EC announced that it will propose an extension of the equivalence decision applying to U.K. CCPs in early 2022.

As a result of the U.K. and EU trade and cooperation agreement not providing free trade arrangements for financial services, any equivalence determinations or any further transition period for financial services, could include restrictions on access to our services by persons located in the EU or make access more expensive, which could adversely affect our operations and profitability or even make it uneconomical for us to continue to conduct all or certain of our businesses in such jurisdictions. The consequences of Brexit and the terms of the trade and cooperation agreement could also cause us to incur significant costs associated with changing our business practices, restructuring our businesses or moving certain of our businesses and our employees to other jurisdictions. See Item 1 "- Business - Regulation" above for additional information regarding Brexit, including risks to our business associated with Brexit.

Risks relating to the administration of benchmarks and indices, including LIBOR, and the potential for changes to, cessations of, and the replacement of, or transition from, benchmarks and indices, including LIBOR, may result in legal risks and could adversely affect our business.

Certain of our subsidiaries produce and license multiple benchmarks and indices across asset classes, which are used globally and are referenced in certain of our trading and clearing products. To ensure continued trading and clearing in these benchmark-related products, and the continued licensing and use of these benchmarks and indices, our subsidiaries must be able to demonstrate that these benchmarks and indices are determined with integrity and are not readily subject to manipulation, and must also continue to evolve these benchmarks and indices as necessary to maintain their reliability and relevance and continue to administer these benchmarks and indices in compliance with applicable laws and regulations. As an example, our subsidiary, IBA, is the administrator of various global benchmarks, including LIBOR. Any failures, negative publicity or lawsuits related to our subsidiaries' administration of benchmarks and indices, including LIBOR, could result in a loss of confidence in the administration of these benchmarks and indices and could harm our business and our reputation.

Changes to, cessations of, and the replacement of or transition from, our subsidiaries' benchmarks and indices, including LIBOR, or any other changes or reforms to the determination or administration of such benchmarks and indices, could result in legal risks, risks to our reputation, and have an adverse impact on our business, financial condition and operating results. In July 2017, the FCA stated its intention that it would no longer be necessary to sustain LIBOR through its influence or legal powers beyond 2021. As a result, regulators in multiple jurisdictions have encouraged market participants to transition from using LIBOR to alternative reference rates. The publication of most LIBOR settings ceased after December 31, 2021 and certain others are scheduled to cease after June 30, 2023.

The FCA is requiring IBA to publish certain LIBOR settings under a changed "synthetic" methodology during 2022. Any settings published under a “synthetic” methodology will no longer be representative of the underlying market or economic reality the setting is intended to measure as those terms are used in the U.K. BMR. Any failures, negative publicity or lawsuits related to our subsidiaries' administration of "synthetic" LIBOR, could result in a loss of confidence in the administration of these benchmarks and indices and could harm our business and our reputation.

Under the U.K. BMR, the use of continuing LIBOR settings by U.K.-supervised entities in certain regulated contracts and instruments may be restricted or prohibited. The use of continuing LIBOR settings in jurisdictions outside the U.K. and by entities subject to the oversight of other regulatory authorities may also be restricted or prohibited by law in those jurisdictions and by the requirements of such regulatory authorities. We continue to monitor industry and regulatory developments in relation to the LIBOR transition and cessation and the resulting impacts on our business and on the markets that use the benchmark today.

We may face liability for content contained in our data products and services.

We have been, and may in the future be, subject to claims for breach of contract, defamation, libel, copyright or trademark infringement, fraud or negligence or based on other theories of liability, in each case relating to the data, articles, commentary, ratings, information or other content we distribute in our financial data services. If such data or other content or information that we distribute has errors, is delayed or has design defects, we could be subject to liability or our reputation could suffer. We could also be subject to claims based upon the content that is accessible from our corporate website or those websites that we own and operate through links to other websites. Use of our products and services as part of the investment process creates the risk that clients, or the parties whose assets are managed by our clients, may pursue claims against us for significant amounts. Any such claim, even if the outcome were ultimately favorable to us, could involve a significant commitment of our management, personnel, financial and other resources. Such claims and lawsuits could have a material adverse effect on our business, financial condition and operating results and a negative impact on our reputation.

In addition, we license and redistribute data and content from various third-party sources and the terms of these licenses change frequently. Our third-party data and content suppliers may audit our use of and our clients’ use of and payment for data and content from time to time in the ordinary course of business, including audits currently underway. Such third-party data and content suppliers have asserted and may in the future assert that we or our clients owe additional amounts under the terms of the applicable license agreements, that we inappropriately distributed the third-party data or that we or our clients used the data or content in a manner that exceeded the scope of the applicable license agreement or without a license agreement. In some instances, where we have certain commercial relationships with third-parties, we have assumed the responsibility for this third-party source liability. We have and expect to continue to spend and allocate resources to develop and acquire the use of technology and other intellectual property rights to manage these risks and track third-party data usage, but we cannot be assured that we will not incur liability. The costs and resources required to investigate any allegations could be material, and we may still be required to pay damages to or make unexpected large settlement payments to these data and content suppliers, which could also give rise to reputational harm.

We are subject to significant litigation and liability risks.

Many aspects of our business, and the businesses of our participants, involve substantial risks of liability. These risks include, among others, potential liability from disputes over terms of a trade and the claim that a system failure or delay caused monetary loss to a participant or that an unauthorized trade occurred. For example, dissatisfied market participants that have traded on our electronic platforms or those on whose behalf such participants have traded may make claims regarding the quality of trade execution, or allege improperly confirmed or settled trades, abusive trading practices, security and confidentiality breaches, mismanagement or even fraud against us or our participants. In addition, because of the ease and speed with which sizable trades can be executed on our electronic platform, participants can lose substantial amounts by inadvertently entering trade orders or by entering them inaccurately. A large number of significant error trades could result in participant dissatisfaction and a decline in participant willingness to trade in our electronic markets.

In addition, we are subject to ongoing legal disputes that could result in the payment of fines, penalties or damages and could expose us to additional liability in the future. See Item 3 "Legal Proceedings" in this Annual Report for a general description of our legal proceedings and claims and Note 15 to our consolidated financial statements and related notes, which are included elsewhere in this Annual Report, for a summary of specific legal proceedings. The outcome of any of these legal proceedings that remain unresolved cannot be determined and adverse rulings in these matters could impact our financial condition and continued operations.

Further, we could incur significant expenses defending the claims mentioned above and any future claims, even those without merit, which could adversely affect our business, financial condition and operating results. An adverse resolution of any lawsuit or claim against us, including those we are involved with due to acquisition activity, may require us to pay substantial damages or impose restrictions on how we conduct business, either of which could adversely affect our business, financial condition and operating results. In addition, we may have to establish accruals for those matters in circumstances when a loss contingency is considered probable and the related amount is reasonably estimable. Any such accruals may be adjusted as circumstances change.

OPERATIONAL AND LIQUIDITY

Our systems and those of our third-party service providers may be vulnerable to cyberattacks, hacking and other cybersecurity risks, which could result in wrongful manipulation, disclosure, destruction, or use of our information or that of a third party, or which could make our participants unable or reluctant to use our electronic platforms.

The secure transmission of confidential information and the ability to reliably transact on our electronic platforms and provide financial data services are critical elements of our operations. Some of our products and services involve the storage and transmission of proprietary information and sensitive or confidential client and other data, including client portfolio information or personally identifiable information. If anyone gains improper access to our electronic platforms, networks or databases, they may be able to steal, publish, delete or modify our confidential information or that of a third party. Breaches of our cybersecurity measures or the accidental loss, inadvertent disclosure or unapproved dissemination of proprietary information or sensitive or confidential data about us, our clients or our customers, including the potential loss or disclosure of such information or data could expose us, our customers or the individuals affected to a risk of loss or misuse of this information, result in litigation, regulatory action and potential liability for us, damage our brand and reputation or otherwise harm our business. Our networks and those of our participants, third-party service providers and external market infrastructures may be vulnerable to compromise, unauthorized access, security technology failure, computer viruses, social engineering, denial of service attacks, terrorism, ransomware attacks, firewall or encryption failures or other security problems resulting in loss of data integrity, information disclosure, unavailability or fraud. The financial services industry has been targeted for purposes of political protest, activism and financial gain and our role in the global marketplace places us at greater risk than other public companies for cyberattack and other information security threats. Further, former employees of companies in the financial sector have misappropriated trade secrets or stolen source code in the past and we could be a target for such illegal acts in the future. There also may be system or network disruptions if new or upgraded systems are defective or not tested and installed properly.

Although we have not been subject to cyberattacks or other cyber incidents that have had a material impact on our operations or financial condition, we have from time to time experienced cybersecurity events including distributed denial of service, or DDoS, attacks, malware infections, phishing, web attacks and other information technology incidents that are typical for a financial services company of our size. For example, we experienced DDoS attempts, brand misuse, and phishing attempts directed toward employee systems and personal email accounts during 2021. While we operate an Information Security program that is designed to prevent, detect, track and mitigate cyber incidents and that has detected and mitigated such incidents in the past, we cannot assure you that these measures will be sufficient to protect our business against future attacks. Any such attacks could result in reputational damage, cause system failures or delays that could cause us to lose customers, cause us to experience lower current and future trading volumes or incur significant liabilities or have a negative impact on our competitive position. In addition, given the increasing complexity and sophistication of the techniques used to obtain unauthorized access or disable or degrade systems, a cyberattack could occur and persist for an extended period of time before being detected, and we may not anticipate these acts or respond adequately or timely. The extent of a particular cyber incident and the steps that we may need to take to investigate the incident may not be immediately clear, and it may take a significant amount of time before such investigation can be completed and full and reliable information about the incident is known. While such an investigation is ongoing, we may not necessarily know the extent of the harm or how best to remediate it, which may compound damages before the incident is discovered or remediated. Additionally, as threats continue to evolve and increase, and as the regulatory environment related to information security, data collection and use, and privacy becomes increasingly rigorous, we may be required to devote significant additional resources to modify and enhance our security controls and to identify and remediate any security vulnerabilities, which could adversely impact our net income.

Further, cybersecurity threats to, and incidents involving, vendors and other third parties who support our activities - particularly those with less-sophisticated defenses - could impact us. For example, although we did not experience any material impacts from the Log4j security vulnerability that was widely publicized in December 2021, we cannot assure you that we will not experience future events that may be material.

Our business may be harmed by computer and communication systems failures and delays.

Our business depends on the integrity, reliability and security of our infrastructure which is highly dependent on our computer and communication systems. Our customers rely on us for the delivery of time-sensitive, up-to-date and high-quality financial market data, analytics and related solutions. Our timely, reliable delivery of high-quality products and services is dependent upon an array of technical production processes that enable our content delivery platforms. Our redundant systems or disaster recovery plans, including our ability to recover from the loss of one of our primary data centers, may prove to be inadequate in the event of a systems failure or cybersecurity breach. Our systems, or those of our third-party providers, may fail or be shut down or, due to capacity constraints, may operate slowly, causing one or more of the following:

- unanticipated disruption in service to our participants;
- slower response time and delays in our participants' trade execution and processing;
- failed settlement by participants to whom we provide trade confirmation or clearing services;
- incomplete or inaccurate accounting, recording or processing of trades;
- failure to complete the clearing house margin settlement process resulting in significant financial risk;
- distribution of inaccurate or untimely market data to participants who rely on this data in their trading activity;
- disruption to ICE Mortgage Technology and loan origination systems; and
- financial loss to us or those who depend on our systems and data.

We have experienced system failures in the past due to telecommunication failures and hardware and software malfunctions and defects, and could experience future system failures due to power or telecommunications failures, human error on our part or on the part of our vendors or participants, natural disasters, fire, sabotage, hardware or software malfunctions or defects, computer viruses, cyberattacks, intentional acts of vandalism or terrorism and similar events. These situations could result in damage to our business reputation and participant dissatisfaction with our electronic platform, which could prompt participants to trade elsewhere or expose us to litigation or regulatory sanctions. As a consequence, our business, financial condition and operating results could suffer materially.

Our regulated business operations generally require that our trade execution and communications systems be able to handle anticipated present and future peak trading volume. Heavy use of computer systems during peak trading times or at times of unusual market volatility could cause those systems to operate slowly or even to fail for periods of time. However, we cannot assure you that our estimates of future trading volume will be accurate or that our systems will always be able to accommodate actual trading volume without failure or degradation of performance. If we cannot increase the capacity and capabilities of our systems to accommodate an increasing volume of transactions and to execute our business strategy, our ability to maintain or expand our businesses could be adversely affected.

An interruption or cessation of an important service, data or content supplied by any third party, or the loss of an exclusive license, could have a material adverse effect on our business.

We depend on a number of suppliers, such as online service providers, hosting service and software providers, data processors, data centers, software and hardware vendors, banks, local and regional utility providers, and telecommunications companies for elements of our trading, clearing, data services, mortgage technology applications and other systems. We rely on access to certain data used in our business through licenses with third parties, and we rely on a large international telecommunications company for the provision of hosting services. We also depend on third-party suppliers for data and content, including data received from certain competitors, clients, various government and public record services and financial institutions, used in our products and services. Some of this data is exclusive to particular suppliers and may not be obtained from other suppliers. In addition, our data suppliers could enter into exclusive contracts with our competitors without our knowledge. The general trend toward industry consolidation may increase the risk that these services may not be available to us in the future. If these companies were to experience difficulties, discontinue providing services to us for any reason or be unable to or fail to provide the type of service agreed to for any reason, we would likely experience significant disruption to our business and may be subject to litigation by our clients, increased regulatory scrutiny or regulatory fines or damage to our reputation. It could require a significant amount of time and additional resources to transition to new third-party service providers or to enter into new commercial arrangements in order to offset loss of services to our clients. Our third-party data suppliers perform audits on us from time to time in the ordinary course of business to determine if data we license for redistribution has been properly accounted for in accordance with the terms of the applicable license agreement. As a result of these audits, we may incur additional expenses.

Many of our clients also rely on third parties to provide them with systems necessary to access our trading platform. If these companies were to discontinue providing services to our clients for any reason, we may experience a loss of revenue associated with our clients' inability to transact with our businesses. We hold exclusive licenses to list various index futures and contracts. In the future, litigation or regulatory action may limit the right of owners to grant exclusive licenses for index futures and contracts trading to a single exchange, and our competitors may succeed in providing economically similar products in a manner or jurisdiction not otherwise covered by our exclusive license. MiFID II introduced a harmonized approach to the licensing of services relating to commodity derivatives across Europe and the legislation requires open access to any benchmarks used in Europe. If unlicensed trading of any index product where we hold an exclusive license were permitted, we could lose trading volume for these products which would adversely affect our revenues associated with the license and the related index products.

Our success largely depends on key personnel, including our senior management, and having adequate succession plans in place. We may not be able to attract, retain and develop the highly skilled employees we need to support our business, which could harm our business.

Our future performance depends, in large part, on the continued services of our senior management and other key personnel, including our ability to attract, retain and motivate key personnel. Competition for key personnel in the various localities and business segments in which we operate is intense. Our ability to attract and retain key personnel, in particular senior management, will be dependent on a number of factors, including prevailing market conditions and compensation packages offered by companies competing for the same talent. Current economic, market, social, and political conditions and the recent re-opening of the global economy have increased talent risk, which has led to higher employee attrition and made recruitment for certain positions more difficult, and could lead to a loss of top performers and make it more difficult to fill key positions. For example, our in-office requirements, as well as the location of our offices, and our remote working arrangements may not meet the needs or expectations of our employees, including senior management or other key employees, or may not be viewed as competitive, which could negatively impact our ability to attract and retain highly skilled employees. In addition, we operate globally and geopolitical events or conflicts in the countries or regions in which we operate could lead to physical risks to our personnel and disruption to business continuity that could negatively impact our ability to execute our business strategy. There is no guarantee that we will have the continued service of key employees who we rely upon to execute our business strategy and identify and pursue strategic opportunities and initiatives. The loss of the services of any of our senior management or other key personnel, or our inability to attract highly qualified senior management and other key personnel, could harm our business. In particular, we have to incur costs to replace senior officers or other key employees who leave, and our ability to execute our business strategy could be impaired if we are unable to replace such persons in a timely manner or at all.

Effective succession planning is also important to our long-term success. Failure to ensure effective transfer of knowledge and smooth transitions involving key employees could hinder our strategic planning and execution. Further, changes in our management team may be disruptive to our business, and any failure to successfully integrate key new hires or promoted employees could adversely affect our business and results of operations.

We currently have a substantial amount of outstanding indebtedness which could adversely affect our financial condition and operations and restrict our activities or satisfy our debt service obligations.

As of December 31, 2021, we had $13.9 billion of outstanding debt. This level of indebtedness could have important consequences to our business, including making it more difficult to satisfy our debt service obligations, increasing our vulnerability to general adverse economic and industry conditions, limiting our flexibility in planning for, or reacting to, changes in our business and the industry in which we operate, placing us at a competitive disadvantage compared to our peers and restricting us from pursuing certain business opportunities. As we use our available resources to reduce and refinance our consolidated debt, our flexibility in planning for, or reacting to, changes in our business and the industry in which we operate and our ability to pursue future business opportunities may be further restrained. In addition, the terms of our debt facilities contain affirmative and negative covenants, including a leverage ratio test and certain limitations on the incurrence of additional debt or the creation of liens and other matters. Further, a portion of our outstanding debt has historically been and continues to be in commercial paper, which is subject to interest rate changes. Rising interest rates will result in an increase in our interest expense. We may incur additional indebtedness in the future, which could materially affect our financial condition.

Our long-term and short-term debt is currently rated by Moody's Investor Services and Standard & Poor's. These ratings agencies regularly evaluate us and our credit ratings based on a number of quantitative and qualitative factors, including our financial strength and conditions affecting the financial services industry, generally. Our credit ratings remain subject to change at any time, and it is possible that a ratings agency may take action to downgrade our credit ratings in the future. In particular, our inability to sustain reduced debt on a consolidated basis may result in a downgrade of our credit ratings.

A significant downgrade of our credit ratings in the future could impact customers' willingness to use our clearing houses, make parties less willing to do business with us, and could negatively impact our ability to access the capital markets and increase the cost of our commercial paper and any future debt funding we may obtain.

COMPETITION

We face intense competition; failure to keep up with rapid changes in technology and client preferences could negatively impact our competitive position.

We face intense competition in all aspects of our business and our competitors, both domestic and international, are numerous. We currently compete with:

- regulated, diversified futures exchanges that offer trading in a variety of asset classes similar to those offered by us, such as energy, agriculture, equity and equity index, credit, and interest rate derivatives markets and foreign exchange;
- exchanges offering listing and trading of cash equities, ETFs, closed-end funds and other structured products similar to those offered by us;
- market data and information vendors;
- providers of digital solutions, including providers of mortgage origination, compliance, pricing and documentation services;
- interdealer brokers active in the global credit derivatives markets;
- existing and newly formed electronic trading platforms, service providers and exchanges, some of which do not receive the same regulatory scrutiny as established market places;
- other clearing houses; and
- consortiums of our customers, members or market participants that may work together to achieve more favorable terms or pool their trading activity to establish new exchanges, trading platforms or clearing facilities.

Trends towards the globalization of capital markets have resulted in greater mobility of capital, greater international participation in markets and increased competition among markets in different geographical areas. Competition in the market for derivatives trading and clearing and in the market for cash equity listings, trading and execution have intensified as a result of consolidation, as the markets become more global in connection with the increase in electronic trading platforms and the desire by existing exchanges to diversify their product offerings. Finally, many of our competitors are our largest customers or are owned by our customers and may prioritize their internalization and ATS businesses ahead of their exchange-based market making business. Some of our competitors may have greater capital and resources, offer a wide range of products and services or operate under less stringent regulatory regimes than we do.

In the mortgage technology sector, we compete against other software providers as well as companies that offer "point of sale" or web-based online loan applications services. We also compete with traditional methods of exchanging data and documents among mortgage industry participants, such as email, facsimile, phone, courier, and mail. Mortgage originators may also manually upload loan data or enter information into each investor's, lender's, or service provider's website in lieu of using our solutions. There is vigorous competition among providers of mortgage technology services, and we may be unsuccessful in differentiating our services to the extent necessary to effectively compete and may not succeed in convincing potential customers using other services or methods to switch to ours.

We also face pricing competition in many areas of our business. A decline in our fees due to competitive pressure or regulatory changes, the inability to successfully launch new products or the loss of customers due to competition could lower our revenues, which would adversely affect our profitability. For example, our data service offerings have benefited from a high renewal rate in its subscription-based services, but we cannot assure you that this will continue. We also cannot assure you that we will be able to continue to expand our product offerings, modify the pricing for our products or retain our current customers or attract new customers. If we are not able to compete successfully, our business could be materially impacted, including our ability to remain as an operating entity.

Our success depends on our ability to maintain and expand our product offerings, our customer base and our technology. To remain competitive, we must continue to enhance and improve the responsiveness, functionality, accessibility and reliability of our electronic platforms and our proprietary and acquired technology. The financial services industry is characterized by rapid technological change, change in use patterns, change in client preferences, frequent product and service introductions, the emergence of new industry standards and practices and increased consolidation through mergers and acquisitions activity that results in new competitors or expanded product offerings by current competitors. These changes could render our existing proprietary technology uncompetitive or obsolete.

We cannot assure you that we will successfully implement new technologies or adapt our proprietary technology to our clients’ requirements or emerging industry standards in a timely and cost-effective manner. Any failure to remain abreast of industry standards in technology and to be responsive to client preferences could cause our market share to decline and negatively impact our results.

Damage to our reputation could damage our business.

Our business is highly competitive and our customers typically have options on where to conduct their business. Our management team and business operations benefit from being highly regarded in our industry. Maintaining our reputation is critical to attracting and retaining customers and investors and for maintaining our relationships with our regulators. Negative publicity regarding our company or actual, alleged or perceived issues regarding our products or services, operations, risk management, compliance with regulations, political affiliations or management team could give rise to reputational risk which could significantly harm our existing business and business prospects.

INTELLECTUAL PROPERTY

Our use of "open source" software could negatively impact our ability to sell our products and services and subject us to litigation.

We use some open-source software in our technology, most often as small components within a larger product or service, to augment algorithms, functionalities or libraries we create, and we may use more open-source software in the future. Open-source code is also contained in some third-party software we rely on. We could be subject to suits by parties claiming breach of the terms of the license for such open-source software. The terms of many open-source licenses are ambiguous and have not been interpreted by U.S. or other courts, and these licenses could be construed in a manner that imposes unanticipated conditions or restrictions on our ability to commercialize our products and services. Further, open-source licensors generally do not provide technology support, maintenance, warranties or assurance of title or controls on the origin of the software, which can also lead to greater risks than use of third-party commercial software.

A failure to protect our intellectual property rights, or allegations that we have infringed the intellectual property rights of others, could adversely affect our business.

Our business is dependent on proprietary technology and other intellectual property that we own or license from third parties, including trademarks, service marks, trade names, trade secrets, copyrights and patents. We cannot assure you that the steps that we have taken or will take in the future will prevent misappropriation of our proprietary technology or intellectual property. Additionally, we may be unable to detect the misappropriation or unauthorized use of our proprietary technology and intellectual property. Our failure to adequately protect our proprietary technology and intellectual property could harm our reputation and affect our ability to compete effectively. Further, we have resorted to litigation to enforce our intellectual property rights in the past, and may need to in the future, which requires significant financial and managerial resources. As a result, we have chosen not to enforce our infringed intellectual property rights in the past, and may choose not to in the future, depending on our strategic evaluation and judgment regarding the best use of our resources, the relative strength of our intellectual property portfolio and the recourse available to us.

In addition, our competitors, as well as other companies and individuals, have obtained, and may obtain in the future, patent and intellectual property rights related to the types of products and services we offer or plan to offer. We cannot assure you that we are or will be aware of all patents and intellectual property rights that may pose a risk of infringement by our products and services. As a result, we have in the past faced and may in the future face allegations that we have infringed the intellectual property rights of third parties which may be costly for us to defend against. If one or more of our products or services is found to infringe patents and intellectual property rights held by others, we may be subject to lawsuits or required to stop developing or marketing the products or services, obtain licenses to develop and market the products or services from the owners of the intellectual property or redesign the products or services in such a way as to avoid infringing the third-party intellectual property. We also have in the past, and could in the future, be required to pay damages if we are found to infringe intellectual property rights held by others, which could materially adversely affect our business, financial condition and operating results. We cannot assess the extent to which we may be required in the future to obtain licenses with respect to intellectual property rights held by others, whether such licenses would be available or, if available, whether we would be able to obtain such licenses on commercially reasonable terms. If we were unable to obtain such licenses, we may not be able to redesign our products or services at a reasonable cost to avoid infringement, which could materially adversely affect our business, financial condition and operating results.

COMMON STOCK

We are a holding company and depend on our subsidiaries for dividends, distributions and other payments.

We are a legal entity separate and distinct from our operating subsidiaries. Our principal source of cash flow, including cash flow to pay dividends to our stockholders, principal and interest on our outstanding debt or repurchase shares of our common stock, is dividends from our subsidiaries. There are statutory and regulatory limitations on the payment of dividends by certain of our subsidiaries to us. If our subsidiaries are unable to make dividend payments to us and sufficient cash or liquidity is not otherwise available, we may not be able to make dividend payments to our stockholders, principal and interest payments on our outstanding debt or repurchase shares of our common stock, which could have a material adverse effect on our business, financial condition and operating results.

We may fail to complete or realize the anticipated cost savings, growth opportunities and synergies and other benefits anticipated from our acquisitions or anticipated growth opportunities or expected benefits of our strategic investments, which could adversely affect the value of our common stock.

We have completed many acquisitions and plan to continue to pursue acquisitions and joint ventures. The success of our acquisitions will depend, in part, on our ability to integrate these businesses and realize anticipated cost savings, revenue synergies and growth opportunities. We generally set aggressive timelines for realizing savings, which assumes we successfully undertake a variety of actions (including, but not limited to, integrating technology, eliminating redundancies and effecting organizational restructurings) that are themselves subject to a variety of risks and may be subject to regulatory approvals that we do not control. The process of integrating acquired companies is time consuming and could disrupt each company's ongoing businesses, produce unforeseen regulatory and operating difficulties (including inconsistencies in standards, controls, procedures and policies that adversely affect relationships with market participants, regulators and others), require substantial resources and expenditures and divert the attention of management from the ongoing operation of the business.

There is also a risk that we may not integrate these acquired companies in a manner that permits our expected cost savings and revenue synergies to be fully realized in the time periods expected, or at all. In addition, a variety of factors, including but not limited to regulatory conditions, governmental competition approvals, cultural differences and difficulty integrating technology platforms, may adversely affect our ability to complete our acquisitions or realize our anticipated cost savings and synergies.

We may also not realize anticipated growth opportunities and other benefits from strategic investments or strategic joint ventures or alliances that we have entered into or may enter into for a number of reasons, including decline in value of the other company, regulatory or government approvals or changes, global market changes, contractual obligations, competing products and, in some instances, our lack of or limited control over the management of the business. For example, we have a majority ownership interest in Bakkt but do not control the management of the business. A substantial decline in Bakkt's financial performance or stock price, significant failure to or any major technology failures or cyber attacks could lead to litigation against us and reputational harm that could negatively impact our business and the value of our stock. Further, strategic initiatives that have historically been successful may not continue to be successful due to competitive threats, changing market conditions or the inability for the parties to extend the relationship into the future.

As a result of any future acquisition, we may issue additional shares of our common stock that dilute our stockholders' ownership interest, expend cash, incur debt, assume actual and contingent liabilities, inherit existing or pending litigation or create additional expenses related to amortizing intangible assets. Further, we cannot assure you that any such financing or equity investments will be available with terms that will be favorable to us, or available at all.

Provisions of our organizational documents and Delaware law may delay or deter a change of control of ICE.

Our organizational documents contain provisions that may have the effect of discouraging, delaying or preventing a change of control of, or unsolicited acquisition proposals for, ICE. These provisions make a change of control less likely, which may be contrary to the desires of certain of our stockholders. Many of these provisions are required by relevant regulators in connection with our ownership and operation of U.S. and European equity exchanges. For example, our organizational documents include provisions that generally restrict any person (either alone or together with its related persons) from (i) voting or causing the voting of shares of stock representing more than 10% of our outstanding voting capital stock (including as a result of any agreement by any other persons not to vote shares of stock) or (ii) beneficially owning shares of stock representing more than 20% of the outstanding shares of any class or series of our capital stock. Further, our organizational documents generally limit the ability of stockholders to call special stockholders' meetings or act by written consent, and generally authorize our Board of Directors, without stockholder approval, to issue and fix the rights and preferences of one or more series of preferred stock. In addition, provisions of Delaware law may have a similar effect, such as provisions limiting the ability of certain interested stockholders, as defined under Delaware law, from causing the merger or acquisition of a corporation against the wishes of the Board of Directors.

ITEM 1 (B). UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

The net book value of our property was $1.7 billion as of December 31, 2021. Our intellectual property is described under the heading in Item 1 “- Business -Technology” and "-Business-Intellectual Property." In addition to our intellectual property, our other primary assets include buildings, computer equipment, corporate aircraft, software, and internally developed software. We own an array of computers and related equipment.

Our headquarters and principal executive offices are located in Atlanta, Georgia and New York, New York. We currently occupy 370,000 square feet of office space in Atlanta in two buildings that we own that serve as our Atlanta headquarters. Our New York headquarters are located at 11 Wall Street, where we occupy 370,000 square feet of office space in a building we own. In total, we maintain approximately 3.3 million square feet in offices primarily throughout the U.S., U.K., and India, with smaller offices located throughout the world. Generally, our properties are not earmarked for use by a particular business segment. Our principal offices consist of the properties described below.

Location	Owned/Leased	Lease Expiration	Approximate Size
5660 New Northside Drive Atlanta, Georgia	Owned	N/A	273,000 sq. ft.
5680 New Northside Drive Atlanta, Georgia	Owned	N/A	97,000 sq. ft.
11 Wall Street New York, New York	Owned	N/A	370,000 sq. ft.
Basildon, U.K.	Owned	N/A	539,000 sq. ft.
Mahwah, New Jersey	Leased	2029	396,000 sq. ft.
Skyview Tower Hyderabad, India	Leased	2024 - 2025	175,000 sq. ft.
4420 Rosewood Drive Pleasanton, California	Leased	2025	137,000 sq. ft.
55 East 52nd Street New York, New York	Leased	2028	94,000 sq. ft.
32 Crosby Drive Bedford, Massachusetts	Leased	2026	82,000 sq. ft.
Milton Gate London, U.K.	Leased	2024	72,000 sq. ft.
Tower VI, Cybercity Pune, India	Leased	2026-2029	71,000 sq. ft.
Fitzroy House London, U.K.	Leased	2025	68,000 sq. ft.
100 Church Street New York, New York	Leased	2024	65,000 sq. ft.
353 North Clark Street Chicago, Illinois	Leased	2027	57,000 sq. ft.
350 E Cermak Rd Chicago, Illinois	Leased	2022-2027	51,000 sq. ft.

In addition to the above, we currently lease an aggregate of nearly 713,000 square feet of administrative, sales and disaster preparedness facilities in various cities around the word. We believe that our facilities are adequate for our current operations and that we will be able to obtain additional space as and when it is needed.

ITEM 3. LEGAL PROCEEDINGS

We are subject to legal proceedings, claims and investigations that arise in the ordinary course of our business. We establish accruals for those matters in circumstances when a loss contingency is considered probable and the related amount is reasonably estimable. Any such accruals may be adjusted as circumstances change. Assessments of losses are inherently subjective and involve unpredictable factors. We do not believe that the resolution of these legal matters, including the matters described in this Annual Report, will have a material adverse effect on our consolidated financial condition, results of operations, or liquidity. It is possible, however, that future results of operations for any particular quarterly or annual period could be materially and adversely affected by any developments relating to the legal proceedings, claims and investigations. See Note 15 to the consolidated financial statements in Part II, Item 8 of this Annual Report for a summary of our legal proceedings and claims.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Approximate Number of Holders of Common Stock

As of February 1, 2022, there were approximately 492 holders of record of our common stock. Our common stock trades on the New York Stock Exchange under the ticker symbol “ICE.”

Dividends

Our Board of Directors has adopted a quarterly dividend declaration policy providing that the declaration of any dividends will be determined quarterly by the Board or Audit Committee of the Board of Directors taking into account such factors as our evolving business model, prevailing business conditions and our financial results and capital requirements, without a predetermined annual net income payout ratio. The declaration of dividends is subject to the discretion of our Board of Directors, and may be affected by various factors, including our future earnings, financial condition, capital requirements, share repurchase activity, current and future planned strategic growth initiatives, levels of indebtedness, credit ratings and other considerations our Board of Directors deems relevant.

Equity Compensation Plan Information

The following provides information about our common stock that has been or may be issued under our equity compensation plans as of December 31, 2021:

- Intercontinental Exchange, Inc. 2018 Employee Stock Purchase Plan
- Intercontinental Exchange, Inc. 2017 Omnibus Employee Incentive Plan
- Intercontinental Exchange, Inc. 2013 Omnibus Employee Incentive Plan
- Intercontinental Exchange, Inc. 2013 Omnibus Non-Employee Director Incentive Plan
- Intercontinental Exchange, Inc. 2009 Omnibus Incentive Plan
- Intercontinental Exchange, Inc. 2003 Restricted Stock Deferral Plan for Outside Directors

The 2009 Omnibus Incentive Plan was retired in May 2013 upon adoption of the 2013 Omnibus Employee Incentive Plan. The 2013 Omnibus Employee Incentive Plan was retired in May 2017 upon adoption of the 2017 Omnibus Employee Incentive Plan. No future grants will be made from the retired plans. All future grants to employees will be made under the Intercontinental Exchange, Inc. 2017 Omnibus Employee Incentive Plan and to directors under the Intercontinental Exchange, Inc. 2013 Omnibus Non-Employee Director Incentive Plan. All purchases made pursuant to the Employee Stock Purchase Plan are made from the 2018 Employee Stock Purchase Plan.

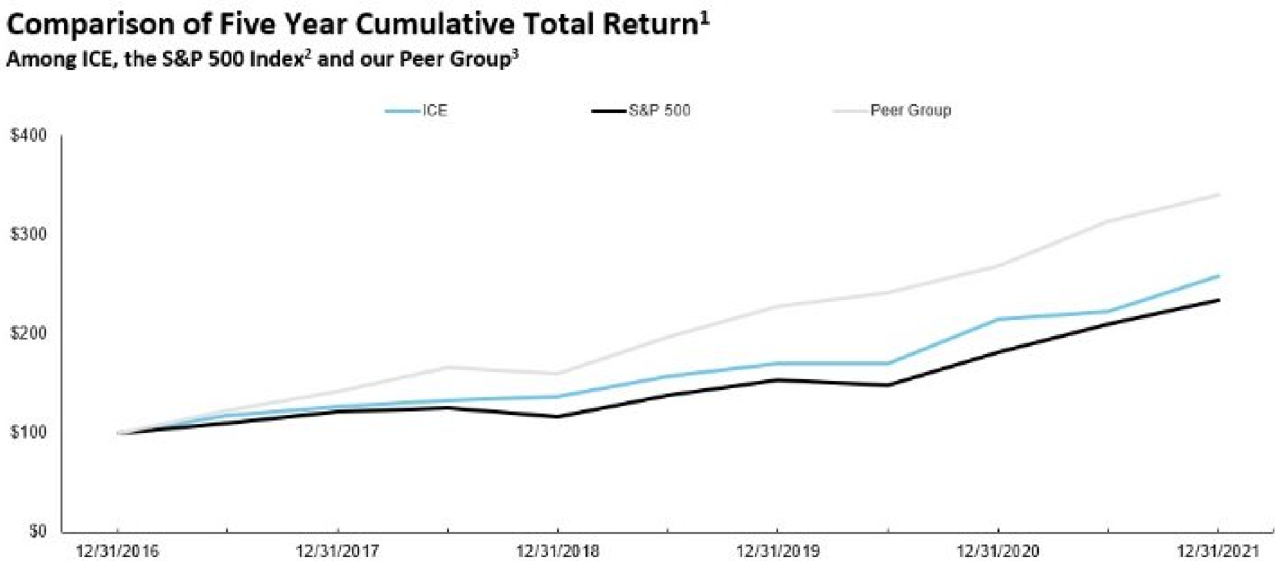
Plan Category	Number of securities to be issued upon exercise of outstanding options and rights (in thousands) (a)		Weighted average exercise price of outstanding options (b)		Number of securities available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (in thousands) (c)
Equity compensation plans approved by security holders[1]	6,476	(1)	$ 68.77	(1)	31,555
Equity compensation plans not approved by security holders[2]	50	(2)	—	(2)	—
TOTAL	6,526		$ 68.77		31,555

(1) The 2009 Omnibus Incentive Plan was approved by our stockholders in May 2009. The 2013 Omnibus Employee Incentive Plan and the 2013 Omnibus Non-Employee Director Incentive Plan were approved by our stockholders in May 2013. The 2017 Omnibus Employee Incentive Plan was approved by our stockholders in May 2017. Of the 6.5 million securities to be issued upon exercise, 3.0 million are options with a weighted average exercise price of $68.77 and the remaining 3.5 million securities are restricted stock shares that do not have an exercise price. The 2018 Employee Stock Purchase Plan was approved by stockholders in May 2018.

(2) This category includes the 2003 Restricted Stock Deferral Plan for Outside Directors. All of the 50,000 securities to be issued are restricted stock shares that do not have an exercise price. For more information concerning these plans, see Note 11 to our consolidated financial statements, which are included in this Annual Report.

Performance Graph

The following graph compares the total return of our common stock to the S&P 500 Index and a peer group selected by us, shown below, for the past five years:



		12/31/16	6/30/17	12/31/17	6/30/18	12/31/18	6/30/19	12/31/19	6/30/20	12/31/20	6/30/21	12/31/21
S&P 500	$	100.00	109.34	121.83	125.06	116.49	138.09	153.17	148.45	181.35	209.01	233.41
ICE	$	100.00	117.59	126.60	132.82	136.88	157.25	170.37	169.84	214.99	222.62	257.85
PEER	$	100.00	123.19	141.28	166.71	159.77	196.99	227.77	241.56	268.46	313.75	340.67

1) $100 invested on 12/31/2016 in stock or index, including reinvestment of dividends. Fiscal year ending December 31, 2021.

2) Copyright © 2022 Standard & Poor's, a division of S&P Global. All rights reserved.

3) The peer group includes CME Group Inc., Deutsche Boerse AG, IHS Markit LTD, London Stock Exchange Group PLC, MSCI Inc., Nasdaq Inc. and S&P Global Inc.

Stock Repurchases

With respect to purchases made by or on behalf of ICE or any "affiliated purchaser" (as defined in Rule 10b-18(a)(3) under the Exchange Act), prior to early August 2020, we had a Rule 10b5-1 trading plan that governed some of the repurchases of shares of our common stock. In connection with our September 2020 acquisition of Ellie Mae, we discontinued stock repurchases and terminated our Rule 10b5-1 trading plan. In November 2021, we resumed stock repurchases. In December 2021, our Board approved an aggregate of $3.15 billion for future repurchases of our common stock with no fixed expiration date that became effective January 1, 2022. The $3.15 billion replaces the previous amount approved by the Board. In December 2021 we entered into a new Rule 10b5-1 trading plan that will become effective in February 2022.

Refer to Note 12 to our consolidated financial statements, included in this Annual Report, for additional details on our stock repurchase plans and our repurchase activity during 2021.

ITEM 6. [RESERVED]

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in these forward-looking statements for many reasons. See the factors set forth under the heading "Forward Looking Statements" at the beginning of Part 1 of this Annual Report and in Item 1(A) under the heading "Risk Factors." For discussion related to the results of operations and changes in financial condition for 2020 compared to 2019 refer to Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations in our 2020 Annual Report on Form 10-K, which was filed with the U.S. Securities and Exchange Commission on February 4, 2021.

Overview

We are a provider of market infrastructure, data services and technology solutions to a broad range of customers including financial institutions, corporations and government entities. These products, which span major asset classes including futures, equities, fixed income and U.S. residential mortgages, provide our customers with access to mission critical tools that are designed to increase asset class transparency and workflow efficiency. We report our results in three segments: Exchanges, Fixed Income and Data Services, and Mortgage Technology. The majority of our identifiable assets are located in the U.S. and U.K.

- In our Exchanges segment, we operate regulated marketplaces for the listing, trading and clearing of a broad array of derivatives contracts and financial securities.
- In our Fixed Income and Data Services segment, we provide fixed income pricing, reference data, indices, analytics and execution services as well as global CDS clearing and multi-asset class data delivery solutions.
- In our Mortgage Technology segment, we provide an end-to-end technology platform that offers customers comprehensive, digital workflow tools that aim to address the inefficiencies that exist in the U.S. residential mortgage market.

Recent Developments

Bakkt Transaction

On October 15, 2021, Bakkt Holdings, LLC, or Bakkt, completed its merger with VPC Impact Acquisition Holdings, or VIH, a special purpose acquisition company sponsored by Victory Park Capital, or VPC. Bakkt is an integrated platform that enables customers and consumers to transact in digital assets.

The business combination between Bakkt and VIH resulted in enterprise value of approximately $2.1 billion, including approximately $479 million of cash on the combined company's balance sheet, reflecting a contribution of up to $123 million of cash held in VIH's trust account, and a $325 million concurrent private investment in public equity, or PIPE, of Class A common stock of the combined company and $31 million of cash held in Bakkt accounts. The PIPE was priced at $10.00 per share and included a $47 million commitment from us. The newly combined company has been renamed Bakkt Holdings, Inc. and is listed on the New York Stock Exchange, or NYSE.

As part of the transaction, Bakkt's existing equity holders and management rolled 100% of their equity into the combined company, and are subject to a six-month lockup period. Certain shareholders of VIH exercised their redemption rights, and at closing, Bakkt equity holders, including ICE, owned approximately 81% of the combined company, VIH's public shareholders owned approximately 5%, VPC owned 2%, and PIPE investors (a group that also includes us) owned approximately 12% of the issued and outstanding common stock of the combined company.

Following completion of the business combination, we initially held a 68% economic interest and a minority voting interest in the combined company. Prior to the closing, Bakkt revenues and operating expenses were reported within our consolidated revenues and operating expenses. Following the closing, as a consequence of holding a minority voting interest in the combined company, during the fourth quarter of 2021 we deconsolidated Bakkt and treat it as an equity method investment within our financial statements. We recorded a gain on the transaction of $1.4 billion during the fourth quarter of 2021, which is included in other non-operating income within our consolidated income statement. For the three months ended December 31, 2021, we recorded estimated equity losses of ($92 million) related to our investment in Bakkt.

COVID-19

Since March 2020, the coronavirus (COVID-19) pandemic has created economic and financial disruptions globally and has led governmental authorities to take unprecedented measures to mitigate the spread of the disease, including travel bans, border closings, business closures, quarantines and shelter-in-place orders, and to take actions designed to stabilize markets and promote economic growth.

From an operational perspective, our businesses, including our exchanges, clearing houses, listing venues, data services businesses, and mortgage platforms, have remained open and we do not have any plans to close any of our business operations as a result of the COVID-19 pandemic. However, due to the COVID-19 pandemic, we have taken preventative measures and implemented contingency plans, and many of our employees are continuing to work remotely. We believe that our global office closures and phased re-opening measures were and continue to be in compliance, as necessary, with local government directives and social distancing directives. We continue to monitor local government mandates in determining our office re-openings, re-closures and work-related travel.

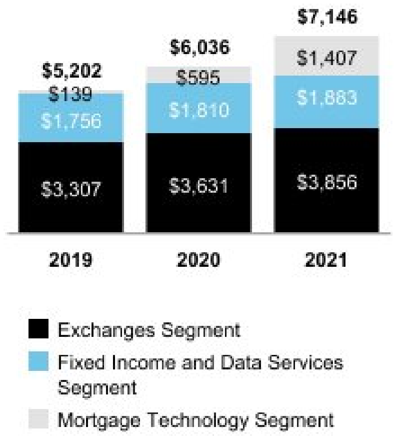
Global health concerns relating to COVID-19 and preventive measures taken to reduce its spread have created significant volatility in financial markets, which has resulted in higher trading volumes for some of our products and increased demand for our services.

The extent of the impact of the pandemic on our business will depend on future developments, including the duration, spread and severity of the outbreak, the effectiveness of vaccines against COVID-19 over the long term and against new and emerging variants thereof, and the actions taken to contain the spread of the disease or mitigate its impact. We continue to monitor this dynamic situation, including guidance and regulations issued by U.S. and other governmental authorities. In light of the continually evolving nature of the COVID-19 outbreak, we are not able at this time to estimate the ultimate effect of the pandemic on our business, results of operations or financial condition in the future.

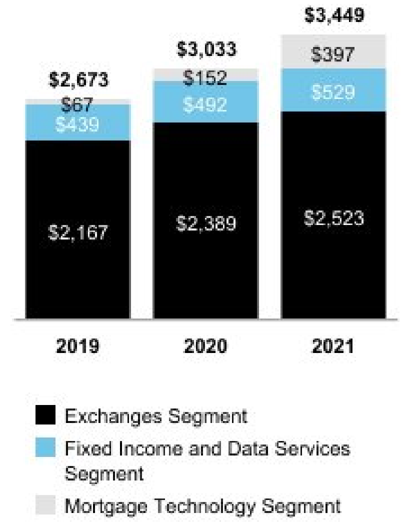
Consolidated Financial Highlights

The following summarizes our results and significant changes in our consolidated financial performance for the periods presented (dollars in millions, except per share amounts):

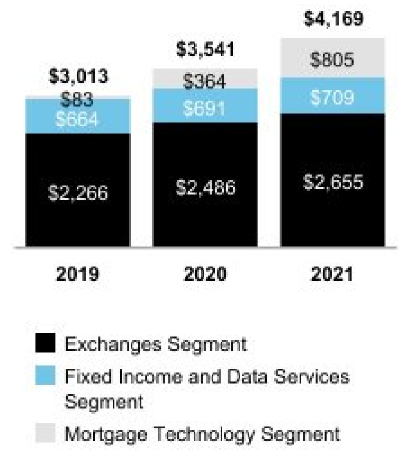
REVENUES, LESS TRANSACTION- BASED EXPENSES



OPERATING INCOME



ADJUSTED OPERATING INCOME (1)



CASH FLOWS FROM OPERATIONS

NET INCOME ATTRIBUTABLE TO ICE

ADJUSTED NET INCOME ATTRIBUTABLE TO ICE (1)

	Year Ended December 31,			Year Ended December 31,		
	2021	2020	Change	2020	2019	Change
Revenues, less transaction-based expenses	$ 7,146	$ 6,036	18 %	$ 6,036	$ 5,202	16 %
Operating expenses	$ 3,697	$ 3,003	23 %	$ 3,003	$ 2,529	19 %
Adjusted operating expenses(1)	$ 2,977	$ 2,495	19 %	$ 2,495	$ 2,189	14 %
Operating income	$ 3,449	$ 3,033	14 %	$ 3,033	$ 2,673	13 %
Adjusted operating income(1)	$ 4,169	$ 3,541	18 %	$ 3,541	$ 3,013	18 %
Operating margin	48 %	50 %	(2 pts)	50 %	51 %	(1 pt)
Adjusted operating margin(1)	58 %	59 %	(1 pt)	59 %	58 %	1 pt
Other income (expense), net	$ 2,249	$ (267)	n/a	$ (267)	$ (192)	39 %
Income tax expense	$ 1,629	$ 658	148 %	$ 658	$ 521	26 %
Effective tax rate	29 %	24 %	5 pts	24 %	21 %	3 pts
Net income attributable to ICE	$ 4,058	$ 2,089	94 %	$ 2,089	$ 1,933	8 %
Adjusted net income attributable to ICE(1)	$ 2,910	$ 2,449	19 %	$ 2,449	$ 2,142	14 %
Diluted earnings per share attributable to ICE common stockholders	$ 7.18	$ 3.77	90 %	$ 3.77	$ 3.42	10 %
Adjusted diluted earnings per share attributable to ICE common stockholders(1)	$ 5.15	$ 4.41	17 %	$ 4.41	$ 3.79	16 %
Cash flows from operating activities	$ 3,123	$ 2,881	8 %	$ 2,881	$ 2,659	8 %

*Percentage changes in the table above deemed "n/a" are not meaningful.

(1) The adjusted figures exclude items that are not reflective of our ongoing core operations and business performance. Adjusted net income attributable to ICE and adjusted diluted earnings per share attributable to ICE common stockholders are presented net of taxes. These adjusted numbers are not calculated in accordance with U.S. Generally Accepted Accounting Principles, or GAAP. See "- Non-GAAP Financial Measures" below.

- Revenues, less transaction-based expenses, increased $1.1 billion in 2021 from 2020. The increase in revenues includes $44 million in favorable foreign exchange effects arising from the weaker U.S. dollar in 2021 from 2020.
- Revenues, less transaction-based expenses, increased $834 million in 2020 from 2019. The increase in revenues includes $7 million in favorable foreign exchange effects arising from the weaker U.S. dollar in 2020 from 2019.
- Operating expenses increased $694 million in 2021 from 2020. The increase in operating expenses includes $22 million in unfavorable foreign exchange effects arising from the weaker U.S. dollar in 2021 from 2020.
- Operating expenses increased $474 million in 2020 from 2019. The increase in operating expenses includes $2 million in unfavorable foreign exchange effects arising from the weaker U.S. dollar in 2020 from 2019.
- Other income (expense), net, in 2021 primarily includes our gain on the Bakkt transaction of $1.4 billion, our gain on the sale of our Coinbase Global, Inc., or Coinbase, investment of $1.2 billion, equity earnings in OCC of $51 million, estimated equity losses in our investment in Bakkt during the post-merger period of $92 million, dividend income from Euroclear plc, or Euroclear, of $60 million, a fair value adjustment gain on our Euroclear investment of $34 million and interest expense of $423 million.
- Other income (expense), net, in 2020 primarily includes interest expense of $357 million, equity earnings in OCC of $71 million, an accrual for potential legal settlements of $30 million, a fair value adjustment gain on our Euroclear investment of $35 million, and gain on the sale of our BIDS Trading, LP, or BIDS, investment of $20 million.
- The effective tax rate in 2021 is higher than the effective tax rate in 2020 primarily due to the deferred income tax impacts resulting from the U.K. tax law changes as well as the Bakkt transaction. In June 2021, the U.K. enacted a corporate income tax rate increase from 19% to 25% effective April 1, 2023.
- The effective tax rate in 2020 was higher than the effective tax rate in 2019 primarily due to U.K. tax law changes enacted in July 2020, partially offset by favorable state apportionment changes as a result of our acquisition of Ellie Mae, as well as favorable changes in certain international tax provisions as part of the U.S. Federal Tax Cuts and Jobs Act, or TCJA, in 2019.

Business Environment and Market Trends

Our business environment has been characterized by:

- globalization of marketplaces, customers and competitors;
- growing customer demand for workflow efficiency and automation;
- commodity, interest rate and financial markets uncertainty;
- growing demand for data to inform customers' risk management and investment decisions;
- evolving, increasing and disparate regulation across multiple jurisdictions;
- price volatility increasing customers' demand for risk management services;
- increasing focus on capital and cost efficiencies;
- customers' preference to manage risk in markets demonstrating the greatest depth of liquidity and product diversity;
- the evolution of existing products and new product innovation to serve emerging customer needs and changing industry agreements;
- rising demand for speed, data, data capacity and connectivity by market participants, necessitating increased investment in technology; and
- consolidation and increasing competition among global markets for trading, clearing and listings.

Recent changes with regard to global financial reform have emphasized the importance of transparent markets, centralized clearing and access to data, all of which are important aspects of our product offering. However, some of the proposed rules have yet to be implemented and some rules that have already been partially implemented are being reconsidered. In addition, some of the global regulations have not been fully harmonized and several non-U.S. regulations are inconsistent with U.S. rules. As the evolution continues, legislative and regulatory actions may change the way we conduct our business and may create uncertainty for market participants, which could affect trading volumes or demand for market data. As a result, it is difficult to predict all of the effects that the legislation and its implementing regulations will have on us. As discussed more fully in Item 1 “- Business - Regulation” included in this Annual Report, Brexit, the implementation of MiFID II and other regulations may result in operational, regulatory and/or business risk.

We have diversified our business so that we are not dependent on volatility or transaction activity in any one asset class. In addition, we have increased our portion of recurring revenues from 34% in 2014 to 49% in 2021. These recurring revenues include data services, listings and various mortgage technology solutions.

Many of the data products we sell and services we provide are required for our clients’ business operations regardless of market volatility or shifts in business profitability levels. We anticipate that there will continue to be growth in the financial information services sector driven by a number of global trends, including the following:

- increasing global regulatory demands;
- greater use of fair value accounting standards and reliance on independent valuations;
- greater emphasis on risk management;
- market fragmentation driven by regulatory changes;
- the move to passive investing and indexation;
- ongoing growth in the size and diversity of financial markets;
- increased automation of fixed income, mortgage and other less automated markets;
- the development of new data products;
- the demand for greater data capacity and connectivity;
- new entrants; and
- increasing demand for outsourced services by financial institutions.

We continue to focus on our strategy to grow each of our revenue streams, and prudently manage expenses, in order to mitigate these uncertainties and to build on our growth opportunities by leveraging our proprietary data, clearing, markets and technology solutions.

Segment Results

Our business is conducted through three reportable business segments, comprised of the following:

- Our Exchanges segment includes our trade execution and clearing within our global futures network and NYSE businesses, various data and connectivity services that are directly related to those exchange platforms, administration fees and our NYSE listings business. Trade execution and clearing products include energy, agricultural and metals, financial futures and options, cash equities, equity options, OTC and other;
- Our Fixed Income and Data Services segment includes pricing and reference data, analytics, indices, trade execution and clearing within our ICE Bonds and CDS businesses, consolidated feeds and our ICE Global Network businesses; and
- Our Mortgage Technology segment includes origination technology, closing solutions, data and analytics and other mortgage technology businesses.

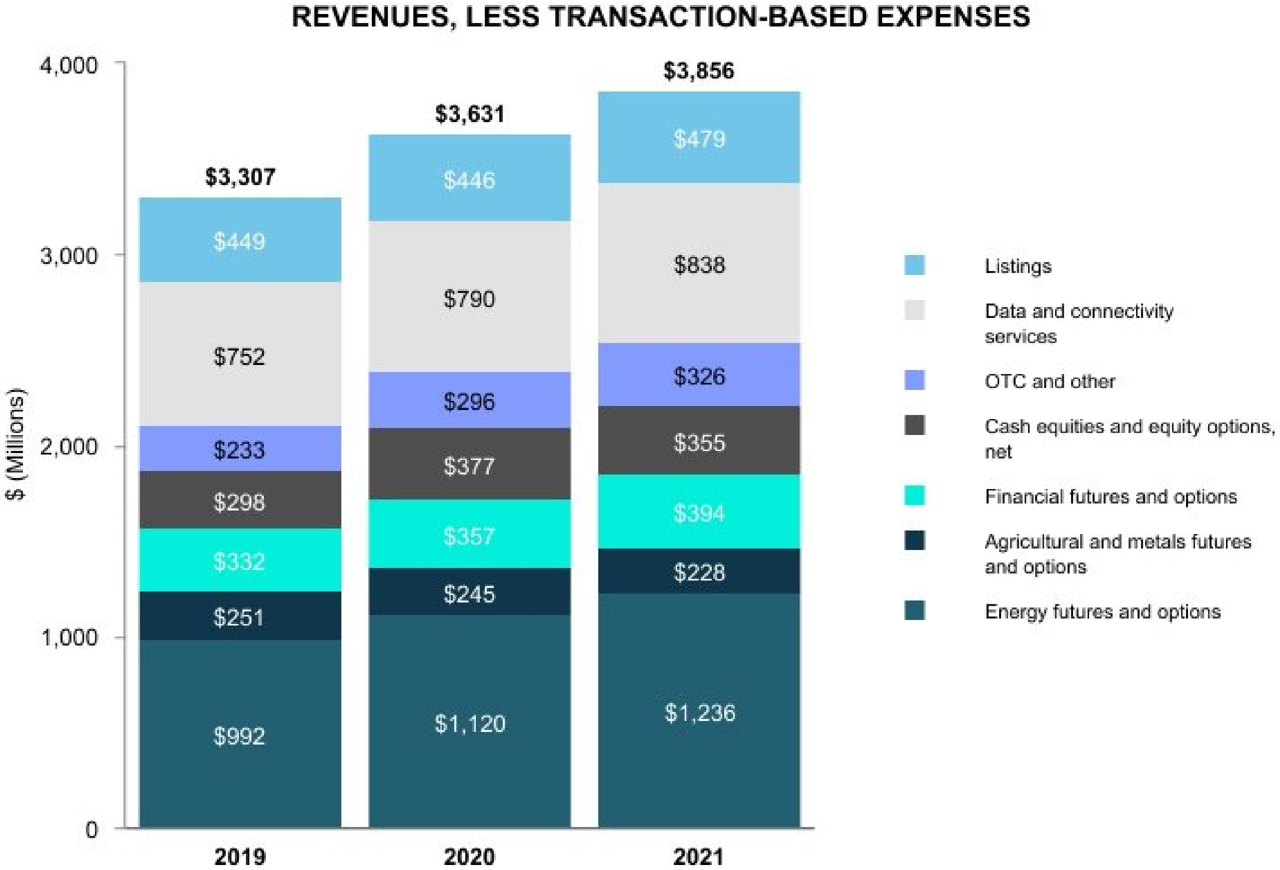
While revenues are recorded specifically in the segment in which they are earned or to which they relate, a significant portion of our operating expenses are not solely related to a specific segment because the expenses serve functions that are necessary for the operation of more than one segment. We directly allocate expenses when reasonably possible to do so. Otherwise, we use a pro-rata revenue approach as the allocation method for the expenses that do not relate solely to one segment and serve functions that are necessary for the operation of all segments. Our segments do not engage in intersegment transactions.

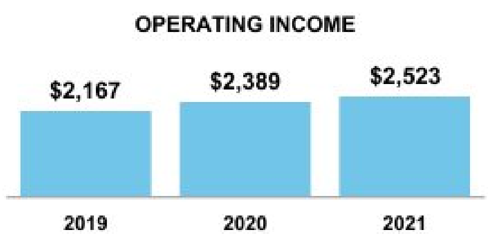
Beginning in the first quarter of 2021, origination technology revenues include those related to our ICE Mortgage Technology network (previously reported in closing solutions revenues) and closing solutions revenues now include registration revenues related to MERSCORP Holdings, Inc., or MERS, (previously reported in other revenues). We believe these changes more accurately reflect how we operate the business. Prior-year periods have been adjusted to reflect these changes.

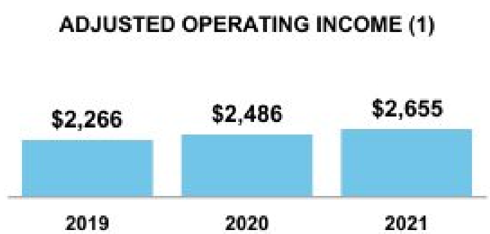
For details on trends in recent prior-year periods, refer to our 2020 and 2019 Annual Reports on Form 10-K.

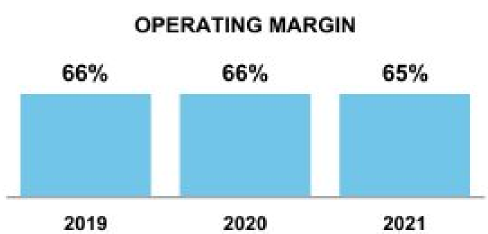
Exchanges Segment

The following presents selected statements of income data for our Exchanges segment (dollars in millions):









(1) The adjusted figures in the charts above are calculated by excluding items that are not reflective of our cash operations and core business performance. As a result, these adjusted numbers are not calculated in accordance with U.S. GAAP. See "- Non-GAAP Financial Measures" below.

	Year Ended December 31, 2021	Year Ended December 31, 2020	Change	Year Ended December 31, 2020	Year Ended December 31, 2019	Change
Revenues:						
Energy futures and options	$ 1,236	$ 1,120	10 %	$ 1,120	$ 992	13 %
Agricultural and metals futures and options	228	245	(7)	245	251	(2)
Financial futures and options	394	357	10	357	332	8
Futures and options	1,858	1,722	8	1,722	1,575	9
Cash equities and equity options	2,377	2,585	(8)	2,585	1,643	57
OTC and other	326	296	10	296	233	27
Transaction and clearing, net	4,561	4,603	(1)	4,603	3,451	33
Data and connectivity services	838	790	6	790	752	5
Listings	479	446	7	446	449	(1)
Revenues	5,878	5,839	1	5,839	4,652	26
Transaction-based expenses(1)	2,022	2,208	(8)	2,208	1,345	64
Revenues, less transaction-based expenses	3,856	3,631	6	3,631	3,307	10
Other operating expenses	1,028	965	6	965	874	10
Depreciation and amortization	244	261	(7)	261	265	(2)
Acquisition-related transaction and integration costs	61	16	287	16	1	n/a
Operating expenses	1,333	1,242	7	1,242	1,140	9
Operating income	$ 2,523	$ 2,389	6 %	$ 2,389	$ 2,167	10 %

*Percentage changes in the table above deemed "n/a" are not meaningful.
(1)Transaction-based expenses are largely attributable to our cash equities and options business.

Exchanges Revenues

Our Exchanges segment includes transaction and clearing revenues from our futures and NYSE exchanges, related data and connectivity services, and our listings business. Transaction and clearing revenues consist of fees collected from derivatives, cash equities and equity options trading and derivatives clearing, and are reported on a net basis, except for the NYSE transaction-based expenses discussed below. Rates per-contract, or RPC, are driven by the number of contracts or securities traded and the fees charged per contract, net of certain rebates. Our per-contract transaction and clearing revenues will depend upon many factors, including, but not limited to, market conditions, transaction and clearing volume, product mix, pricing, applicable revenue sharing and market making agreements, and new product introductions. Because transaction and clearing revenues are generally assessed on a per-contract basis, revenues and profitability fluctuate with changes in contract volume and product mix. Our data and connectivity services revenues are recurring subscription fees related to the various data and connectivity services that we provide which are directly attributable to our exchange venues. Our listings revenues are also recurring subscription fees that we earn for the provision of NYSE listings services for public companies and ETFs, and related corporate actions for listed companies.

In 2021 and 2020, 17% and 14%, respectively, of our Exchanges segment revenues, less transaction-based expenses, were billed in pounds sterling or euros. Due to the fluctuations of the pound sterling and euro compared to the U.S. dollar, our Exchanges segment revenues, less transaction-based expenses, were higher by $30 million in 2021 from 2020.

Our exchange transaction and clearing revenues are presented net of rebates. We recorded rebates of $1.0 billion and $962 million in 2021 and 2020, respectively. We offer rebates in certain of our markets primarily to support market liquidity and trading volume by providing qualified participants in those markets a discount to the applicable commission rate. Such rebates are calculated based on volumes traded. The increase in rebates is primarily due to the launch of new products, including ICE Murban crude oil futures and the Sterling Overnight Index Average, or SONIA.

- **Energy Futures and Options:** Total energy volume increased 1% and revenues increased 10% in 2021 from 2020.
    - Total oil volume increased 3% in 2021 from 2020 driven by price volatility related to oil supply and demand dynamics and macroeconomic uncertainty in late 2021.
    - Our global natural gas futures and options volume decreased 4% in 2021 from 2020 as 2020 benefited from elevated volatility related to COVID-19, partially offset by 2021 continued growth in our TTF and Asian JKM gas complexes driven by the globalization of gas, coupled with heightened price volatility in 2021 related to natural gas supply and demand dynamics in the U.K. and Europe.

- Our environmentals and other futures and options volume increased 18% to record levels in 2021 from 2020 due to an increase in the price of carbon and continued demand for market-based mechanisms to price climate risk and help enable greenhouse gas reduction goals.

- **Agricultural and Metals Futures and Options:** Total volume in our agricultural and metals futures and options markets decreased 10% and revenues decreased 7% in 2021 from 2020. The overall decrease in agricultural volumes was due to 2020 benefiting from elevated volatility related to COVID-19 and a sharp decline in oil prices, partially offset by elevated volatility in late 2021 as a result of weather-related supply and demand dynamics impacting our Coffee and Cotton markets as well as geopolitical events impacting our Cocoa markets.

  - Sugar futures and options volumes decreased 21% in 2021 from 2020.

  - Other agricultural and metal futures and options volumes were flat in 2021 as compared to 2020.

- **Financial Futures and Options:** Total volume increased 2% and revenues increased 10% in our financial futures and options markets in 2021 from 2020.

  - Interest rate futures and options volume and revenue increased 6% and 23% in 2021 from 2020, respectively, driven by interest rate volatility from increased speculation of central bank activity due to post-pandemic global economic re-opening and inflation concerns. Interest rate futures and options revenues were $237 million and $193 million in 2021 and 2020, respectively.

  - Other financial futures and options volume, which includes our MSCI®, FTSE® and NYSE FANG+ equity index products, decreased 12% and revenue decreased 4% in 2021 from 2020. Other financial futures and options volume decreased as 2020 benefited from elevated volatility across global equity markets driven by the emergence of COVID-19. Other financial futures and options revenues were $157 million and $164 million in 2021 and 2020, respectively.

- **Cash Equities and Equity Options:** Cash equities volume decreased 6% in 2021 from 2020 as 2020 benefited from elevated volatility across global equity markets driven by the emergence of COVID-19. Cash equities revenues, net of transaction-based expenses, were $246 million and $276 million in 2021 and 2020, respectively. Equity options volume increased 40% in 2021 from 2020 driven by increased participation and higher market share. Equity options revenues, net of transaction-based expenses, were $109 million and $101 million in 2021 and 2020, respectively.

- **OTC and Other:** OTC and other transactions include revenues from our OTC energy business and other trade confirmation services, as well as interest income on certain clearing margin deposits, regulatory penalties and fines, fees for use of our facilities, regulatory fees charged to member organizations of our U.S. securities exchanges, designated market maker service fees, exchange membership fees and agricultural grading and certification fees. Our OTC and other revenues increased 10% in 2021 from 2020. Following the October 2021 Bakkt transaction, Bakkt revenues are no longer included within our OTC and other revenues.

- **Data and Connectivity Services:** Our data and connectivity services revenues increased 6% in 2021 from 2020. The increase in revenue was driven by the strong retention rate of existing customers and increased purchases by existing customers.

- **Listings Revenues:** Through NYSE, NYSE American and NYSE Arca, we generate listings revenue related to the provision of listings services for public companies and ETFs, and related corporate actions for listed companies. Listings revenues increased 7% in 2021 from 2020, driven by equity capital markets activity, including an increase in demand for special purpose acquisition company, or SPAC, listings.

  Listings revenues in our securities markets arise from fees applicable to companies listed on our cash equities exchanges– original listing fees and annual listing fees. Original listing fees consist of two components: initial listing fees and fees related to corporate actions. Initial listing fees, subject to a minimum and maximum amount, are based on the number of shares that a company initially lists. All listings fees are billed upfront and the identified performance obligations are satisfied over time. Revenue related to the investor relations performance obligation is recognized ratably over the period these services are provided, with the remaining revenue recognized ratably over time as customers continue to list on our exchanges.

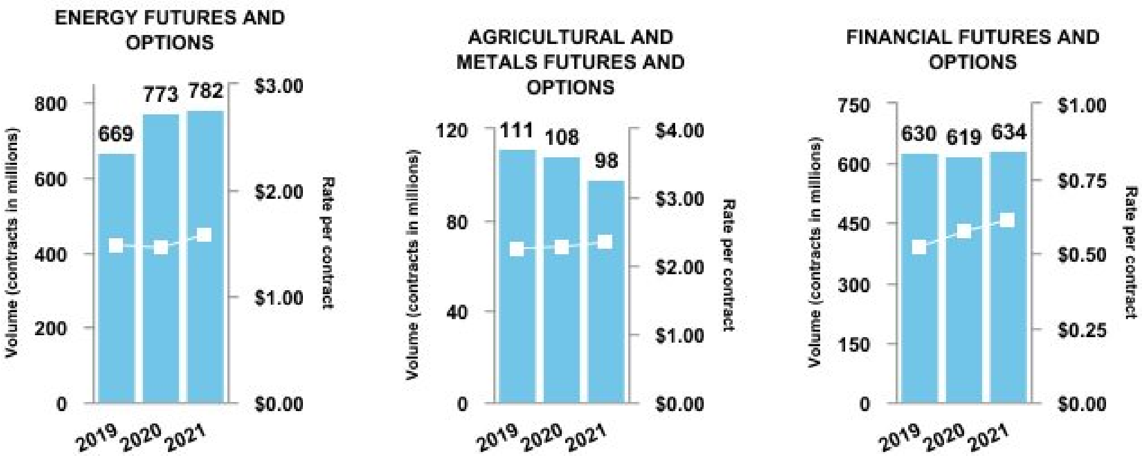
  In addition, we earn corporate actions-related listing fees in connection with actions involving the issuance of new shares, such as stock splits, rights issues and sales of additional securities, as well as mergers and acquisitions. Listings fees related to other corporate actions are considered contract modifications of our listing contracts and are recognized ratably over time as customers continue to list on our exchanges.

In a record year for new issuance, NYSE raised $221 billion in IPOs and follow-on offerings from over 594 transactions, an increase of 20% from $185 billion raised in 2020.

Selected Operating Data

The following charts and tables present trading activity in our futures and options markets by commodity type based on the total number of contracts traded, as well as futures and options rate per contract (in millions, except for percentages and rate per contract amounts):

Volume and Rate per Contract

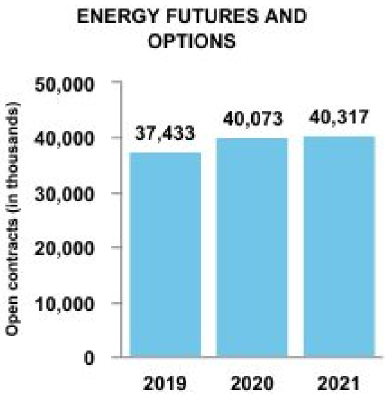


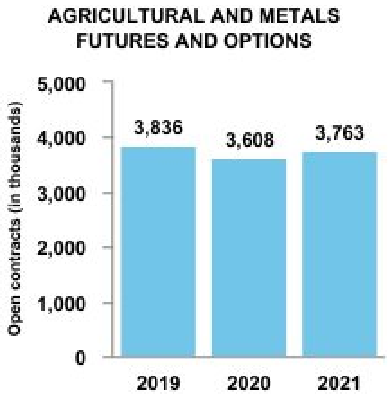
	Year Ended December 31,			Year Ended December 31,		
	2021	2020	Change	2020	2019	Change
Number of contracts traded (in millions):						
Energy futures and options	782	773	1 %	773	669	15 %
Agricultural and metals futures and options	98	108	(10) %	108	111	(3) %
Financial futures and options	634	619	2 %	619	630	(2) %
Total	1,514	1,500	1 %	1,500	1,410	6 %

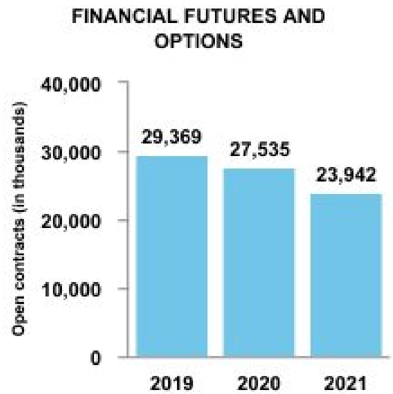
	Year Ended December 31,			Year Ended December 31,		
	2021	2020	Change	2020	2019	Change
Average Daily Volume of contracts traded (in thousands):						
Energy futures and options	3,103	3,054	2 %	3,054	2,655	15 %
Agricultural and metals futures and options	388	428	(9) %	428	442	(3) %
Financial futures and options	2,475	2,409	3 %	2,409	2,460	(2) %
Total	5,966	5,891	1 %	5,891	5,557	6 %

	Year Ended December 31,			Year Ended December 31,		
Rate per contract:	2021	2020	Change	2020	2019	Change
Energy futures and options	$ 1.58	$ 1.45	9 %	$ 1.45	$ 1.48	(2) %
Agricultural and metals futures and options	$ 2.34	$ 2.27	3 %	$ 2.27	$ 2.25	1 %
Financial futures and options	$ 0.61	$ 0.57	7 %	$ 0.57	$ 0.52	10 %

Open interest is the aggregate number of contracts (long or short) that clearing members hold either for their own account or on behalf of their clients. Open interest refers to the total number of contracts that are currently "open," – in other words, contracts that have been entered into but not yet liquidated by either an offsetting trade, exercise, expiration or assignment. Open interest is also a measure of the future activity remaining to be closed out in terms of the number of contracts that members and their clients continue to hold in the particular contract and by the number of contracts held for each contract month listed by the exchange. The following charts and table present our year-end open interest for our futures and options contracts (in thousands, except for percentages):

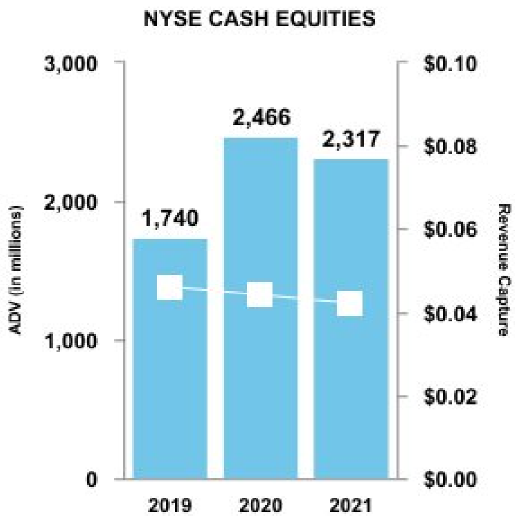


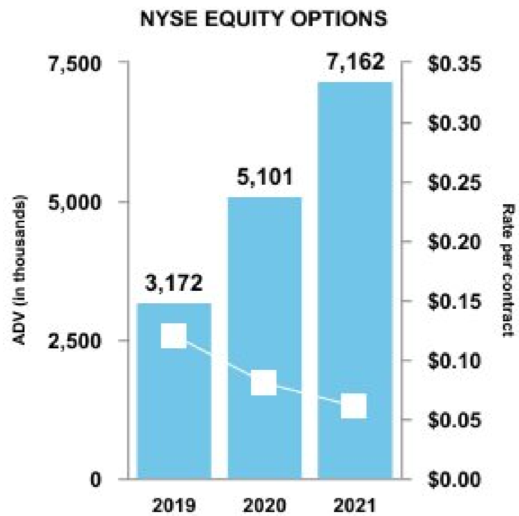




	As of December 31,			As of December 31,		
	2021	2020	Change	2020	2019	Change
Open interest — in thousands of contracts:						
Energy futures and options	40,317	40,073	1 %	40,073	37,433	7 %
Agricultural and metals futures and options	3,763	3,608	4 %	3,608	3,836	(6) %
Financial futures and options	23,942	27,535	(13) %	27,535	29,369	(6) %
Total	68,022	71,216	(4) %	71,216	70,638	1 %

The following charts and tables present selected cash and equity options trading data. All trading volume below is presented as average net daily trading volume, or ADV, and is single counted:





	Year Ended December 31,			Year Ended December 31,		
	2021	2020	Change	2020	2019	Change
NYSE cash equities (shares in millions):						
Total cash handled volume	2,317	2,466	(6) %	2,466	1,740	42 %
Total cash market share matched	19.9 %	22.1 %	(2.3) pts	22.1 %	24.2 %	(2.1) pts
NYSE equity options (contracts in thousands):						
NYSE equity options volume	7,162	5,101	40 %	5,101	3,172	61 %
Total equity options volume	37,170	27,685	34 %	27,685	17,542	58 %
NYSE share of total equity options	19.3 %	18.4 %	0.8 pts	18.4 %	18.1 %	0.3 pts
Revenue capture or rate per contract:						
Cash equities rate per contract (per 100 shares)	$0.042	$0.044	(5) %	$0.044	$0.046	(4) %
Equity options rate per contract	$0.06	$0.08	(23) %	$0.08	$0.12	(34) %

Handled volume represents the total number of shares of equity securities, ETFs and crossing session activity internally matched on our exchanges or routed to and executed on an external market center. Matched volume represents the total number of shares of equity securities, ETFs and crossing session activity executed on our exchanges.

Transaction-Based Expenses

Our equities and equity options markets pay fees to the SEC pursuant to Section 31 of the Exchange Act. Section 31 fees are recorded on a gross basis as a component of transaction and clearing fee revenue. These Section 31 fees are assessed to recover the government's costs of supervising and regulating the securities markets and professionals and are subject to change. We, in turn, collect corresponding activity assessment fees from member organizations clearing or settling trades on the equities and options exchanges, and recognize these amounts in our transaction and clearing revenues when invoiced. The activity assessment fees are designed to equal the Section 31 fees. As a result, activity assessment fees and the corresponding Section 31 fees do not have an impact on our net income, although the timing of payment by us will vary from collections. Section 31 fees were $248 million and $622 million in 2021 and 2020, respectively. The decrease in Section 31 fees was primarily related to a decline in rates, which were revised in February of both years. The fees we collect are included in cash at the time of receipt and we remit the amounts to the SEC semi-annually as required. The total amount is included in accrued liabilities and was $57 million as of December 31, 2021.

We make liquidity payments to cash and options trading customers, as well as routing charges made to other exchanges which are included in transaction-based expenses. We incur routing charges when we do not have the best bid or offer in the market for a security that a customer is trying to buy or sell on one of our securities exchanges. In that case, we route the customer's order to the external market center that displays the best bid or offer. The external market center charges us a fee per share (denominated in tenths of a cent per share) for routing to its system. We record routing charges on a gross basis as a component of transaction and clearing fee revenue. Cash liquidity payments, routing and clearing fees were $1.8 billion and $1.6 billion in 2021 and 2020, respectively.

Operating Expenses, Operating Income and Operating Margin

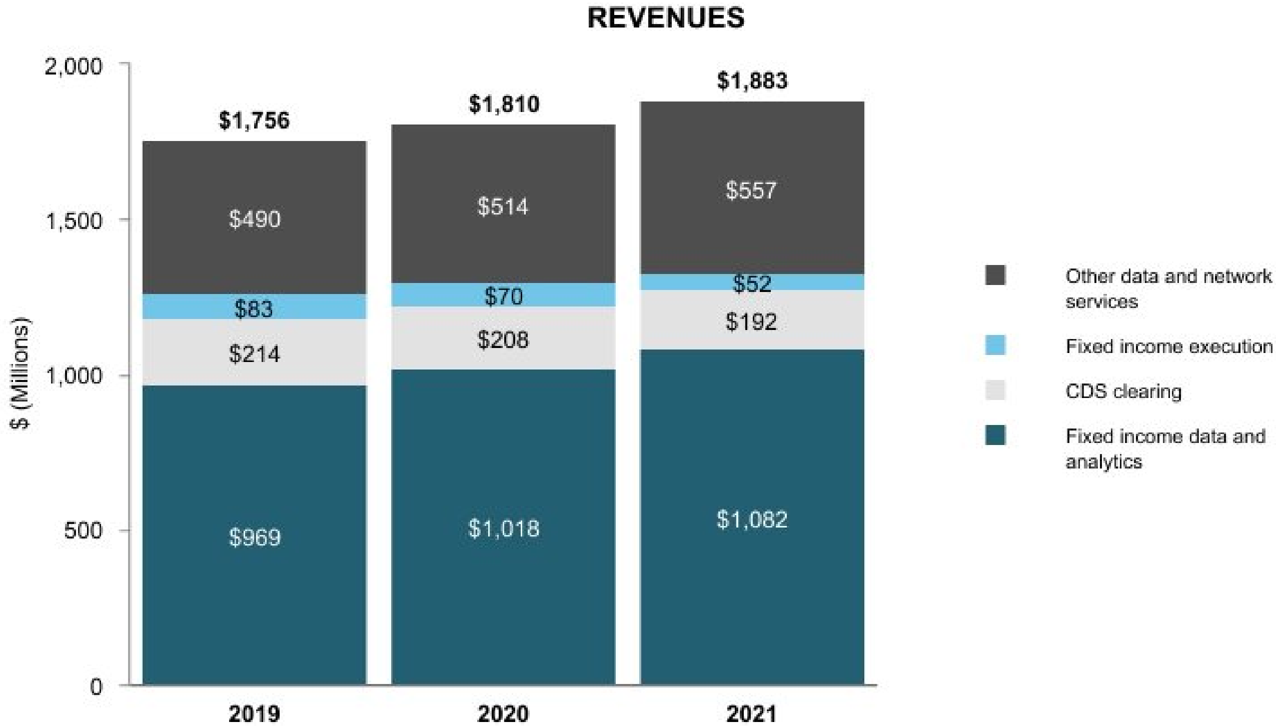
The following chart summarizes our Exchanges segment's operating expenses, operating income and operating margin (dollars in millions). See "- Consolidated Operating Expenses" below for a discussion of the significant changes in our operating expenses.

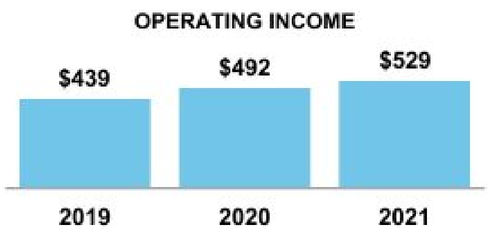
Exchanges Segment:	**Year Ended December 31,**			**Year Ended December 31,**		
	2021	**2020**	**Change**	**2020**	**2019**	**Change**
Operating expenses	$ 1,333	$ 1,242	7 %	$ 1,242	$ 1,140	9 %
Adjusted operating expenses[1]	$ 1,201	$ 1,145	5 %	$ 1,145	$ 1,041	10 %
Operating income	$ 2,523	$ 2,389	6 %	$ 2,389	$ 2,167	10 %
Adjusted operating income[1]	$ 2,655	$ 2,486	7 %	$ 2,486	$ 2,266	10 %
Operating margin	65 %	66 %	(1 pt)	66 %	66 %	—
Adjusted operating margin[1]	69 %	68 %	1 pt	68 %	69 %	(1 pt)

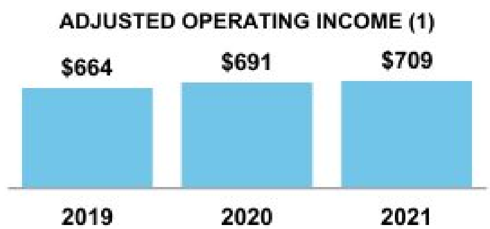
[1] The adjusted figures exclude items that are not reflective of our ongoing core operations and business performance. These adjusted numbers are not calculated in accordance with GAAP. See "- Non-GAAP Financial Measures" below.

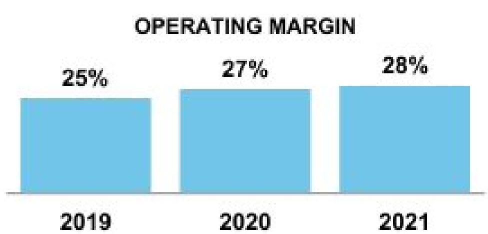
Fixed Income and Data Services Segment

The following charts and table present our selected statements of income data for our Fixed Income and Data Services segment (dollars in millions):









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(1) The adjusted figures in the charts above are calculated by excluding items that are not reflective of our cash operations and core business performance. As a result, these adjusted numbers are not calculated in accordance with U.S. GAAP. See "- Non-GAAP Financial Measures" below.

	Year Ended December 31, 2021	Year Ended December 31, 2020	Change	Year Ended December 31, 2020	Year Ended December 31, 2019	Change
Revenues:						
Fixed income execution	$ 52	$ 70	(25) %	$ 70	$ 83	(16) %
CDS clearing	192	208	(8)	208	214	(2)
Fixed income data and analytics	1,082	1,018	6	1,018	969	5
Fixed income and credit	1,326	1,296	2	1,296	1,266	2
Other data and network services	557	514	8	514	490	5
Revenues	1,883	1,810	4	1,810	1,756	3
Other operating expenses	1,012	967	5	967	939	3
Acquisition-related transaction and integration costs	1	—	195	—	—	(10)
Depreciation and amortization	341	351	(3)	351	378	(7)
Operating expenses	1,354	1,318	3	1,318	1,317	—
Operating income	$ 529	$ 492	7 %	$ 492	$ 439	12 %

Our Fixed Income and Data Services segment represents fixed income and credit trading and clearing as well as subscription-based, or recurring, revenues related to our fixed income data and analytics offerings as well as other multi-asset class data and network services.

In both 2021 and 2020, 14% of our Fixed Income and Data Services segment revenues were billed in pounds sterling or euros. As the pound sterling or euro exchange rate changes, the U.S. equivalent of revenues denominated in foreign currencies changes accordingly. Due to the fluctuations of the pound sterling and euro compared to the U.S. dollar during 2021, our Fixed Income and Data Services revenues were higher by $14 million in 2021 than in 2020.

Fixed Income and Data Services Revenues

Our Fixed Income and Data Services revenues increased 4% in 2021 from 2020 primarily due to growth in our fixed income data and analytics products and our other data and network services.

- **Fixed Income Execution:** Fixed income execution includes revenues from ICE Bonds. Execution fees are reported net of rebates, which were nominal in 2021, 2020 and 2019. Our fixed income execution revenues decreased 25% in 2021 from 2020. The decrease in revenue was due to 2020 benefiting from price volatility related to COVID-19, as well as decreased retail activity, particularly in municipal and corporate bonds, as a result of low interest rates.

- **CDS Clearing:** CDS clearing revenues decreased 8% in 2021 from 2020. The notional value of CDS cleared was $17.0 trillion and $17.9 trillion in 2021 and 2020, respectively. Elevated volatility in 2020 related to COVID-19 benefited 2020 revenues, with volatility and cleared volumes generally returning to more normal levels late in 2021.

- **Fixed Income Data and Analytics:** Our fixed income data and analytics revenues increased 6% in 2021 from 2020. The increase in revenue was due to strength in our index business and continued growth in our pricing and reference data business driven by the strong retention rate of existing customers, the addition of new customers, and increased purchases by existing customers.

- **Other Data and Network Services:** Our other data and network services revenues increased 8% in 2021 from 2020. The increase in revenues was driven primarily by growth in our ICE Global Network offering, coupled with strength in our consolidated feeds and desktop revenues.

Annual Subscription Value, or ASV, represents, at a point in time, the data services revenues, which includes Fixed Income Data and Analytics as well as Other Data and Network Services, subscribed for the succeeding 12 months. ASV does not include new sales, contract terminations or price changes that may occur during that 12-month period. However, while it is an indicative forward-looking metric, it does not provide a precise growth forecast of the next 12 months of data services revenues.

As of December 31, 2021, ASV was $1.646 billion, which increased 4.9% compared to the ASV as of December 31, 2020. ASV represents nearly 100% of total data services revenues for this segment. This does not adjust for year-over-year foreign exchange fluctuations.

Operating Expenses, Operating Income and Operating Margin

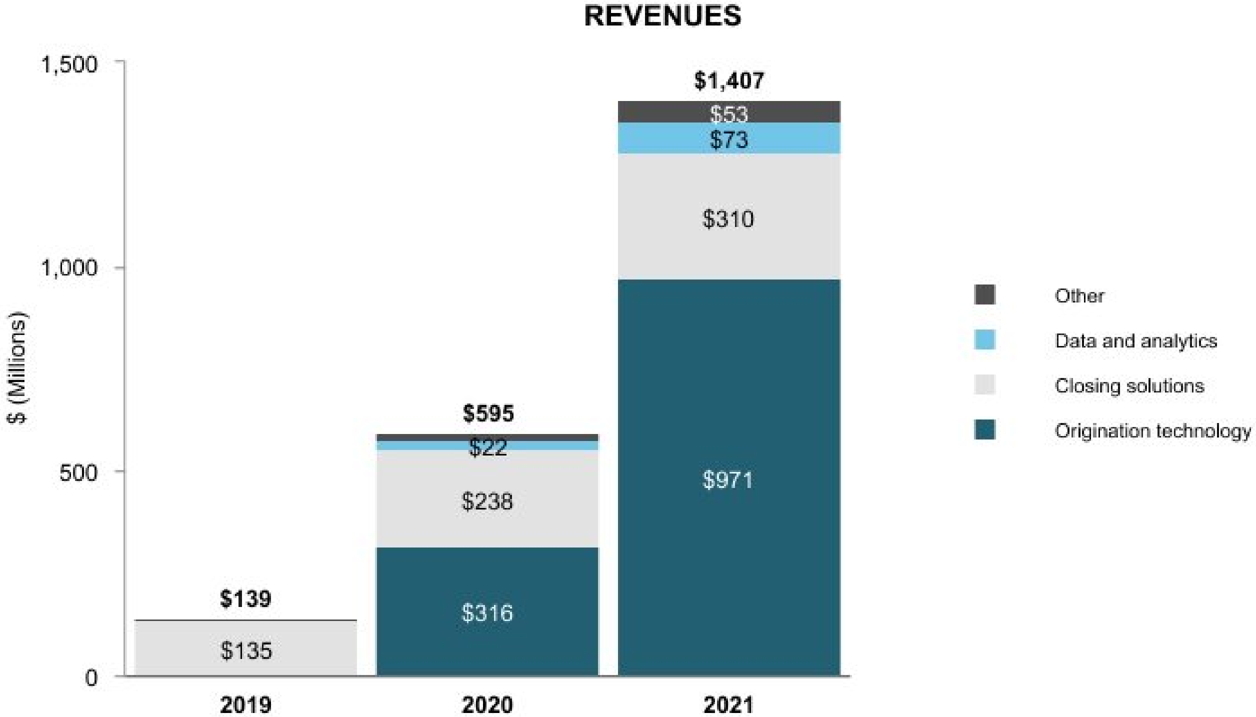
The following chart summarizes our Fixed Income and Data Services segment's operating expenses, operating income and operating margin (dollars in millions). See “- Consolidated Operating Expenses” below for a discussion of the significant changes in our operating expenses.

Fixed Income and Data Services Segment:	Year Ended December 31,		Change	Year Ended December 31,		Change
	2021	2020		2020	2019	
Operating expenses	$ 1,354	$ 1,318	3 %	$ 1,318	$ 1,317	— %
Adjusted operating expenses(1)	$ 1,174	$ 1,119	5 %	$ 1,119	$ 1,092	3 %
Operating income	$ 529	$ 492	7 %	$ 492	$ 439	12 %
Adjusted operating income(1)	$ 709	$ 691	3 %	$ 691	$ 664	4 %
Operating margin	28 %	27 %	1 pt	27 %	25 %	2 pts
Adjusted operating margin(1)	38 %	38 %	—	38 %	38 %	—

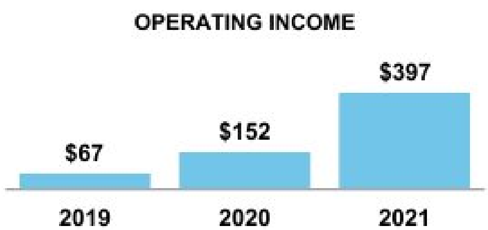
(1) The adjusted figures exclude items that are not reflective of our ongoing core operations and business performance. These adjusted numbers are not calculated in accordance with GAAP. See “- Non-GAAP Financial Measures” below.

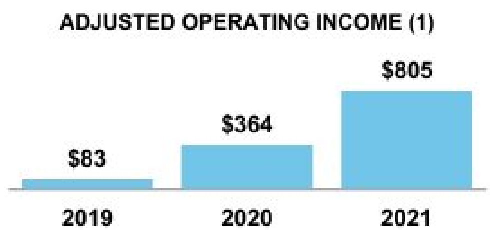
Mortgage Technology Segment

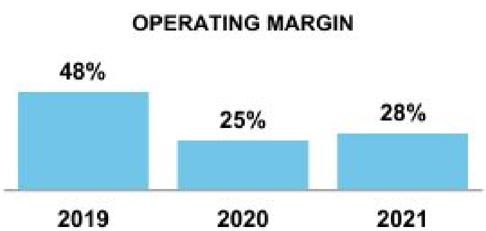
The following charts and table present our selected statements of income data for our Mortgage Technology segment (dollars in millions):

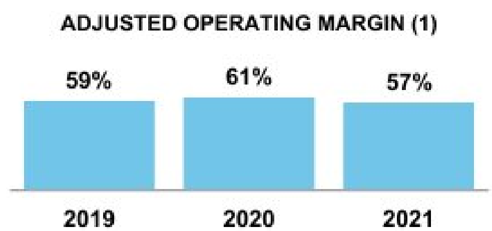


*Other revenues were $4 million in 2019 and $19 million in 2020.









(1) The adjusted figures in the charts above are calculated by excluding items that are not reflective of our cash operations and core business performance. As a result, these adjusted numbers are not calculated in accordance with U.S. GAAP. See "- Non-GAAP Financial Measures" below.

	Year Ended December 31,			Year Ended December 31,		
	2021	2020	Change	2020	2019	Change
Revenues:						
Origination technology	971	316	208 %	316	—	n/a
Closing solutions	310	238	30	238	135	76
Data and analytics	73	22	226	22	—	n/a
Other	53	19	185	19	4	n/a
Revenues	1,407	595	137	595	139	n/a
Other operating expenses	546	215	154	215	52	n/a
Acquisition-related transaction and integration costs	40	89	(56)	89	1	n/a
Depreciation and amortization	424	139	205	139	19	n/a
Operating expenses	1,010	443	128	443	72	n/a
Operating income	$ 397	$ 152	162 %	$ 152	$ 67	124 %

*Percentage changes in the table above deemed "n/a" are not meaningful due to the acquisition of Ellie Mae in September 2020.

Mortgage Technology Revenues

Our mortgage technology revenues are derived from our comprehensive, end-to-end U.S. residential mortgage platform. Our mortgage technology business enables greater workflow efficiency for customers focused on originating U.S. residential mortgage loans. Mortgage technology revenues increased $812 million or 137% in 2021 from 2020. Revenues from Ellie Mae following our September 2020 acquisition were $351 million in 2020.

- **Origination technology:** Our origination technology acts as a system of record for the mortgage transaction, automating the gathering, reviewing, and verifying of mortgage-related information and enabling automated enforcement of rules and business practices designed to help ensure that each completed loan transaction is of high quality and adheres to secondary market standards. These revenues are based on recurring Software as a Service, or SaaS, subscription fees, with an additive transaction-based or Success-Based Pricing fee as lenders exceed the number of loans closed that are included with their monthly base subscription.

  In addition, the ICE Mortgage Technology network provides originators connectivity to the mortgage supply chain and facilitates the secure exchange of information between our customers and a broad ecosystem of third-party service providers, as well as lenders and investors that are critical to consummating the millions of loan transactions that occur on our origination network each year. Revenue from the ICE Mortgage Technology network is largely transaction-based.

- **Closing solutions:** Our closing solutions uniquely connect key participants, such as lenders, title and settlement agents and individual county recorders, to digitize the traditionally manual and paper-based closing and recording process. Our closing solutions also include revenues from the MERS database, a leading system for recording and tracking changes in mortgage servicing rights and beneficial ownership interests in loans secured by U.S. residential real estate. Closing solutions revenues increased in 2021 from 2020 as a result of an increase in residential home sales, market share gains and increased demand and adoption of digital solutions. Revenues from closing solutions are largely transaction-based.

- **Data and Analytics**: Revenues include those related to ICE Mortgage Technology's Automation, Intelligence, Quality, or AIQ, offering, which applies machine learning and artificial intelligence, or AI, to the entire loan origination process, offering customers greater efficiency by streamlining data collection and validation through our automated document recognition and data extraction capabilities. AIQ revenues can be both recurring and transaction-based in nature. In addition, our data offerings include real-time industry and peer benchmarking tools, which provide originators a granular view into the real-time trends of nearly half the U.S. residential mortgage market. We also provide a Data as a Service, or DaaS, offering through private data clouds for lenders to access their own data and origination information. Revenues related to our data products are largely subscription-based and recurring in nature.

- **Other:** Other revenues include professional services fees, as well as revenues from ancillary products. Other revenues can be both recurring and transaction-based in nature.

The following chart summarizes our Mortgage Technology segment's operating expenses, operating income and operating margin (dollars in millions). See "- Consolidated Operating Expenses" below for a discussion of the significant changes in our operating expenses.

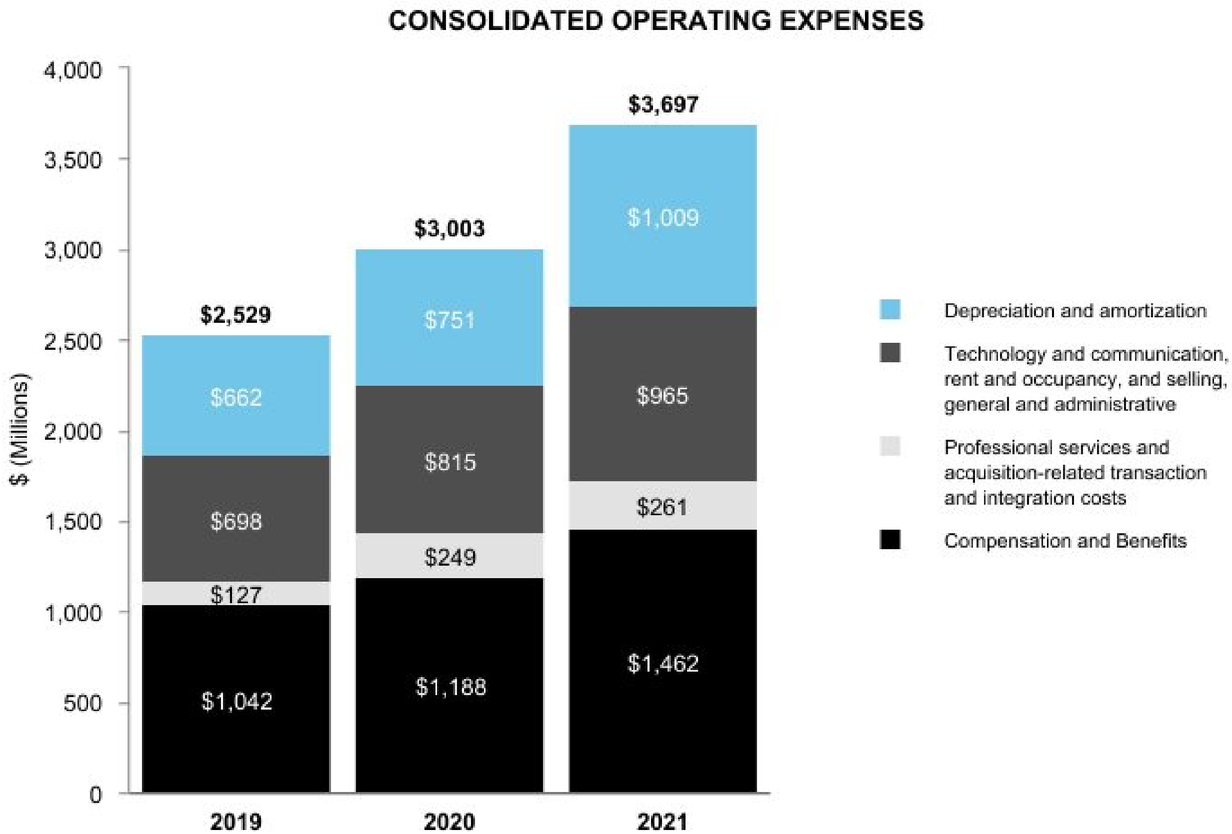
Mortgage Technology Segment:	Year Ended December 31,		Change	Year Ended December 31,		Change
	2021	2020		2020	2019	
Operating expenses	$ 1,010	$ 443	128 %	$ 443	$ 72	n/a
Adjusted operating expenses[1]	$ 602	$ 231	160 %	$ 231	$ 56	n/a
Operating income	$ 397	$ 152	162 %	$ 152	$ 67	124 %
Adjusted operating income[1]	$ 805	$ 364	122 %	$ 364	$ 83	n/a
Operating margin	28 %	25 %	3 pts	25 %	48 %	(23 pts)
Adjusted operating margin[1]	57 %	61 %	(4 pts)	61 %	59 %	2 pts

*Percentage changes in the table above deemed "n/a" are not meaningful due to the acquisition of Ellie Mae in September 2020.

(1) The adjusted figures exclude items that are not reflective of our ongoing core operations and business performance. These adjusted numbers are not calculated in accordance with GAAP. See “- Non-GAAP Financial Measures”

Consolidated Operating Expenses

The following presents our consolidated operating expenses (dollars in millions):



	Year Ended December 31,		Change	Year Ended December 31,		Change
	2021	2020		2020	2019	
Compensation and benefits	$ 1,462	$ 1,188	23 %	$ 1,188	$ 1,042	14 %
Professional services	159	144	10	144	125	15
Acquisition-related transaction and integration costs	102	105	(3)	105	2	n/a
Technology and communication	666	549	21	549	469	17
Rent and occupancy	84	81	3	81	68	19
Selling, general and administrative	215	185	16	185	161	15
Depreciation and amortization	1,009	751	34	751	662	13
Total operating expenses	$ 3,697	$ 3,003	23 %	$ 3,003	$ 2,529	19 %

*Percentage changes in the table above deemed "n/a" are not meaningful.

The majority of our operating expenses do not vary directly with changes in our volume and revenues, except for certain technology and communication expenses, including data acquisition costs, licensing and other fee-related arrangements and a portion of our compensation expense that is tied directly to our data sales or overall financial performance.

We expect our operating expenses to increase in absolute terms in future periods in connection with the growth of our business, and to vary from year-to-year based on the type and level of our acquisitions, our integrations and other investments.

In 2021 and 2020, 10% and 11%, respectively, of our operating expenses were incurred in pounds sterling or euros. Due to fluctuations in the U.S. dollar compared to the pound sterling and euro, our consolidated operating expenses were $22 million higher in 2021 than in 2020. See Item 7(A) "- Quantitative and Qualitative Disclosures About Market Risk - Foreign Currency Exchange Rate Risk" below for additional information.

Compensation and Benefits Expenses

Compensation and benefits expense is our most significant operating expense and includes non-capitalized employee wages, bonuses, non-cash or stock compensation, certain severance costs, benefits and employer taxes. The bonus component of our compensation and benefits expense is based on both our financial performance and individual employee performance. The performance-based restricted stock compensation expense is also based on our financial performance. Therefore, our compensation and benefits expense will vary year-to-year based on our financial performance and fluctuations in our number of employees. The below chart summarizes the significant drivers of our compensation and benefits expense results for the periods presented (dollars in millions, except employee headcount).

	Year Ended December 31,		Change
	2021	2020	
Employee headcount	8,858	8,890	— %
Stock-based compensation expenses	$ 155	$ 127	22 %

Employee headcount decreased in 2021 from 2020 primarily due to the deconsolidation of Bakkt, which was partially offset by increased hiring in 2021. Ellie Mae compensation and benefits expense was $174 million higher in 2021 than in 2020 due to our September 2020 acquisition. Bakkt compensation and benefits expense was $16 million higher in 2021 than in 2020 due to increases in employee headcount prior to deconsolidating Bakkt. In addition, compensation and benefits expense increased $67 million in 2021 from 2020 due to merit pay increases, above target performance-based compensation and higher employee insurance costs than in 2020 due to the impact of COVID-19. The stock-based compensation expenses in the table above relate to employee stock option and restricted stock awards.

Professional Services Expenses

Professional services expense includes fees for consulting services received on strategic and technology initiatives, temporary labor, as well as regulatory, legal and accounting fees, and may fluctuate as a result of changes in our use of these services in our business.

Professional services expenses increased in 2021 from 2020 primarily due to an increase of $26 million from Ellie Mae which was partially offset by lower legal expenses for 2021.

Acquisition-Related Transaction and Integration Costs

In 2021, we incurred $59 million in acquisition-related transaction costs related to the deconsolidation of Bakkt, which included $31 million non-cash compensation related to a market condition event triggered on the Bakkt equity incentive awards in connection with the merger of Bakkt and VIH. Additionally, we incurred $39 million in integration costs related to Ellie Mae.

We expect to continue to explore and pursue various potential acquisitions and other strategic opportunities to strengthen our competitive position and support our growth. As a result, we may incur acquisition-related transaction costs in future periods.

Technology and Communication Expenses

Technology support services consist of costs for running our wholly-owned data centers, hosting costs paid to third-party data centers, and maintenance of our computer hardware and software required to support our technology and cybersecurity. These costs are driven by system capacity, functionality and redundancy requirements. Communication expenses consist of costs for network connections for our electronic platforms and telecommunications costs.

Technology and communications expense also includes fees paid for access to external market data, licensing and other fee agreement expenses. Technology and communications expenses may be impacted by growth in electronic contract volume, our capacity requirements, changes in the number of telecommunications hubs and connections with customers to access our electronic platforms directly.

Technology and communications expenses increased by $117 million in 2021 from 2020, primarily due to the inclusion of Ellie Mae expenses, which were $87 million higher in 2021 than in 2020. In addition, technology and communications expenses increased by $24 million in 2021 from 2020 due to increased license fees and data acquisition costs.

Rent and Occupancy Expenses

Rent and occupancy expense relates to leased and owned property and includes rent, maintenance, real estate taxes, utilities and other related costs. We have significant operations located in the U.S., U.K., and India, with smaller offices located throughout the world.

Rent and occupancy expenses includes the expenses of Ellie Mae, which increased $6 million in 2021 from 2020. These expenses were partially offset by a reduction in other occupancy expenses in 2021 and the early termination of our NYSE Chicago office lease in 2020. See Item 2 "- Properties" above for additional information regarding our leased and owned property.

Selling, General and Administrative Expenses

Selling, general and administrative expenses include marketing, advertising, public relations, insurance, bank service charges, dues and subscriptions, travel and entertainment, non-income taxes and other general and administrative costs.

Selling, general and administrative expenses increased in 2021 from 2020, primarily due to the inclusion of $13 million of Ellie Mae expenses and $12 million of Bakkt expenses related to the launch of Bakkt's digital wallet, Bakkt App. In addition, marketing expenses increased $19 million in 2021 from 2020 primarily due to a higher number of NYSE initial public offerings, or IPOs, which were partially offset by a charitable contribution in support of COVID-19 relief efforts of $10 million and an $8 million regulatory settlement accrual in 2020.

Depreciation and Amortization Expenses

Depreciation and amortization expense results from depreciation of long-lived assets such as buildings, leasehold improvements, aircraft, hardware and networking equipment, software, furniture, fixtures and equipment over their estimated useful lives. This expense includes amortization of intangible assets obtained in our acquisitions of businesses, as well as on various licensing agreements, over their estimated useful lives. Intangible assets subject to amortization consist primarily of customer relationships, trading products with finite lives and technology. This expense also includes amortization of internally-developed and purchased software over its estimated useful life.

We recorded amortization expenses on intangible assets acquired as part of our acquisitions, as well as on other intangible assets, of $622 million and $388 million in 2021 and 2020, respectively. The increase in 2021 over 2020 was primarily due to an increase in the amortization of Ellie Mae intangible assets of $246 million.

We recorded depreciation expenses on our fixed assets of $387 million and $363 million in 2021 and 2020, respectively. The increase in 2021 over 2020 was primarily due to an increase in the depreciation of Ellie Mae fixed assets of $31 million, partially offset by a software impairment charge of $11 million in 2020 related to a portion of customized software developed at Bakkt that was no longer useful.

Consolidated Non-Operating Income (Expense)

Income and expenses incurred through activities outside of our core operations are considered non-operating. The following tables present our non-operating income (expenses) (dollars in millions):

	Year Ended December 31,			Year Ended December 31,		
	2021	2020	Change	2020	2019	Change
Other income (expense):						
Interest income	$ 1	$ 10	(93) %	$ 10	$ 35	(71) %
Interest expense	(423)	(357)	19	(357)	(285)	25
Other income, net	2,671	80	n/a	80	58	38
Total other income (expense), net	$ 2,249	$ (267)	n/a	$ (267)	$ (192)	39 %
Net income attributable to non-controlling interest	$ (11)	$ (19)	(44) %	$ (19)	$ (27)	(27) %

Interest Income

Interest income decreased in 2021 from 2020 primarily due to a decrease in short-term interest rates on various investments.

Interest Expense

Interest expense increased in 2021 from 2020 primarily due to the issuance of senior notes in May 2020 to refinance existing debt, the issuance of senior notes in August 2020 related to the Ellie Mae acquisition, and $4 million in accelerated unamortized costs related to the early redemption in September 2021 of the floating rate notes due June 2023, partially offset by a $14 million extinguishment payment we incurred related to the June 2020 early redemption of senior notes with an original maturity of December 1, 2020, or the December 2020 Senior Notes, and $5 million pre-acquisition interest expense on debt issued for Ellie Mae acquisition. See “- Debt” below.

Other income (expense), net

During 2021, Bakkt completed its merger with VIH, which resulted in an initial 68% economic interest, and we recorded a gain of $1.4 billion as other income upon our deconsolidation of Bakkt. Following the merger, we show our economic interest share of estimated Bakkt profits/(losses) as equity earnings, which are also included in other income (expense), net. We recorded other expense of ($92 million) related to our Bakkt investment for the post-merger period during 2021.

During 2021, Coinbase completed an IPO and we sold our investment in Coinbase for $1.2 billion, and recorded a gain of $1.2 billion as other income.

During 2021, we recorded a gain of $7 million related to the settlement of an acquisition-related indemnification claim from a prior acquisition as other income. In addition, we accrued approximately $16 million related to a legal settlement. In 2020, we recorded an accrual for potential legal settlements of $30 million as other income.

We own a 40% interest in the Options Clearing Corporation, or OCC, which we treat as an equity method investment. OCC is regulated by the SEC and the CFTC. We recognized $51 million and $71 million of equity earnings as our share of OCC's estimated profits during 2021 and 2020, respectively, which is included in other income. Refer to Note 4 to our consolidated financial statements, included in this Annual Report for additional details on our OCC investment.

In connection with our equity investment in Euroclear, we recognized dividend income of $60 million in 2021 and $19 million in 2019, included in other income. As a result of a 2020 European regulation limiting dividend payments, we did not receive a Euroclear dividend in 2020, but we received two dividend payments during 2021. In addition, in both September 2021 and in November 2020 we became aware of observable price changes in orderly transactions of similar Euroclear investments by third parties. The transactions resulted in fair value adjustments of our Euroclear investment, and we recorded gains of $34 million and $35 million in other income in 2021 and 2020, respectively, including the impacts of foreign currency exchange.

We historically held a 9% ownership interest in BIDS, a registered broker-dealer and the operator of the BIDS Alternative Trading System. In December 2020, we sold our investment in BIDS to Cboe and recorded a gain on the sale of $20 million, included in other income.

We incurred foreign currency transaction losses of $13 million and $5 million in 2021 and 2020, respectively. This was primarily attributable to the fluctuations of the pound sterling and euro relative to the U.S. dollar. Foreign currency transaction gains and losses are recorded in other income (expense), net, when the settlement of foreign currency assets, liabilities and payables occur in non-functional currencies and there is an increase or decrease in the period-end foreign currency exchange rates between periods. See Item 7A "- Quantitative and Qualitative Disclosures About Market Risk - Foreign Currency Exchange Rate Risk" included elsewhere in this Annual Report for more information on these items.

In connection with our adoption of Accounting Standards Update, or ASU, 2017-07, *Compensation Retirement Benefits: Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost*, or ASU 2017-07, we are recognizing the other components of net benefit cost of our defined benefit plans in the income statement as non-operating income on a full retrospective basis. The combined net periodic expense of these plans was $3 million and $6 million in 2021 and 2020, respectively.

Non-controlling Interest

For consolidated subsidiaries in which our ownership is less than 100%, and for which we have control over the assets, liabilities and management of the entity, the outside stockholders' interests are shown as non-controlling interests. As of December 31, 2021, our non-controlling interests include those related to the non-ICE limited partners' interest in our CDS clearing subsidiaries and non-controlling interest in ICE Futures Abu Dhabi. Prior to completion of the Bakkt transaction on October 15, 2021, our non-controlling interest also included the redeemable non-controlling interest of the non-ICE partners in Bakkt, as discussed further below.

The non-ICE limited partners of our CDS clearing subsidiaries hold a 26.7% ownership interest as of December 31, 2021. In addition, during 2020 we received a contribution from a group of minority investors for a non-controlling interest in ICE Futures Abu Dhabi.

As of December 31, 2020, minority interests related to Bakkt were reflected as redeemable non-controlling interests in temporary equity within our consolidated balance sheet. On October 15, 2021, Bakkt completed its merger with VIH and as of December 31, 2021, we no longer hold redeemable non-controlling interest related to Bakkt. Refer to Note 3 to our consolidated financial statements contained elsewhere in this Annual Report.

Consolidated Income Tax Provision

Consolidated income tax expense was $1.6 billion and $658 million in 2021 and 2020, respectively. The change in consolidated income tax expense between years is primarily due to the tax impact of changes in our pre-tax income and the changes in our effective tax rate. The consolidated income tax expense for 2021 was elevated due to the tax expense associated with the gains resulting from our Coinbase and Bakkt transactions.

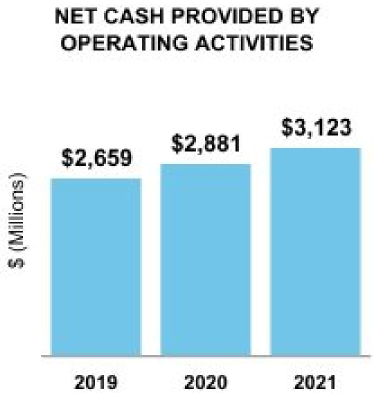
Our effective tax rate was 29% and 24% in 2021 and 2020, respectively. The effective tax rate for 2021 is higher than the effective tax rate for 2020 primarily due to the deferred income tax impacts from the U.K. tax law changes as well as the Bakkt transaction. In June 2021, the U.K. enacted a corporate income tax rate increase from 19% to 25% effective April 1, 2023.

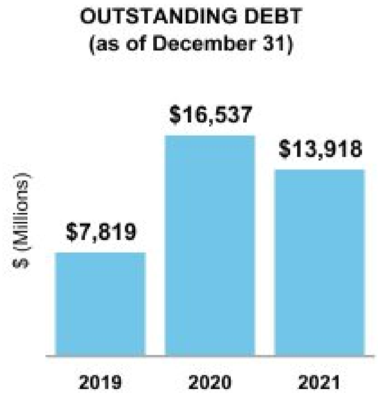
On March 27, 2020, the CARES Act was enacted and certain income tax related relief was provided under the CARES Act. On March 11, 2021, the American Rescue Plan Act, or ARPA, was signed into law. The ARPA enacted certain provisions that are relevant to corporate income tax. On November 15, 2021, the Infrastructure Investment and Jobs Act was signed into law. These provisions did not have a material impact on our income tax provision for 2021 or 2020.

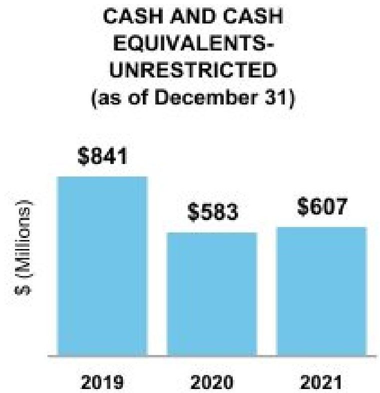
See Note 13 to our consolidated financial statements and related notes, which are included in this Annual Report, for additional information on these tax items.

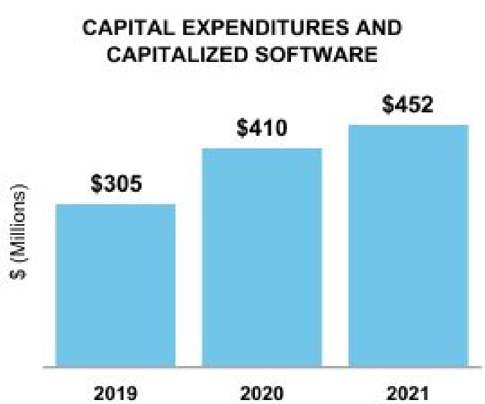
Liquidity and Capital Resources

Below are charts that reflect our outstanding debt and capital allocation. The acquisition and integration costs in the chart below include cash paid for acquisitions, net of cash received for divestitures, cash paid for equity and equity method investments, cash paid for non-controlling interest and redeemable non-controlling interest, and acquisition-related transaction and integration costs, in each year.









We have financed our operations, growth and cash needs primarily through income from operations and borrowings under our various debt facilities. Our principal capital requirements have been to fund capital expenditures, working capital, strategic acquisitions and investments, stock repurchases, dividends and the development of our technology platforms. We believe that our cash on hand and cash flows from operations will be sufficient to repay our outstanding debt, but we may also need to incur additional debt or issue additional equity securities in the future. See "- Future Capital Requirements" below.

See "- Cash Flow" below for a discussion of our capital expenditures and capitalized software development costs.

Consolidated cash and cash equivalents were $607 million and $583 million as of December 31, 2021 and 2020, respectively. We had $1.4 billion in short-term and long-term restricted cash and cash equivalents as of both December 31, 2021 and 2020. We had $145.9 billion and $81.6 billion of cash and cash equivalent margin deposits and guaranty funds as of December 31, 2021 and 2020, respectively.

As of December 31, 2021, the amount of unrestricted cash held by our non-U.S. subsidiaries was $400 million. Due to U.S. tax reform, the majority of our foreign earnings since January 1, 2018 have been subject to immediate U.S. income taxation, and the existing non-U.S. unrestricted cash balance can be distributed to the U.S. in the future with no material additional income tax consequences.

Our cash and cash equivalents and financial investments are managed as a global treasury portfolio of non-speculative financial instruments that are readily convertible into cash, such as overnight deposits, term deposits, money market funds, mutual funds for treasury investments, short duration fixed income investments and other money market instruments, thus ensuring high liquidity of financial assets. We may invest a portion of our cash in excess of short-term operating needs in investment-grade marketable debt securities, including government or government-sponsored agencies and corporate debt securities. As of December 31, 2021, we held $13 million of unrestricted cash that was set aside for legal, regulatory and surveillance operations at NYSE.

Cash Flow

The following table presents the major components of net changes in cash, cash equivalents, and restricted cash and cash equivalents (in millions):

	Year Ended December 31,		
	2021	2020	2019
Net cash provided by (used in):			
Operating activities	$ 3,123	$ 2,881	$ 2,659
Investing activities	(786)	(10,361)	(1,740)
Financing activities	62,026	26,000	(424)
Effect of exchange rate changes	(6)	8	4
Net increase in cash, cash equivalents, restricted cash and cash equivalents, and cash and cash equivalent margin deposits and guaranty funds	$ 64,357	$ 18,528	$ 499

Operating Activities

Net cash provided by operating activities primarily consists of net income adjusted for certain items, including depreciation and amortization, deferred taxes, stock based compensation and the effects of changes in working capital.

The $242 million increase in net cash provided by operating activities in 2021 from 2020 was driven by an increase of accounts receivable collections of $144 million, primarily due to a prior period COVID-19-related decision to allow customers to defer payment of their 2020 listings invoices. In addition, operating cash increased due to a $2.0 billion increase in net income, adjusted for depreciation and amortization, deferred taxes, the gain from the sale of our Coinbase investment, net of taxes, of $892 million, and the gain from the deconsolidation of Bakkt, of $1.4 billion. These increases were partially offset by a decrease in Section 31 fee collections of $219 million, primarily due to lower rates, which were revised in February of each year. The remaining change is due to fluctuations in our working capital and the timing of various payments such as transaction-related expenses and taxes payable on the sale of our Coinbase investment.

Investing Activities

Consolidated net cash used in investing activities in 2021 primarily relates to $5.1 billion purchases of invested margin deposits, $179 million of capitalized expenditures, $273 million of software development costs, $117 million for the purchase of an equity method investment and $66 million cash paid for acquisitions, net of cash acquired, partially offset by $3.7 billion of proceeds from the sale of invested margin deposits and $1.2 billion in proceeds from the sale of our Coinbase investment. Consolidated net cash used in investing activities in 2020 relates to $9.4 billion cash paid for acquisitions, primarily Ellie Mae, net of cash acquired, $3.4 billion purchases of invested margin deposits, $207 million of capitalized expenditures and $203 million of software development costs, partially offset by $2.8 billion proceeds from the sale of invested margin deposits.

The capital expenditures primarily relate to hardware and software purchases to continue the development and expansion of our electronic platforms, data services and clearing houses and leasehold improvements. The software development expenditures primarily relate to the development and expansion of our electronic trading platforms, data services, mortgage services and clearing houses.

Financing Activities

Consolidated net cash provided by financing activities in 2021 primarily relates to an increase in our cash and cash equivalent margin deposits and guaranty fund balances of $65.7 billion, partially offset by $1.2 billion in repayments of debt facilities, $1.4 billion in net repayments under our Commercial Paper Program, $250 million in repurchases of common stock, $747 million in dividend payments to our stockholders and $70 million in cash payments related to treasury shares received for restricted stock tax payments and stock options exercises.

Consolidated net cash provided by financing activities in 2020 primarily relates to an increase in our cash and cash equivalent margin deposits and guaranty fund balances of $19.3 billion, $9.6 billion in net proceeds from the issuance of the May 2020 Notes and the August 2020 Notes, borrowings under a term loan facility and $1.1 billion in net issuances under our Commercial Paper Program. Cash provided by financing activities was partially offset by repayments of our $1.25 billion December 2020 Senior Notes, and the early payoff of the term loan mentioned above, $1.2 billion in repurchases of common stock, $669 million in dividend payments to stockholders and $74 million in cash payments related to treasury shares received for restricted stock tax payments and stock options exercises.

We have adjusted our historical presentation of opening and ending amounts of cash, cash equivalents, and restricted cash and cash equivalents in our consolidated statements of cash flows to include cash and cash equivalent margin deposits and guaranty funds. Changes in these balances are reflected as cash provided by/(used in) financing activities.

See Note 10 to our consolidated financial statements, included in this Annual Report.

Debt

As of December 31, 2021, we had $13.9 billion in outstanding debt, consisting of $12.9 billion of fixed rate senior notes, $1.0 billion under our U.S. dollar commercial paper program, or the Commercial Paper Program and $10 million under credit lines at our ICE India subsidiaries. Our fixed rate senior notes of $12.9 billion have a weighted average maturity of 15 years and a weighted average cost of 2.9% per annum. The commercial paper notes had original maturities ranging from three to 73 days as of December 31, 2021, with a weighted average interest rate of 0.33% per annum, and a weighted average remaining maturity of 26 days.

As of December 31, 2020, we had $16.5 billion in outstanding debt, consisting of $12.9 billion of fixed rate senior notes, $1.2 billion of floating rate senior notes, $2.4 billion under the Commercial Paper Program and $6 million under credit lines at our ICE India subsidiaries. Our fixed rate senior notes of $12.9 billion had a weighted average maturity of 16 years and a weighted average cost of 3.0% per annum. The commercial paper notes had original maturities ranging from four to 266 days as of December 31, 2020, with a weighted average interest rate of 0.40% per annum, and a weighted average remaining maturity of 82 days.

In September 2021, we used the proceeds from commercial paper issuances and cash on hand to fund the redemption of $1.25 billion aggregate principal amount of senior floating rate notes due in June 2023, or the Floating Rate Notes. We delivered a notice of redemption of the Floating Rate Notes to Wells Fargo Bank, National Association, as trustee, under the indenture governing the Floating Rate Notes, which was delivered to the holders of the Floating Rate Notes on September 17, 2021, and they were subsequently redeemed on September 27, 2021. In connection with this redemption, we recorded $4 million in accelerated unamortized deferred loan costs, which are included in interest expense in our consolidated statements of income for 2021.

We have a $3.8 billion senior unsecured revolving credit facility, or the Credit Facility, pursuant to a credit agreement with Wells Fargo Bank, N.A., as primary administrative agent, issuing lender and swing-line lender, Bank of America, N.A., as syndication agent, backup administrative agent and swing-line lender, and the lenders party thereto. As of December 31, 2021, of the $3.8 billion that is currently available for borrowing under the Credit Facility, $1.0 billion is required to back-stop the amount outstanding under our Commercial Paper Program and $171 million is required to support certain broker-dealer and other subsidiary commitments. The amount required to backstop the amounts outstanding under the Commercial Paper Program will fluctuate as we increase or decrease our commercial paper borrowings. The remaining $2.6 billion is available for working capital and general corporate purposes, including, but not limited to, acting as a backstop to future increases in the amounts outstanding under the Commercial Paper Program. On October 15, 2021, we agreed with the lenders to extend the maturity date of the Credit Facility to October 15, 2026, among other items.

On August 21, 2020, we entered into a $750 million 18-month senior unsecured delayed draw term loan facility with a maturity date of February 21, 2022. We borrowed in full under the facility on September 3, 2020 and the proceeds were used to fund a portion of the purchase price for the Ellie Mae acquisition. We had the option to prepay the facility in whole or in part at any time and paid off the full balance of the loan on December 16, 2020. Interest on borrowings under this term loan facility were based on the principal amount outstanding at LIBOR plus an applicable margin, which was equal to 1.125%.

On August 20, 2020, we issued $6.5 billion in aggregate principal amount of new senior notes, comprised of $1.25 billion in aggregate principal amount of floating rate senior notes due in 2023, $1.0 billion in aggregate principal amount of 0.70% senior notes due in 2023, $1.5 billion in aggregate principal amount of 1.85% senior notes due in 2032, $1.25 billion in aggregate principal amount of 2.65% senior notes due in 2040, and $1.5 billion in aggregate principal amount of 3.00% senior notes due in 2060. We used the net proceeds from the offering to fund a portion of the purchase price for the Ellie Mae acquisition.

On May 26, 2020, we issued $2.5 billion in aggregate principal amount of new senior notes, comprised of $1.25 billion in aggregate principal amount of 2.10% senior notes due in 2030 and $1.25 billion in aggregate principal amount of 3.00% senior notes due in 2050. We used the net proceeds from the offering for general corporate purposes, including to fund the redemption of our $1.25 billion aggregate principal amount of 2.75% senior notes due in December 2020 and to pay down a portion of our commercial paper outstanding.

Our Commercial Paper Program enables us to borrow efficiently at reasonable short-term interest rates and provides us with the flexibility to de-lever using our strong annual cash flows from operating activities whenever our leverage becomes elevated as a result of investment or acquisition activities. We had net repayments of $1.4 billion under our Commercial Paper Program during 2021. We used $1.2 billion of proceeds received from the sale of our Coinbase investment to pay down the balance under our Commercial Paper Program.

Upon maturity of our commercial paper and to the extent old issuances are not repaid by cash on hand, we are exposed to the rollover risk of not being able to issue new commercial paper. To mitigate this risk, we maintain the Credit Facility for an aggregate amount which meets or exceeds the amount issued under our Commercial Paper Program at any time. If we were not able to issue new commercial paper, we have the option of drawing on the backstop revolving facility. However, electing to do so would result in higher interest expense.

For additional details of our debt instruments, refer to Note 10 to our consolidated financial statements, included in this Annual Report.

Capital Return

In December 2019, our Board approved an aggregate of $2.4 billion for future repurchases of our common stock with no fixed expiration date that became effective January 1, 2020.

During 2021, we repurchased 1.8 million shares of our outstanding common stock at a cost of $250 million on the open market. During 2020, we repurchased 13.6 million shares of our outstanding common stock at a cost of $1.2 billion, including 10.4 million shares at a cost of $948 million under our Rule 10b5-1 trading plan and 3.2 million shares at a cost of $299 million on the open market. Shares repurchased are held in treasury stock.

We discontinued stock repurchases and terminated our Rule 10b5-1 trading plan in August 2020 in connection with our Ellie Mae acquisition and in November 2021, we resumed repurchases. The remaining balance of Board approved funds for future repurchases as of December 31, 2021 was $903 million. In December 2021, our Board approved an aggregate of $3.15 billion for future repurchases of our common stock with no fixed expiration date that became effective January 1, 2022. The $3.15 billion replaces the previous amount approved by the Board. In December 2021 we entered into a new Rule 10b5-1 trading plan that will become effective in February 2022. We may discontinue stock repurchases at any time and may amend or terminate a Rule 10b5-1 trading plan at any time. The approval of our Board for the stock repurchases does not obligate us to acquire any particular amount of our common stock. In addition, our Board may increase or decrease the amount available for repurchases from time to time.

From time to time, we enter into Rule 10b5-1 trading plans, as authorized by our Board, to govern some or all of the repurchases of our shares of common stock. We expect funding for any stock repurchases to come from our operating cash flow or borrowings under our Commercial Paper Program or our debt facilities. The timing and extent of future repurchases that are not made pursuant to a Rule 10b5-1 trading plan will be at our discretion and will depend upon many conditions. In making a determination regarding any stock repurchases, management considers multiple factors, including overall stock market conditions, our common stock price performance, the remaining amount authorized for repurchases by our Board, the potential impact of a stock repurchase program on our corporate debt ratings, our expected free cash flow and working capital needs, our current and future planned strategic growth initiatives, and other potential uses of our cash and capital resources.

During 2021, we paid cash dividends of $1.32 per share of our common stock in the aggregate, including quarterly dividends of $0.33 per share, for an aggregate payout of $747 million, which includes the payment of dividend equivalents on unvested employee restricted stock units. Refer to Note 12 to our consolidated financial statements included in this Annual Report, for details on the amounts of our quarterly dividend payouts for the last three years.

Future Capital Requirements

Our future capital requirements will depend on many factors, including the rate of growth across our segments, strategic plans and acquisitions, available sources for financing activities, required and discretionary technology and clearing initiatives, regulatory requirements, the timing and introduction of new products and enhancements to existing products, the geographic mix of our business and potential stock repurchases.

We currently expect to incur capital expenditures (including operational and real estate capital expenditures) and to incur software development costs that are eligible for capitalization ranging in the aggregate between $490 million and $520 million in 2022, which we believe will support the enhancement of our technology, business integration and the continued growth of our businesses.

As of December 31, 2021, we had $903 million authorized for future repurchases of our common stock. Refer to Note 12 to our consolidated financial statements included in this Annual Report for additional details on our stock repurchase program.

Our Board has adopted a quarterly dividend policy providing that dividends will be approved quarterly by the Board or the Audit Committee taking into account factors such as our evolving business model, prevailing business conditions, our current and future planned strategic growth initiatives and our financial results and capital requirements, without a predetermined net income payout ratio. For the first quarter of 2022, we announced a $0.38 per share dividend payable on March 31, 2022 to stockholders of record as of March 17, 2022.

Other than the facilities for the ICE Clearing Houses, our Credit Facility and our Commercial Paper Program are currently the only significant agreements or arrangements that we have for liquidity and capital resources with third parties. See Notes 10 and 14 to our consolidated financial statements for further discussion. In the event of any strategic acquisitions, mergers or investments, or if we are required to raise capital for any reason or desire to return capital to our stockholders, we may incur additional debt, issue additional equity to raise necessary funds, repurchase additional shares of our common stock or pay a dividend. However, we cannot provide assurance that such financing or transactions will be available or successful, or that the terms of such financing or transactions will be favorable to us. See “-Risk Factors" and Note 10 to our consolidated financial statements, included in this Annual Report.

Non-GAAP Measures

We use certain financial measures internally to evaluate our performance and make financial and operational decisions that are presented in a manner that adjusts from their equivalent GAAP measures or that supplement the information provided by our GAAP measures. We use these adjusted results because we believe they more clearly highlight trends in our business that may not otherwise be apparent when relying solely on GAAP financial measures, since these measures eliminate from our results specific financial items that have less bearing on our core operating performance.

We use these measures in communicating certain aspects of our results and performance, including in this Annual Report, and believe that these measures, when viewed in conjunction with our GAAP results and the accompanying reconciliation, can provide investors with greater transparency and a greater understanding of factors affecting our financial condition and results of operations than GAAP measures alone. In addition, we believe the presentation of these measures is useful to investors for making period-to-period comparisons of results because the adjustments to GAAP are not reflective of our core business performance.

These financial measures are not presented in accordance with, or as an alternative to, GAAP financial measures and may be different from non-GAAP measures used by other companies. We encourage investors to review the GAAP financial measures included in this Annual Report, including our consolidated financial statements, to aid in their analysis and understanding of our performance and in making comparisons.

The table below outlines our adjusted operating expenses, adjusted operating income, adjusted operating margin, adjusted net income attributable to ICE common stockholders and adjusted earnings per share, which are non-GAAP measures that are calculated by making adjustments for items we view as not reflective of our cash operations and core business performance. These measures, including the adjustments and their related income tax effect and other tax adjustments (in millions, except for percentages and per share amounts), are as follows:

	Exchanges Segment			Fixed Income and Data Services Segment			Mortgage Technology Segment			Consolidated		
	Year Ended December 31,			Year Ended December 31,			Year Ended December 31,			Year Ended December 31,		
	2021	2020	2019	2021	2020	2019	2021	2020	2019	2021	2020	2019
Total revenues, less transaction-based expenses	$ 3,856	$ 3,631	$ 3,307	$ 1,883	$ 1,810	$ 1,756	$ 1,407	$ 595	$ 139	$ 7,146	$ 6,036	$ 5,202
Operating expenses	1,333	1,242	1,140	1,354	1,318	1,317	1,010	443	72	3,697	3,003	2,529
Less: Amortization of acquisition-related intangibles	73	74	68	180	191	225	369	123	16	622	388	309
Less: Transaction and integration costs and acquisition-related success fees	59	12	—	—	—	—	39	89	—	98	101	—
Less: Impairment of developed software	—	11	—	—	—	—	—	—	—	—	11	—
Less: Impairment of exchange registration intangible assets on ICE Futures Singapore	—	—	31	—	—	—	—	—	—	—	—	31
Less: Accrual relating to a regulatory settlement	—	—	—	—	8	—	—	—	—	—	8	—
Adjusted operating expenses	$ 1,201	$ 1,145	$ 1,041	$ 1,174	$ 1,119	$ 1,092	$ 602	$ 231	$ 56	$ 2,977	$ 2,495	$ 2,189
Operating income	$ 2,523	$ 2,389	$ 2,167	$ 529	$ 492	$ 439	$ 397	$ 152	$ 67	$ 3,449	$ 3,033	$ 2,673
Adjusted operating income	$ 2,655	$ 2,486	$ 2,266	$ 709	$ 691	$ 664	$ 805	$ 364	$ 83	$ 4,169	$ 3,541	$ 3,013
Operating margin	65 %	66 %	66 %	28 %	27 %	25 %	28 %	25 %	48 %	48 %	50 %	51 %
Adjusted operating margin	69 %	68 %	69 %	38 %	38 %	38 %	57 %	61 %	59 %	58 %	59 %	58 %
Net income attributable to ICE common stockholders										$ 4,058	$ 2,089	$ 1,933
Add: Amortization of acquisition-related intangibles										622	388	309
Add: Transaction and integration costs and acquisition-related success fees										98	101	—
Less: Gain on value of Euroclear equity investment										(34)	(35)	—
Less: Gain on sale of Coinbase equity investment										(1,227)	—	—
Less: Gain on deconsolidation of Bakkt										(1,419)	—	—
Less: Gain on sale of BIDS equity investment										—	(20)	—
Less: Gain related to the settlement of an acquisition-related indemnification claim										(7)	—	—
Add: Accelerated unamortized costs related to the early payoff of the June 2023 floating rate senior notes										4	—	—
Add: Extinguishment of December 2020 Senior Notes										—	14	—
Add: Pre-acquisition interest expense on debt issued for Ellie Mae acquisition										—	5	—
Add: Impairment of developed software										—	11	—
Add: Impairment of CAT promissory notes										—	2	16
Add: Impairment of exchange registration intangible assets on ICE Futures Singapore										—	—	31
Add: Accrual relating to legal settlement										16	30	—
Add: Accrual relating to regulatory settlement										—	8	—
Add/(Less): Net losses/(income) from unconsolidated investees										42	(71)	(62)
Add/(Less): Income tax effect for the above items										574	(109)	(80)
Add/(Less): Deferred tax adjustments on acquisition-related intangibles										183	36	(8)
Add: Other tax adjustments										—	—	3
Adjusted net income attributable to ICE common stockholders										$ 2,910	$ 2,449	$ 2,142
Basic earnings per share attributable to ICE common stockholders										$ 7.22	$ 3.79	$ 3.44
Diluted earnings per share attributable to ICE common stockholders										$ 7.18	$ 3.77	$ 3.42
Adjusted basic earnings per share attributable to ICE common stockholders										$ 5.17	$ 4.44	$ 3.82
Adjusted diluted earnings per share attributable to ICE common stockholders										$ 5.15	$ 4.41	$ 3.79
Basic weighted average common shares outstanding										562	552	561
Diluted weighted average common shares outstanding										565	555	565

Amortization of acquisition-related intangibles are included in non-GAAP adjustments as excluding these non-cash expenses provides greater clarity regarding our financial strength and stability of cash operating results.

Transaction and integration costs are included as part of our core business expenses, except for those that are directly related to the announcement, closing, financing or termination of a transaction. However, we adjust for the acquisition-related transaction and integration costs relating to acquisitions such as Ellie Mae given the magnitude of the $11.4 billion purchase price of the acquisition. We also adjust for the acquisition-related transaction costs related to the merger of Bakkt and VIH due to the significance of the transaction. In 2020, we also included a $10 million adjustment for Bridge2 Solutions acquisition costs resulting from a Bakkt incentive award market condition estimation adjustment as an acquisition-related success fee. This adjustment was directly related to the March 2020 capital call to fund the acquisition of Bridge2 Solutions and we believe is therefore appropriate since we exclude costs directly related to the success of a transaction.

In 2021, we recorded a $1.2 billion gain on the sale of our Coinbase equity investment and a $1.4 billion gain on the deconsolidation of Bakkt. We do not consider these items to be part of our core business operations.

Effective January 1, 2021, we exclude net income from our unconsolidated equity method investees for purposes of calculating non-GAAP measures and have retroactively restated the prior-year periods for comparability purposes. For 2021, this adjustment includes our share of net income from OCC, BondLink, and Bakkt (from the period of the Bakkt merger on October 15, 2021 through December 31, 2021). This is consistent with how we treat changes in the fair value of our equity investments. We believe these adjustments provide greater clarity of our performance given that equity investments are non-cash and not a part of our core operations.

In addition, we also include the following items as non-GAAP adjustments, as each of these are not considered a part of our core business operations:

- 2021: The $34 million gain on the fair value adjustment of our Euroclear equity investment;
- 2021: The $7 million gain related to the settlement of an acquisition-related indemnification claim;
- 2021: Accrual of $16 million relating to a legal settlement;
- 2021: The acceleration of unamortized costs of $4 million related to the September 2021 early redemption of our Floating Rate Notes;
- 2020: The $11 million impairment of software developed at Bakkt when it was our subsidiary since it relates to the build-out of a fundamental software design vs. a recurring upgrade;
- 2020: Accrual of $30 million relating to a legal settlement;
- 2020: Accrual of $8 million relating to a regulatory settlement;
- 2020: The $35 million gain on the fair value adjustment of our Euroclear equity investment;
- 2020: The extinguishment payment of $14 million related to the June 2020 early redemption of the December 2020 Senior Notes which had an original maturity of December 1, 2020, as a result of our new senior notes offering in May 2020. This included both a make-whole redemption payment and duplicative interest;
- 2020: The $20 million gain on the sale of our BIDS equity investment;
- 2020: Pre-acquisition interest expense of $5 million on the August 2020 debt issued to fund a portion of the purchase price of our Ellie Mae acquisition;
- 2020: Promissory note impairment charges of $2 million on work performed by the original plan processor on the CAT as non-GAAP adjustments (this was in addition to the 2019 accrual of $16 million for the same item). See additional discussion on the CAT in Item 1(A) "-Risk Factors" in this Annual Report;
- 2019: Impairment of exchange registration intangible assets of $31 million at ICE Futures Singapore. This non-cash impairment was a result of the estimated fair value of an acquired intangible asset falling below its carrying value. See Note 8 to our consolidated financial statements, included in this Annual Report.

The tax items in non-GAAP adjustments are either the tax impacts of the pre-tax non-GAAP adjustments or tax items as described below that are not in the normal course of business and are not indicative of our core business performance. The following tax-related items are included as non-GAAP adjustments:

- Deferred tax adjustments on acquisition-related intangibles, including the impact of U.K. and U.S. state tax law changes and apportionment updates, as well as other foreign tax law changes which resulted in deferred tax expense/(benefit) of $183 million, $36 million and ($8 million) in 2021, 2020 and 2019, respectively. The deferred tax adjustments in 2021 relate primarily to the U.K. tax law changes enacted in June 2021, which increased the U.K. corporate income tax rate from 19% to 25% effective April 1, 2023. The deferred tax adjustments in 2020 were due to the tax law changes enacted in July 2020, which increased the U.K. corporate income tax rate from 17% to 19% effective April 1, 2020, as well as impacts of U.S. state apportionment charges.
- Other tax adjustments of $3 million in 2019 for audit settlement payments primarily related to pre-acquisition tax matters in connection with our acquisition of NYSE in 2013.

For additional information on these items, refer to our consolidated financial statements included in this Annual Report and "- Recent Developments," "- Consolidated Operating Expenses", "- Consolidated Non-Operating Income (Expenses)" and "-Consolidated Income Tax Provision" above.

Off-Balance Sheet Arrangements

As described in Note 14 to our consolidated financial statements, which are included elsewhere in this Annual Report, certain clearing house collateral is reported off-balance sheet. We do not have any relationships with unconsolidated entities or financial partnerships, often referred to as structured finance or special purpose entities.

Contractual Obligations and Commercial Commitments

We intend to fund our contractual obligations and commercial commitments from existing cash and cash flow from operations. As of December 31, 2021, our primary cash requirements include the following contractual and other obligations.

As of December 31, 2021, we had $13.9 billion in outstanding debt, including $1.5 billion of short-term debt. Our outstanding debt consists of $12.9 billion of fixed rate senior notes, $1.0 billion under our U.S. dollar commercial paper program, or the Commercial Paper Program and $10 million under credit lines at our ICE India subsidiaries.

Our operating leases primarily relate to our leased office space and data center facilities, and as of December 31, 2021, we had fixed lease payment obligations of $350 million, with $82 million payable within one-year.

We have other purchase obligations to purchase various goods and services that we believe are enforceable and legally binding.

In addition, we have $150.4 billion in cash and cash equivalent margin deposits and guaranty funds, invested deposits, delivery contracts payable and unsettled variation margin. Clearing members of our clearing houses are required to deposit original margin and variation margin and to make deposits to a guaranty fund. The cash and cash equivalent deposits made to these margin accounts and to the guaranty fund are recorded in the consolidated balance sheet as current assets with corresponding current liabilities to the clearing members that deposited them. ICE NGX administers the physical delivery of energy trading contracts. It has an equal and offsetting claim to and from its respective participants on opposite sides of the physically-settled contract, each of which is reflected as a delivery contract receivable with an offsetting delivery contract payable. See Note 14 to our consolidated financial statements included in this Annual Report for additional information on our clearing houses and the margin deposits, guaranty funds, invested deposits, delivery contracts payable and unsettled variation margin.

We also have unrecognized tax benefits, or UTBs. As of December 31, 2021, our cumulative UTBs were $229 million, and accrued interest and penalties related to UTBs were $49 million. We are under examination by various tax authorities. We are unable to make a reasonable estimate of the periods of cash settlement because it is not possible to reasonably predict the amount of tax, interest and penalties, if any, that might be assessed by a tax authority or the timing of an assessment or payment. It is also not possible to reasonably predict whether or not the applicable statutes of limitations might expire without us being examined by any particular tax authority. See Note 13 to our consolidated financial statements for additional information on our UTBs.

As of December 31, 2021, we, through NYSE, have net obligations of $103 million related to our pension and other benefit programs. The date of payment under these net obligations cannot be determined. See Note 16 to our consolidated financial statements for additional information on our pension and other benefit programs.

In addition, the future funding of the implementation and operation of the CAT is ultimately expected to be provided by both the SROs and broker-dealers. To date, however, funding has been provided solely by the SROs, and future funding is expected to be repaid if industry member fees are approved by the SEC and subsequently collected by industry members. See "- Non-GAAP Measures" above.

New and Recently Adopted Accounting Pronouncements

Refer to Note 2 to our consolidated financial statements included in this Annual Report for information on the new and recently adopted accounting pronouncements that are applicable to us.

Critical Accounting Policies

We have identified the policies below as critical to our business operations and the understanding of our results of operations. The impact of, and any associated risks related to, these policies on our business operations is discussed throughout “- Management’s Discussion and Analysis of Financial Condition and Results of Operations.” For a detailed discussion on the application of these and other accounting policies, see Note 2 to our consolidated financial statements included in this Annual Report.

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with U.S. GAAP. The preparation of financial statements in conformity with these accounting principles requires us to make estimates and assumptions that affect the reported amount of assets and liabilities, and the disclosure of contingent assets and liabilities, at the date of our financial statements and the reported amounts of revenues and expenses during the reporting period.

We base our estimates and judgments on our historical experience and other factors that we believe to be reasonable under the circumstances when we make these estimates and judgments and re-evaluate them on a periodic basis. Based on these factors, we make estimates and judgments about, among other things, the carrying values of assets and liabilities that are not readily apparent from market prices or other independent sources and about the recognition and characterization of our revenues and expenses. The values and results based on these estimates and judgments could differ significantly under different assumptions or conditions and could change materially in the future.

We believe that the following critical accounting policies, among others, affect our more significant judgments and estimates used in the preparation of our consolidated financial statements and could materially increase or decrease our reported results, assets and liabilities.

Goodwill and Other Identifiable Intangible Assets

Assets acquired and liabilities assumed in connection with our acquisitions are recorded at their estimated fair values. Goodwill represents the excess of the purchase price of an acquired company over the fair value of its identifiable net assets, including identified intangible assets. We recognize specifically identifiable intangibles, such as customer relationships, trademarks, technology, trading products, data, exchange registrations, backlog, trade names and licenses when a specific right or contract is acquired. Our determination of the fair value of the intangible assets and whether or not these assets may be impaired following their acquisition requires us to apply significant judgments and make significant estimates and assumptions regarding future cash flows. If we change our strategy or if market conditions shift, our judgments and estimates may change, which may result in adjustments to recorded asset balances. Intangible assets with finite useful lives are amortized over their estimated useful lives whereas goodwill and intangible assets with indefinite useful lives are not.

In performing the allocation of the acquisitions' purchase price to assets and liabilities, we consider, among other factors, the intended use of the acquired assets, analysis of past financial performance and estimates of future performance of the acquired business. At the acquisition date, a preliminary allocation of the purchase price is recorded based upon a preliminary valuation performed with the assistance of a third-party valuation specialist. We continue to review and assess our estimates, assumptions and valuation methodologies during the measurement period provided by GAAP, which ends as soon as we receive the information about facts and circumstances that existed as of the acquisition date or we learn that more information is not obtainable, which usually does not exceed one year from the date of acquisition. Accordingly, these estimates and assumptions are subject to change, which could have a material impact on our consolidated financial statements. Estimation uncertainty may exist due to the sensitivity of the respective fair value to underlying assumptions about the future performance of an acquired business in our discounted cash flow models. Significant assumptions typically include revenue growth rates and expense synergies that form the basis of the forecasted results and the discount rate.

Our goodwill and other indefinite-lived intangible assets are evaluated for impairment annually in our fiscal fourth quarter or more frequently if conditions exist that indicate that the value may be impaired. We test our goodwill for impairment at the reporting unit level, and we have identified four reporting units, which were updated in 2020 to reflect our new segment presentation. Our reporting units identified for our goodwill testing are the NYSE, Other Exchanges, Fixed Income and Data Services, and Mortgage Technology reporting units. These impairment evaluations are performed by comparing the carrying value of the goodwill or other indefinite-lived intangibles to its estimated fair value.

In accordance with Accounting Standards Update 2017-04, *Simplifying the Test for Goodwill Impairment*, or ASU-2017, for both goodwill and indefinite-lived intangible impairment testing, we have the option to first perform a qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit or indefinite-lived intangible asset is less than its carrying amount. If the fair value of the goodwill or indefinite-lived intangible asset is less than its carrying value, an impairment loss is recognized in earnings in an amount equal to the difference. Alternatively, we may choose to bypass the qualitative option and perform quantitative testing to determine if the fair value is less than the carrying value. For our goodwill impairment testing, we have elected to bypass the qualitative assessment and apply the quantitative approach. For our testing of indefinite-lived intangible assets, we apply qualitative and quantitative approaches.

Application of the impairment test requires judgment, including the identification of reporting units, assignment of assets and liabilities to reporting units, assignment of goodwill to reporting units, and determination of the fair value of each reporting unit. We have historically determined the fair value of our reporting units based on various valuation techniques, including discounted cash flow analysis and a multiple of earnings approach. In assessing whether goodwill and other intangible assets are impaired, we must make estimates and assumptions regarding future cash flows, long-term growth rates of our business, operating margins, discount rates, weighted average cost of capital and other factors to determine the fair value of our assets. These estimates and assumptions require management’s judgment, and changes to these estimates and assumptions, as a result of changing economic and competitive conditions, could materially affect the determination of fair value and/or impairment. During 2019, we recorded an impairment charge of $31 million on the remaining value of exchange registration intangible assets on ICE Futures Singapore as a result of a decrease in fair value determined during our annual impairment testing. We did not record any impairments in 2021 or 2020 as a result of our goodwill or indefinite-lived impairment testing.

We are also required to evaluate other finite-lived intangible assets for impairment by first determining whether events or changes in circumstances indicate that the carrying value of these assets to be held and used may not be recoverable. If impairment indicators are present, then an estimate of undiscounted future cash flows produced by these long-lived assets is compared to the carrying value of those assets to determine if the asset is recoverable. If an asset is not recoverable, the loss is measured as the difference between fair value and carrying value of the impaired asset. Fair value of these assets is based on various valuation techniques, including discounted cash flow analysis.

Income Taxes

We are subject to income taxes in the U.S., U.K. and other foreign jurisdictions where we operate. The determination of our provision for income taxes and related accruals, deferred tax assets and liabilities requires the use of significant judgment, estimates, and the interpretation and application of complex tax laws. We recognize a current tax liability or tax asset for the estimated taxes payable or refundable on tax returns for the current year. We recognize deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the financial statement carrying amounts and the tax bases of our assets and liabilities. We establish valuation allowances if we believe that it is more likely than not that some or all of our deferred tax assets will not be realized. Deferred tax assets and liabilities are measured using current enacted tax rates in effect for the years in which those temporary differences and carryforwards are expected to reverse.

The FASB Staff has provided additional guidance to address the accounting for the effects of the provisions related to the taxation of Global Intangible Low-Taxed Income noting that companies should make an accounting policy election to recognize deferred taxes for temporary basis differences expected to reverse in future years or to include the tax expense in the year it is incurred. We have made a policy election to recognize such taxes as current period expenses when incurred.

We do not recognize a tax benefit unless we conclude that it is more likely than not that the benefit will be sustained on audit by the taxing authority based solely on the technical merits of the associated tax position. If the recognition threshold is met, we recognize a tax benefit measured at the largest amount of the tax benefit that, in our judgment, is greater than 50 percent likely to be realized. We recognize accrued interest and penalties related to uncertain income tax positions as income tax expense in the consolidated statements of income.

We operate within multiple domestic and foreign taxing jurisdictions and are subject to audit in these jurisdictions by domestic and foreign tax authorities. These audits include questions regarding our tax filing positions, including the timing and amount of deductions taken and the allocation of income among various tax jurisdictions. We record accruals for the estimated outcomes of these audits, and the accruals may change in the future due to new developments in each matter. At any point in time, many tax years are subject to or in the process of being audited by various taxing authorities. To the extent our estimates of settlements change or the final tax outcome of these matters is different from the amounts recorded, such differences will impact the income tax provision in the period in which such determinations are made. Our income tax expense includes changes in our estimated liability for exposures associated with our various tax filing positions. Determining the income tax expense for these potential assessments requires management to make assumptions that are subject to factors such as proposed assessments by tax authorities, changes in facts and circumstances, issuance of new regulations, and resolution of tax audits.

We believe the judgments and estimates discussed above are reasonable. However, if actual results are not consistent with our estimates or assumptions, we may be exposed to losses or gains that could be material.

ITEM 7 (A). QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

As a result of our operating and financing activities, we are exposed to market risks such as interest rate risk, foreign currency exchange rate risk and credit risk. We have implemented policies and procedures designed to measure, manage, monitor and report risk exposures, which are regularly reviewed by the appropriate management and supervisory bodies.

Interest Rate Risk

We have exposure to market risk for changes in interest rates relating to our cash and cash equivalents, short-term and long-term restricted cash and cash equivalents, short-term and long-term investments and indebtedness. As of December 31, 2021 and 2020, our cash and cash equivalents and short-term and long-term restricted cash and cash equivalents were $2.0 billion for both periods, of which $276 million and $245 million, respectively, were denominated in pounds sterling, euros or Canadian dollars, and the remaining amounts are denominated in U.S. dollars. We do not use our investment portfolio for trading or other speculative purposes. A hypothetical 50% decrease in short-term interest rates would have an immaterial impact on our annual pre-tax earnings as of December 31, 2021, assuming no change in the amount or composition of our cash and cash equivalents and short-term and long-term restricted cash and cash equivalents.

As of December 31, 2021, we had $13.9 billion in outstanding debt, of which $12.9 billion relates to our fixed rate senior notes. The remaining amount outstanding of $1.0 billion relates to $1.0 billion outstanding under our Commercial Paper Program, which bears interest at fluctuating rates, and $10 million under lines of credit at our India subsidiaries. A hypothetical 100 basis point increase in short-term interest rates relating to the amounts under our Commercial Paper Program as of December 31, 2021 would decrease annual pre-tax earnings by $10 million, assuming no change in the volume or composition of our outstanding indebtedness and no hedging activity. See Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations – Debt," and Note 10 to our consolidated financial statements included in this Annual Report.

The interest rates on our Commercial Paper Program are currently evaluated based upon current maturities and market conditions. The weighted average interest rate on our Commercial Paper Program decreased from 0.40% as of December 31, 2020 to 0.33% as of December 31, 2021. The effective interest rate of commercial paper issuances will continue to fluctuate based on the movement in short-term interest rates along with shifts in supply and demand within the commercial paper market.

Foreign Currency Exchange Rate Risk

As an international business, we are subject to foreign currency exchange rate risk. We may experience gains or losses from foreign currency transactions in the future given that a significant part of our assets and liabilities are recorded in pounds sterling, Canadian dollars or euros, and a significant portion of our revenues and expenses are recorded in pounds sterling or euros. Certain assets, liabilities, revenues and expenses of foreign subsidiaries are denominated in the local functional currency of such subsidiaries. Our exposure to foreign denominated earnings in 2021 and 2020 is presented by primary foreign currency in the following table (dollars in millions, except exchange rates):

	Year Ended December 31, 2021		Year Ended December 31, 2020	
	Pound Sterling	Euro	Pound Sterling	Euro
Average exchange rate to the U.S. dollar in the current year	$ 1.3762	$ 1.1835	$ 1.2832	$ 1.1412
Average exchange rate to the U.S. dollar in the prior year	$ 1.2832	$ 1.1412	$ 1.2769	$ 1.1195
Average exchange rate increase (decrease)	7 %	4 %	— %	2 %
Foreign denominated percentage of:				
Revenues, less transaction-based expenses	7 %	6 %	7 %	6 %
Operating expenses	8 %	2 %	9 %	2 %
Operating income	6 %	11 %	6 %	9 %
Impact of the currency fluctuations (1) on:				
Revenues, less transaction-based expenses	$ 31	$ 13	$ 1	$ 6
Operating expenses	$ 19	$ 3	$ 1	$ 1
Operating income	$ 12	$ 10	$ —	$ 5

(1) Represents the impact of currency fluctuation for the year compared to the same period in the prior year.

We have a significant part of our assets, liabilities, revenues and expenses recorded in pounds sterling or euros. In both 2021 and 2020, 13% of our consolidated revenues, less transaction-based expenses, were denominated in pounds sterling or euros, and in 2021 and 2020, 10% and 11%, respectively, of our consolidated operating expenses were denominated in pounds sterling or euros. As the pound sterling or euro exchange rate changes, the U.S. equivalent of revenues and expenses denominated in foreign currencies changes accordingly.

Foreign currency transaction risk related to the settlement of foreign currency denominated assets, liabilities and payables occurs through our operations, which are received in or paid in pounds sterling, Canadian dollars, or euros, due to the increase or decrease in the foreign currency exchange rates between periods. We incurred foreign currency transaction losses of $13 million and $5 million in 2021 and 2020, respectively inclusive of the impact of foreign currency hedging transactions. The foreign currency transaction losses were primarily attributable to the fluctuations of the pound sterling and euro relative to the U.S. dollar. A 10% adverse change in the underlying foreign currency exchange rates as of December 31, 2021, assuming no change in the composition of the foreign currency denominated assets, liabilities and payables and assuming no hedging activity, would result in a foreign currency loss of $15 million.

We entered into foreign currency hedging transactions during 2021 and 2020 as economic hedges to help mitigate a portion of our foreign exchange risk exposure and may enter into additional hedging transactions in the future to help mitigate our foreign exchange risk exposure. Although we may enter into additional hedging transactions in the future, these hedging arrangements may not be effective, particularly in the event of imprecise forecasts of the levels of our non-U.S. denominated assets and liabilities.

We have foreign currency translation risk equal to our net investment in our foreign subsidiaries. The financial statements of these subsidiaries are translated into U.S. dollars using a current rate of exchange, with gains or losses included in the cumulative translation adjustment account, a component of equity. Our exposure to the net investment in foreign currencies is presented by primary foreign currencies in the table below (in millions):

	As of December 31, 2021		
	Position in pounds sterling	Position in Canadian dollars	Position in euros
Assets	£ 722	C$ 2,245	€ 220
of which goodwill represents	566	398	92
Liabilities	78	1,826	48
Net currency position	£ 644	C$ 419	€ 172
Net currency position, in $USD	$ 871	$ 331	$ 195
Negative impact on consolidated equity of a 10% decrease in foreign currency exchange rates	$ 87	$ 33	$ 20

Foreign currency translation adjustments are included as a component of accumulated other comprehensive income/(loss) within our balance sheet. See the table below for the portion of equity attributable to foreign currency translation adjustments as well as the activity by year included within our statement of other comprehensive income. The impact of the foreign currency exchange rate differences in the table below were primarily driven by fluctuations of the pound sterling as compared to the U.S. dollar which were 1.3524, 1.3665 and 1.3260 as of December 31, 2021, 2020, and 2019, respectively.

	Changes in Accumulated Other Comprehensive Income/ (Loss) from Foreign Currency Translation Adjustments (in millions)
Balance, as of January 1, 2019	$ (227)
Net current period other comprehensive income/(loss)	50
Balance, as of December 31, 2019	(177)
Net current period other comprehensive income/(loss)	43
Balance, as of December 31, 2020	(134)
Net current period other comprehensive income/(loss)	(16)
Balance, as of December 31, 2021	$ (150)

The future impact on our business relating to the U.K. leaving the EU and the corresponding regulatory changes are uncertain at this time, including future impacts on currency exchange rates.

Credit Risk

We are exposed to credit risk in our operations in the event of a counterparty default. We limit our exposure to credit risk by rigorously selecting the counterparties with which we make our investments, monitoring them on an ongoing basis and executing agreements to protect our interests.

Clearing House Cash Deposit Risks

The ICE Clearing Houses hold material amounts of clearing member margin deposits which are held or invested primarily to provide security of capital while minimizing credit, market and liquidity risks. Refer to Note 14 to our consolidated financial statements for more information on the ICE Clearing Houses' cash and cash equivalent margin deposits and guaranty funds, invested deposits, delivery contracts receivable and unsettled variation margin which were $150.4 billion as of December 31, 2021. While we seek to achieve a reasonable rate of return which may generate interest income for our clearing members, we are primarily concerned with preservation of capital and managing the risks associated with these deposits. As the ICE Clearing Houses may pass on interest revenues (minus costs) to the clearing members, this could include negative or reduced yield due to market conditions. The following is a summary of the risks associated with these deposits and how these risks are mitigated:

- **Credit Risk:** When a clearing house has the ability to hold cash collateral at a central bank, the clearing house utilizes its access to the central bank system to minimize credit risk exposures. Credit risk is managed by using exposure limits depending on the credit profile of the counterparty as well as the nature and maturity of transactions. Our investment objective is to invest in securities that preserve principal while maximizing yields, without significantly increasing risk. We seek to substantially mitigate the credit risk associated with investments by placing them with governments, well-capitalized financial institutions and other creditworthy counterparties.

  An ongoing review is performed to evaluate changes in the financial status of counterparties. In addition to the intrinsic creditworthiness of counterparties, our policies require diversification of counterparties (banks, financial institutions, bond issuers and funds) so as to avoid a concentration of risk.

- **Liquidity Risk:** Liquidity risk is the risk a clearing house may not be able to meet its payment obligations in the right currency, in the right place and at the right time. To mitigate this risk, the clearing houses monitor liquidity requirements closely and maintain funds and assets in a manner which minimizes the risk of loss or delay in the access by the clearing house to such funds and assets. For example, holding funds with a central bank where possible or making only short term investments such as overnight reverse repurchase agreements serves to reduce liquidity risks.

- **Interest Rate Risk:** Interest rate risk is the risk that interest rates rise and cause the value of securities we hold or invest in to decline. If we were required to sell securities prior to maturity, and interest rates had risen, the sale might be made at a loss relative to the carrying value. Our clearing houses seek to manage this risk by making short term investments. For example, where possible and in accordance with regulatory requirements, the clearing houses invest cash pursuant to overnight reverse repurchase agreements or term reverse repurchase agreements with short dated maturities. In addition, the clearing house investment guidelines allow for direct purchases of high quality sovereign debt (for example, U.S. Treasury securities) and supranational debt instruments (Euro cash deposits only) with short dated maturities.

- **Security Issuer Risk:** Security issuer risk is the risk that an issuer of a security defaults on the payment when the security matures or debt is serviced. This risk is mitigated by limiting allowable investments under the reverse repurchase agreements to high quality sovereign or government agency debt and limiting any direct investments to high quality sovereign debt instruments.

- **Investment Counterparty Risk:** Investment counterparty risk is the risk that a reverse repurchase agreement counterparty might become insolvent and, thus, fail to meet its obligations to our clearing houses. We mitigate this risk by only engaging in transactions with high credit quality counterparties and by limiting the acceptable collateral to securities of high quality issuers. When engaging in reverse repurchase agreements, our clearing houses take delivery of the securities underlying the reverse repurchase arrangement in custody accounts under clearing house control. Additionally, the securities purchased subject to reverse repurchase have a market value greater than the reverse repurchase amount. The typical haircut for high quality sovereign debt is 2% of the reverse repurchase amount which provides additional excess collateral. Thus, in the event that a reverse repurchase counterparty defaults on its obligation to repurchase the underlying reverse repurchase securities, our clearing house will have possession of a security with a value potentially greater than the counterparty's obligation.

  The ICE Clearing Houses may use third-party investment advisors who make investments subject to the guidelines provided by each clearing house. Such advisors do not hold clearing member cash or cash equivalent deposits or the underlying investments. Clearing house property is held in custody accounts under clearing house control with credit worthy custodians. The ICE Clearing Houses employ (or may employ) multiple investment advisors and custodians to ensure that in the event a single advisor or custodian is unable to fulfill its role, additional advisors or custodians are available as alternatives.

- **Cross-Currency Margin Deposit Risk:** Each of the ICE Clearing Houses may permit posting of cross-currency collateral to satisfy margin requirements (for example, accepting margin deposits denominated in U.S. dollars to secure a Euro margin obligation). The ICE Clearing Houses mitigate the risk of a currency value exposure by applying a "haircut" to the currency posted as margin at a level viewed as sufficient to provide financial protection during periods of currency volatility. Cross-currency balances are marked-to-market on a daily basis. Should the currency posted to satisfy margin requirements decline in value, the clearing member is required to increase its margin deposit on a same-day basis.

Impact of Inflation

We have not been adversely affected by inflation as technological advances and competition have generally caused prices for the hardware and software that we use for our electronic platforms to remain constant. In the event of inflation, we believe that we will be able to pass on any price increases to our participants, as the prices that we charge are not governed by long-term contracts.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

REPORT OF MANAGEMENT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

Our management is responsible for the preparation and integrity of the consolidated financial statements appearing in our Annual Report on Form 10-K. The financial statements were prepared in conformity with generally accepted accounting principles appropriate in the circumstances and, accordingly, include certain amounts based on our best judgments and estimates.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as such term is defined in Rule 13a-15(f) and 15d-a5(f) under the Securities Exchange Act of 1934 (“Exchange Act”). Our internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of the consolidated financial statements. Our internal control over financial reporting is supported by a program of internal audits and appropriate reviews by management, written policies and guidelines, careful selection and training of qualified personnel and a written Global Code of Business Conduct adopted by our Board of Directors, applicable to all of our directors and all officers and all of our employees.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements and even when determined to be effective, can only provide reasonable assurance with respect to financial statement preparation and presentation. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management assessed the effectiveness of our internal control over financial reporting as of December 31, 2021. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”) in Internal Control - Integrated Framework (2013 framework). Based on our assessment, management believes that we maintained effective internal control over financial reporting as of December 31, 2021.

Our independent auditors, Ernst & Young LLP, a registered public accounting firm, are appointed by the Audit Committee, subject to ratification by our stockholders. Ernst & Young LLP has audited and reported on our consolidated financial statements and the effectiveness of our internal control over financial reporting. The reports of our independent registered public accounting firm are contained in this Annual Report.

/s/ Jeffrey C. Sprecher	/s/ A. Warren Gardiner
Jeffrey C. Sprecher Chairman of the Board and Chief Executive Officer	A. Warren Gardiner Chief Financial Officer
February 3, 2022	February 3, 2022

**REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM
ON INTERNAL CONTROL OVER FINANCIAL REPORTING**

To the Stockholders and the Board of Directors of Intercontinental Exchange, Inc.

Opinion on Internal Control over Financial Reporting

We have audited Intercontinental Exchange, Inc. and Subsidiaries’ internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Intercontinental Exchange, Inc. and Subsidiaries (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2021 and 2020, and the related consolidated statements of income, comprehensive income, changes in equity and redeemable non-controlling interest, and cash flows for each of the three years in the period ended December 31, 2021, and the related notes, and our report dated February 3, 2022 expressed an unqualified opinion thereon.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying “Report of Management on Internal Control over Financial Reporting”. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

Atlanta, Georgia
February 3, 2022

**REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM
ON FINANCIAL STATEMENTS**

To the Stockholders and the Board of Directors of Intercontinental Exchange, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Intercontinental Exchange, Inc. and Subsidiaries (the Company) as of December 31, 2021 and 2020, and the related consolidated statements of income, comprehensive income, changes in equity and redeemable non-controlling interest, and cash flows for each of the three years in the period ended December 31, 2021, and the related notes (collectively referred to as the “consolidated financial statements”). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company’s internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 Framework), and our report dated February 3, 2022 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical accounting matter communicated below is a matter arising from the current period audit of the financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing separate opinions on the critical audit matter or on the accounts or disclosures to which it relates.

Accounting for Income Taxes

Description of the Matter As discussed in Note 13 to the consolidated financial statements, the Company operates in the United States and multiple international tax jurisdictions and is therefore subject to various tax treaty arrangements and where applicable, transfer pricing guidelines for intercompany transactions. Consolidated income tax expense, including the liability for unrecognized tax benefits, is an estimate based on management’s understanding and interpretation of current enacted tax laws and tax rates of each tax jurisdiction. For the year-ended December 31, 2021, the Company recognized consolidated income tax expense of $1.629 billion, and as of December 31, 2021, the Company accrued liabilities of $229 million for unrecognized tax benefits.

Auditing the Company's accounting for consolidated income tax expense was complex because management's calculation of consolidated income tax expense involves application and interpretation of complex tax laws. Further, the identification and measurement of unrecognized tax benefits requires significant management judgment and estimation. Each tax position may involve unique facts and circumstances to be evaluated, and there may be uncertainties around initial recognition and de-recognition of tax positions, including regulatory changes, litigation and examination activity.

How we Addressed the Matter in Our Audit

We tested the Company's controls that address the risks of material misstatement relating to the Company's consolidated income tax expense. For example, we tested controls over management's calculation of the federal, state and foreign components of income tax expense including management's controls over the identification and ongoing review of its unrecognized tax benefits.

To test consolidated income tax expense, we performed audit procedures that included, among others, recalculation of consolidated income tax expense and agreeing the data used in the calculations to the Company's underlying books and records. We involved our tax professionals to evaluate the application of tax law to management's calculation methodologies and tax positions. We also evaluated assumptions the Company used to develop its tax positions and related unrecognized tax benefit amounts by jurisdiction. For example, we compared the estimated liabilities for unrecognized tax benefits to similar positions in prior periods and assessed management's consideration of current tax controversy and litigation and trends in similar positions challenged by tax authorities. We also evaluated the adequacy of the Company's disclosures included in Note 13 in relation to these tax matters.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2002.

Atlanta, Georgia
February 3, 2022

Intercontinental Exchange, Inc. and Subsidiaries
Consolidated Balance Sheets
(In millions, except per share amounts)

	As of December 31, 2021	As of December 31, 2020
Assets:		
Current assets:		
Cash and cash equivalents	$ 607	$ 583
Short-term restricted cash and cash equivalents	1,035	1,000
Cash and cash equivalent margin deposits and guaranty funds	145,936	81,628
Invested deposits, delivery contracts receivable and unsettled variation margin	4,493	2,455
Customer accounts receivable, net of allowance for doubtful accounts of $24 and $27, respectively	1,208	1,230
Prepaid expenses and other current assets	1,021	323
Total current assets	154,300	87,219
Property and equipment, net	1,699	1,713
Other non-current assets:		
Goodwill	21,123	21,291
Other intangible assets, net	13,736	14,408
Long-term restricted cash and cash equivalents	398	408
Other non-current assets	2,246	1,161
Total other non-current assets	37,503	37,268
Total assets	$ 193,502	$ 126,200
Liabilities and Equity:		
Current liabilities:		
Accounts payable and accrued liabilities	$ 703	$ 639
Section 31 fees payable	57	207
Accrued salaries and benefits	354	346
Deferred revenue	194	158
Short-term debt	1,521	2,411
Margin deposits and guaranty funds	145,936	81,628
Invested deposits, delivery contracts payable and unsettled variation margin	4,493	2,455
Other current liabilities	153	155
Total current liabilities	153,411	87,999
Non-current liabilities:		
Non-current deferred tax liability, net	4,100	3,563
Long-term debt	12,397	14,126
Accrued employee benefits	200	206
Non-current operating lease liability	252	320
Other non-current liabilities	394	359
Total non-current liabilities	17,343	18,574
Total liabilities	170,754	106,573
Commitments and contingencies		
Redeemable non-controlling interest in consolidated subsidiaries	—	93
Equity:		
Intercontinental Exchange, Inc. stockholders' equity:		
Preferred stock, $0.01 par value; 100 shares authorized; none issued or outstanding	—	—
Common stock, $0.01 par value; 1,500 authorized; 631 and 561 shares issued and outstanding at December 31, 2021, respectively, and 629 and 561 shares issued and outstanding at December 31, 2020, respectively	6	6
Treasury stock, at cost; 70 and 68 shares at December 31, 2021 and December 31, 2020, respectively	(5,520)	(5,200)
Additional paid-in capital	14,069	13,845
Retained earnings	14,350	11,039
Accumulated other comprehensive loss	(196)	(192)
Total Intercontinental Exchange, Inc. stockholders' equity	22,709	19,498
Non-controlling interest in consolidated subsidiaries	39	36
Total equity	22,748	19,534
Total liabilities and equity	$ 193,502	$ 126,200

See accompanying notes.

Intercontinental Exchange, Inc. and Subsidiaries
Consolidated Statements of Income
(In millions, except per share amounts)

	Year Ended December 31, 2021	2020	2019
Revenues:			
Exchanges	$ 5,878	$ 5,839	$ 4,652
Fixed income and data services	1,883	1,810	1,756
Mortgage technology	1,407	595	139
Total revenues	9,168	8,244	6,547
Transaction-based expenses:			
Section 31 fees	248	622	379
Cash liquidity payments, routing and clearing	1,774	1,586	966
Total revenues, less transaction-based expenses	7,146	6,036	5,202
Operating expenses:			
Compensation and benefits	1,462	1,188	1,042
Professional services	159	144	125
Acquisition-related transaction and integration costs	102	105	2
Technology and communication	666	549	469
Rent and occupancy	84	81	68
Selling, general and administrative	215	185	161
Depreciation and amortization	1,009	751	662
Total operating expenses	3,697	3,003	2,529
Operating income	3,449	3,033	2,673
Other income (expense):			
Interest income	1	10	35
Interest expense	(423)	(357)	(285)
Other income, net	2,671	80	58
Other income (expense), net	2,249	(267)	(192)
Income before income tax expense	5,698	2,766	2,481
Income tax expense	1,629	658	521
Net income	$ 4,069	$ 2,108	$ 1,960
Net income attributable to non-controlling interest	(11)	(19)	(27)
Net income attributable to Intercontinental Exchange, Inc.	$ 4,058	$ 2,089	$ 1,933
Earnings per share attributable to Intercontinental Exchange, Inc. common stockholders:			
Basic	$ 7.22	$ 3.79	$ 3.44
Diluted	$ 7.18	$ 3.77	$ 3.42
Weighted average common shares outstanding:			
Basic	562	552	561
Diluted	565	555	565

See accompanying notes.

Intercontinental Exchange, Inc. and Subsidiaries
Consolidated Statements of Comprehensive Income
(In millions)

	Year Ended December 31,		
	2021	2020	2019
Net income	$ 4,069	$ 2,108	$ 1,960
Other comprehensive income (loss):			
Foreign currency translation adjustments, net of tax expense of $—, $— and $1 for 2021, 2020 and 2019, respectively	(16)	43	50
Change in equity method investment	1	—	(1)
Employee benefit plan net gains, net of tax expense of $4, $3 and $9 in 2021, 2020 and 2019, respectively	11	8	23
Other comprehensive income (loss)	(4)	51	72
Comprehensive income	$ 4,065	$ 2,159	$ 2,032
Comprehensive income attributable to non-controlling interest	(11)	(19)	(27)
Comprehensive income attributable to Intercontinental Exchange, Inc.	$ 4,054	$ 2,140	$ 2,005

See accompanying notes.

Intercontinental Exchange, Inc. and Subsidiaries
Consolidated Statements of Changes in Equity and Redeemable Non-Controlling Interest
(In millions)

	Intercontinental Exchange, Inc. Stockholders' Equity									
	Common Stock		Treasury Stock							
	Shares	Value	Shares	Value	Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Non-Controlling Interest in Consolidated Subsidiaries	Total Equity	Redeemable Non-controlling Interest
Balance, as of January 1, 2019	604	6	(35)	(2,354)	11,547	8,317	(315)	30	17,231	71
Other comprehensive income	—	—	—	—	—	—	72	—	72	—
Exercise of common stock options	1	—	—	—	23	—	—	—	23	—
Repurchases of common stock	—	—	(17)	(1,460)	—	—	—	—	(1,460)	—
Payments relating to treasury shares	—	—	(1)	(65)	—	—	—	—	(65)	—
Stock-based compensation	—	—	—	—	143	—	—	—	143	11
Issuance under the employee stock purchase plan	—	—	—	—	29	—	—	—	29	—
Issuance of restricted stock	2	—	—	—	—	—	—	—	—	—
Distributions of profits	—	—	—	—	—	—	—	(29)	(29)	—
Dividends paid to stockholders	—	—	—	—	—	(621)	—	—	(621)	—
Net income attributable to non-controlling interest	—	—	—	—	—	(27)	—	30	3	(4)
Net income	—	—	—	—	—	1,960	—	—	1,960	—
Balance, as of December 31, 2019	607	6	(53)	(3,879)	11,742	9,629	(243)	31	17,286	78
Impact of adoption of ASU 2016-13, net of tax	—	—	—	—	—	(10)	—	—	(10)	—
Other comprehensive income	—	—	—	—	—	—	51	—	51	—
Stock consideration issued for acquisition	18	—	—	—	1,895	—	—	—	1,895	—
Exercise of common stock options	1	—	—	—	31	—	—	—	31	—
Repurchases of common stock	—	—	(14)	(1,247)	—	—	—	—	(1,247)	—
Payments relating to treasury shares	—	—	(1)	(74)	—	—	—	—	(74)	—
Stock-based compensation	—	—	—	—	141	—	—	—	141	11
Issuance under the employee stock purchase plan	1	—	—	—	33	—	—	—	33	—
Warrants issued to minority interest holders	—	—	—	—	3	—	—	—	3	2
Issuance of restricted stock	2	—	—	—	—	—	—	—	—	—
Distributions of profits	—	—	—	—	—	—	—	(31)	(31)	—
Dividends paid to stockholders	—	—	—	—	—	(669)	—	—	(669)	—
Redeemable non-controlling interest	—	—	—	—	—	—	—	—	—	10
Issuance of non-controlling interest	—	—	—	—	—	—	—	9	9	—
Net income attributable to non-controlling interest	—	—	—	—	—	(19)	—	27	8	(8)
Net income	—	—	—	—	—	2,108	—	—	2,108	—
Balance, as of December 31, 2020	629	$ 6	(68)	$ (5,200)	$ 13,845	$ 11,039	$ (192)	$ 36	$ 19,534	$ 93
Other comprehensive income	—	—	—	—	—	—	(4)	—	(4)	—
Exercise of common stock options	—	—	—	—	17	—	—	—	17	—
Repurchases of common stock	—	—	(1)	(250)	—	—	—	—	(250)	—
Payments relating to treasury shares	—	—	(1)	(70)	—	—	—	—	(70)	—
Stock-based compensation	—	—	—	—	168	—	—	—	168	27
Issuance under the employee stock purchase plan	—	—	—	—	42	—	—	—	42	—
Issuance of restricted stock	2	—	—	—	—	—	—	—	—	—
Distributions of profits	—	—	—	—	—	—	—	(21)	(21)	—
Dividends paid to stockholders	—	—	—	—	—	(747)	—	—	(747)	—
Bakkt deconsolidation adjustment	—	—	—	—	(3)	—	—	—	(3)	(107)
Net income attributable to non-controlling interest	—	—	—	—	—	(11)	—	24	13	(13)
Net income	—	—	—	—	—	4,069	—	—	4,069	—
Balance, as of December 31, 2021	631	$ 6	(70)	$ (5,520)	$ 14,069	$ 14,350	$ (196)	$ 39	$ 22,748	$ —

See accompanying notes.

Intercontinental Exchange, Inc. and Subsidiaries
Consolidated Statements of Cash Flows
(In millions)

	Year Ended December 31,		
	2021	2020	2019
Operating activities:			
Net income	$ 4,069	$ 2,108	$ 1,960
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	1,009	751	662
Stock-based compensation	188	139	139
Deferred taxes	537	92	(33)
Gain on deconsolidation of Bakkt	(1,419)	—	—
Gain on sale of Coinbase investment	(1,227)	—	—
Gain on equity investments	(34)	(55)	—
Net losses/(income) from unconsolidated investees	42	(71)	(62)
Other	45	46	22
Changes in assets and liabilities:			
Customer accounts receivable	(5)	(149)	(30)
Other current and non-current assets	(100)	(83)	(17)
Section 31 fees payable	(150)	69	34
Deferred revenue	34	2	(18)
Other current and non-current liabilities	134	32	2
Total adjustments	(946)	773	699
Net cash provided by operating activities	3,123	2,881	2,659
Investing activities:			
Capital expenditures	(179)	(207)	(153)
Capitalized software development costs	(273)	(203)	(152)
Cash paid for acquisitions, net of cash acquired	(66)	(9,446)	(352)
Return of capital from equity method investment	—	—	60
Purchase of equity method investment	(117)	—	—
Proceeds from the sale of Coinbase investment	1,237	—	—
Proceeds from other investments, net	1	4	9
Purchases of invested margin deposits	(5,050)	(3,371)	(1,890)
Proceeds from sale of invested margin deposits	3,661	2,840	744
Other	—	22	(6)
Net cash used in investing activities	(786)	(10,361)	(1,740)
Financing activities:			
Proceeds from debt facilities, net	—	9,606	10
Repayments of debt facilities	(1,246)	(2,004)	—
Proceeds from/(redemption of) commercial paper, net	(1,393)	1,094	360
Repurchases of common stock	(250)	(1,247)	(1,460)
Dividends to stockholders	(747)	(669)	(621)
Change in cash and cash equivalent margin deposits and guaranty funds	65,697	19,256	1,329
Payments relating to treasury shares received for restricted stock tax payments and stock option exercises	(70)	(74)	(65)
Other	35	38	23
Net cash provided by (used in) financing activities	62,026	26,000	(424)
Effect of exchange rate changes on cash, cash equivalents, restricted cash and cash equivalents, and cash and cash equivalent margin deposits and guaranty funds	(6)	8	4
Net increase in cash, cash equivalents, restricted cash and cash equivalents, and cash and cash equivalent margin deposits and guaranty funds	64,357	18,528	499
Cash, cash equivalents, restricted cash and cash equivalents and cash and cash equivalent margin deposits and guaranty funds at beginning of year	83,619	65,091	64,592
Cash, cash equivalents, restricted cash and cash equivalents and cash and cash equivalent margin deposits and guaranty funds at end of year	$ 147,976	$ 83,619	$ 65,091
Supplemental cash flow disclosures:			
Common stock issued for acquisition	$ —	$ 1,895	$ —
Cash paid for income taxes	$ 1,057	$ 642	$ 557
Cash paid for interest	$ 406	$ 298	$ 280

See accompanying notes.

1. Description of Business

Nature of Business and Organization

We are a provider of market infrastructure, data services and technology solutions to a broad range of customers including financial institutions, corporations and government entities. These products, which span major asset classes including futures, equities, fixed income and United States, or U.S., residential mortgages, provide our customers with access to mission critical tools that are designed to increase asset class transparency and workflow efficiency.

- In our Exchanges segment, we operate regulated marketplaces for the listing, trading and clearing of a broad array of derivatives contracts and financial securities.
- In our Fixed Income and Data Services segment, we provide fixed income pricing, reference data, indices, analytics and execution services as well as global credit default swap, or CDS, clearing and multi-asset class data delivery solutions.
- In our Mortgage Technology segment, we provide an end-to-end technology platform that offers customers comprehensive, digital workflow tools that aim to address the inefficiencies that exist in the U.S. residential mortgage market.

We operate marketplaces, technology and provide data services in the U.S., United Kingdom, or U.K., European Union, or EU, Canada, Asia Pacific and the Middle East.

2. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying consolidated financial statements have been prepared by us in accordance with U.S. generally accepted accounting principles, or U.S. GAAP. These statements include the accounts of our wholly-owned and controlled subsidiaries. For consolidated subsidiaries in which our ownership is less than 100% and for which we have control over the assets and liabilities and the management of the entity, the outside stockholders' interests are shown as non-controlling interests.

All intercompany balances and transactions between us and our wholly-owned and controlled subsidiaries have been eliminated in consolidation. The financial results of companies we acquire are included from the acquisition dates and the results of companies we sold are included up to the disposition dates. The accounting policies used to prepare these financial statements are the same as those used to prepare the consolidated financial statements in prior years except as described in these footnotes or for the adoption of new standards as outlined below.

Use of Estimates

Preparing financial statements in conformity with U.S. GAAP requires us to make certain estimates and assumptions that affect the amounts reported in our consolidated financial statements and accompanying disclosures. Actual amounts could differ from those estimates.

Comprehensive Income

Other comprehensive income includes foreign currency translation adjustments, comprehensive income from a change in an equity method investment, and amortization of the difference in the projected benefit obligation and the accumulated benefit obligation associated with benefit plan liabilities, net of tax.

Segment and Geographic Information

As of December 31, 2021, our business is conducted through three reportable business segments: our Exchanges segment, our Fixed Income and Data Services segment, and our Mortgage Technology segment. This presentation is reflective of how our chief operating decision maker reviews and operates our business. The majority of our identifiable assets are located in the U.S and U.K. (Note 18).

Cash and Cash Equivalents, Short-Term and Long-Term Restricted Cash and Cash Equivalents, and Cash and Cash Equivalent Margin Deposits and Guaranty Funds

Cash and Cash Equivalents

We consider all short-term, highly liquid investments with maturities of three months or less at the time of purchase to be cash equivalents.

Short-Term and Long-Term Restricted Cash and Cash Equivalents

We classify all cash and cash equivalents that are not available for immediate or general business use by us as restricted in the accompanying consolidated balance sheets (Note 6). This includes amounts set aside due to regulatory requirements, earmarked for specific purposes, or restricted by specific agreements. We also invest a portion of funds in excess of short-term operating needs in term deposits and investment-grade marketable debt securities, including government or government-sponsored agencies and corporate debt securities. These are classified as cash equivalents, are short-term in nature and carrying amount approximates fair value.

Cash and Cash Equivalent Margin Deposits and Guaranty Funds (Cash and Cash Equivalent Margin)

Original margin, variation margin and guaranty funds received by our clearing houses may be in the form of cash, government obligations, certain agency debt, letters of credit or on rare occasions, gold (Note 14). We hold the cash deposits at central banks, highly-rated financial institutions or at times secure the cash through reverse repurchase agreements or direct investments, certain of which are not cash equivalents. See "Credit Risk and Significant Customers", below. Although not included in short term restricted cash and cash equivalents, cash and cash equivalent margin represent a form of restricted cash. The amount of cash and cash equivalent margin deposits on hand will fluctuate over time as a result of, among other things, the extent of open positions held at any point in time by market participants in contracts and the margin rates then in effect for such contracts, as well as the extent to which we invest in non-cash and cash equivalents.

Consolidated Statement of Cash Flows Presentation

As of December 31, 2021, we revised our consolidated statements of cash flows to include changes in cash and cash equivalent margin within cash flows from financing activities and changes in invested margin deposits within cash flows from investing activities. This immaterial revision did not have an effect on our previously reported consolidated balance sheets, statements of income, statements of comprehensive income, or statements of changes in equity and redeemable non-controlling interest or the related disclosures. Cash and cash equivalent margin amounts cannot be used to satisfy the Company's operating or other liabilities, as further discussed in Note 14. The following table summarizes the immaterial revisions to our historical consolidated statements of cash flows for each of the years presented (in millions):

	As of December 31, 2020			As of December 31, 2019		
	As Previously Presented	Adjustment	As Adjusted	As Previously Presented	Adjustment	As Adjusted
Purchases of invested margin deposits (within investing activities)	$ —	$ (3,371)	$ (3,371)	$ —	$ (1,890)	$ (1,890)
Proceeds from sales of invested margin deposits (within investing activities)	—	2,840	2,840	—	744	744
Net cash used in investing activities	(9,830)	(531)	(10,361)	(594)	(1,146)	(1,740)
Change in cash and cash equivalent margin deposits and guaranty funds (within financing activities)	—	19,256	19,256	—	1,329	1,329
Net cash provided by (used in) financing activities	6,744	19,256	26,000	(1,753)	1,329	(424)
Net (decrease) increase in cash, cash equivalents, restricted cash and cash equivalents, and cash and cash equivalent margin deposits and guaranty funds	(197)	18,725	18,528	316	183	499
Cash, cash equivalents, restricted cash and cash equivalents, and cash and cash equivalent margin deposits and guaranty funds at beginning of year	2,188	62,903	65,091	1,872	62,720	64,592
Cash, cash equivalents, restricted cash and cash equivalents, and cash and cash equivalent margin deposits and guaranty funds at end of year	$ 1,991	$ 81,628	$ 83,619	$ 2,188	$ 62,903	$ 65,091

A reconciliation of the components of cash, cash equivalents, restricted cash and cash equivalents, and cash and cash equivalent margin deposits and guaranty funds as presented in the consolidated statements of cash flows to the balance sheet is as follows (in millions):

	As of December 31, 2021	As of December 31, 2020	As of December 31, 2019	As of December 31, 2018
Cash and cash equivalents	$ 607	$ 583	$ 841	$ 724
Short-term restricted cash and cash equivalents	1,035	1,000	943	818
Long-term restricted cash and cash equivalents	398	408	404	330
Cash and cash equivalent margin deposits and guaranty funds	145,936	81,628	62,903	62,720
Total	$ 147,976	$ 83,619	$ 65,091	$ 64,592

Investments

We have made various investments in the equity securities of other companies. We also invest in mutual funds and fixed income securities. We classify all other investments that are not cash equivalents with original maturity dates of less than one year as short-term investments and all investments that we intend to hold for more than one year as long-term investments. Short-term and long-term investments are included in other current and other non-current assets, respectively, in the accompanying consolidated balance sheets.

Equity Investments

Investments in equity securities, or equity investments, are carried at fair value, with changes in fair value, whether realized or unrealized, recognized in net income. For those investments that we do not control and which do not have readily determinable fair market values, such as those which are not publicly-listed companies, we have made a fair value policy election under ASU No. 2016-01, *Financial Instruments - Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities,* or ASU 2016-01. The election requires us to only adjust the fair value of such investments if and when there is an observable price change in an orderly transaction of a similar or identical investment, with any change in fair value recognized in net income.

Equity Method Investments

When we do not have a controlling financial interest in an entity but exercise significant influence over the entity's operating and financial policies, such investments are accounted for using the equity method and included in other non-current assets. We recognize dividends when declared as a reduction in the carrying value of our equity method investments. We evaluate our equity method investments for impairment whenever events or changes in circumstances indicate that a decline in value has occurred that is other than temporary. If the investment is determined to have a decline in value deemed to be other than temporary it is written down to estimated fair value. We did not identify impairment associated with our equity method investments as of December 31, 2021.

Property and Equipment

Property and equipment is recorded at cost, reduced by accumulated depreciation (Note 7). Depreciation and amortization is computed using the straight-line method based on estimated useful lives of the assets, or in the case of leasehold improvements, the shorter of the initial lease term or the estimated useful life of the improvement. We review the remaining estimated useful lives at each balance sheet date and make adjustments whenever events or changes in circumstances indicate that the remaining useful lives have changed. Gains on disposals are included in other income and losses on disposals are included in depreciation expense. Maintenance and repair costs are expensed as incurred.

Allowance for Doubtful Accounts

On January 1, 2020, we adopted ASU 2016-13, *Financial Instruments - Measurement of Credit Losses on Financial Instruments*, or ASU 2016-13. Under ASU 2016-13, we estimate our allowance for doubtful accounts using an aging method, disaggregated based on major revenue stream categories as well as other unique revenue stream factors. The allowance for doubtful accounts is maintained at a level that we believe to be sufficient to absorb probable losses over the expected life in our accounts receivable portfolio. The allowance is based on several factors, including continuous assessments of risk characteristics, specific customer events that may impact its ability to meet its financial obligations, and other reasonable and supportable economic characteristics. Accounts receivable are written-off against the allowance for doubtful accounts when collection efforts cease. See "Adoption of ASU 2016-13, *Financial Instruments - Measurement of Credit Losses on Financial Instruments*", below, for a reconciliation of the beginning and ending amount of allowance for doubtful accounts and other disclosures related to our adoption of ASU 2016-13.

Software Development Costs

We capitalize costs related to software we develop or obtain for internal use. The costs capitalized include both internal and external direct and incremental costs. General and administrative costs related to developing or obtaining such software are expensed as incurred. Development costs incurred during the preliminary or maintenance project stages are expensed as incurred. Costs incurred during the application development stage are capitalized and amortized using the straight-line method over the useful life of the software, generally not exceeding three years (except for certain ICE Data Services, ICE Mortgage Technology and NYSE platforms, which have seven-year useful lives). Amortization begins only when the software becomes ready for its intended use.

Accrued Employee Benefits

We have a defined benefit pension plan and other postretirement benefit plans, or collectively the “benefit plans,” covering certain of our U.S. operations. The benefit accrual for the pension plan is frozen. We recognize the funded status of the benefit plans in our consolidated balance sheets, measure the fair value of plan assets and benefit obligations as of the date of our fiscal year-end, and provide additional disclosures in the footnotes (Note 16).

Benefit plan costs and liabilities are dependent on assumptions used in calculating such amounts. These are provided by a third-party specialist and include discount rates, health care cost trend rates, benefits earned, interest cost, expected return on assets, mortality rates and other factors. Actual results that differ from the assumptions are accumulated and amortized over future periods and, therefore, generally affect recognized expense and the recorded obligation in future periods. However, certain of these unrecognized amounts are recognized when triggering events occur, such as when a settlement of pension obligations in excess of total interest and service costs occurs. While we believe that the assumptions used are appropriate, differences in actual experience or changes in assumptions may affect our pension and other post-retirement obligations and future expense recognized.

Goodwill and Indefinite-Lived Intangible Assets

Goodwill represents the excess of the purchase price of our acquisitions over the fair value of identifiable net assets acquired, including other identified intangible assets (Note 8). We recognize specifically-identifiable intangibles when a specific right or contract is acquired with the assistance of third-party valuation specialists. Goodwill has been allocated to our reporting units for purposes of impairment testing based on the portion of synergy, cost savings and other expected future cash flows expected to benefit the reporting units at the time of the acquisition. Our reporting units were updated in 2020 to reflect our new segment presentation. The reporting units identified for our goodwill testing are the NYSE, Other Exchanges, Fixed Income and Data Services, and Mortgage Technology reporting units. Goodwill impairment testing is performed annually at the reporting unit level in the fiscal fourth quarter or more frequently if conditions exist that indicate that it may be impaired, or if changes are made to the reporting units. In 2020, we performed a goodwill impairment test prior to and after the change in our reporting units.

We also evaluate indefinite-lived intangible assets for impairment annually in our fiscal fourth quarter or more frequently if conditions exist that indicate that an asset may be impaired.

For both goodwill and indefinite-lived impairment testing we have the option to first perform a qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit or indefinite lived intangible asset is less than its carrying amount. If the fair value of the goodwill or indefinite-lived intangible asset is less than its carrying value, an impairment loss is recognized in earnings in an amount equal to the difference. Alternatively, we may choose to bypass the qualitative option and perform quantitative testing to determine if the fair value is less than carrying value. For our goodwill impairment testing, we have elected to bypass the qualitative assessment and apply the quantitative approach. For our testing of indefinite-lived intangible assets, we apply qualitative and quantitative approaches.

Impairment of Long-Lived Assets and Finite-Lived Intangible Assets

We review our finite-lived intangible assets for impairment whenever events or changes in circumstances indicate that the carrying amount may not be fully recoverable. When these indicators exist, we project undiscounted net future cash flows over the remaining life of such assets. If the sum of the projected cash flows is less than the carrying amount, an impairment would exist, measured based upon the difference between the carrying amount and the fair value of the assets. Finite-lived intangible assets are generally amortized using the straight-line method or an accelerated method over the lesser of their contractual or estimated useful lives.

Derivatives and Hedging Activity

Periodically, we may use derivative financial instruments to manage exposure to changes in currency exchange rates. All derivatives are recorded at fair value. We generally do not designate these derivatives as hedges for accounting purposes. Accordingly, changes in fair value are recognized in income.

We entered into foreign currency hedging transactions during 2021, 2020 and 2019 as economic hedges to help mitigate a portion of our foreign exchange risk exposure. The gains and losses on these transactions were not material during these years.

Intellectual Property

All costs related to internally developed patents and trademarks are expensed as incurred. All costs related to purchased patents, trademarks and internet domain names are recorded as other intangible assets and are amortized using a straight-line method over their estimated useful lives. All costs related to licensed patents are capitalized and amortized using a straight-line method over the term of the license.

Income Taxes

We recognize income taxes under the liability method. We recognize a current tax liability or tax asset for the estimated taxes payable or refundable on tax returns for the current year. We recognize deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the financial statement carrying amounts and the tax bases of assets and liabilities. We establish valuation allowances if we believe that it is more likely than not that some or all of our deferred tax assets will not be realized. Deferred tax assets and liabilities are measured using current enacted tax rates in effect. We do not recognize a tax benefit unless we conclude that it is more likely than not that the benefit will be sustained on audit by the taxing authority based solely on the technical merits of the associated tax position. If the recognition threshold is met, we recognize a tax benefit measured at the largest amount of the tax benefit that, in our judgment, is greater than 50 percent likely to be realized. We recognize accrued interest and penalties related to uncertain tax positions as a component of income tax expense. We recognize the tax effects related to Global Intangible Low-Taxed Income in the period it is incurred.

We are subject to tax in numerous domestic and foreign jurisdictions primarily based on our operations in these jurisdictions. Significant judgment is required in assessing the future tax consequences of events that have been recognized in our financial statements or tax returns. Fluctuations in the actual outcome of these future tax consequences could have a material impact on our financial position or results of operations.

We use a portfolio approach with respect to pension, postretirement benefits plan obligations and currency translation matters when we determine the timing and extent to which stranded income tax effects from items that were previously recorded in accumulated other comprehensive income are released.

Revenue Recognition

Our revenues primarily consist of revenues for transactions executed and/or cleared through our global electronic derivatives trading and clearing exchanges and cash equities trading as well as revenues related to our fixed income, data services, mortgage technology services and listings. We recognize revenue when we transfer promised goods or services to customers in an amount that reflects the consideration to which we expect to be entitled in exchange for those goods or services. We enter into contracts that can include various combinations of products and services, which are generally capable of being distinct and accounted for as separate performance obligations. We also evaluate all contracts in order to determine appropriate gross versus net revenue reporting.

Substantially all of our revenues are considered to be revenues from contracts with customers. The related accounts receivable balances are recorded in our balance sheets as customer accounts receivable. We do not have obligations for warranties, returns or refunds to customers, other than rebates, which are settled each period and therefore do not result in variable consideration. We do not have significant revenue recognized from performance obligations that were satisfied in prior periods, and we do not have any transaction price allocated to unsatisfied performance obligations other than in our deferred revenue. Certain judgments and estimates are used in the identification and timing of satisfaction of performance obligations and the related allocation of transaction price. We believe that these represent a faithful depiction of the transfer of services to our customers.

Deferred revenue represents our contract liabilities related to our annual, original and other listings revenues, certain data services, clearing services, mortgage technology services and other revenues. Deferred revenue is our only significant contract asset or liability. See Note 9 for our discussion of deferred revenue balances, activity, and expected timing of recognition.

We have elected not to provide disclosures about transaction price allocated to unsatisfied performance obligations if contract durations are less than one year, or if we are not required to estimate the transaction price. For all of our contracts with customers, except for listings and certain data, mortgage and clearing services, our performance obligations are short term in nature and there is no significant variable consideration. In addition, we have elected the practical expedient of excluding sales taxes from transaction prices. We have assessed the costs incurred to obtain or fulfill a contract with a customer and determined them to be immaterial.

Activity Assessment Fees and Section 31 Fees

We pay the Securities and Exchange Commission, or SEC, fees pursuant to Section 31 of the Securities Exchange Act of 1934 for transactions executed on our U.S. equities and options exchanges. These Section 31 fees are designed to recover the costs to the government for supervising and regulating the securities markets and securities professionals. We (or the Options Clearing Corporation, or OCC, on our behalf), in turn, collect activity assessment fees, which are included in exchanges revenues in the accompanying consolidated statements of income, from member organizations clearing or settling trades on the U.S. equities and options exchanges and recognize these amounts as revenue when invoiced. Fees received are included in cash at the time of receipt and, as required by law, the amount due to the SEC is remitted semi-annually and recorded as an accrued liability until paid. The activity assessment fees are designed so that they are equal to the Section 31 fees paid by us to the SEC. As a result, Section 31 fees do not have an impact on our net income.

Stock-Based Compensation

We currently sponsor stock option plans, restricted stock plans and our Employee Stock Purchase Plan, or ESPP, to provide additional and incentive-based compensation to our employees and directors (Note 11). Stock options and restricted stock are granted at the discretion of the Compensation Committee of the Board of Directors. We measure and recognize compensation expense for share-based payment awards, including employee stock options, restricted stock and shares purchased under the ESPP based on estimated fair values on the date of grant. The value of the portion of the award that is ultimately expected to vest is recognized as stock-based compensation expense over the requisite service period.

We use the Black-Scholes pricing model to value stock option awards as well as shares purchased as part of our ESPP. The values estimated by the model are affected by the price of our stock as well as subjective variables that include assumed interest rates, our expected dividend yield, our expected share price volatility over the term of the awards and actual and projected employee stock option exercise behavior. Under our ESPP, employees may purchase shares of our common stock at a price equal to 85% of the lesser of the fair market value of the stock on the first or the last trading day of each offering period. We record compensation expenses related to the discount given to our participating employees.

Treasury Stock

We record treasury stock activities under the cost method whereby the cost of the acquired stock is recorded as treasury stock (Note 12). In the event it occurs in the future, our accounting policy upon the formal retirement of treasury stock is to deduct the par value from common stock and to reflect any excess of cost over par value as a deduction from additional paid-in capital (to the extent created by previous issuances of the shares) and retained earnings.

Credit Risk and Significant Customers

Our clearing houses are exposed to credit risk as a result of maintaining clearing member cash deposits at various financial institutions (Note 14). Cash deposit accounts are established at large, highly-rated financial institutions and entered into so that they restrict the rights of offset or imposition of liens by the banks. We also limit our risk of loss by holding the majority of the cash deposits in cash accounts at the Federal Reserve Bank of Chicago, high quality short-term sovereign debt reverse repurchase agreements with several different counterparty banks or direct investments in short-term high quality sovereign and supranational debt issues primarily with original maturities of less than three months. While we seek to achieve a reasonable rate of return which may generate interest income for our clearing members, we are primarily concerned with preservation of capital and managing the risks associated with these deposits. As the clearing houses may pass on interest revenues, minus costs, to the members, this could include negative or reduced yield due to market conditions.

When engaging in reverse repurchase agreements, our clearing houses take delivery of the underlying securities in custody accounts under clearing house control. Additionally, the securities purchased have a market value greater than the reverse repurchase amount. The typical haircut received for high quality sovereign debt is 2% of the reverse repurchase amount. Thus, in the event that a reverse repurchase counterparty defaults on its obligation to repurchase the underlying reverse repurchase securities, our clearing house will have possession of securities with a value potentially greater than the reverse repurchase counterparty’s obligation to the clearing house.

ICE Clear Credit, a systemically important financial market utility as designated by the Financial Stability Oversight Council, maintains a U.S. dollar account at the Federal Reserve Bank of Chicago as of December 31, 2021. ICE Clear Europe maintains a euro-denominated account at the European Central Bank, or ECB, the central bank of the Netherlands, as well as pounds sterling- and euro-denominated accounts at the Bank of England, or BOE, the central bank of the U.K. These accounts provide the flexibility for ICE Clear Europe to place euro- and pounds sterling-denominated cash margin securely at national banks, in particular during periods when liquidity in the euro and pounds sterling repo markets may temporarily become contracted. Such accounts are intended to decrease ICE Clear Credit and ICE Clear Europe’s custodial, liquidity and operational risk as compared to alternative custodial and investment arrangements.

Our futures businesses have minimal credit risk as the majority of their transaction revenues are currently cleared through our clearing houses. Our accounts receivable related to fixed income and data services revenues, cash trading, listing revenues, technology revenues, CDS and bilateral OTC energy transaction revenues and mortgage technology services subjects us to credit (collection) risk, as we do not require these customers to post collateral. We limit our risk of loss by terminating a customer's ability to remain listed or receive data or terminating other services for entities with delinquent accounts. The concentration of risk on accounts receivable is also mitigated by the large number of entities comprising our customer base.

Our accounts receivable are stated at the billed amount. Excluding clearing members, there were no individual accounts receivable balances greater than 10% of total consolidated accounts receivable as of December 31, 2021 or December 31, 2020. No single customer accounted for more than 10% of total consolidated revenues, less transaction-based expenses, during 2021, 2020 or 2019.

Leases

Operating lease right-of-use assets and liabilities are recorded at the lease commencement date based on the present value of the lease payments to be made over the lease term using an estimated incremental borrowing rate. We expense rent monthly on a straight-line basis, as a reduction to the right-of-use asset. Rent expense is included in rent and occupancy expenses and technology and communication expenses in the accompanying consolidated statements of income (Notes 2 and 15). See "Recently Adopted Accounting Pronouncements," below, for the lease accounting standard that we adopted on January 1, 2019 and its impact on our financial statements.

Acquisition-Related Transaction and Integration Costs

We incur incremental costs relating to our completed and potential acquisitions and other strategic opportunities. This includes fees for investment banking advisors, lawyers, accountants, tax advisors and public relations firms, as well as costs associated with credit facilities and other external costs directly related to the proposed or closed transactions.

The acquisition-related transaction and integration costs incurred during 2021 are primarily related to our integration of Ellie Mae and the Bakkt transaction (Note 3). The acquisition-related transaction and integration costs incurred during 2020 primarily relate to costs incurred for our acquisitions of Ellie Mae and Bridge2 Solutions. Acquisition-related transaction and integration costs were nominal in 2019.

Fair Value of Financial Instruments

Fair value is the price that would be received from selling an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants at the measurement date. Our financial instruments consist primarily of certain short-term and long-term assets and liabilities, customer accounts receivable, margin deposits and guaranty funds, equity and equity method investments, and short-term and long-term debt (Note 17).

The fair value of our financial instruments is measured based on a three-level hierarchy:

- **Level 1 inputs** — quoted prices for identical assets or liabilities in active markets.
- **Level 2 inputs** — observable inputs other than Level 1 inputs such as quoted prices for similar assets and liabilities in active markets or inputs other than quoted prices that are directly observable.
- **Level 3 inputs** — unobservable inputs supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

Foreign Currency Translation Adjustments and Foreign Currency Transaction Gains and Losses

Our functional and reporting currency is the U.S. dollar. We have exposure to foreign currency translation gains and losses arising from our net investment in certain U.K., continental European, Asian and Canadian subsidiaries. The revenues, expenses and financial results of these subsidiaries are recorded in the functional currency of the countries that these subsidiaries are located in, which are primarily pounds sterling and euros. The financial statements of these subsidiaries are translated into U.S. dollars using a current rate of exchange, with gains or losses, net of tax as applicable, included in the cumulative translation adjustment account, a component of equity. As of December 31, 2021 and 2020, the portion of our equity attributable to accumulated other comprehensive loss from foreign currency translation adjustments was $150 million and $134 million, respectively.

We have foreign currency transaction gains and losses related to the settlement of foreign currency denominated assets, liabilities and payables that occur through our operations. These transaction gains and losses are due to the increase or decrease in the foreign currency exchange rates between periods. Forward contracts on foreign currencies are entered into to manage the foreign currency exchange rate risk. Gains and losses from foreign currency transactions are included in other income (expense) in the accompanying consolidated statements of income and resulted in net losses of $13 million, $5 million and $5 million in 2021, 2020 and 2019, respectively.

Earnings Per Common Share

Basic earnings per common share is calculated using the weighted average common shares outstanding during the year. Common equivalent shares from stock options and restricted stock awards, using the treasury stock method, are included in the diluted per share calculations unless the effect of inclusion would be antidilutive (Note 19).

Recently Adopted Accounting Pronouncements

Standard/Description	Effective Date and Adoption Considerations	Effect on Financial Statements
ASU No. 2016-13, *Financial Instruments - Measurement of Credit Losses on Financial Instruments,* applies to all financial instruments carried at amortized cost including held-to-maturity debt securities and accounts receivable. It requires financial assets carried at amortized cost to be presented at the net amount expected to be collected and requires entities to record credit losses through an allowance for credit losses on available-for-sale debt securities.	We adopted on January 1, 2020 on a modified retrospective basis.	We evaluated this guidance to determine the impact on our consolidated financial statements. Based on our assessment, we concluded the impact of adoption of this guidance was not material. Further disclosures and details on our adoption are discussed below.
ASU 2017-04, *Simplifying the Test for Goodwill Impairment,* removes the second step of the goodwill impairment test, which requires a hypothetical purchase price allocation if the fair value of a reporting unit is less than its carrying value. Goodwill impairment will now be measured using the difference between the carrying value and the fair value of the reporting unit, and any loss recognized should not exceed the total amount of goodwill allocated to that reporting unit.	We adopted on January 1, 2020 on a prospective basis.	We evaluated this guidance to determine the impact on our consolidated financial statements. Based on our assessment, we concluded the impact of adoption of this guidance was not material. The fair values of our reporting units have been greater than their corresponding carrying values in recent years. Changes in future projections, market conditions, and other factors may cause a change in the excess of fair value of our reporting units over their corresponding carrying values.
ASU 2018-15, *Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement that is a Service Contract,* helps entities evaluate the accounting for fees paid by a customer in a cloud computing arrangement by providing guidance for determining when an arrangement includes a software license and is solely a hosted service. Customers will now apply the same criteria for capitalizing implementation costs as they would for a software license arrangement. The guidance also prescribes the balance sheet, income statement, and cash flow classification of the capitalized implementation costs and related amortization expense, and requires additional quantitative and qualitative disclosures.	We adopted on January 1, 2020 and apply the rules prospectively to eligible costs incurred on or after the effective date.	We evaluated this guidance to determine the impact on our consolidated financial statements. Based on our assessment, we concluded the impact of adoption of this guidance was not material.
ASU No. 2019-12, *Simplifying the Accounting for Income Taxes*, eliminates certain exceptions related to the approach for intraperiod tax allocation, the methodology for calculating income taxes in an interim period and the recognition of deferred tax liabilities for outside basis differences. It clarifies that single-member limited liability companies, and other similar disregarded entities that are not subject to income tax, are not required to recognize an allocation of consolidated income tax expense in their separate financial statements. Further, it simplifies the accounting for franchise taxes, enacted changes in tax laws or rates and transactions that result in a step-up in the tax basis of goodwill.	Effective for fiscal years beginning after December 15, 2020 with early adoption permitted. We elected early adoption and adopted on January 1, 2020.	We evaluated this guidance to determine the impact on our consolidated financial statements. Based on our assessment, we concluded the impact of adoption of this guidance was not material.

Standard/Description	Effective Date and Adoption Considerations	Effect on Financial Statements
ASU No. 2016-02, *Leases,* requires entities to recognize both assets and liabilities arising from finance and operating leases, along with additional qualitative and quantitative disclosures.	Adopted on January 1, 2019.	Further disclosures and details on our adoption are discussed below.
ASU 2018-07, *Compensation–Stock Compensation (Topic 718) - Improvements to Nonemployee Share-Based Payment Accounting*, or ASU 2018-07 aligns the accounting for share-based payment awards issued to employees and nonemployees. Under this new guidance, the existing employee guidance will now apply to nonemployee share-based transactions.	Effective for fiscal years beginning after December 15, 2018. Adopted on January 1, 2019.	This guidance is applied to all new awards granted after the date of adoption, and adoption did not have a material impact on our consolidated financial statements or related disclosures.
ASU 2018-14, *Compensation-Retirement Benefits-Defined Benefit Plans — General (Subtopic 715-20): Disclosure Framework-Changes to the Disclosure Requirements for Defined Benefit Plans*, or ASU 2018-14 was issued in August 2018 and removes certain disclosures that are not considered cost beneficial, clarifies certain required disclosures and adds additional disclosures.	Effective for fiscal years beginning after December 15, 2020 with early adoption permitted. We elected early adoption and adopted on December 31, 2019. The amendments in ASU 2018-14 are required to be applied retrospectively.	Upon adoption we eliminated certain disclosure requirements related to our defined benefit plans that were previously disclosed in Note 16. Certain other disclosure requirements described in Subtopic 715-20 were not applicable to us.

We do not currently expect that any pending accounting pronouncements will have a material impact on our financial statements.

Adoption of ASU 2016-02, *Leases*

On January 1, 2019, we adopted Accounting Standards Update, or ASU, 2016-02, *Leases*, or ASU 2016-02. This standard requires recognition of both assets and liabilities arising from finance and operating leases, along with additional qualitative and quantitative disclosures. ASU 2016-02 requires lessees to recognize a right-of-use asset representing a right to use the underlying asset over the lease term, and a corresponding lease liability on the balance sheet. Our operating leases primarily relate to our leased office space and data center facilities, and we do not have any leases classified as finance leases.

We adopted ASU 2016-02 using the modified retrospective transition method and did not restate prior periods. Using the modified retrospective approach, we applied the provisions of ASU 2016-02 beginning in the period of adoption, and elected the package of practical expedients available to us. There was no impact to the opening balance of retained earnings as a result of a cumulative-effect adjustment on the adoption date.

At lease inception, we review the service arrangement and components of a contract to identify if a lease or embedded lease arrangement exists. An indicator of a contract containing a lease is when we have the right to control and use an identified asset over a period of time in exchange for consideration. Operating lease right-of-use assets and liabilities are recognized at the commencement date based on the present value of lease payments over the lease term, using our estimated incremental borrowing rate. We utilize the short-term lease policy election to recognize leases with a term of 12 months or less as lease expense on a straight-line basis over the lease term and do not recognize these short-term leases on our balance sheet. We have elected the practical expedient of not separating lease and non-lease components as our lease arrangements are not highly dependent on other underlying assets. We have also made policy elections related to capitalization thresholds and discount rates. We have elected to use a portfolio approach in consideration of our incremental borrowing rate to our population of lease agreements. Our incremental borrowing rate is determined based on indicative new issue pricing estimates reflecting our existing debt issuances and comparable industry debt issuances. Certain lease agreements include options to extend, renew or terminate the lease agreement. Our lease agreements do not contain any residual value guarantees. As of December 31, 2021, the weighted-average remaining lease term was 5.1 years and the weighted average discount rate was 3.1%. As of December 31, 2020, the weighted-average remaining lease term was 5.8 years and the weighted average discount rate was 3.1%. Our lease agreements do not contain any residual value guarantees.

We recognize rent expense monthly on a straight-line basis for each respective operating lease, as a reduction to the right-of-use asset. We recognized $61 million, $46 million and $41 million of rent expense for office space as rent and occupancy expense in 2021, 2020, and 2019, respectively, and $24 million, $22 million and $21 million of rent expense for data center facilities as technology and communication expense in 2021, 2020, and 2019, respectively, within our consolidated income statement. We do not have any significant variable lease costs related to building and maintenance costs, real estate taxes, or other charges.

Details of our lease asset and liability balances are as follows (in millions):

	As of December 31, 2021	As of December 31, 2020	As of January 1, 2019
Right-of-use lease assets	$ 278	$ 339	$ 287
Current operating lease liability	72	69	53
Non-current operating lease liability	252	320	281
Total operating lease liability	$ 324	$ 389	$ 334

As of December 31, 2021, we estimate that our operating lease liability will be recognized in the following years (in millions):

2022	$ 82
2023	69
2024	65
2025	51
2026	31
Thereafter	52
Lease liability amounts repayable	$ 350
Interest costs	26
Total operating lease liability	$ 324

Supplemental cash flow information and non-cash activity related to our operating leases are as follows:

	Year Ended December 31, 2021	Year Ended December 31, 2020
Cash paid for amounts included in the measurement of operating lease liability	$ 91	$ 72
Right-of-use assets obtained in exchange for operating lease obligations	$ 13	$ 117

Adoption of ASU 2016-13, *Financial Instruments - Measurement of Credit Losses on Financial Instruments*

On January 1, 2020, we adopted ASU 2016-13. This standard requires the application of a current expected credit loss, or CECL, impairment model to financial assets measured at amortized cost, including accounts receivable and certain off-balance-sheet credit exposures. The standard also amends the impairment model for available-for-sale debt securities requiring entities to record credit losses through an allowance account. The CECL model requires an entity to estimate its lifetime expected credit loss and record an allowance that, when deducted from the amortized cost basis of the financial asset, presents the net amount expected to be collected on the financial asset.

We adopted ASU 2016-13 using the modified retrospective approach through a cumulative-effect adjustment to retained earnings on January 1, 2020. ASU 2016-13 primarily impacted the calculation of our allowance for doubtful accounts on accounts receivable utilizing the expected credit losses model. We do not currently hold available-for-sale debt securities, off-balance-sheet credit exposures, or other material financial assets impacted by the standard, besides those mentioned below.

We consider our material financial assets within scope, including our cash equivalents, short-term and long-term restricted cash equivalents as well as our clearing members' cash equivalent and reverse repurchase receivables, and determined that such assets have a de minimis risk of credit loss. We invest our cash and clearing members' cash by placing it in highly-rated government securities, primarily U.S. Treasury securities and other sovereign debt with original maturities of less than three months which we consider to be cash equivalents, or into reverse repurchase agreements, referred to as reverse repos, with primarily overnight maturities. Reverse repos are valued daily and are subject to collateral maintenance provisions whereby the counterparty must provide additional collateral if the value of the underlying securities lose value, in an amount sufficient to maintain collateralization of at least 102%. Therefore, as of and for the year ended December 31, 2021 we have not recorded a credit loss for these financial assets.

Based on the high turnover and collectability of our accounts receivable, the mitigated default and concentration risks due to the high quality and large number of entities comprising our customer base, and the monthly billing process for the majority of our revenue, we have not experienced a significant increase in the loss provision recognized upon adoption of the CECL model.

We estimate our allowance for doubtful accounts using an aging method, disaggregated based on major revenue stream categories as well as other unique revenue stream factors. At each measurement date we reassess whether our accounts receivable pools continue to exhibit similar risk characteristics. We then determine if assets need to be isolated further as part of their own specific line item reserve due to specific events, such as a customer's inability to meet its financial obligations (i.e. customer disputes, highly unresponsive customers, delinquency of the receivable, or other indicators of credit deterioration of customers). Lastly, the CECL standard is forward-looking and requires us to factor reasonable and supportable economic expectations into our allowance estimate for the asset's entire expected life, which is generally less than one year.

A reconciliation of the beginning and ending amount of allowance for doubtful accounts is as follows for the years ended December 31, 2021, 2020, and 2019 (in millions):

	Year Ended December 31,		
	2021	2020	2019
Beginning balance of allowance for doubtful accounts	$ 27	$ 8	$ 7
Impact of adoption of ASU 2016-13	—	13	—
Bad debt expense	13	16	10
Charge-offs	(16)	(10)	(9)
Ending balance of allowance for doubtful accounts	$ 24	$ 27	$ 8

The impact of our adoption of ASU 2016-13 was $10 million, net of tax. We recorded this impact as an adjustment to retained earnings on January 1, 2020 as shown in our Consolidated Statement of Changes in Equity and Redeemable Non-Controlling Interest. We have included in our allowance assessment the impact of and our responses to the coronavirus, or COVID-19, pandemic. Our bad debt expense, which is included in selling, general and administive expense in our statements of income, in the table above includes that assessment, the impact of which was not material for the years ended December 31, 2021 or 2020. We will continue to review our accounts receivable and may incur future charge-offs as better estimates become available in future periods. Charge-offs in the table above represent the write-off of uncollectible receivables, net of recoveries. These amounts also include the impact of foreign currency translation adjustments.

3. Acquisitions and Divestitures

Acquisitions

Company	Acquisition Date	Primary Segment	Description
Ellie Mae Intermediate Holdings I, Inc., and its indirect wholly owned subsidiary, Ellie Mae, Inc. (collectively, Ellie Mae)	September 4, 2020	Mortgage Technology	Ellie Mae is a cloud-based technology solution provider for the mortgage finance industry, and expanded our ICE Mortgage Technology portfolio. Through its digital lending platform, Ellie Mae provides technology solutions to participants in the mortgage supply chain, including over 3,000 customers and thousands of partners and investors who participate on its open network. Originators rely on Ellie Mae to securely manage the exchange of data across the mortgage ecosystem to enable the origination of mortgages while adhering to various local, state and federal compliance requirements. See below for the Ellie Mae purchase price allocation and supplemental pro forma financial information.

Company	Acquisition Date	Primary Segment	Description
Bridge2 Solutions	February 21, 2020	Exchanges	Bridge2 Solutions is a leading provider of loyalty solutions for merchants and consumers. Bridge2 Solutions enables some of the world's leading brands to engage customers and drive loyalty. It powers incentive and employee perk programs for companies across a wide spectrum of industries. As of October 31, 2021, following the Bakkt transaction discussed below, we no longer consolidate Bridge2 Solutions.
Simplifile, LC, or Simplifile	June 12, 2019	Mortgage Technology	Simplifile offers an array of mortgage services, primarily serving as an electronic liaison between lenders, settlement agents and county recording offices, streamlining the local recording of residential mortgage transactions and is now part of ICE Mortgage Technology. See below for the Simplifile purchase price allocation.

During 2021 and 2019, we acquired multiple companies which were not material to our operations.

Ellie Mae Acquisition

On September 4, 2020, we acquired Ellie Mae for aggregate consideration of $11.4 billion from private equity firm Thoma Bravo. The purchase price consisted of $9.5 billion in cash, as adjusted for $335 million of cash and cash equivalents held by Ellie Mae on the date of acquisition, and approximately $1.9 billion, or approximately 18.4 million shares of our common stock, based on our stock price on the acquisition date. ICE funded the cash portion of the purchase price with net proceeds from our offering of new senior notes in August 2020, together with the issuance of commercial paper and borrowings under a new senior unsecured term loan facility (Note 10). We have evaluated the impact of this acquisition and related disclosures under ASC 805- *Business Combinations.*

The purchase price has been allocated to the net tangible and identifiable intangible assets and liabilities based on the respective estimated fair values on the date of acquisition, as determined with the assistance of a third-party valuation specialist. The excess of purchase price over the net tangible and identifiable intangible assets has been recorded as goodwill. Goodwill represents potential revenue synergies related to new product development, various expense synergies and opportunities to enter new markets. The purchase price allocation is as follows (in millions):

	Purchase Price Allocation
Cash and cash equivalents	$ 335
Property and equipment	125
Goodwill	7,731
Identifiable intangibles	4,442
Other assets and liabilities, net	48
Deferred tax liabilities on identifiable intangibles	(1,253)
Total purchase price allocation	$ 11,428

In performing the purchase price allocation, we considered, among other factors, the intended future use of acquired assets, analysis of historical financial performance and estimates of future performance of the Ellie Mae business.

The following table sets forth the components of the intangible assets associated with the acquisition as of December 31, 2021 (in millions, except years):

	Acquisition-Date Fair Value	Accumulated Amortization	Net Book Value	Useful Life (Years)
Customer relationships	$ 3,136	$ (215)	$ 2,921	10 to 20
Backlog	300	(79)	221	5
Trademark/Tradenames	200	(14)	186	5 to 20
Developed Technology	739	(147)	592	7
In-process Research & Development	67	—	67	N/A
Total	$ 4,442	$ (455)	$ 3,987	

From the acquisition date through December 31, 2020, Ellie Mae revenues of $351 million, were included in our mortgage technology revenues, and operating expenses of $250 million were recorded in our consolidated income statement.

The financial information in the table below summarizes the combined results of operations of ICE and Ellie Mae, on a pro forma basis, as though the companies had been combined as of the beginning of the period presented. The unaudited pro forma financial information is presented for informational purposes only and is not indicative of the results of operations that would have been achieved if the acquisition had taken place at the beginning of the period presented. Such unaudited pro forma financial information is based on the historical financial statements of ICE and Ellie Mae. This unaudited pro forma financial information is based on estimates and assumptions that have been made solely for purposes of developing such unaudited pro forma information, including, without limitation, purchase accounting adjustments, interest expense on debt issued to finance the purchase price, acquisition-related transaction costs, the removal of historical Ellie Mae intangible asset amortization and the addition of intangible asset amortization related to this acquisition. The unaudited pro forma financial information does not reflect any synergies or operating cost reductions that have been and may be achieved from the combined operations. The unaudited pro forma financial information combines the historical results for us and Ellie Mae for 2020 in the following table (in millions, except per share amounts).

	Year Ended December 31,	
	2020	2019
Total revenues, less transaction-based expenses	$ 6,644	$ 5,832
Net income attributable to ICE	$ 2,193	$ 1,732

Transaction-based expenses included within revenues, less transaction-based expenses in the table above, were not impacted by pro forma adjustments and agree to the amounts presented historically in our consolidated income statements as they relate solely to ICE and not to Ellie Mae.

Bakkt Transaction

On October 15, 2021, Bakkt Holdings, LLC, or Bakkt, completed its merger with VPC Impact Acquisition Holdings, or VIH, a special purpose acquisition company sponsored by Victory Park Capital, or VPC. Bakkt is an integrated platform that enables customers and consumers to transact in digital assets.

The business combination between Bakkt and VIH resulted in enterprise value of approximately $2.1 billion, including approximately $479 million of cash on the combined company's balance sheet, reflecting a contribution of up to $123 million of cash held in VIH's trust account, and a $325 million concurrent private investment in public equity, or PIPE, of Class A common stock of the combined company and $31 million of cash held in Bakkt accounts. The PIPE was priced at $10.00 per share and included a $47 million commitment from us. The newly combined company has been renamed Bakkt Holdings, Inc. and is listed on the New York Stock Exchange, or NYSE.

As part of the transaction, Bakkt's existing equity holders and management rolled 100% of their equity into the combined company through a retained variable interest in Bakkt and are subject to a six-month lockup period. Certain shareholders of VIH exercised their redemption rights, and at closing, Bakkt equity holders, including ICE, owned approximately 81% of the combined company, VIH's public shareholders owned approximately 5%, VPC owned 2%, and PIPE investors (a group that also includes us) owned approximately 12% of the issued and outstanding equity of the combined company.

Following completion of the business combination, we initially held a 68% economic interest, which includes both our variable interest and PIPE investment. As a result of limitations on ICE from the Bakkt voting agreement entered into in connection with the transaction, we hold a minority voting interest in the combined company. Prior to the closing, Bakkt revenues and operating expenses were reported within our consolidated revenues and operating expenses. Following the closing, as a consequence of our inability to meet the power criterion through our variable interest and because of holding a minority voting interest in the combined company, during the fourth quarter of 2021 we deconsolidated Bakkt upon loss of control and prospectively treat it as an equity method investment within our financial statements. We recorded a pre-tax gain on the transaction of $1.4 billion during the fourth quarter of 2021, which is included in other non-operating income within our consolidated income statement. The pre-tax gain is a result of recording an equity method investment value of $1.7 billion plus the removal of our redeemable non-controlling interest liability of $107 million, partially offset by the deconsolidation of Bakkt net assets of $295 million and our additional PIPE contribution of $47 million.

The merger of Bakkt and VIH triggered a market condition event on the Bakkt equity incentive awards. As a result, during 2021, we incurred a $31 million non-cash compensation expense related to these awards which we recorded as an acquisition-related cost prior to deconsolidating Bakkt (Note 11).

Additional Bridge2 Solutions Acquisition Considerations

To fund the acquisition of Bridge2 Solutions, and prior to the Bakkt merger with VIH discussed above, Bakkt completed a capital call for $300 million in funding by ICE and the minority investors. This acquisition-related capital call triggered a market condition of certain Bakkt equity incentive awards, and as a result, we incurred a $10 million non-cash compensation expense in 2020 related to these awards which was recorded as an acquisition-related cost (Note 11).

Acquisition Purchase Prices and Allocation

The following summarizes our purchase price allocation for Bridge2 Solutions and Simplifile to the respective net tangible and identifiable intangible assets and liabilities based on their respective estimated fair values on the date of acquisition. For each acquisition, the excess of the purchase price over the net tangible and identifiable intangible assets has been recorded as goodwill. Cash consideration was gross of $12 million cash held by Simplifile on the date of its acquisition. For these acquisitions, revenues and expenses were not material to the periods presented.

	Acquisition Purchase Price Allocation (dollars in millions)			
	Bridge2 Solutions	Useful Life (Years)	Simplifile	Useful Life (Years)
Customer relationship intangibles	$ 54	12	$ 104	20
Developed technology intangibles	12	7	7	7
Trade name intangibles	—	1	2	5
Total identifiable intangible assets	$ 66		$ 113	
Goodwill	217		218	
Other working capital adjustments	(22)		7	
Total purchase price cash consideration	$ 261		$ 338	

Non-Controlling Interest

During 2020, we received a contribution from a group of minority investors for a non-controlling interest in ICE Futures Abu Dhabi.

Minority investors hold a net profit sharing interest in our CDS clearing subsidiaries of 26.7% ownership interest as of December 31, 2021.

In December 2018, Bakkt was capitalized with $183 million in initial funding with ICE as the majority owner, along with a group of other minority investors, and in March 2020, an additional $300 million in funding occurred with ICE maintaining its majority ownership. We held a call option over these interests subject to certain terms. Similarly, the non-ICE partners in Bakkt held a put option to require us to repurchase their interests subject to certain terms. These minority interests were reflected as redeemable non-controlling interests in temporary equity within our consolidated balance sheet. Following the October 2021 Bakkt merger discussed above, we no longer consolidate Bakkt and therefore do not record a redeemable non-controlling interest in Bakkt as of December 31, 2021.

4. Investments

Equity Investments Subject to ASU 2016-01

Our equity investments, including our investment in Euroclear plc, or Euroclear, among others, are subject to valuation under ASU 2016-01, *Financial Instruments- Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities,* or ASU 2016-01. See Note 17 for a discussion of our determination of fair value of our financial instruments.

Investment in Coinbase

On December 1, 2014, we acquired preferred stock of Coinbase Global, Inc., or Coinbase, which operates a cryptocurrency exchange platform, for $10 million, representing a 1.4% ownership share on a fully-diluted, as-converted basis. On April 14, 2021, Coinbase completed an initial public offering, or IPO. On April 15, 2021, we completed the sale of our investment in Coinbase for $1.24 billion and recorded a gain of $1.23 billion, or $892 million net of tax, as other income in our consolidated statement of income.

Investment in Euroclear

We own a 9.8% stake in Euroclear as of December 31, 2021 that we originally purchased for $631 million, and we participate on the Euroclear Board of Directors. Euroclear is a provider of post-trade services, including settlement, central securities depositories and related services for cross-border transactions across asset classes. We classify our investment in Euroclear as an equity investment.

In September 2021, we became aware of an observable price change in orderly transactions of similar Euroclear investments by a third party. The transactions resulted in a fair value adjustment of our Euroclear investment, and we recorded a gain of $34 million in other income, which includes the impact of foreign currency translation. Following the adjustment and as of December 31, 2021, the adjusted fair value of our Euroclear investment is $701 million. We are not aware of the occurrence of any observable price changes in orderly transactions of similar Euroclear investments since September 2021.

On October 18, 2021, we announced that we had reached an agreement to sell our entire 9.8% stake in Euroclear for €709 million. The sale is subject to customary closing conditions and regulatory approval. As a result of our expectation to sell our Euroclear investment, we include this investment in other current assets as of December 31, 2021.

Additionally, we recognized dividend income of $60 million and $19 million in 2021 and 2019, respectively, from Euroclear, included in other income. As a result of a 2020 European regulation limiting dividend payments, we did not receive a Euroclear dividend in 2020, but we received two dividend payments during 2021.

Equity Method Investments

We recognized ($42 million), $71 million and $62 million as other income/(expense) during 2021, 2020 and 2019, respectively, related to our equity method investments in OCC, BondLink, Inc., or BondLink and Bakkt, discussed below. BondLink and Bakkt became our equity method investments during 2021, and prior to that, as of December 31, 2020, OCC was our only equity method investment. Our equity method investments are included in other non-current assets in the accompanying consolidated balance sheets. Under the equity method of accounting, each reporting period we adjust the carrying value of our equity method investments on our balance sheet by recognizing our pro-rata share of the earnings or losses of each investment, with a corresponding adjustment in our statement of income to other income, after eliminating any intra-entity income or expenses. In addition, if and when our equity method investments issue cash dividends to us, we deduct the amount of these dividends from the carrying amount of that investment.

Investment in OCC

We own a 40% interest in OCC through a direct investment by the NYSE and which is regulated by the SEC and the Commodity Futures Trading Commission, or CFTC, that we treat as an equity method investment. OCC serves as a clearing house for securities options, security futures, commodity futures and options on futures traded on various independent exchanges. OCC clears securities options traded on NYSE Arca and NYSE Amex Options, along with other non-affiliated exchanges, and is regulated by the SEC as a registered clearing agency and by the CFTC as a derivatives clearing organization.

We recognized $51 million, $71 million and $62 million during 2021, 2020 and 2019, respectively, of equity earnings as our share of the OCC's estimated profits, which is included in other income.

Investment in BondLink, Inc.

On May 12, 2021, we made a 35.0% strategic investment in BondLink, a financial technology company that provides cloud-based debt management software solutions to governments financing infrastructure in the municipal bond market. The Series B investment is designed to accelerate BondLink’s growth and product development, including by providing a variety of our market-leading data sets to municipalities as they prepare to issue bonds. We treat BondLink as an equity method investment which is included in other non-current assets in the accompanying consolidated balance sheet, and we record equity earnings of our share of BondLink's estimated profits, which we include in other income.

Investment in Bakkt

Following Bakkt's October 15, 2021 merger with VIH, we initially held a 68% economic interest and we show our share of Bakkt's profits and losses in other income (Note 3). For the three months ended December 31, 2021, we recorded estimated equity losses of ($92 million) related to our investment in Bakkt, and as of December 31, 2021 our carrying value of our Bakkt investment is $1.6 billion.

5. Revenue Recognition

Our primary revenue contract classifications are described below. These categories best represent those with similar economic characteristics of the nature, amount, timing and uncertainty of our revenues and cash flows.

Exchanges Revenues

- **Futures and Options:** Revenues in our futures and options trading businesses primarily represent fees charged for the performance obligations of derivatives trading and clearing. In our derivatives markets, we earn transaction and clearing revenues from both counterparties to each contract that is traded and/or cleared.

  Our transaction and clearing revenues are primarily included in our Exchanges segment with the exception of our CDS transaction and clearing revenues which are discussed below and are included in our Fixed Income and Data Services segment. Derivatives trading and clearing fees contain two performance obligations: (1) trade execution/clearing novation and (2) risk management of open interest. While we allocate the transaction price between these two performance obligations, since they generally are satisfied almost simultaneously, there is no significant deferral of revenue. Our Exchanges segment futures and options transaction and clearing revenues are reported net of rebates. Rebates were $982 million, $933 million and $843 million in 2021, 2020 and 2019, respectively. Transaction and clearing fees can be variable based on trade volume discounts used in the determination of rebates, however virtually all volume discounts are calculated and recorded on a monthly basis. Transaction and clearing fees, as well as any volume discounts rebated to our customers, are calculated and billed monthly in accordance with our published fee schedules.

- **Cash Equities and Equity Options:** Revenues in our equity and equity options markets represent trade execution fees. Cash trading and equity options contain one performance obligation related to each transaction which occurs instantaneously, and the revenue is recorded at the point in time of the transaction. We make liquidity payments to certain customers, as well as charge routing fees related to orders in our markets which are routed to other markets for execution and recognize those payments as a cost of revenue. In addition, we pay NYSE regulatory oversight fees to the SEC and collect equal amounts from our customers. These are also considered a cost of revenue, and both of these NYSE-related fees are included in transaction-based expenses. For one of our equity option exchanges, revenues are reported net of rebates. Rebates for that exchange were $51 million, $29 million and $12 million in 2021, 2020 and 2019, respectively.

- **Listings:** Our listings revenues include original and annual listings fees, and other corporate action fees. Each distinct listing fee is allocated to multiple performance obligations including original and incremental listing and investor relations services, as well as a customer's material right to renew the option to list on our exchanges. In performing this allocation, the standalone selling price of the listing services is based on the original and annual listing fees and the standalone selling price of the investor relations services is based on its market value. All listings fees are billed upfront and the identified performance obligations are satisfied over time. Revenue related to the investor relations performance obligation is recognized ratably over the period these services are provided, with the remaining revenue recognized ratably over time as customers continue to list on our exchanges. Listings fees related to other corporate actions are considered contract modifications of our listing contracts and are recognized ratably over time as customers continue to list on our exchanges.

- **Data and Connectivity Services:** Our data and connectivity services revenues are related to the various data and connectivity services that we provide which are directly attributable to our exchange venues. Exchange data services include, among other offerings, proprietary real-time and historical pricing data, as well as order book and transaction information related to our global futures markets and the NYSE exchanges. In addition, we receive a share of revenue from the National Market System, or NMS, Plan. Separately, we also provide connectivity services directly related to our futures, cash equity and options exchanges and clearing houses. Data and connectivity services revenues are primarily subscription-based, billed monthly, quarterly or annually in advance and recognized ratably over time as our performance obligations of data delivery are met consistently throughout the period. Considering that these contracts primarily consist of single performance obligations with fixed prices, there is no variable consideration and no need to allocate the transaction price.

- **OTC and Other:** Our OTC revenues are generated in our bilateral energy markets where we offer electronic trading on contracts based on physically settled natural gas, power and refined oil contracts. Other revenues primarily include interest income on certain clearing margin deposits, regulatory penalties and fines, fees for use of our facilities, regulatory fees charged to member organizations of our U.S. securities exchanges, designated market maker service fees, exchange membership fees and agricultural grading and certification fees. Generally, fees for OTC and other revenues contain one performance obligation. Because these contracts primarily consist of single performance obligations with fixed prices, there is no variable consideration and no need to allocate the transaction price. Services for OTC and other revenues are primarily satisfied at a point in time. Therefore, there is no need to allocate the fee and no deferral results as we have no further obligation to the customer at that time.

In certain of our revenue share arrangements with third parties we control the delivered contract; in these arrangements we are acting as a principal and the revenue is recorded gross.

Fixed Income and Data Services Revenues

- **Fixed Income Execution:** Execution fees are reported net of rebates, and can be variable based on trade volume discounts used in the determination of rebates, however virtually all volume discounts are calculated and recorded on a monthly basis. Execution fees and rebates are calculated and billed monthly in accordance with our published fee schedules. Fixed income execution rebates were nominal in 2021, 2020 and 2019. In addition, we earn fixed income transaction fees on the trade execution of agency trades, commissions and net markups and markdowns on riskless principal trades. Fixed income execution fees contain one performance obligation related to each transaction which occurs instantaneously, and the revenue is recorded at the point in time. Fixed income revenues also include interest income on certain clearing margin deposits related to our CDS clearing business which are satisfied at a point in time and consists of a single performance obligations.

- **CDS Clearing:** CDS clearing revenues are reported net of rebates. Rebates were nominal in 2021 and 2020 and were $5 million in 2019. We provide clearing services to the global CDS market and the timing and nature of our CDS transaction and clearing revenue is similar in nature to the Exchanges Segment transaction and clearing revenues discussed above. The CDS derivatives trading and clearing fees contain two performance obligations: (1) trade execution/clearing novation and (2) risk management of open interest. While we allocate the transaction price between these two performance obligations, since they generally are satisfied almost simultaneously, there is no significant deferral of revenue.

- **Fixed Income Data and Analytics, and Other Data and Network Services:** Fixed income data and analytics services revenues are recurring in nature and include evaluated pricing and reference data and analytics including sovereign, corporate and municipal bonds, mortgage and asset-backed securities, as well as leveraged loans. Other data and network services include those related to the ICE Global Network and our consolidated feeds business, as well as desktops and other multi-asset class analytics.

  The nature and timing of each contract type for the data services above are similar in nature. Data services revenues are primarily subscription-based, billed monthly, quarterly or annually in advance and recognized ratably over time as our performance obligations of data delivery are met consistently throughout the period. Considering that these contracts primarily consist of single performance obligations with fixed prices, there is no variable consideration and no need to allocate the transaction price. In certain of our data contracts, where third parties are involved, we either arrange for the third party to transfer the services to our customers, or we transfer third-party data to our customers; in these arrangements we are acting as an agent and revenue is recorded net.

Mortgage Technology Revenues

- **Origination Technology:** Our origination technology acts as a system of record for the mortgage origination, automating the gathering, reviewing, and verifying of mortgage-related information and enabling automated enforcement of rules and business practices designed to help ensure that each completed loan transaction is of high quality and adheres to secondary market standards. These revenues are based on recurring Software as a Service, or SaaS, subscription fees, with an additive Success-Based Pricing fee as lenders exceed the number of loans closed that are included with their monthly base subscription.

  In addition, the ICE Mortgage Technology network provides originators connectivity to the mortgage supply chain and facilitates the secure exchange of information between our customers and a broad ecosystem of third-party service providers, as well as lenders and investors that are critical to consummating the millions of loan transactions that occur on our origination network each year. Revenue from the ICE Mortgage Technology network is largely transaction-based.

  Performance obligations consist of a series of distinct services and support services. Mortgage subscription customers simultaneously receive and consume benefits from our performance and revenues are recognized over time as our performance obligations are met consistently throughout the period. Contracts generally range from one year to five years. Success-based contracts are subject to monthly billing calculations whereby customers are obligated to pay the greater of a contractual base fee or variable closed loan fee based on the number of closed loan transactions processed by the customer in the specific month. Under success-based contracts, monthly base fees are recognized ratably over the contract terms as subscription performance obligations are satisfied and closed loan fees in excess of base fees are considered variable consideration.

For the majority of contracts that include variable consideration, such fees are recognized in the month in which they are earned because the terms of the variable payments relate specifically to the outcome from transferring the distinct time increment (one month) of service and because such amounts reflect the fees to which we expect to be entitled for providing access to the Encompass platform for that period, consistent with the allocation objective of Topic 606. For certain contracts where the allocation objective would not be met by allocating variable consideration in this way, total variable consideration to be received is estimated at contract inception and recognized ratably over the contract term considering historical trends, industry data, and contract specific factors to determine an expected amount to which we expect to be entitled. The amount of variable consideration included in the transaction price is constrained to ensure that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the amount of variable consideration is subsequently resolved. When agreements involve multiple distinct performance obligations, we allocate arrangement consideration to all performance obligations at the inception of an arrangement based on the relative standalone selling prices of each performance obligation.

- **Closing Solutions:** Our closing solutions connect key participants such as lenders, title and settlement agents and individual county recorders together to digitize the closing and recording process. For these services, we act as agent and revenues are recorded net. Revenues for these services primarily contain one performance obligation related to each transaction which occurs instantaneously, and the revenues are primarily recorded at the point in time of the transaction. Closing solutions also includes revenues from our Mortgage Electronic Registrations Systems, Inc., or MERS database, which provides a system of record for recording and tracking changes and servicing rights and beneficial ownership interests in loans secured by U.S. residential real estate. MERS implemented a revised pricing structure effective July 1, 2021. As a result, MERS database revenues contain multiple performance obligations related to each new loan registration and future transfers, and the revenues are primarily recorded at the point in time of each transaction. Closing solutions revenues may include a fixed-fee subscription component recognized ratably over the contract term, as this method best depicts our pattern of performance.

- **Data and Analytics:** Revenues include those related to ICE Mortgage Technology's Automation, Intelligence, Quality, or AIQ, offering which applies machine learning and artificial intelligence to the entire loan origination process, offering customers greater efficiency by streamlining data collection and validation through our automated document recognition and data extraction capabilities. AIQ revenues can be both recurring and transaction-based in nature. In addition, our data offerings include real-time industry and peer benchmarking tools, which provide originators a granular view into the real-time trends of nearly half the U.S. residential mortgage market. We also provide a Data as a Service, or DaaS, offering through private data clouds for lenders to access their own data and origination information. Revenues related to our data products are largely subscription-based and recurring in nature and recognized ratably over time as this method best depicts our pattern of performance. Our performance obligations of data delivery are met consistently throughout the period.

- **Other:** Other revenues include professional services fees, as well as revenues from ancillary products. Other revenues are transaction-based and primarily contain one performance obligation which occurs instantaneously, therefore revenues are recorded at the point in time of the transaction.

The following table depicts the disaggregation of our revenue according to business line and segment (in millions). Amounts here have been aggregated as they follow consistent revenue recognition patterns, and are consistent with the segment information in Note 18:

	Exchanges Segment	Fixed Income and Data Services Segment	Mortgage Technology Segment	Total Consolidated
Year ended December 31, 2021				
Exchanges	$ 5,878	$ —	$ —	$ 5,878
Fixed income and data services	—	1,883	—	1,883
Mortgage technology	—	—	1,407	1,407
Total revenues	5,878	1,883	1,407	9,168
Transaction-based expenses	2,022	—	—	2,022
Total revenues, less transaction-based expenses	$ 3,856	$ 1,883	$ 1,407	$ 7,146
Timing of Revenue Recognition				
Services transferred at a point in time	$ 2,166	$ 216	$ 820	$ 3,202
Services transferred over time	1,690	1,667	587	3,944
Total revenues, less transaction-based expenses	$ 3,856	$ 1,883	$ 1,407	$ 7,146

	Exchanges Segment	Fixed Income and Data Services Segment	Mortgage Technology Segment	Total Consolidated
Year ended December 31, 2020				
Exchanges	$ 5,839	$ —	$ —	$ 5,839
Fixed income and data services	—	1,810	—	1,810
Mortgage technology	—	—	595	595
Total revenues	5,839	1,810	595	8,244
Transaction-based expenses	2,208	—	—	2,208
Total revenues, less transaction-based expenses	$ 3,631	$ 1,810	$ 595	$ 6,036
Timing of Revenue Recognition				
Services transferred at a point in time	$ 2,045	$ 249	$ 439	$ 2,733
Services transferred over time	1,586	1,561	156	3,303
Total revenues, less transaction-based expenses	$ 3,631	$ 1,810	$ 595	$ 6,036

	Exchanges Segment	Fixed Income and Data Services Segment	Mortgage Technology Segment	Total Consolidated
Year ended December 31, 2019				
Exchanges	$ 4,652	$ —	$ —	$ 4,652
Fixed income and data services	—	1,756	—	1,756
Mortgage technology	—	—	139	139
Total revenues	4,652	1,756	139	6,547
Transaction-based expenses	1,345	—	—	1,345
Total revenues, less transaction-based expenses	$ 3,307	$ 1,756	$ 139	$ 5,202
Timing of Revenue Recognition				
Services transferred at a point in time	$ 1,784	$ 270	$ 133	$ 2,187
Services transferred over time	1,523	1,486	6	3,015
Total revenues, less transaction-based expenses	$ 3,307	$ 1,756	$ 139	$ 5,202

The Exchanges segment revenues above include $838 million, $790 million, and $752 million in 2021, 2020 and 2019, respectively, of data services revenues. Fixed Income and Data Services segment revenues above include $1.6 billion, $1.5 billion, and $1.5 billion in 2021, 2020 and 2019, respectively, of data services revenues. Our data services revenues are transferred over time, and a majority of those revenues are performed over a short period of time of one month or less and relate to subscription-based data services billed monthly, quarterly or annually in advance. These revenues are recognized ratably over time as our data delivery performance obligations are met consistently throughout the period.

The Exchanges segment revenues above include $479 million, $446 million, and $449 million in 2021, 2020 and 2019, respectively, for services transferred over time related to listings, as well as $260 million, $241 million, and $221 million in 2021, 2020 and 2019, respectively, for services transferred over time related to risk management of open interest performance obligations. In addition, the Exchanges segment revenues include $113 million, $109 million, and $101 million in 2021, 2020 and 2019, respectively, for services transferred over time related to regulatory fees, trading permits, and software licenses.

The Fixed Income and Data Services segment revenues above include $28 million, $29 million, and $26 million in 2021, 2020 and 2019, respectively, for services transferred over time related to risk management of open interest performance obligations. A majority of these performance obligations are performed over a short period of time of one month or less.

The Mortgage Technology segment revenues transferred over time in the table above primarily relate to our origination technology revenue whereby performance obligations consist of a series of distinct services and are recognized over the contract terms as subscription performance obligations are satisfied, and to a lesser extent, professional services revenues.

6. Short-Term and Long-Term Restricted Cash and Cash Equivalents

Our total restricted cash and cash equivalents, including short-term and long-term portions, consisted of the following (in millions):

	As of December 31,	
	2021	**2020**
Restricted cash and cash equivalents:		
Short-term restricted cash and cash equivalents:		
ICE Futures Europe	$ 100	$ 100
ICE Clear Europe	550	495
CFTC Regulated Entities	289	278
Other Regulated Entities	76	92
Other	20	35
Total short-term restricted cash and cash equivalents	1,035	1,000
Long-term restricted cash and cash equivalents:		
ICE Clearing House Portion of the Guaranty Fund Contribution	398	408
Total long-term restricted cash and cash equivalents	398	408
Total restricted cash and cash equivalents	$ 1,433	$ 1,408

Short-Term Restricted Cash and Cash Equivalents

Our short-term restricted cash and cash equivalents in the table above consist of the following:

- **ICE Futures Europe:** ICE Futures Europe operates as a U.K. Recognized Investment Exchange, and is required by the U.K. Financial Conduct Authority to maintain financial resources sufficient to properly perform its relevant functions equivalent to a minimum of six months of operating costs, subject to certain deductions.
- **ICE Clear Europe:** ICE Clear Europe operates as a U.K. Recognized Clearing House. As such, ICE Clear Europe is required by the BOE and the European Market Infrastructure Regulation, or EMIR, to restrict as cash, cash equivalents or investments in an amount to reflect an estimate of the capital required to wind down or restructure the activities of the clearing house, cover operational, legal and business risks and to reserve capital to meet credit, counterparty and market risks not covered by the members' margin and guaranty funds. The increase in the regulatory capital restricted cash at ICE Clear Europe as of December 31, 2021 was due to the growth of our clearing businesses, a related increase in costs and the consequential additional regulatory capital buffers required by the BOE. ICE Clear Europe, in addition to being regulated by the BOE, is also regulated by the CFTC

as a U.S. Derivatives Clearing Organization, or DCO. The regulatory capital available to ICE Clear Europe, as described above, exceeds the CFTC requirements.

- **CFTC Regulated Entities:** Our CFTC regulated U.S. Designated Contract Market, or DCM, ICE Futures U.S., our CFTC regulated U.S. DCOs, ICE Clear U.S. and ICE Clear Credit, our CFTC regulated U.S. Swap Data Repository, or SDR, ICE Trade Vault, LLC, and our U.S. Swap Execution Facility, or SEF, ICE Swap Trade, are required to maintain financial resources including cash, in an amount that would cover certain operating costs for a one-year period, subject to certain deductions, to satisfy at least six months of such operating costs at all times. For our U.S. DCOs, ICE Clear U.S. and ICE Clear Credit, these amounts include voluntarily-held additional reserves consistent with the EMIR requirements to cover operational, legal and business risks and to reserve capital to meet credit, counterparty and market risks not covered by the member margin and guaranty funds. In addition, ICE NGX is registered by the CFTC as a Foreign Board of Trade and a DCO and the CFTC requires ICE NGX to maintain financial resources including cash, in an amount that would cover certain operating costs for a one-year period. ICE NGX is regulated by both the CFTC and the Alberta Securities Commission.

- **Other Regulated Entities:** Restricted cash on our various regulated entities and exchanges includes ICE Benchmark Administration, ICE Clear Netherlands, ICE Trade Vault U.K., ICE Endex, ICE Futures Singapore and ICE Futures Abu Dhabi. It also includes the clearing member requirements of ICE Securities Executions & Clearing, LLC and restricted cash related to Bakkt Trust Company, LLC until our deconsolidation of Bakkt in October 2021.

- **Other:** Primarily related to escrow for recent acquisitions.

Long-Term Restricted Cash and Cash Equivalents

Our long-term restricted cash and cash equivalents in the table above consist of the following:

- **ICE Clearing House Portion of the Guaranty Fund Contribution:** Our clearing houses, other than ICE NGX, require each clearing member to make deposits to a fund known as the guaranty fund. Of our total contribution to ICE Clear U.S., $15 million was solely applicable to any losses associated with a default in Bitcoin contracts and other digital asset contracts that ICE Clear U.S. may clear in the future. In February 2021, we decreased our contribution to ICE Clear U.S.'s guaranty fund applicable to any losses associated with a default in Bitcoin contracts and other digital asset contracts by $20 million from $35 million as of December 31, 2020. In March 2021, we increased our contribution to ICE Clear Europe's guaranty fund by $10 million in connection with the launch of ICE Futures Abu Dhabi Limited. In addition, we have a $15 million first-loss amount related to ICE NGX insurance and included in our contribution to its guaranty fund. See Note 14 for additional information on the guaranty funds and our contributions of cash to our clearing houses guaranty funds.

7. Property and Equipment

Property and equipment consisted of the following (in millions):

	As of December 31, 2021	As of December 31, 2020	Depreciation Period (Years)
Software and internally developed software	$ 1,407	$ 1,223	3 to 7
Computer and network equipment	792	803	3 to 5
Land	156	146	N/A
Buildings and building improvements	342	322	15 to 40
Right-of-use lease assets	278	339	1 to 20
Leasehold improvements	322	314	4 to 15
Equipment, aircraft and office furniture	335	317	4 to 12
Total property and equipment	3,632	3,464	
Less accumulated depreciation and amortization	(1,933)	(1,751)	
Property and equipment, net	$ 1,699	$ 1,713	

Beginning January 1, 2019, in connection with our adoption of ASU 2016-02 (Note 2), we recognize right-of-use assets representing our rights to use assets over an underlying lease term as rent expense.

In 2021, 2020 and 2019, amortization of software and internally developed software was $213 million, $190 million and $175 million, respectively, and depreciation of all other property and equipment was $174 million, $173 million and $145 million, respectively. As of December 31, 2021 and 2020, unamortized software and internally developed software was $361 million and $329 million, respectively. During 2020, we recorded an impairment charge of $11 million related to capitalized software developed at Bakkt that was no longer useful. The valuation was performed by a third-party valuation expert and the impairment is included in depreciation expense.

8. Goodwill and Other Intangible Assets

The following is a summary of the activity in our goodwill balance (in millions):

Goodwill balance at January 1, 2020	$ 13,342
Acquisitions	7,926
Foreign currency translation	19
Other activity, net	4
Goodwill balance at December 31, 2020	$ 21,291
Acquisitions	50
Divestitures	(233)
Foreign currency translation	(7)
Other activity, net	22
Goodwill balance at December 31, 2021	$ 21,123

The following is a summary of the activity in our other intangible assets balance (in millions):

Other intangible assets balance at January 1, 2020	$ 10,258
Acquisitions	4,519
Foreign currency translation	19
Amortization of other intangible assets	(388)
Other intangible assets balance at December 31, 2020	$ 14,408
Acquisitions	26
Divestitures	(58)
Foreign currency translation	(6)
Amortization of other intangible assets	(622)
Other activity, net	(12)
Other intangible assets balance at December 31, 2021	$ 13,736

We completed our divestiture of Bakkt in 2021 and our acquisitions of Bridge2 Solutions and Ellie Mae during 2020 (Note 3).

Foreign currency translation adjustments result from a portion of our goodwill and other intangible assets being held at our U.K., EU and Canadian subsidiaries, whose functional currencies are not the U.S. dollar. The changes in other activity, net, in the tables above primarily relate to adjustments to the fair value of the net tangible and intangible assets made within one year of acquisitions, with a corresponding adjustment to goodwill. We have performed an analysis of impairment indicators and did not recognize any impairment losses on goodwill or other intangible assets in 2021 or 2020. In 2019, we recorded an impairment charge of $31 million on the remaining value of exchange registration intangible assets on ICE Futures Singapore as a result of a decrease in fair value determined during our annual impairment testing. ICE Futures Singapore is part of our Exchanges segment.

Other intangible assets and the related accumulated amortization consisted of the following (in millions):

	As of December 31,		Useful Life (Years)
	2021	2020	
Finite-lived intangible assets:			
Customer relationships	$ 7,958	$ 8,011	3 to 25
Technology	1,379	1,318	2.5 to 11
Trading products with finite lives	237	237	20
Data/databases	150	150	4 to 10
Market data provider relationships	11	11	20

	As of December 31,		Useful Life (Years)
	2021	2020	
Non-compete agreements	42	42	1 to 5
Other	253	236	1 to 5
Total finite-lived intangible assets	10,030	10,005	
Less accumulated amortization	(2,814)	(2,188)	
Total finite-lived intangible assets, net	7,216	7,817	
Indefinite-lived intangible assets:			
Exchange registrations, licenses and contracts with indefinite lives	6,232	6,236	
Trade names and trademarks with indefinite lives	280	280	
In-process research and development	—	67	
Other	8	8	
Total indefinite-lived intangible assets	6,520	6,591	
Total other intangible assets, net	$ 13,736	$ 14,408	

In 2021, 2020 and 2019, amortization of other intangible assets was $622 million, $388 million and $311 million, respectively. Collectively, the remaining weighted average useful lives of the finite-lived intangible assets is 15.1 years as of December 31, 2021. We expect future amortization expense from the finite-lived intangible assets as of December 31, 2021 to be as follows (in millions):

2022	$ 611
2023	601
2024	581
2025	558
2026	510
Thereafter	4,355
	$ 7,216

9. Deferred Revenue

Our contract liabilities, or deferred revenue, represent consideration received that is yet to be recognized as revenue. Total deferred revenue was $284 million as of December 31, 2021, including $194 million in current deferred revenue and $90 million in other non-current liabilities. Total deferred revenue was $259 million as of December 31, 2020, including $158 million in current deferred revenue and $101 million in other non-current liabilities. See Note 5 for a description of our annual listing, original listing, other listings, data services and mortgage technology services revenues and the revenue recognition policy for each of these revenue streams. The changes in our deferred revenue during 2021 and 2020 are as follows (in millions):

	Annual Listing Revenue	Original Listing Revenues	Other Listing Revenues	Data Services and Other Revenues	Mortgage Technology	Total
Deferred revenue balance at January 1, 2020	$ —	$ 19	$ 94	$ 86	$ 2	$ 201
Additions	386	12	40	444	73	955
Amortization	(386)	(18)	(42)	(435)	(16)	(897)
Deferred revenue balance at December 31, 2020	—	13	92	95	59	259
Additions	403	39	44	451	83	1,020
Amortization	(403)	(33)	(43)	(453)	(63)	(995)
Deferred revenue balance at December 31, 2021	$ —	$ 19	$ 93	$ 93	$ 79	$ 284

The increase in our deferred revenue balance in 2020 in our Mortgage Technology segment relates to our September 2020 acquisition of Ellie Mae. The Mortgage Technology deferred revenue balance as of December 31, 2021 primarily relates to origination technology subscription services for which the performance obligations have not yet been provided as of the balance sheet date but for which billings or payments have been received in advance. Performance obligations for origination technology revenue consist of a series of distinct services and are recognized over the contract terms as subscription performance obligations are satisfied. Contracts generally range from one year to five years.

Included in the amortization recognized in 2021, $152 million related to the deferred revenue balance as of January 1, 2021. Included in the amortization in 2020, $123 million related to the deferred revenue balance as of January 1, 2020. As of December 31, 2021, we estimate that our deferred revenue will be recognized in the following years (in millions):

	Original Listing Revenues	Other Listing Revenues	Data Services and Other Revenues	Mortgage Technology	Total
2022	$ 16	$ 29	$ 84	$ 65	$ 194
2023	3	25	3	9	40
2024	—	18	3	4	25
2025	—	13	1	1	15
2026	—	7	1	—	8
Thereafter	—	1	1	—	2
Total	$ 19	$ 93	$ 93	$ 79	$ 284

10. Debt

Our total debt, including short-term and long-term debt, consisted of the following (in millions):

	As of December 31,	
	2021	2020
Debt:		
Short-term debt:		
Commercial Paper	$ 1,012	$ 2,405
2022 Senior Notes (2.35% senior unsecured notes due September 15, 2022)	499	—
Other short-term debt	10	6
Total short-term debt	1,521	2,411
Long-term debt:		
2022 Senior Notes (2.35% senior unsecured notes due September 15, 2022)	—	498
2023 Senior Notes (floating rate senior unsecured notes due June 15, 2023)	—	1,244
2023 Senior Notes (0.70% senior unsecured notes due June 15, 2023)	997	995
2023 Senior Notes (3.45% senior unsecured notes due September 21, 2023)	399	398
2023 Senior Notes (4.00% senior unsecured notes due October 15, 2023)	797	796
2025 Senior Notes (3.75% senior unsecured notes due December 1, 2025)	1,246	1,245
2027 Senior Notes (3.10% senior unsecured notes due September 15, 2027)	497	496
2028 Senior Notes (3.75% senior unsecured notes due September 21, 2028)	594	593
2030 Senior Notes (2.10% senior unsecured notes due June 15, 2030)	1,234	1,232
2032 Senior Notes (1.85% senior unsecured notes due September 15, 2032)	1,483	1,481
2040 Senior Notes (2.65% senior unsecured notes due September 15, 2040)	1,230	1,229
2048 Senior Notes (4.25% senior unsecured notes due September 21, 2048)	1,230	1,230
2050 Senior Notes (3.00% senior unsecured notes due June 15, 2050)	1,220	1,219
2060 Senior Notes (3.00% senior unsecured notes due September 15, 2060)	1,470	1,470
Total long-term debt	12,397	14,126
Total debt	$ 13,918	$ 16,537

Credit Facilities

- **Credit Facility:** We have a $3.8 billion senior unsecured revolving credit facility, or the Credit Facility, with future capacity to increase our borrowings under the Credit Facility by an additional $625 million, subject to the consent of the lenders funding the increase and certain other conditions. On October 15, 2021, we agreed with the lenders to extend the maturity date of the Credit Facility from August 21, 2025 to October 15, 2026, among other items. We incurred new debt issuance costs of $4 million and $9 million during 2021 and 2020, respectively, relating to the Credit Facility and these costs are represented in the accompanying consolidated balance sheet as other non-current assets and will be amortized over the remaining life of the Credit Facility. No amounts were outstanding under the Credit Facility as of December 31, 2021.

As of December 31, 2021, of the $3.8 billion that is currently available for borrowing under the Credit Facility, $1.0 billion is required to back-stop the amount outstanding under our U.S. dollar commercial paper program, or the Commercial Paper Program, and $171 million is required to support certain broker-dealer and other subsidiary commitments. The amount required to back-stop the amounts outstanding under the Commercial Paper Program will fluctuate as we increase or decrease our commercial paper borrowings. The remaining $2.6 billion is available for working capital and general corporate purposes including, but not limited to, acting as a back-stop to future increases in the amounts outstanding under the Commercial Paper Program.

We also pay an annual commitment fee for unutilized amounts payable in arrears at a rate that ranges from 0.08% to 0.20% determined based on our current long-term debt rating. As of December 31, 2021, the applicable rate for commitments to October 2026 was 0.13%. Amounts borrowed under the facility may be prepaid at any time without premium or penalty.

The Credit Facility also contains customary representations and warranties, covenants and events of default, including a leverage ratio, limitations on liens on our assets, indebtedness of non-obligor subsidiaries, the sale of all or substantially all of our assets, and other matters.

- **Term Loan:** On August 21, 2020, we entered into a $750 million 18-month senior unsecured delayed draw term loan facility with a maturity date of February 21, 2022. We borrowed in full under the facility on September 3, 2020, and the proceeds were used to fund a portion of the purchase price for the Ellie Mae acquisition. We had the option to prepay the facility in whole or in part at any time, and paid off the full balance of the loan on December 16, 2020. Interest on borrowings under this term loan facility were based on the principal amount outstanding at the London Interbank Offered Rate, or LIBOR, plus an applicable margin, which was equal to 1.125%. We incurred new debt issuance costs of $3 million during 2020 relating to this term loan and these costs were fully amortized when the term loan was repaid on December 16, 2020.
- **Other:** Our India subsidiaries maintain $20 million of credit lines for their general corporate purposes. As of December 31, 2021, they had borrowed $10 million, which is reflected as "other short-term debt" in the table above.

Commercial Paper Program

Our Commercial Paper Program is currently backed by the borrowing capacity available under the Credit Facility, as described above. The effective interest rate of commercial paper issuances does not materially differ from short-term interest rates, which fluctuate due to market conditions and as a result may impact our interest expense.

We had net repayments of $1.4 billion under the Commercial Paper Program during 2021. We used $1.2 billion of proceeds received from the sale of our Coinbase investment to pay down the commercial paper balance. We had net issuances of $1.1 billion under the Commercial Paper Program during 2020, the proceeds of which were primarily used to fund a portion of the purchase price for the Ellie Mae acquisition. We had net issuances of $360 million under the Commercial Paper Program during 2019 the proceeds of which were used to fund the acquisition of Simplifile and for general corporate purposes. We repaid a portion of the amounts outstanding under the program during 2021, 2020 and 2019 with cash flows from operations.

Commercial paper notes of $1.0 billion with original maturities ranging from three to 73 days were outstanding as of December 31, 2021, with a weighted average interest rate of 0.33% per annum, and a weighted average remaining maturity of 26 days. Commercial paper notes of $2.4 billion with original maturities ranging from four to 266 days were outstanding as of December 31, 2020 with a weighted average interest rate of 0.40% per annum, and a weighted average remaining maturity of 82 days.

Fixed Rate Senior Notes

- **Senior Notes Issued in August 2020:** On August 20, 2020, we issued $6.5 billion in aggregate principal amount of new senior notes, comprised of $1.25 billion in aggregate principal amount of floating rate senior notes due in 2023, or the Floating Rate Notes, $1.0 billion in aggregate principal amount of 0.70% senior notes due in 2023, $1.5 billion in aggregate principal amount of 1.85% senior notes due in 2032, $1.25 billion in aggregate principal amount of 2.65% senior notes due in 2040, and $1.5 billion in aggregate principal amount of 3.00% senior notes due in 2060 (collectively, the August 2020 Notes). We used the net proceeds to fund a portion of the purchase price for the Ellie Mae acquisition.

We incurred debt issuance costs of $53 million relating to the issuance of the August 2020 Notes and these costs are presented in the accompanying consolidated balance sheet as a deduction from the carrying amount of the related debt liability and will be amortized over the remaining term of each series of the August 2020 Notes.

In September 2021, we used the proceeds from commercial paper issuances and cash on hand to fund the redemption of $1.25 billion of the Floating Rate Notes and recorded $4 million of accelerated unamortized deferred loan costs, included in interest expense in our consolidated statements of income for 2021.

- **Senior Notes Issued in May 2020:** On May 26, 2020, we issued $2.5 billion in aggregate principal amount of new senior notes comprised of $1.25 billion in aggregate principal amount of 2.10% senior notes due in 2030 and $1.25 billion in aggregate principal amount of 3.00% senior notes due in 2050 (collectively, the May 2020 Notes).

  We used the net proceeds of the May 2020 Notes for general corporate purposes, including to fund the redemption of our $1.25 billion aggregate principal amount of 2.75% senior notes due December 2020, or the 2020 Senior Notes, which were redeemed in accordance with their terms on June 25, 2020, and to pay down a portion of our commercial paper outstanding. In connection with our issuance of the May 2020 Notes and our early redemption of the 2020 Senior Notes, we recorded an extinguishment payment of $14 million that includes both a make-whole redemption payment and duplicative interest. These costs are included in interest expense in our consolidated statements of income in 2020.

  We incurred debt issuance costs of $23 million relating to the issuance of the May 2020 Notes and these costs are presented in the accompanying consolidated balance sheet as a deduction from the carrying amount of the related debt liability and will be amortized over the remaining term of each note series.

- **Senior Notes Issued in August 2018:** In August 2018, we issued $2.25 billion in new aggregate unsecured fixed-rate senior notes, including $400 million, 3.45% notes due in 2023, $600 million, 3.75% notes due in 2028, and $1.25 billion, 4.25% notes due in 2048. We used the proceeds for general corporate purposes, including to fund the redemption of the $600 million, 2.50% Senior Notes due October 2018 and to refinance all of our issuances under our Commercial Paper Program that resulted from acquisitions and investments in 2018. We incurred debt issuance costs of $21 million relating to these notes that we recorded as a deduction from the carrying amount of the debt and which is being amortized over the respective note lives.

- **Senior Notes Issued in August 2017:** In August 2017, we issued $1.0 billion in aggregate senior unsecured fixed-rate notes, including $500 million, 2.35% notes due in 2022 and $500 million, 3.10% notes due in 2027. We used the majority of the proceeds of the offering to fund the redemption of $850 million, 2.00% senior unsecured fixed-rate NYSE Notes prior to the October 2017 maturity date. We incurred debt issuance costs of $8 million relating to these notes that we recorded as a deduction from the carrying amount of the debt and which is being amortized over the respective note lives.

- **Senior Notes Issued in November 2015:** In November 2015, we issued $2.5 billion in aggregate senior unsecured fixed-rate notes, including the 2020 Senior Notes, and $1.25 billion, 3.75% notes due 2025. We used the proceeds, together with $1.6 billion of borrowings under our Commercial Paper Program, to finance the cash portion of the purchase price of Interactive Data. The 2020 Senior Notes were paid off in June 2020 with net proceeds from the offering of the May 2020 Notes.

- **Senior Notes Issued in October 2013:** In October 2013, we issued $800 million, 4.00% senior unsecured fixed-rate notes due 2023. We used the net proceeds to finance a portion of the purchase price of the acquisition of NYSE.

All of our Senior Notes contain affirmative and negative covenants, including, but not limited to, certain redemption rights, limitations on liens and indebtedness and limitations on certain mergers, sales, dispositions and lease-back transactions.

Debt Repayment Schedule

As of December 31, 2021, the outstanding debt repayment schedule is as follows (in millions):

2022	$ 1,521
2023	2,200
2024	—
2025	1,250
2026	—
Thereafter	9,100
Principal amounts repayable	14,071
Debt issuance costs	(86)
Unamortized balance discounts on bonds, net	(67)
Total debt outstanding	$ 13,918

11. Share-Based Compensation

The non-cash compensation expenses recognized in our consolidated statements of income for stock options, restricted stock and under our employee stock purchase plan were $188 million, $139 million and $139 million in 2021, 2020 and 2019, respectively, net of $13 million, $12 million and $14 million, respectively, that was capitalized as software development costs. As of December 31, 2021, we had 31.6 million shares in total under various equity plans available for future issuance as stock option and restricted stock awards. This includes the expense related to the Bakkt Incentive Units, described below.

Stock Option Plans

Stock options are granted with an exercise price equal to the fair value of our common stock on the grant date. We may grant, under provisions of the plans, both incentive stock options and nonqualified stock options. The options generally vest over three or four years and may generally be exercised up to ten years after the date of grant, but generally expire either 14 or 60 days after termination of employment. The shares of common stock issued under our stock option plans are made available from authorized and unissued common stock or treasury shares.

The fair value is based on our closing stock price on the date of grant as well as certain other assumptions. Compensation expense arising from option grants is recognized ratably over the vesting period based on the grant date fair value, net of estimated forfeitures.

The following is a summary of our stock option activity:

	Number of Options (in thousands)	Weighted Average Exercise Price per Option
Outstanding at January 1, 2019	3,610	$ 46.44
Granted	493	76.16
Exercised	(598)	38.96
Forfeited	(4)	77.58
Outstanding at December 31, 2019	3,501	51.87
Granted	413	92.63
Exercised	(723)	42.88
Forfeited	(44)	75.81
Outstanding at December 31, 2020	3,147	58.96
Granted	310	114.19
Exercised	(493)	34.80
Forfeited	—	—
Outstanding at December 31, 2021	2,964	68.77

Details of stock options outstanding as of December 31, 2021 are as follows:

	Number of Options (in thousands)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (Years)	Aggregate Intrinsic Value (In millions)
Vested or expected to vest	2,964	$ 68.77	5.8	$ 202
Exercisable	2,228	$ 59.03	5.0	$ 173

Details of stock options exercised during 2021, 2020 and 2019 are as follows:

	Year Ended December 31,		
Options exercised:	**2021**	**2020**	**2019**
Total intrinsic value of options exercised (in millions)	$ 41	$ 38	$ 26

	As of December 31,		
Options outstanding:	**2021**	**2020**	**2019**
Number of options exercisable (in millions)	2.2	2.3	2.4
Weighted-average exercise price	$ 59.03	$ 50.07	$ 44.35

As of December 31, 2021, there were $8 million in total unrecognized compensation costs related to stock options, which are expected to be recognized over a weighted average period of 1.3 years as the stock options vest.

We use the Black-Scholes option pricing model to value our stock option awards. During 2021, 2020 and 2019, we used the assumptions in the table below to compute the value:

	Year Ended December 31,		
Assumptions:	**2021**	**2020**	**2019**
Risk-free interest rate	0.64%	1.46%	2.49%
Expected life in years	5.7	5.8	5.9
Expected volatility	24%	20%	20%
Expected dividend yield	1.16%	1.30%	1.44%
Estimated weighted-average fair value of options granted per share	$ 22.70	$ 16.65	$ 15.45

The risk-free interest rate is based on the zero-coupon U.S. Treasury yield curve in effect at the date of grant. The expected life is derived from historical and anticipated future exercise patterns. Expected volatility is based on historical volatility data of our stock.

Restricted Stock Plans

Restricted shares are used as an incentive to attract and retain qualified employees and to align our and our stockholders' interests by linking actual performance to both short and long-term stockholder return. We issue awards that may contain a combination of time, performance and/or market conditions. The grant date fair value of each award is based on the closing stock price of our stock at the date of grant.

Granted but unvested shares are generally forfeited upon termination of employment, whereby compensation costs previously recognized for unvested shares are reversed. Until the shares vest and are issued, participants have no voting or dividend rights and the shares may not be sold, assigned, transferred, pledged or otherwise encumbered. Unvested restricted stock earns dividend equivalents which are paid in cash on the vesting date.

The grant date fair value of time-based restricted stock units is recognized as expense ratably over the vesting period, which is typically three or four years, net of forfeitures. Our equity plans include a change in control provision that may accelerate vesting on both the time-based and performance-based restricted shares if the awards are not assumed by an acquirer in the case of a change in control.

For awards with performance conditions, we recognize compensation costs, net of forfeitures, using an accelerated attribution method over the vesting period. Compensation costs are recognized only if it is probable that the performance condition will be satisfied. If we initially determine that it is not probable of being satisfied and later determine that it is, or vice versa, a cumulative catch-up adjustment is retroactively recorded in the period of change based on the new estimate. We recognize the remaining compensation costs over the remaining vesting period.

For awards with a market condition, fair value is estimated based on a simulation of various outcomes and includes inputs such as our stock price on the grant date, the valuation of historical awards with market conditions, the probability that the market condition will affect the number of shares granted (as the market condition only affects shares granted in excess of certain financial performance targets), and our expectation of achieving the financial performance targets.

In February 2021, we reserved a maximum of 0.7 million restricted shares for potential issuance as performance-based restricted shares to certain of our employees. The number of shares ultimately granted under this award is based on our actual financial performance as compared to financial performance targets set by our Board and the Compensation Committee for the year ending December 31, 2021, and is also subject to a market condition reduction based on how our 2021 total stockholder return, or TSR, compared to that of the S&P 500 Index. In 2021, a TSR share reduction was required to reflect that the S&P 500 Index TSR outperformed ours. Based on our actual 2021 financial performance as compared to the 2021 financial performance level thresholds, and as adjusted for the TSR haircut, 0.5 million restricted shares were awarded, which resulted in $58 million in compensation expenses that will be expensed over the three-year accelerated vesting period, including $32 million expensed during 2021.

The following is a summary of nonvested restricted shares under all plans discussed above:

	Number of Restricted Stock Shares (in thousands)	Weighted Average Grant-Date Fair Value per Share
Nonvested at January 1, 2019	4,470	$60.56
Granted	1,758	75.75
Vested	(2,269)	57.92
Forfeited	(231)	67.66
Nonvested at December 31, 2019	3,728	68.87
Granted	1,697	91.83
Vested	(2,035)	65.21
Forfeited	(154)	79.24
Nonvested at December 31, 2020	3,236	82.73
Granted	1,679	115.28
Vested	(1,619)	78.07
Forfeited	(169)	101.47
Nonvested at December 31, 2021	3,127	101.62

	Year Ended December 31,		
	2021	2020	2019
Time-based restricted stock units granted (in thousands) (1)	1,196	910	997
Total fair value of restricted stock vested under all restricted stock plans (in millions)	$ 184	$ 194	$ 173

(1) The remaining shares granted are performance-based.

Performance-based restricted shares have been presented in the table above to reflect the actual shares issued based on the achievement of past performance targets, also considering the impact of any market conditions. Non-vested performance-based restricted shares granted are presented in the table above at the target number of restricted shares that would vest if the performance targets are met. As of December 31, 2021, there were $161 million in total unrecognized compensation costs related to time-based and performance-based restricted stock. These costs are expected to be recognized over a weighted-average period of 1.5 years as the restricted stock vests.

Employee Stock Purchase Plan

We offer our employees participation in our ESPP, under which we have reserved and may sell up to 25 million shares of our common stock to employees. The ESPP grants participating employees the right to acquire our stock in increments of 1% of eligible pay, with a maximum contribution of 25% of eligible pay, subject to applicable annual Internal Revenue Service, or IRS, limitations. Under our ESPP, participating employees are limited to $25,000 of common stock annually, and a maximum of 1,250 shares of common stock each offering period. There are two offering periods each year, from January 1st (or the first trading day thereafter) through June 30th (or the last trading day prior to such date) and from July 1st (or the first trading day thereafter) through December 31st (or the last trading day prior to such date). The purchase price per share of common stock is 85% of the lesser of the fair market value of the stock on the first or the last trading day of each offering period. We recorded compensation expenses of $11 million, $8 million and $7 million during 2021, 2020 and 2019, respectively, related to the discount given to our participating employees.

Bakkt Incentive Units

Prior to the Bakkt merger with VIH (Note 3), we sponsored the Bakkt Equity Incentive Plan under which Bakkt issued various Bakkt preferred, common and phantom, or participation, equity unit awards. These awards were made to certain employees and board members of Bakkt. The units were unvested at the issuance date, were subject to the vesting terms in the award agreements and upon vesting were converted into Bakkt equity or cash.

During 2020, a $300 million capital call related to the acquisition of Bridge2 Solutions triggered a market condition of certain of these Bakkt equity incentive awards. The market condition was based on numerous possible Bakkt transaction or event scenarios established on the original date of grant, each of which have a fixed fair market value. Over the life of these awards, we were required to estimate the most likely outcome and reflect the cumulative financial statement impact of any changes between outcomes. As a result, during 2020, we incurred a $10 million non-cash compensation expense related to these awards that was recorded as an acquisition-related cost.

During 2021, the merger of Bakkt and VIH triggered a market condition of these Bakkt equity incentive awards. As a result, during 2021, we incurred $31 million of non-cash compensation expense related to these awards which we recorded as an acquisition-related cost prior to deconsolidating Bakkt.

12. Equity

Treasury Stock

During each of 2021, 2020 and 2019, we received 1.0 million shares of common stock from employees to satisfy tax withholdings we made on their behalf for restricted stock and stock option exercises. We recorded the receipt of the shares as treasury stock.

Stock Repurchase Program

We periodically review whether to repurchase our stock. In making a determination regarding the timing and extent of any stock repurchases, we consider multiple factors that may include: overall stock market conditions, our common stock price performance, the remaining amount authorized for repurchases by our Board, the potential impact of a stock repurchase program on our debt ratings, our expected free cash flow and working capital needs, our current and future planned strategic growth initiatives, and other potential uses of our cash and capital resources.

Repurchases may be made from time to time on the open market, through established trading plans, in privately-negotiated transactions or otherwise, in accordance with all applicable securities laws, rules and regulations. We may begin or discontinue stock repurchases at any time and may amend or terminate a Rule 10b5-1 trading plan at any time or enter into additional plans. We discontinued stock repurchases and terminated our Rule 10b5-1 trading plan in August 2020 in connection with the Ellie Mae acquisition. In November 2021, we resumed stock repurchases.

In December 2021, our Board approved an aggregate of $3.15 billion for future repurchases of our common stock with no fixed expiration date that became effective January 1, 2022. The $3.15 billion replaces the previous amount approved by the Board. In December 2021 we entered into a new Rule 10b5-1 trading plan that will become effective in February 2022.

During 2021, 2020 and 2019, we repurchased 1.8 million shares, 13.6 million shares and 17.4 million shares, respectively, of our outstanding common stock at a cost of $250 million, $1.2 billion and $1.5 billion, respectively, excluding shares withheld upon vesting of equity awards. The shares repurchased are held in treasury stock.

As of December 31, 2021, the remaining balance of Board approved funds for future repurchase was $903 million. The approval of our Board for stock repurchases does not obligate us to acquire any particular amount of our common stock. In addition, our Board may increase or decrease the amount available for repurchases from time to time.

The table below sets forth the information with respect to purchases made by or on behalf of ICE or any "affiliated purchaser" (as defined in Rule 10b-18(a)(3) under the Exchange Act) of our common stock during the periods presented as follows:

	Shares Repurchased (in thousands)	Average Repurchase Price Per Share	Amount of Repurchases (in millions)	Total cumulative year-to-date shares purchased as part of publicly announced plans or programs (in thousands)	Approximate dollar value of shares that may yet be purchased under the plans or programs as of the end of the quarter (in millions)
2021					
Fourth quarter	1,834	$ 136.31	$ 250	1,834	$ 903
Third quarter	—	$ —	—	—	$ —
Second quarter	—	$ —	—	—	$ —
First quarter	—	$ —	—	—	$ —
Total common stock repurchases[1]	1,834	$ 136.31	$ 250		
2020					
Fourth quarter	—	$ —	$ —	13,603	$ 1,153
Third quarter	1,576	$ 93.88	148	13,603	$ 1,153
Second quarter	4,384	$ 91.24	400	12,027	$ 1,301
First quarter	7,643	$ 91.50	699	7,643	$ 1,701
Total common stock repurchases[2]	13,603	$ 91.69	$ 1,247		
2019					
Fourth quarter	3,661	$ 92.86	$ 340	17,432	$ 540
Third quarter	3,730	$ 91.16	340	13,771	$ 880
Second quarter	4,170	$ 81.53	340	10,041	$ 1,220
First quarter	5,871	$ 74.95	440	5,871	$ 1,560
Total common stock repurchases[3]	17,432	$ 83.75	$ 1,460		

(1)All 1.8 million shares were purchased on the open market at a cost of $250 million.

(2)Includes 3.2 million shares purchased on the open market at a cost of $299 million and 10.4 million shares purchased under our Rule 10b5-1 trading plan at a cost of $948 million.

(3) Includes 1.3 million shares purchased on the open market at a cost of $100 million and 16.1 million shares purchased under our Rule 10b5-1 trading plan at a cost of $1.4 billion.

Dividends

Our Board has adopted a quarterly dividend declaration policy providing that the declaration of any dividends will be determined quarterly by the Board or the Audit Committee, taking into account such factors as our evolving business model, prevailing business conditions, our financial results and capital requirements, and other considerations which our Board deems relevant, without a predetermined annual net income payout ratio. We declared and paid cash dividends per share during the periods presented as follows:

	Dividends Per Share	Amount (in millions)
2021		
Fourth quarter	$ 0.33	$ 186
Third quarter	0.33	187
Second quarter	0.33	187
First quarter	0.33	187
Total cash dividends declared and paid	$ 1.32	$ 747
2020		
Fourth quarter	$ 0.30	$ 169
Third quarter	0.30	170
Second quarter	0.30	164
First quarter	0.30	166
Total cash dividends declared and paid	$ 1.20	$ 669
2019		
Fourth quarter	$ 0.275	$ 154
Third quarter	0.275	155
Second quarter	0.275	155
First quarter	0.275	157
Total cash dividends declared and paid	$ 1.10	$ 621

Accumulated Other Comprehensive Income (Loss)

The following tables present changes in the accumulated balances for each component of other comprehensive income (loss) (in millions):

	Changes in Accumulated Other Comprehensive Income (Loss) by Component			
	Foreign currency translation adjustments	Comprehensive income from equity method investment	Employee benefit plans adjustments	Total
Balance, as of January 1, 2019	$ (227)	$ 2	$ (90)	$ (315)
Other comprehensive income (loss)	51	(1)	32	82
Income tax benefit (expense)	(1)	—	(9)	(10)
Net current period other comprehensive income (loss)	50	(1)	23	72
Balance, as of December 31, 2019	(177)	1	(67)	(243)
Other comprehensive income (loss)	43	—	11	54
Income tax benefit (expense)	—	—	(3)	(3)
Net current period other comprehensive income (loss)	43	—	8	51
Balance, as of December 31, 2020	(134)	1	(59)	(192)
Other comprehensive income (loss)	(16)	1	15	—
Income tax benefit (expense)	—	—	(4)	(4)
Net current period other comprehensive income (loss)	(16)	1	11	(4)
Balance, as of December 31, 2021	$ (150)	$ 2	$ (48)	$ (196)

13. Income Taxes

Income before income taxes and the income tax provision consisted of the following (in millions), and our consolidated income tax provision for 2021 was elevated due to the income tax expense associated with the gains we recognized from the Coinbase and Bakkt transactions.

	Year Ended December 31,		
	2021	2020	2019
Income before income taxes			
Domestic	$ 4,179	$ 1,449	$ 1,333
Foreign	1,519	1,317	1,148
Total	$ 5,698	$ 2,766	$ 2,481
Income tax provision			
Current tax expense:			
Federal	$ 533	$ 166	$ 189
State	267	136	124
Foreign	292	264	241
Total	$ 1,092	$ 566	$ 554
Deferred tax expense (benefit):			
Federal	$ 258	$ 73	$ (21)
State	92	(42)	(4)
Foreign	187	61	(8)
	$ 537	$ 92	$ (33)
Total income tax expense	$ 1,629	$ 658	$ 521

A reconciliation of the statutory U.S. federal income tax rate to our effective income tax rate is as follows:

	Year Ended December 31,		
	2021	2020	2019
Statutory federal income tax rate	21 %	21 %	21 %
State and local income taxes, net of federal benefit	4	3	4
Foreign tax rate differential	—	(1)	(1)
Current year tax benefit from foreign derived intangible income	(1)	(1)	(1)
Deferred tax from foreign tax law change and Bakkt transaction	4	2	—
Unrecognized tax benefits	1	1	—
State apportionment changes	—	(1)	—
Other	—	—	(2)
Total provision for income taxes	29 %	24 %	21 %

Our effective tax rates were 29%, 24% and 21% in 2021, 2020 and 2019, respectively. The effective tax rate in 2021 is higher than in 2020 primarily due to the deferred income tax impacts from the U.K. tax law changes as well as the Bakkt transaction. In June 2021, the U.K. enacted a corporate income tax rate increase from 19% to 25% effective April 1, 2023.

The effective tax rate in 2020 was higher than in 2019 primarily due to U.K. tax law changes enacted in July 2020, which increased the corporate income tax rate from 17% to 19% effective April 1, 2020. This U.K. deferred tax impact was partially offset by favorable state apportionment changes as a result of our acquisition of Ellie Mae, as well as favorable changes in certain international tax provisions as part of the TCJA in 2020.

On November 15, 2021, the Infrastructure Investment and Jobs Act was signed into law. On March 11, 2021, the American Rescue Plan Act, or ARPA, was signed into law. The ARPA enacted certain provisions that are relevant to corporate income tax. On March 27, 2020, the CARES Act was enacted and certain income tax related relief was provided under the CARES Act. These provisions did not have a material impact on our income tax provision for 2021, 2020 or 2019.

Deferred Tax Assets and Liabilities

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. As a result of the U.K. corporate income tax rate change from 19% to 25% enacted in June 2021, and from 17% to 19% enacted in 2020, we revalued the U.K. deferred tax assets and liabilities accordingly. Certain unrecognized tax benefits associated with our acquisition of Ellie Mae are presented as a reduction to related deferred tax assets. During the fourth quarter of 2021, we deconsolidated Bakkt and treat it as an equity investment within our consolidated financial statements resulting in a pre-tax gain of $1.4 billion (Note 3). The deferred tax liability with respect to the equity investment in Bakkt is $424 million as of December 31, 2021 and is reflected in the following table, which summarizes the significant components of our deferred tax liabilities and assets as of December 31, 2021 and 2020 (in millions):

	As of December 31,	
	2021	**2020**
Deferred tax assets:		
Deferred and stock-based compensation	$ 76	$ 82
Liability reserve	59	49
Tax credits	12	14
Loss carryforward	115	115
Deferred revenue	23	26
Lease liability	77	93
Other	20	33
Total	382	412
Valuation allowance	(99)	(95)
Total deferred tax assets, net of valuation allowance	$ 283	$ 317
Deferred tax liabilities:		
Property and equipment	$ (172)	$ (153)
Acquired intangibles	(3,660)	(3,606)
Right of use asset	(58)	(75)
Equity investment	(493)	(46)
Total deferred tax liabilities	$ (4,383)	$ (3,880)
Net deferred tax liabilities	$ (4,100)	$ (3,563)
Reported as:		
Net non-current deferred tax liabilities	$ (4,100)	$ (3,563)

A reconciliation of the beginning and ending amount of deferred income tax valuation allowance is as follows (in millions):

	Year Ended December 31,		
	2021	**2020**	**2019**
Beginning balance of deferred income tax valuation allowance	$ 95	$ 119	$ 119
Charges against goodwill	—	2	1
Increases/(Decreases)	4	(26)	(1)
Ending balance of deferred income tax valuation allowance	$ 99	$ 95	$ 119

We recognize valuation allowances on deferred tax assets if, based on the weight of the evidence, we believe that it is more likely than not that some or all of the deferred tax assets will not be realized. We recorded a valuation allowance for deferred tax assets of $99 million and $95 million as of December 31, 2021 and 2020, respectively. Decreases in 2020 primarily relate to certain tax attributes that expired during the year and increased future taxable capital gains. Increases charged against goodwill primarily relate to deferred tax assets arising on acquisitions.

The majority of our undistributed earnings of our non-U.S. subsidiaries are subject to the Global Intangible Low-Taxed Income provisions under the TCJA and, as such, are subject to immediate U.S. income taxation and can be distributed to the U.S. with no material additional income tax consequences in the future. Consequently, these earnings are not considered to be indefinitely reinvested and the related tax impact is included in our income tax provision for 2021, 2020 and 2019.

However, our non-U.S. subsidiaries' cumulative undistributed earnings as of December 31, 2021, 2020 and 2019 that are not subject to the Global Intangible Low-Taxed Income provisions are considered to be indefinitely reinvested. Accordingly, no provision for U.S. federal and state income taxes has been made in the accompanying consolidated financial statements. Further, a determination of the unrecognized deferred tax liability is not practicable. An estimate of these indefinitely reinvested undistributed earnings as of December 31, 2021, based on post-income tax earnings under U.S. GAAP, is $5.8 billion.

As of December 31, 2021 and 2020, we have gross U.S. federal net operating loss carryforwards of $120 million and $125 million, respectively, and gross state and local net operating loss carryforwards of $137 million and $241 million, respectively. The net decrease of federal, state and local net operating loss carryforwards are primarily due to losses utilized in the current year. The net operating loss carryforwards are available to offset future taxable income until they expire, with amounts beginning in 2026. In addition, as of December 31, 2021 and 2020, we have gross foreign net operating loss carryforwards of $293 million and $276 million, respectively. The majority of gross foreign net operating losses are not expected to be realizable in future periods and have related valuation allowances.

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows (in millions):

	Year Ended December 31,		
	2021	2020	2019
Beginning balance of unrecognized tax benefits	188	103	$ 98
Additions/(reductions) related to acquisitions	(1)	58	—
Additions based on tax positions taken in current year	41	21	17
Additions based on tax positions taken in prior years	3	14	9
Reductions based on tax positions taken in prior years	(2)	—	(1)
Reductions resulting from statute of limitation lapses	—	(5)	(13)
Reductions related to settlements with taxing authorities	—	(3)	(7)
Ending balance of unrecognized tax benefits	$ 229	$ 188	$ 103

As of December 31, 2021 and 2020, the balance of unrecognized tax benefits which would, if recognized, affect our effective tax rate was $194 million and $109 million, respectively. It is reasonably possible, as a result of settlements of ongoing audits or statute of limitations expirations, that unrecognized tax benefits could increase as much as $35 million and decrease as much as $36 million within the next 12 months. Of the $229 million in unrecognized tax benefits as of December 31, 2021, $193 million is recorded within other non-current liabilities and $36 million is recorded within other current liabilities.

We recognize interest and penalties accrued on income tax uncertainties as a component of income tax expense. In 2021, 2020 and 2019, we recognized $10 million, $6 million and $5 million, respectively, of income tax expense for interest and penalties. As of December 31, 2021 and 2020, accrued interest and penalties were $49 million and $39 million, respectively. Of the $49 million in accrued interest and penalties as of December 31, 2021, $20 million is recorded within other non-current liabilities and $29 million is recorded within other current liabilities in the accompanying consolidated balance sheet.

We or one of our subsidiaries files income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. The following table summarizes open tax years by major jurisdiction:

Jurisdiction	Open Tax Years
U.S. Federal	2017 - 2021
U.S. States	2009 - 2021
U.K.	2019 - 2021

Although the outcome of tax audits is always uncertain, we believe that adequate amounts of tax, including interest and penalties, have been provided for any adjustments expected to result from open tax years.

14. Clearing Operations

We operate six clearing houses, each of which acts as a central counterparty that becomes the buyer to every seller and the seller to every buyer for its clearing members or participants, or Members. Through this central counterparty function, the clearing houses provide financial security for each transaction for the duration of the position by limiting counterparty credit risk.

Our clearing houses are responsible for providing clearing services to each of our futures exchanges, and in some cases to third-party execution venues, and are as follows, referred to herein collectively as "the ICE Clearing Houses":

Clearing House	Products Cleared	Exchange where Executed	Location
ICE Clear Europe	Energy, agricultural, interest rates and equity index futures and options contracts and OTC European CDS instruments	ICE Futures Europe, ICE Futures U.S., ICE Endex, ICE Futures Abu Dhabi and third-party venues	U.K.
ICE Clear U.S.	Agricultural, metals, and foreign exchange, or FX index futures and options contracts, equity futures contracts and digital assets futures contracts	ICE Futures U.S.	U.S.
ICE Clear Credit	OTC North American, European, Asian-Pacific and Emerging Market CDS instruments	Creditex and third-party venues	U.S.
ICE Clear Netherlands	Derivatives on equities and equity indices traded on regulated markets	ICE Endex	The Netherlands
ICE Clear Singapore	Energy, metals and financial futures products and digital assets futures contracts	ICE Futures Singapore	Singapore
ICE NGX	Physical North American natural gas, electricity and oil futures	ICE NGX	Canada

Original and Variation Margin

Each of the ICE Clearing Houses generally requires all Members to deposit collateral in cash or certain pledged assets. The collateral deposits are known as “original margin.” In addition, the ICE Clearing Houses may make intraday original margin calls in circumstances where market conditions require additional protection. The daily profits and losses to and from the ICE Clearing Houses due to the marking-to-market of open contracts is known as “variation margin.” With the exception of ICE NGX’s physical natural gas and physical power products discussed separately below, the ICE Clearing Houses mark all outstanding contracts to market, and therefore pay and collect variation margin, at least once daily.

The amounts that Members are required to maintain are determined by proprietary risk models established by each ICE Clearing House and reviewed by the relevant regulators, independent model validators, risk committees and the boards of directors of the respective ICE Clearing House. The amounts required may fluctuate over time. Each of the ICE Clearing Houses is a separate legal entity and is not subject to the liabilities of the others, or the obligations of Members of the other ICE Clearing Houses.

Should a particular Member fail to deposit its original margin or fail to make a variation margin payment, when and as required, the relevant ICE Clearing House may liquidate or hedge the defaulting Member's open positions and use their original margin and guaranty fund deposits to pay any amount owed. In the event that the defaulting Member's deposits are not sufficient to pay the amount owed in full, the ICE Clearing Houses will first use their respective contributions to the guaranty fund, often referred to as Skin In The Game, or SITG, to pay any remaining amount owed. In the event that the SITG is not sufficient, the ICE Clearing Houses may utilize the respective guaranty fund deposits, or collect limited additional funds from their respective non-defaulting Members on a pro-rata basis, to pay any remaining amount owed.

As of December 31, 2021 and 2020, the ICE Clearing Houses had received or had been pledged $239.9 billion and $154.1 billion, respectively, in cash and non-cash collateral in original margin and guaranty fund deposits to cover price movements of underlying contracts for both periods.

Guaranty Funds and ICE Contribution

As described above, mechanisms have been created, called guaranty funds, to provide partial protection in the event of a Member default. With the exception of ICE NGX, each of the ICE Clearing Houses requires that each Member make deposits into a guaranty fund.

In addition, we have contributed our own capital that could be used if a defaulting Member’s original margin and guaranty fund deposits are insufficient. Such amounts are recorded as long-term restricted cash and cash equivalents in our balance sheets and are as follows (in millions):

	ICE Portion of Guaranty Fund Contribution		Default insurance	
	As of December 31,		As of December 31,	
Clearing House	2021	2020	2021	2020
ICE Clear Europe	$247	$237	$75	$75
ICE Clear U.S.	83	103	25	25
ICE Clear Credit	50	50	50	50
ICE Clear Netherlands	2	2	N/A	N/A
ICE Clear Singapore	1	1	N/A	N/A
ICE NGX	15	15	100	100
Total	$398	$408	$250	$250

Of our total contribution to ICE Clear U.S. above, as of December 31, 2021, $15 million is solely applicable to any losses associated with a default in Bitcoin contracts and other digital assets that ICE Clear U.S. may clear in the future. In February 2021, we decreased our contribution to ICE Clear U.S.'s guaranty fund applicable to any losses associated with a default in Bitcoin contracts and other digital asset contracts by $20 million from $35 million as of December 31, 2020. In March 2021, we increased our contribution to ICE Clear Europe's guaranty fund by $10 million in connection with the launch of ICE Futures Abu Dhabi Limited.

We also maintain default insurance as an additional layer of clearing member default protection which is reflected in the table below. The default insurance was added in September 2019 and has a three-year term for the following clearing houses in the following amounts: ICE Clear Europe - $75 million; ICE Clear U.S. - $25 million; and ICE Clear Credit - $50 million. The default insurance layer resides after and in addition to the ICE Clear Europe, ICE Clear U.S. and ICE Clear Credit SITG contributions and before the guaranty fund contributions of the non-defaulting Members.

Similar to SITG, the default insurance layer is not intended to replace or reduce the position risk-based amount of the guaranty fund. As a result, the default insurance layer is not a factor that is included in the calculation of the Members' guaranty fund contribution requirement. Instead, it serves as an additional, distinct, and separate default resource that should serve to further protect the non-defaulting Members' guaranty fund contributions from being mutualized in the event of a default.

As of December 31, 2021, ICE NGX maintains a guaranty fund utilizing a $115 million letter of credit and a default insurance policy, discussed below.

Cash and Invested Deposits

We have recorded cash and invested margin deposits and amounts due in our balance sheets as current assets with corresponding current liabilities to the Members. As of December 31, 2021, our cash and invested margin deposits were as follows (in millions):

	ICE Clear Europe [1]	ICE Clear Credit	ICE Clear U.S.	ICE NGX	Other ICE Clearing Houses	Total
Original margin	$ 94,010	$ 39,372	$ 6,963	$ —	$ 27	$ 140,372
Unsettled variation margin, net	—	—	—	226	—	226
Guaranty fund	4,175	3,952	597	—	4	8,728
Delivery contracts receivable/payable, net	—	—	—	1,103	—	1,103
Total	$ 98,185	$ 43,324	$ 7,560	$ 1,329	$ 31	$ 150,429

As of December 31, 2020, our cash and invested margin deposits, were as follows (in millions):

	ICE Clear Europe [2]	ICE Clear Credit	ICE Clear U.S.	ICE NGX	Other ICE Clearing Houses	Total
Original margin	$ 33,726	$ 34,922	$ 7,288	$ —	$ 12	$ 75,948
Unsettled variation margin, net	—	—	—	99	—	99
Guaranty fund	4,374	2,574	502	—	5	7,455
Delivery contracts receivable/payable, net	—	—	—	581	—	581
Total	$ 38,100	$ 37,496	$ 7,790	$ 680	$ 17	$ 84,083

[1] $92.0 billion and $6.2 billion is related to futures/options and CDS, respectively.
[2] $31.8 billion and $6.3 billion is related to futures/options and CDS, respectively.

Our cash and invested margin and guaranty fund deposits are maintained in accounts with national banks and highly-rated financial institutions or secured through direct investments, primarily in U.S. Treasury and other highly-rated foreign government securities, or reverse repurchase agreements with primarily overnight maturities. We primarily use Level 1 inputs when evaluating the fair value of the non-cash equivalent direct investments, as highly-rated government securities are quoted in active markets. The carrying value of these deposits are deemed to approximate fair value.

To provide a tool to address the liquidity needs of our clearing houses and manage the liquidation of margin and guaranty fund deposits held in the form of cash and high quality sovereign debt, ICE Clear Europe, ICE Clear Credit and ICE Clear U.S. have entered into Committed Repurchase Agreement Facilities, or Committed Repo. Additionally, ICE Clear Credit and ICE Clear Netherlands have entered into Committed FX Facilities to support these liquidity needs. As of December 31, 2021 the following facilities were in place:

- **ICE Clear Europe:** $1.0 billion in Committed Repo to finance U.S. dollar, euro and pound sterling deposits.
- **ICE Clear Credit:** $300 million in Committed Repo (U.S. dollar based) to finance U.S. dollar denominated sovereign debt and euro deposits, €250 million in Committed Repo (euro based) to finance euro and U.S. dollar denominated sovereign debt deposits, and €1.9 billion in Committed FX Facilities to finance euro payment obligations.
- **ICE Clear U.S.:** $250 million in Committed Repo to finance U.S. dollar denominated sovereign debt deposits.
- **ICE Clear Netherlands**: €10 million in Committed FX Facilities to finance euro payment obligations.

Details of our deposits are as follows (in millions):

Cash and Cash Equivalent Margin Deposits and Guaranty Funds

Clearing House	Investment Type	As of December 31, 2021	As of December 31, 2020
ICE Clear Europe	National bank account [1]	$ 55,959	$ 10,887
ICE Clear Europe	Reverse repo	25,518	23,696
ICE Clear Europe	Sovereign debt	9,324	1,726
ICE Clear Europe	Demand deposits	4,220	16
ICE Clear Credit	National bank account	37,282	30,275
ICE Clear Credit	Reverse repo	3,639	4,520
ICE Clear Credit	Demand deposits	2,403	2,701
ICE Clear U.S.	Reverse repo	6,485	5,690
ICE Clear U.S.	Sovereign debt	1,075	2,100
Other ICE Clearing Houses	Demand deposits	31	17
Total cash and cash equivalent margin deposits and guaranty funds		$ 145,936	$ 81,628

Invested Deposits, Delivery Contracts Receivable and Unsettled Variation Margin

Clearing House	Investment Type	As of December 31, 2021	As of December 31, 2020
ICE NGX	Unsettled variation margin and delivery contracts receivable/payable	$ 1,329	$ 680
ICE Clear Europe	Invested deposits - sovereign debt	3,164	1,775
Total invested deposits, delivery contracts receivable and unsettled variation margin		$ 4,493	$ 2,455

(1) As of December 31, 2021, ICE Clear Europe held €47.2 billion ($53.7 billion based on the euro/U.S. dollar exchange rate of 1.1372 as of December 31, 2021) at European Central Bank, or ECB, £1.7 billion ($2.3 billion based on the pound sterling/U.S. dollar exchange rate of 1.3524 as of December 31, 2021) at the Bank of England, or BOE and €10 million ($11 million based on the above exchange rate) at the BOE. As of December 31, 2020, ICE Clear Europe held €6.3 billion ($7.7 billion based on the euro/U.S. dollar exchange rate of 1.2216 as of December 31, 2020) at De Nederlandsche Bank, or DNB, £2.3 billion ($3.1 billion based on the pound sterling/U.S. dollar exchange rate of 1.3665 as of December 31, 2020) at the BOE and €10 million ($12 million based on the above exchange rate) at the BOE.

Other Deposits

Non-cash original margin and guaranty fund deposits are not reflected in the accompanying consolidated balance sheets as the risks and rewards of these assets remain with the clearing members unless the clearing houses have sold or re-pledged the assets or in the event of a clearing member default, where the clearing member is no longer entitled to redeem the assets. Any income, gain or loss accrues to the clearing members.

In addition to the cash and invested deposits above, the ICE Clearing Houses have also received other assets from Members, which include government obligations, and may include other non-cash collateral such as letters of credit at ICE NGX, or gold on rare occasions at ICE Clear Europe, to mitigate credit risk. For certain deposits, we may impose discount or “haircut” rates to ensure adequate collateral if market values fluctuate. The value-related risks and rewards of these assets remain with the Members. Any gain or loss accrues to the Member. The ICE Clearing Houses do not, in the ordinary course, rehypothecate or re-pledge these assets. These pledged assets are not reflected in our balance sheets, and are as follows (in millions):

	As of December 31, 2021				
	ICE Clear Europe	ICE Clear Credit	ICE Clear U.S.	ICE NGX	Total
Original margin:					
Government securities at face value	$ 58,156	$ 8,425	$ 17,211	$ —	$ 83,792
Letters of credit	—	—	—	3,566	3,566
ICE NGX cash deposits	—	—	—	987	987
Total	$ 58,156	$ 8,425	$ 17,211	$ 4,553	$ 88,345
Guaranty fund:					
Government securities at face value	$ 740	$ 152	$ 273	$ —	$ 1,165

	As of December 31, 2020				
	ICE Clear Europe	ICE Clear Credit	ICE Clear U.S.	ICE NGX	Total
Original margin:					
Government securities at face value	$ 36,295	$ 9,523	$ 20,216	$ —	$ 66,034
Letters of credit	—	—	—	2,329	2,329
ICE NGX cash deposits	—	—	—	405	405
Total	$ 36,295	$ 9,523	$ 20,216	$ 2,734	$ 68,768
Guaranty fund:					
Government securities at face value	$ 508	$ 515	$ 250	$ —	$ 1,273

ICE NGX

ICE NGX owns a clearing house which administers the physical delivery of energy trading contracts. ICE NGX is the central counterparty to Members on opposite sides of its physically-settled contracts, and the balance related to delivered but unpaid contracts is recorded as a delivery contract net receivable, with an offsetting delivery contract net payable in our balance sheets. Unsettled variation margin equal to the fair value of open contracts is recorded as of each balance sheet date. There is no impact on our consolidated statements of income as an equal amount is recognized as both an asset and a liability. ICE NGX marks all outstanding contracts to market daily, but only collects variation margin when a Member's open position falls outside a specified percentage of its pledged collateral. Due to the highly liquid nature and the short period of time to maturity, the fair values of our delivery contract net payable and net receivable are determined to approximate carrying value.

ICE NGX requires Members to maintain cash or letters of credit to serve as collateral in the event of default. The cash is maintained in a segregated bank account, held in trust and remains the property of the Member, therefore, it is not included in our balance sheets. ICE NGX maintains a $250 million daylight liquidity facility with a third-party Canadian chartered bank which is available in the event of physical settlement shortfalls, subject to certain conditions.

As of December 31, 2021, ICE NGX maintains a guaranty fund of $115 million funded by a $100 million letter of credit issued by a major Canadian chartered bank and backed by default insurance underwritten by Export Development Canada, a Crown corporation operated at arm’s length from the Canadian government, plus $15 million held as restricted cash to fund the first loss amount the ICE NGX is responsible for under the default insurance policy. In the event of a participant default where the Member’s collateral is depleted, the shortfall would be covered by a draw down on the letter of credit following which ICE NGX would file a claim under the default insurance to recover additional losses up to $100 million beyond the $15 million first-loss amount that ICE NGX is responsible for under the default insurance policy.

Clearing House Exposure

The net notional value of unsettled contracts was $3.0 trillion as of December 31, 2021. Each ICE Clearing House bears financial counterparty credit risk and provides a central counterparty guarantee, or performance guarantee, to its Members. To reduce their exposure, the ICE Clearing Houses have a risk management program with both initial and ongoing membership standards. Excluding the effects of original and variation margin, guaranty fund and collateral requirements and default insurance, the ICE Clearing Houses' maximum estimated exposure for this guarantee is $218.9 billion as of December 31, 2021, which represents the maximum estimated value by the ICE Clearing Houses of a hypothetical one-day movement in pricing of the underlying unsettled contracts. This value was determined using proprietary risk management software that simulates gains and losses based on historical market prices, volatility and other factors present at that point in time for those particular unsettled contracts. Future actual market price volatility could result in the exposure being significantly different than this amount.

We also performed calculations to determine the fair value of our counterparty performance guarantee taking into consideration factors such as daily settlement of contracts, margining and collateral requirements, other elements of our risk management program, historical evidence of default payments, and estimated probability of potential default payouts by the ICE Clearing Houses. Based on these analyses, the estimated counterparty performance guarantee liability was determined to be nominal and no liability was recorded as of December 31, 2021 or 2020. The ICE Clearing Houses have never experienced an incident of a clearing member default which has required the use of the guaranty funds of non-defaulting clearing members or the assets of the ICE Clearing Houses.

15. Commitments and Contingencies

Leases

We have lease agreements for office space, equipment facilities and certain computer equipment for varying periods that expire at various dates through 2029. All of our leases are classified as operating leases. For details of our lease assets, lease liabilities and rent expense see Note 2.

Legal Proceedings

In the ordinary course of our business, from time to time we are subject to legal proceedings, lawsuits, government investigations and other claims with respect to a variety of matters. In addition, we are subject to periodic reviews, inspections, examinations and investigations by regulators in the U.S. and other jurisdictions, any of which may result in claims, legal proceedings, assessments, fines, penalties, restrictions on our business or other sanctions. We record estimated expenses and reserves for legal or regulatory matters or other claims when these matters present loss contingencies that are probable and the related amount is reasonably estimable. Any such accruals may be adjusted as circumstances change. Assessments of losses are inherently subjective and involve unpredictable factors. While the outcome of legal and regulatory matters is inherently difficult to predict and/or the range of loss often cannot be reasonably estimable, we do not believe that the liabilities, if any, which may ultimately result from the resolution of the various legal and regulatory matters that arise in the ordinary course of our business, including the matters described below, are likely to have a material adverse effect on our consolidated financial condition, results of operations, or liquidity. It is possible, however, that future results of operations for any particular quarterly or annual period could be materially and adversely affected by any developments relating to these legal and regulatory matters.

City of Providence Litigation

In 2014, New York Stock Exchange LLC and NYSE Arca, Inc., two of our subsidiaries, were among more than 40 financial institutions and U.S.-based equity exchanges named as defendants in four purported class action lawsuits filed in the U.S. District Court for the Southern District of New York, or the Southern District, by the City of Providence, Rhode Island, and other plaintiffs. In a subsequent consolidated amended complaint filed against only the exchange defendants (which include exchanges owned and operated by Nasdaq and Cboe), the plaintiffs asserted claims on behalf of a class of "all public investors" who bought or sold stock from April 18, 2009 to the present on the named exchanges.

In 2015, the district court granted a motion to dismiss filed by the exchange defendants and dismissed the complaint with prejudice. The court held that the plaintiffs had failed to sufficiently state a claim under Sections 10(b) and 6(b) of the Exchange Act, and additionally that some of the claims were barred by the doctrine of self-regulatory organization immunity. The plaintiffs appealed, and in 2017 the U.S. Court of Appeals for the Second Circuit, or the Second Circuit, issued a decision vacating the dismissal and remanding the case to the district court for further proceedings. The Second Circuit held that the claims against the exchanges were not barred by the doctrine of self-regulatory organization immunity because (in the view of the Second Circuit) the exchanges were not carrying out regulatory functions while operating their markets and engaging in the challenged conduct at issue, and that the plaintiffs had adequately pleaded claims against the defendants under Section 10(b) of the Exchange Act. The Second Circuit directed that, on remand, the district court should address and rule upon various other defenses raised by the exchanges in their motion to dismiss (which the district court did not address in its prior opinion and order).

In 2019, the district court denied a new motion to dismiss filed by the defendants, and the exchanges filed answers to the complaint, denying the principal allegations of the plaintiffs, denying liability in the matter, and asserting various affirmative defenses. During 2021, the parties conducted discovery, relating largely to class certification issues; the plaintiffs filed a motion for class certification; and the defendants filed motions for summary judgment on the basis of preclusion and lack of standing. The parties are awaiting decisions from the court.

LIBOR Litigation

In 2019, three virtually identical purported class action complaints were filed in the Southern District against ICE and several of its subsidiaries, including ICE Benchmark Administration Limited, or IBA, collectively referred to as the ICE Defendants, as well as 18 multinational banks and various of their respective subsidiaries and affiliates, or the Panel Bank Defendants, by, respectively, Putnam Bank, a savings bank based in Putnam, Connecticut; two municipal pension funds affiliated with the City of Livonia, Michigan; and four retirement and benefit funds affiliated with the Hawaii Sheet Metal Workers Union. IBA is the administrator for various regulated benchmarks, including the ICE LIBOR benchmark that is calculated daily based upon the submissions from a reference panel (which includes the Panel Bank Defendants).

The plaintiffs sought to litigate on behalf of a purported class of all U.S.-based persons or entities who transacted with a Panel Bank Defendant by receiving a payment on an interest rate indexed to a one-month or three-month USD LIBOR-benchmarked rate during the period from February 1, 2014 to the present. The plaintiffs alleged that the ICE Defendants and the Panel Bank Defendants engaged in a conspiracy to set the LIBOR benchmark at artificially low levels, with an alleged purpose and effect of depressing payments by the Panel Bank Defendants to members of the purported class.

Subsequent to the filing of the individual complaints, the various plaintiffs referenced above filed a consolidated amended complaint against the ICE Defendants and the Panel Bank Defendants. As with the individual complaints, the consolidated amended complaint asserted a claim for violations of the Sherman and Clayton Antitrust Acts and sought unspecified treble damages and other relief. The ICE Defendants and the Panel Bank Defendants filed motions to dismiss the consolidated amended complaint.

On March 26, 2020, the court issued a decision and order granting the ICE Defendants and the Panel Bank Defendants' motions to dismiss for failure to state a claim. Among other things, the court found that the amended complaint "…is made up of almost entirely conclusory allegations and is essentially devoid of any evidence, direct or circumstantial, to support the conclusion that Defendants colluded with one another."

The plaintiffs appealed the decision to the Second Circuit. While briefing of the appeal was ongoing, each of the named plaintiffs withdrew from the case. DYJ Holdings, LLC, a New Jersey-based holding company, was permitted, over the objection of the defendants, to intervene for the purpose of serving as named plaintiff and representative of the purported class. On November 29, 2021, the Second Circuit heard oral argument on the merits of the underlying appeal, and the parties are awaiting a decision.

ICE Data Pricing & Reference Data Matter

Our subsidiary ICE Data Pricing & Reference Data, LLC, or PRD, is a registered investment advisor in the business of, among other things, providing clients with evaluated pricing and other information for fixed-income securities. PRD formerly had a business practice of passing through third-party price quotes, or broker quotes, in certain fixed income securities as-is to its clients when PRD did not believe it had the capability to model an evaluated price for such securities. Broker quoted securities were less than 2% of the securities PRD priced. A list of securities that were broker quoted, as distinguished from evaluated, was made available to PRD's clients every day. PRD first notified its clients on December 16, 2019 that it would cease providing broker quotes and did so as of October 1, 2020.

On December 9, 2020, following an SEC investigation of PRD's legacy business practices with respect to broker quotes, the SEC announced a settlement in which PRD, without admitting or denying the findings therein, agreed to pay an $8 million civil monetary penalty, together with certain non-monetary provisions. For further details about the settlement and underlying matter under investigation, please refer to Order Instituting Administrative and Cease-and-Desist Proceedings, Pursuant to Sections 203(e) and 203(k) of the Investment Advisers Act of 1940, Making Findings, and Imposing Remedial Sanctions and a Cease-and-Desist Order, Administrative Proceeding File No. 3-20164 (In the Matter of ICE Data Pricing & Reference Data, LLC).

Separately, PRD's legacy business practices with respect to broker quotes received from a now-bankrupt entity named Live Well Financial, Inc., or Live Well, are relevant to potential civil claims against PRD. In August 2019, the SEC and the

United States Department of Justice, respectively, filed civil and criminal charges against Live Well and certain of its executives, alleging that Live Well fraudulently provided over-stated “broker quotes” to a then-unnamed “industry-leading price service” (which was PRD). Certain of Live Well’s financial institution creditors and its bankruptcy trustee have asserted to PRD that they believe they have putative claims against PRD related to Live Well’s actions. As of December 31, 2021, PRD has resolved the potential claims of the trustee and all but one of the financial institution creditors. PRD continues to deny any wrongdoing, and to the extent any unresolved assertions relating to broker quotes PRD received from Live Well become litigated matters, we plan to vigorously defend any such litigation.

SPAN Trademark Dispute

CME Group, Inc., or CME, filed suit against two of ICE’s clearing houses (ICE Clear U.S. and ICE Clear Europe Limited) in 2018 in the U.S. District Court for the Northern District of Illinois, alleging infringement of CME’s trademark for SPAN, which is a name generally used to refer to a type of initial margining approach that assesses risk for a variety of financial instruments on a portfolio-wide basis, as well as breach of contract and counterfeiting. The ICE clearing entities and CME were parties to 10-year license agreements that expired in 2017, pursuant to which the clearing entities paid CME a collective total of $50,001 over such 10-year period for the right to use the SPAN trademark.

In 2020, CME informed ICE and the court that it was not seeking compensatory damages based on the license fees but rather that it would seek at trial the disgorgement of profits of the ICE clearing entities over the approximate one-year period during which the mark was referenced following expiration of the formal agreements. A bench trial was held during September 2020, and, on August 17, 2021, the trial court issued findings of fact and conclusions of law, in which, among other things, the court found in favor of ICE on CME’s counterfeiting and breach of contract claims; held that ICE had a valid implied license defense for significant periods of time of the alleged infringement; and, excluding the periods to which the implied license applied, awarded CME a judgment for infringement of approximately $16 million. In October 2021, this matter was resolved.

Tax Audits

We are engaged in ongoing discussions and audits with taxing authorities on various tax matters, the resolutions of which are uncertain. Currently, there are matters that may lead to assessments involving us or one of our subsidiaries, some of which may not be resolved for several years. Based on currently available information, we believe we have adequately provided for any assessments that could result from those proceedings where it is more likely than not that we will be assessed. We continuously review our positions as these matters progress.

16. Pension and Other Benefit Programs

Defined Benefit Pension Plan

We have a pension plan covering employees in certain of our U.S. operations whose benefit accrual has been frozen. Retirement benefits are derived from a formula, which is based on length of service and compensation.

We did not make any contributions to our pension plan during 2021, 2020 or 2019. The plan’s target allocation is 5% equity securities and 95% fixed income securities. The fixed income allocation includes corporate bonds of companies from diversified industries and U.S. government bonds. Our long-term objective is to keep the plan at or near full funding, while minimizing the risk inherent in pension plans. As a result, we don't anticipate that there will be a strong need for contributions in future years, and the pension plan will not be required to pay the Pension Benefit Guaranty Corporation variable rate premiums. We do not expect to make contributions to the pension plan in 2022. We will continue to monitor the plan’s funded status, and we will consider modifying the plan’s investment policy based on the actuarial and funding characteristics of the retirement plan, the demographic profile of plan participants, and our business objectives.

The fair values of our plan assets as of December 31, 2021, by asset category, are as follows (in millions):

	Fair Value Measurements			
Asset Category	**Quoted Prices in Active Markets for Identical Assets (Level 1)**	**Significant Observable Inputs (Level 2)**	**Significant Unobservable Inputs (Level 3)**	**Total**
Cash	$ 7	$ —	$ —	$ 7
Equity securities:				
U.S. large-cap	—	26	—	26
U.S. small-cap	—	6	—	6
International	—	15	—	15

	Fair Value Measurements			
Asset Category	**Quoted Prices in Active Markets for Identical Assets (Level 1)**	**Significant Observable Inputs (Level 2)**	**Significant Unobservable Inputs (Level 3)**	**Total**
Fixed income securities	137	720	6	863
Total	$ 144	$ 767	$ 6	$ 917

The above table excludes trades pending settlement with a net benefit of $3 million as of December 31, 2021. These trades settled in January 2022.

The fair values of our plan assets as of December 31, 2020, by asset category, are as follows (in millions):

	Fair Value Measurements			
Asset Category	**Quoted Prices in Active Markets for Identical Assets (Level 1)**	**Significant Observable Inputs (Level 2)**	**Significant Unobservable Inputs (Level 3)**	**Total**
Cash	$ 14	$ —	$ —	$ 14
Equity securities:				
U.S. large-cap	—	29	—	29
U.S. small-cap	—	8	—	8
International	—	15	—	15
Fixed income securities	143	784	6	933
Total	$ 157	$ 836	$ 6	$ 999

The above table excludes trades pending settlement with a net obligation of $24 million as of December 31, 2020. These trades settled in January 2021.

The measurement dates for the pension plan are December 31, 2021 and 2020. The following table provides a summary of the changes in the pension plan's benefit obligations and the fair value of assets measured using the valuation techniques described in Note 17, as of December 31, 2021 and 2020 and a statement of funded status of the pension plan as of December 31, 2021 and 2020 (in millions):

	As of December 31,	
	2021	**2020**
Change in benefit obligation:		
Benefit obligation at beginning of year	$ 914	$ 861
Interest cost	14	22
Actuarial (gain) loss	(35)	78
Benefits paid	(47)	(47)
Benefit obligation at year end	$ 846	$ 914
Change in plan assets:		
Fair value of plan assets at beginning of year	$ 975	$ 894
Actual return on plan assets	(8)	128
Benefits paid	(47)	(47)
Fair value of plan assets at end of year	$ 920	$ 975
Funded status	$ 74	$ 61
Accumulated benefit obligation	$ 846	$ 914
Amounts recognized in the accompanying consolidated balance sheets:		
Accrued pension plan asset	$ 74	$ 61

The following shows the components of the pension plan expense for 2021, 2020 and 2019 (in millions):

	Year Ended December 31,		
	2021	2020	2019
Interest cost	$ 14	$ 22	$ 28
Estimated return on plan assets	(19)	(25)	(31)
Amortization of loss	6	5	3
Aggregate pension expense	$ 1	$ 2	$ —

We use a market-related value of plan assets when determining the estimated return on plan assets. Gains/losses on plan assets are amortized over a four-year period and accumulate in other comprehensive income. We recognize deferred gains and losses in future net income based on a "corridor" approach, where the corridor is equal to 10% of the greater of the benefit obligation or the market-related value of plan assets at the beginning of the year.

The following shows the projected payments for the pension plan based on actuarial assumptions (in millions):

2022	$ 49
2023	50
2024	49
2025	50
2026	49
Next 5 years	238

Supplemental Executive Retirement Plan

We have a U.S. nonqualified supplemental executive retirement plan, or SERP, which provides supplemental retirement benefits for certain employees. The future benefit accrual of the SERP plan is frozen. To provide for the future payments of these benefits, we have purchased insurance on the lives of certain of the participants through company-owned policies. As of December 31, 2021 and 2020, the cash surrender value of such policies was $61 million and $60 million, respectively, and is included in other non-current assets in the accompanying consolidated balance sheets. We also acquired a SERP through both the ICE NGX and CHX acquisitions. The following table provides a summary of the changes in the SERP benefit obligations (in millions):

	As of December 31,	
	2021	2020
Change in benefit obligation:		
Benefit obligation at beginning of year	$ 38	$ 41
Interest cost	1	1
Actuarial (gain) loss	(1)	1
Benefits paid	(5)	(5)
Benefit obligation at year end	$ 33	$ 38
Funded status	$ (33)	$ (38)
Amounts recognized in the accompanying consolidated balance sheets:		
Other current liabilities	$ (4)	$ (5)
Accrued employee benefits	(29)	(33)

SERP plan expense in the accompanying consolidated statements of income was $1 million each year in 2021, 2020 and 2019 and primarily consisted of interest cost. The following table shows the projected payments for the SERP plan based on the actuarial assumptions (in millions):

Projected SERP Plan Payments	
2022	$ 4
2023	4
2024	3
2025	3
2026	3
Next 5 years	10

Pension and SERP Plans Assumptions

The weighted-average assumptions used to develop the actuarial present value of the projected benefit obligation and net periodic pension/SERP costs in 2021, 2020 and 2019 are set forth below:

	Year Ended December 31,		
	2021	2020	2019
Weighted-average discount rate for determining benefit obligations (pension/SERP plans)	2.6% / 2.1%	2.2% / 1.6%	3.0% / 2.7%
Weighted-average discount rate for determining interest costs (pension/SERP plans)	1.6% / 1.1%	2.6% / 2.3%	3.7% / 3.5%
Expected long-term rate of return on plan assets (pension/SERP plans)	2.3% / N/A	3.1% / N/A	3.9% / N/A
Rate of compensation increase	N/A	N/A	N/A

The assumed discount rate reflects the market rates for high-quality corporate bonds currently available. The discount rate was determined by considering the average of pension yield curves constructed on a large population of high quality corporate bonds. The resulting discount rates reflect the matching of plan liability cash flows to yield curves. To develop the expected long-term rate of return on assets assumption, we considered the historical returns and the future expectations for returns for each asset class as well as the target asset allocation of the pension portfolio.

The determination of the interest cost component utilizes a full yield curve approach by applying the specific spot rates along the yield curve used in the determination of the benefit obligation to each year’s discounted cash flow.

Post-retirement Benefit Plans

Our defined benefit plans provide certain health care and life insurance benefits for certain eligible retired NYSE U.S. employees. These post-retirement benefit plans, which may be modified in accordance with their terms, are fully frozen. The net periodic post-retirement benefit costs were $2 million each in 2021, 2020 and 2019. The defined benefit plans are unfunded and we currently do not expect to fund the post-retirement benefit plans. The weighted-average discount rate for determining the benefit obligation as of December 31, 2021 and 2020 is 2.6% and 2.1%, respectively. The weighted-average discount rate for determining the interest cost as of December 31, 2021 and 2020 is 1.6% and 2.6%, respectively. The following table shows the actuarial determined benefit obligation, interest costs, employee contributions, actuarial (gain) loss, benefits paid during the periods and the accrued employee benefits (in millions):

	As of December 31,	
	2021	2020
Benefit obligation at the end of year	$ 145	$ 153
Interest cost	2	4
Actuarial (gain) loss	(2)	17
Employee contributions	2	2
Benefits paid	(11)	(12)
Amounts recognized in the accompanying consolidated balance sheets:		
Other current liabilities	$ (8)	$ (8)
Accrued employee benefits	(136)	(145)

The following table shows the payments projected for our post-retirement benefit plans (net of expected Medicare subsidy receipts of $9 million in aggregate over the next ten fiscal years) based on actuarial assumptions (in millions):

Projected Post-Retirement Benefit by Year:	Projected Payment
2022	$ 8
2023	8
2024	8
2025	8
2026	8
Next 5 years	41

For measurement purposes, we assumed a 5.7% annual rate of increase in the per capita cost of covered health care benefits in 2021 which will decrease on a graduated basis to 4.5% in the year 2038 and thereafter.

Accumulated Other Comprehensive Loss

The accumulated other comprehensive loss, after tax, as of December 31, 2021, consisted of the following amounts that have not yet been recognized in net periodic benefit cost (in millions):

	Pension Plans	SERP Plans	Post-retirement Benefit Plans	Total
Unrecognized net actuarial losses (gains), after tax	$ 56	$ 6	$ (14)	$ 48

Other Benefit Plans and Defined Contribution Plans

Our U.S. employees are eligible to participate in 401(k) and profit sharing plans and our non-U.S. employees are eligible to participate in defined contribution pension plans. Total contributions under the 401(k), profit sharing and defined contribution pension plans were $63 million, $52 million and $42 million in 2021, 2020 and 2019, respectively. No discretionary or profit sharing contributions were made during 2021, 2020 or 2019.

17. Fair Value Measurements

Financial assets and liabilities recorded or disclosed at fair value in the accompanying consolidated balance sheets as of December 31, 2021 and 2020 are classified in their entirety based on the lowest level of input that is significant to the asset or liability's fair value measurement.

Our mutual funds are equity and fixed income mutual funds held for the purpose of providing future payments for the supplemental executive savings plan and SERP. These mutual funds are classified as equity investments and measured at fair value using Level 1 inputs with adjustments recorded in net income (Note 16).

Excluding our equity investments without a readily determinable fair value, all other financial instruments are determined to approximate carrying value due to the short period of time to their maturities.

We did not use Level 3 inputs to determine the fair value of assets or liabilities measured at fair value on a recurring basis as of December 31, 2021 or 2020.

We measure certain assets, such as intangible assets, at fair value on a non-recurring basis. These assets are recognized at fair value if they are deemed to be impaired. As of December 31, 2021 and 2020, except for the 2020 impairment of software developed at Bakkt that is no longer useful (Note 7), none of our intangible assets were required to be recorded at fair value since no other impairments were recorded.

We measure certain equity investments at fair value on a non-recurring basis using our policy election under ASU No. 2016-01 (Note 2). During 2021, we evaluated these investments and concluded that certain fair value adjustments were required under this election based on recent transactions related to our investment in Euroclear (Note 4).

See Note 14 for the fair value considerations related to our margin deposits, guaranty funds and delivery contracts receivable.

The table below displays the fair value of our debt as of December 31, 2021 and December 31, 2020. The fair values of our fixed rate notes were estimated using quoted market prices for these instruments. The fair value of our commercial paper includes a discount and other short-term debt approximates par value since the interest rates on this short-term debt approximate market rates as of December 31, 2021 and December 31, 2020.

	As of December 31, 2021 (in millions)		As of December 31, 2020 (in millions)	
	Carrying Amount	Fair value	Carrying Amount	Fair value
Debt:				
Commercial Paper	$ 1,012	$ 1,012	$ 2,405	$ 2,408
2.35% Senior Notes due September 15, 2022	499	506	498	516
Other short-term debt	10	10	6	6
Floating rate Senior Notes due June 15, 2023	—	—	1,244	1,254
0.70% Senior Notes due June 15, 2023	997	1,000	995	1,008
3.45% Senior Notes due September 21, 2023	399	416	398	431
4.00% Senior Notes due October 15, 2023	797	844	796	878
3.75% Senior Notes due December 1, 2025	1,246	1,351	1,245	1,420

	As of December 31, 2021 (in millions)		As of December 31, 2020 (in millions)	
	Carrying Amount	Fair value	Carrying Amount	Fair value
3.10% Senior Notes due September 15, 2027	497	533	496	560
3.75% Senior Notes due September 21, 2028	594	664	593	702
2.10% Senior Notes due June 15, 2030	1,234	1,242	1,232	1,308
1.85% Senior Notes due September 15, 2032	1,483	1,440	1,481	1,513
2.65% Senior Notes due September 15, 2040	1,230	1,217	1,229	1,286
4.25% Senior Notes due September 21, 2048	1,230	1,563	1,230	1,590
3.00% Senior Notes due June 15, 2050	1,220	1,266	1,219	1,326
3.00% Senior Notes due September 15, 2060	1,470	1,487	1,470	1,570
Total debt	$ 13,918	$ 14,551	$ 16,537	$ 17,776

18. Segment Reporting

Beginning in the first quarter of 2021, origination technology revenues include those related to our ICE Mortgage Technology network (previously reported in closing solutions revenues) and closing solutions revenues now include registration revenues related to MERS (previously reported in other revenues). We believe these changes more accurately reflect how we operate the business. The prior-year periods have been adjusted to reflect this change.

Our business is conducted through three reportable business segments, comprised of the following:

- Our Exchanges segment includes our global futures platforms for trade execution and clearing, NYSE trading and listings and various data services related to those platforms;
- Our Fixed Income and Data Services segment includes our fixed income and data analytics offerings, including pricing and reference data, indices, analytics, fixed income execution, or ICE Bonds, CDS clearing, our consolidated feeds, ICE Global Network businesses, other multi-asset class data and network services; and
- Our Mortgage Technology segment provides mortgage technology solutions for the U.S. residential mortgage market from application through closing and the secondary market.

While revenues are recorded specifically in the segment in which they are earned or to which they relate, a significant portion of our operating expenses are not solely related to a specific segment because the expenses serve functions that are necessary for the operation of more than one segment. We directly allocate expenses when reasonably possible to do so. Otherwise, we use a pro-rata revenue approach as the allocation method for the expenses that do not relate solely to one segment and serve functions that are necessary for the operation of all segments.

Our chief operating decision maker does not review total assets or statements of income below operating income by segments; therefore, such information is not presented below. Our three segments do not engage in intersegment transactions.

Financial data for our business segments is as follows in 2021, 2020 and 2019 (in millions):

	Year Ended December 31, 2021			
	Exchanges	Fixed Income and Data Services	Mortgage Technology	Consolidated
Revenues:				
Energy futures and options	$ 1,236	$ —	$ —	$ 1,236
Agricultural and metals futures and options	228	—	—	228
Financial futures and options	394	—	—	394
Cash equities and equity options	2,377	—	—	2,377
OTC and other	326	—	—	326
Data and connectivity services	838	—	—	838
Listings	479	—	—	479
Fixed income execution	—	52	—	52
CDS clearing	—	192	—	192
Fixed income data and analytics	—	1,082	—	1,082
Other data and network services	—	557	—	557
Origination technology	—	—	971	971
Closing solutions	—	—	310	310
Data and analytics	—	—	73	73
Other	—	—	53	53
Revenues	5,878	1,883	1,407	9,168
Transaction-based expenses	2,022	—	—	2,022
Revenues, less transaction-based expenses	3,856	1,883	1,407	7,146
Operating expenses	1,333	1,354	1,010	3,697
Operating income	$ 2,523	$ 529	$ 397	$ 3,449

	Year Ended December 31, 2020			
	Exchanges	Fixed Income and Data Services	Mortgage Technology	Consolidated
Revenues:				
Energy futures and options	$ 1,120	$ —	$ —	$ 1,120
Agricultural and metals futures and options	245	—	—	245
Financial futures and options	357	—	—	357
Cash equities and equity options	2,585	—	—	2,585
OTC and other	296	—	—	296
Data and connectivity services	790	—	—	790
Listings	446	—	—	446
Fixed income execution	—	70	—	70
CDS clearing	—	208	—	208
Fixed income data and analytics	—	1,018	—	1,018
Other data and network services	—	514	—	514
Origination technology	—	—	316	316
Closing solutions	—	—	238	238
Data and analytics	—	—	22	22
Other	—	—	19	19
Revenues	5,839	1,810	595	8,244
Transaction-based expenses	2,208	—	—	2,208
Revenues, less transaction-based expenses	3,631	1,810	595	6,036
Operating expenses	1,242	1,318	443	3,003
Operating income	$ 2,389	$ 492	$ 152	$ 3,033

	Year Ended December 31, 2019			
	Exchanges	Fixed Income and Data Services	Mortgage Technology	Consolidated
Revenues:				
Energy futures and options	$ 992	$ —	$ —	$ 992
Agricultural and metals futures and options	251	—	—	251
Financial futures and options	332	—	—	332
Cash equities and equity options	1,643	—	—	1,643
OTC and other	233	—	—	233
Data and connectivity services	752	—	—	752
Listings	449	—	—	449
Fixed income execution	—	83	—	83
CDS clearing	—	214	—	214
Fixed income data and analytics	—	969	—	969
Other data and network services	—	490	—	490
Origination technology	—	—	—	—
Closing solutions	—	—	135	135
Data and analytics	—	—	—	—
Other	—	—	4	4
Revenues	4,652	1,756	139	6,547
Transaction-based expenses	1,345	—	—	1,345
Revenues, less transaction-based expenses	3,307	1,756	139	5,202
Operating expenses	1,140	1,317	72	2,529
Operating income	$ 2,167	$ 439	$ 67	$ 2,673

Revenue from one member of our Exchanges segment comprised $443 million or 11% of our Exchanges revenue, less transaction based expenses during 2021. No customers or clearing members accounted for more than 10% of our segment revenues or consolidated revenues, less transaction-based expenses, in 2020. Revenue from one clearing member of the Exchanges segment comprised $368 million, or 11% of our Exchanges revenues less transaction-based expenses in 2019. Clearing members are primarily intermediaries and represent a broad range of principal trading firms. If a clearing member ceased its operations, we believe that the trading firms would continue to conduct transactions and would clear those transactions through another clearing member firm. No additional customers or clearing members accounted for more than 10% of our segment revenues or consolidated revenues in 2021 or 2019.

Geographical Information

The following represents our revenues, less transaction-based expenses, net assets and net property and equipment based on the geographic location (in millions):

	United States	Foreign Countries	Total
Revenues, less transaction-based expenses:			
Year ended December 31, 2021	$ 4,832	$ 2,314	$ 7,146
Year ended December 31, 2020	$ 3,933	$ 2,103	$ 6,036
Year ended December 31, 2019	$ 3,290	$ 1,912	$ 5,202
Net assets:			
As of December 31, 2021	$ 14,628	$ 8,120	$ 22,748
As of December 31, 2020	$ 11,351	$ 8,183	$ 19,534
Property and equipment, net:			
As of December 31, 2021	$ 1,494	$ 205	$ 1,699
As of December 31, 2020	$ 1,506	$ 207	$ 1,713

The foreign countries category above primarily relates to the U.K. and to a lesser extent, EU, Israel, Canada and Singapore.

19. Earnings Per Common Share

The following is a reconciliation of the numerators and denominators of the basic and diluted earnings per common share computations in 2021, 2020 and 2019 (in millions, except per share amounts):

	Year Ended December 31,		
	2021	2020	2019
Basic:			
Net income attributable to Intercontinental Exchange, Inc.	$ 4,058	$ 2,089	$ 1,933
Weighted average common shares outstanding	562	552	561
Basic earnings per common share	$ 7.22	$ 3.79	$ 3.44
Diluted:			
Weighted average common shares outstanding	562	552	561
Effect of dilutive securities - stock options and restricted stock	3	3	4
Diluted weighted average common shares outstanding	565	555	565
Diluted earnings per common share	$ 7.18	$ 3.77	$ 3.42

Basic earnings per common share is calculated using the weighted average common shares outstanding during the periods. Changes in the weighted average common shares outstanding between years was primarily due to the stock issued in 2020 for the Ellie Mae acquisition, and by stock repurchases.

Common equivalent shares from stock options and restricted stock awards, calculated using the treasury stock method, are included in the diluted per share calculations unless the effect of their inclusion would be antidilutive. During 2021, 2020 and 2019 281,000, 372,000 and 454,000 outstanding stock options, respectively, were not included in the computation of diluted earnings per common share because to do so would have had an antidilutive effect. In addition, we excluded warrants and preferred and common incentive units under the Bakkt Equity Incentive Plan in 2020 and 2019 because they were also antidilutive. None of these warrants and preferred/common units are outstanding as of December 31, 2021 due to the deconsolidation of Bakkt. As of both December 31, 2021 and 2020, there were 50,000 and 89,000, respectively, of restricted stock units that were vested but have not been issued that are included in the computation of diluted earnings per share. Certain figures in the table above may not recalculate due to rounding.

20. Subsequent Events

We have evaluated subsequent events and determined that no events or transactions met the definition of a subsequent event for purposes of recognition or disclosure in the accompanying financial statements.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9 (A). CONTROLS AND PROCEDURES

(a) *Evaluation of Disclosure Controls and Procedures.* As of the end of the period covered by this report, an evaluation was carried out by our management, with the participation of our Chief Executive Officer and Chief Financial Officer, of the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Securities Exchange Act of 1934). Based upon that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that these disclosure controls and procedures were effective as of the end of the period covered by this report.

(b) *Management's Annual Report on Internal Control over Financial Reporting and the Attestation Report of the Independent Registered Public Accounting Firm.* Management's report on its assessment of the effectiveness of our internal control over financial reporting as of December 31, 2021 and the attestation report of Ernst & Young LLP on our internal control over financial reporting are set forth in Part II, Item 8 of this Annual Report.

(c) *Changes in Internal Controls over Financial Reporting.* There were no changes in our internal controls over financial reporting that occurred during our most recent fiscal quarter that have materially affected, or are reasonably likely to materially affect, our internal controls over financial reporting. As a result, no corrective actions were taken.

ITEM 9 (B). OTHER INFORMATION

Not applicable.

ITEM 9 (C). DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Information relating to our Board of Directors set forth under the caption "Proposal 1 — Election of Directors — Nominees for Election as Directors at the 2022 Annual Meeting" in our Proxy Statement for our 2022 Annual Meeting of Stockholders ("2022 Proxy Statement") is incorporated herein by reference. Information relating to our executive officers is, pursuant to General Instruction G(3) of Form 10-K, set forth below under the caption "Executive Officers." Information regarding compliance by our directors and executive officers and owners of more than ten percent of our Common Stock with the reporting requirements of Section 16(a) of the Exchange Act (Item 405 of Regulation S-K), set forth under the caption "Delinquent 16(a) Reports" in the 2022 Proxy Statement is incorporated herein by reference. Information relating to our financial expert serving on our Audit Committee (Item 407(d)(5) of Regulation S-K), our Nominating and Corporate Governance Committee (Item 407(c)(3) of Regulation S-K), and our Audit Committee (Item 407(d)(4) of Regulation S-K) is set forth under the caption "Meetings and Committees of the Board of Directors" in our 2022 Proxy Statement and is incorporated herein by reference.

Executive Officers

Set forth below, in accordance with General Instruction G(3) of Form 10-K, is information regarding our executive officers:

Name	Age	Title
Jeffrey C. Sprecher	66	Chairman of the Board and Chief Executive Officer
A. Warren Gardiner	41	Chief Financial Officer
Benjamin R. Jackson	49	President

Name	Age	Title
David S. Goone	61	Chief Strategy Officer
Lynn C. Martin	45	President, NYSE Group and Chair, ICE Fixed Income & Data Services
Andrew J. Surdykowski	51	General Counsel
Mark P. Wassersug	52	Chief Operating Officer

Jeffrey C. Sprecher. Mr. Sprecher has been a director and our Chief Executive Officer since our inception and has served as Chairman of our Board of Directors since November 2002. As our Chief Executive Officer, he is responsible for our strategic direction, operational and financial performance. Mr. Sprecher acquired Continental Power Exchange, or CPEX, our predecessor company, in 1997. Prior to acquiring CPEX, Mr. Sprecher held a number of positions, including President, over a fourteen-year period with Western Power Group, Inc., a developer, owner and operator of large central-station power plants. While with Western Power, he was responsible for a number of significant financings. Mr. Sprecher holds a Bachelor of Science degree in Chemical Engineering from the University of Wisconsin and a Master of Business Administration from Pepperdine University.

A. Warren Gardiner. Mr. Gardiner has served as Chief Financial Officer since May 2021. He is responsible for all aspects of ICE's finance and accounting functions, treasury, tax, audit and controls and investor relations. Mr. Gardiner served as VP, Investor Relations from July 2017 to May 2021. Prior to joining us, Mr. Gardiner served in various positions at Evercore ISI, including Director, Equity Research from February 2016 through May 2017 and Vice President, Equity Research from April 2013 through February 2016. Prior to that, he was an equity research analyst at Barclays. Mr. Gardiner is a CFA Charterholder and holds a Bachelor of Arts degree in Managerial Economics from Union College.

Benjamin R. Jackson. Mr. Jackson has served as President since November 2017. Mr. Jackson is responsible for ICE's global technology, information security and operations and is responsible for coordinating global futures and OTC trading businesses. Additionally, he leads the integration planning and execution of our acquisitions and joint ventures and serves as the Chair of ICE Mortgage Technology. Mr. Jackson previously served as Chief Commercial Officer, and prior to that President and Chief Operating Officer of ICE Futures U.S. Mr. Jackson joined us in July 2011 from SunGard, a leading software and technology provider to commodity market participants. At SunGard, he led the company's energy and commodities business segment as Senior Executive Vice President. Prior to that, Mr. Jackson served as President of SunGard's Kiodex commodity risk management platform. Mr. Jackson earned a Bachelor of Science degree in economics from John Carroll University with supporting studies at the London School of Economics and Political Science.

David S. Goone. Mr. Goone has served as Chief Strategy Officer since March 2001. He is responsible for all aspects of our product line, including futures products and capabilities for ICE's electronic platform. Mr. Goone is a Director of ICE Mortgage Services, the governing Board of MERSCORP Holdings, Inc. Mr. Goone also represents us on industry boards including the Options Clearing Corporation, National Futures Association and the Depository Trust & Clearing Corporation. Prior to joining us, Mr. Goone served as the Managing Director and Head of Product Development and Sales at the Chicago Mercantile Exchange where he worked for nine years. From 1989 through 1992, Mr. Goone was Vice President at Indosuez Carr Futures, where he developed institutional and corporate business. Prior to joining Indosuez, Mr. Goone worked at Chase Manhattan Bank, where he developed and managed their exchange-traded foreign currency options operation at the Chicago Mercantile Exchange. Mr. Goone holds a Bachelor of Science degree in Accountancy from the University of Illinois at Urbana-Champaign.

Lynn C. Martin. Ms. Martin has served as President of NYSE Group, a wholly-owned subsidiary of ICE, since January 2022. NYSE Group includes the New York Stock Exchange, the world's largest stock market and premier venue for capital raising, as well as four fully electronic equity markets and two options exchanges. Ms. Martin is also Chair of Fixed Income & Data Services at ICE, which includes ICE Bonds execution venues, securities pricing and analytics, reference data, indices, desktop solutions, consolidated feeds and connectivity services that cover all major asset classes. Ms. Martin previously served as President of Fixed Income & Data Services from October 2020 to January 2022, President of ICE Data Services from September 2019 to October 2020 and as President and Chief Operating Officer of ICE Data Services from July 2015 to September 2019. Additionally, Ms. Martin served as Chief Operating Officer of ICE Clear U.S., Inc. and served in a number of leadership roles, including as Chief Executive Officer of NYSE Liffe U.S. and Chief Executive Officer of New York Portfolio Clearing. Prior to joining NYSE Euronext in 2001, Ms. Martin worked at IBM in their Global Services organization. Ms. Martin holds a Bachelor of Science degree in Computer Science from Manhattan College and a Master of Arts in Statistics from Columbia University. Ms. Martin serves on the Manhattan College Board of Trustees as well as the Advisory Board of the School of Science.

Andrew J. Surdykowski. Mr. Surdykowski has served as General Counsel since October 2018. He is responsible for overseeing our legal affairs globally, including public company compliance, corporate governance matters and serving as our key legal advisor. Previously Mr. Surdykowski was SVP, Associate General Counsel and Assistant Corporate

Secretary. Prior to joining us in 2005, Mr. Surdykowski was a corporate attorney at McKenna, Long & Aldridge LLP, a national law firm now known as Dentons. At McKenna, Long & Aldridge, he practiced in the corporate law group and represented a broad array of clients in matters dealing with securities, mergers and acquisitions, corporate governance, finance and private equity. Mr. Surdykowski holds a Juris Doctor degree from the Georgia State University College of Law, and a Bachelor of Science degree in Management from the Georgia Institute of Technology.

Mark P. Wassersug. Mr. Wassersug has served as Chief Operating Officer since November 2017. Mr. Wassersug is responsible for the day-to-day operations and support of the global infrastructure, data centers, networks and corporate Information Technology systems that support ICE and its subsidiaries including the NYSE, ICE's global derivatives trading and clearing businesses, and multiple data analytics, reporting and delivery platforms. Mr. Wassersug is also responsible for the customer service teams and oversees all disaster recovery and business continuity planning and operations. Previously, Mr. Wassersug served as SVP of Operations. Prior to joining us in 2001, Mr. Wassersug worked as a strategic planning and technology consultant in Internet infrastructure and ecommerce for Exodus Communication. Mr. Wassersug earned a Bachelor of Science degree in Civil Engineering from Lehigh University and completed a Master of Business Administration at the Goizueta Business School at Emory University.

Code of Ethics

We have adopted a Global Code of Business Conduct that applies to all of our employees, officers and directors. Our Global Code of Business Conduct meets the requirements of a “code of ethics” as defined by Item 406 of Regulation S-K, and applies to our Chief Executive Officer and Chief Financial Officer (who is the principal financial officer), as well as all other employees, as indicated above. Our Global Code of Business Conduct also meets the requirements of a code of ethics and business conduct under the New York Stock Exchange listing standards. Our Global Code of Business Conduct is available on our website at *www.intercontinentalexchange.com* under the heading “Investors & Media” “Governance” then "Governance Overview." We intend to disclose promptly on our website any substantive amendments to our Global Code of Business Conduct. We will also provide a copy of the Global Code of Business Conduct to stockholders at no charge upon written request.

ITEM 11. EXECUTIVE COMPENSATION

Information relating to executive compensation set forth under the captions “Compensation Discussion & Analysis,” “Executive Compensation,” “Compensation Committee Interlocks and Insider Participation,” “Non-Employee Director Compensation,” and “Compensation Committee Report” in our 2022 Proxy Statement is incorporated herein by reference.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Information regarding ownership of our common stock by certain persons as set forth under the caption “Security Ownership of Certain Beneficial Owners and Management” in our 2022 Proxy Statement is incorporated herein by reference. In addition, information in tabular form relating to securities authorized for issuance under our equity compensation plans is set forth under the caption “Equity Compensation Plan Information” in this Annual Report and “Share-Based Compensation” and “Pension and Other Benefit Programs” as described in Notes 11 and 16 to our consolidated financial statements in this Annual Report.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information regarding certain relationships and transactions between our company and certain of our affiliates as set forth under the caption “Certain Relationships and Related Transactions” in our 2022 Proxy Statement is incorporated herein by reference. In addition, information regarding our directors’ independence (Item 407(a) of Regulation S-K) as set forth under the caption “Item 1 — Election of Directors — Nominees for Election as Directors at the 2022 Annual Meeting” in our 2022 Proxy Statement is incorporated herein by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Information regarding principal accountant fees and services of our independent registered public accounting firm, Ernst & Young LLP, is set forth under the caption "Information About Our Independent Registered Public Accounting Firm Fees and Services" in our 2022 Proxy Statement and is incorporated herein by reference.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) *Documents Filed as Part of this Report.*

(1) *Financial Statements*

Our consolidated financial statements and the related reports of management and our independent registered public accounting firm which are required to be filed as part of this Report are included in this Annual Report on Form 10-K. These consolidated financial statements are as follows:

- Consolidated Balance Sheets as of December 31, 2021 and 2020.
- Consolidated Statements of Income for the years ended December 31, 2021, 2020 and 2019.
- Consolidated Statements of Comprehensive Income for the years ended December 31, 2021, 2020 and 2019.
- Consolidated Statements of Changes in Equity and Redeemable Non-Controlling Interest for the years ended December 31, 2021, 2020 and 2019.
- Consolidated Statements of Cash Flows for the years ended December 31, 2021, 2020 and 2019.
- Notes to Consolidated Financial Statements.

(2) *Financial Statement Schedules*

Schedules have been omitted because they are not applicable or the required information is included in the consolidated financial statements or notes, thereto.

(3) *Exhibits*

See (b) below.

(b) *Exhibits*

The exhibits listed below under "Index to Exhibits" are filed with or incorporated by reference in this Report. Where such filing is made by incorporation by reference to a previously filed registration statement or report, such registration statement or report is identified in parentheses. We will furnish any exhibit upon request to Investor Relations, 5660 New Northside Drive, Atlanta, Georgia 30328.

ITEM 16. FORM 10-K SUMMARY

Not applicable.

INDEX TO EXHIBITS

The following exhibits are filed with this Report. We will furnish any exhibit upon request to Intercontinental Exchange, Inc., Investor Relations, 5660 New Northside Drive, Third Floor, Atlanta, Georgia 30328.

Exhibit Number		Description of Document
2.1	—	Stock Purchase Agreement, dated as of August 6, 2020, by and among Intercontinental Exchange, Inc., Ellie Mae Intermediate Holdings I, Inc. and Ellie Mae Parent, LP.* (incorporated by reference to Exhibit 2.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 7, 2020, File No. 001-36198).
3.1	—	Fifth Amended and Restated Certificate of Incorporation of Intercontinental Exchange, Inc. effective October 30, 2019 (incorporated by reference to Exhibit 3.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on October 31, 2019, File No. 001-36198).
3.2	—	Eighth Amended and Restated Bylaws of Intercontinental Exchange, Inc. effective May 25, 2017 (incorporated by reference to Exhibit 3.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on May 26, 2017, File No. 001-36198).
4.1	—	Indenture dated as of October 8, 2013 among Intercontinental Exchange, Inc., as issuer, IntercontinentalExchange Inc. and Baseball Merger Sub, LLC, as guarantors, and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on October 8, 2013, File No. 333-187402).
4.2	—	First Supplemental Indenture dated as of October 8, 2013 among Intercontinental Exchange, Inc., as issuer, Intercontinental Exchange Holdings, Inc. and Baseball Merger Sub, LLC, as guarantors, and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on October 8, 2013, File No. 333-187402).
4.3	—	Form of 4.00% Senior Notes due 2023 (included as an exhibit to the First Supplemental Indenture dated as of October 8, 2013) (incorporated by reference to Exhibit 4.4 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on October 8, 2013, File No. 333-187402).
4.4	—	Indenture dated as of November 24, 2015 among Intercontinental Exchange, Inc., as issuer, NYSE Holdings LLC, as guarantor, and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on November 24, 2015, File No. 001-36198).
4.5	—	First Supplemental Indenture dated as of November 24, 2015 among Intercontinental Exchange, Inc., as issuer, NYSE Holdings LLC, as guarantor, and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on November 24, 2015, File No. 001-36198).
4.6	—	Form of 2.75% Senior Notes due 2020 (included as an exhibit to the First Supplemental Indenture dated as of November 24, 2015) (incorporated by reference to Exhibit 4.3 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on November 24, 2015, File No. 001-36198).
4.7	—	Form of 3.75% Senior Notes due 2025 (included as an exhibit to the First Supplemental Indenture dated as of November 24, 2015) (incorporated by reference to Exhibit 4.4 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on November 24, 2015, File No. 001-36198).
4.8	—	Second Supplemental Indenture dated as of August 17, 2017 among Intercontinental Exchange, Inc., as issuer, NYSE Holdings LLC, as guarantor, and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 17, 2017, File No. 001-36198).
4.9	—	Form of 2.350% Senior Notes due 2022 (included as an exhibit to the Second Supplemental Indenture dated as of August 17, 2017) (incorporated by reference to Exhibit 4.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 17, 2017, File No. 001-36198).
4.10	—	Form of 3.100% Senior Notes due 2027 (included as an exhibit to the Second Supplemental Indenture dated as of August 17, 2017) (incorporated by reference to Exhibit 4.3 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 17, 2017, File No. 001-36198).
4.11	—	Indenture dated as of August 13, 2018 between Intercontinental Exchange, Inc., as issuer, and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 13, 2018, File No. 001-36198).
4.12	—	First Supplemental Indenture dated as of August 13, 2018 between Intercontinental Exchange, Inc., as issuer, and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 13, 2018, File No. 001-36198).
4.13	—	Form of 3.450% Senior Notes due 2023 (included as an exhibit to the First Supplemental Indenture dated as of August 13, 2018) (incorporated by reference to Exhibit 4.3 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 13, 2018, File No. 001-36198).
4.14	—	Form of 3.750% Senior Notes due 2028 (included as an exhibit to the First Supplemental Indenture dated as of August 13, 2018) (incorporated by reference to Exhibit 4.4 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 13, 2018, File No. 001-36198).

4.15	—	Form of 4.250% Senior Notes due 2048 (included as an exhibit to the First Supplemental Indenture dated as of August 13, 2018) (incorporated by reference to Exhibit 4.5 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 13, 2018, File No. 001-36198).
4.16	—	Second Supplemental Indenture dated as of May 26, 2020 between Intercontinental Exchange, Inc., as issuer, and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on May 26, 2020, File No. 001-36198).
4.17	—	Form of 2.100% Senior Notes due 2030 (included as an exhibit to the First Supplemental Indenture dated as of May 26, 2020) (incorporated by reference to Exhibit 4.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on May 26, 2020, File No. 001-36198).
4.18	—	Form of 3.000% Senior Notes due 2050 (included as an exhibit to the First Supplemental Indenture dated as of May 26, 2020) (incorporated by reference to Exhibit 4.3 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on May 26, 2020, File No. 001-36198).
4.19	—	Third Supplemental Indenture dated as of August 20, 2020 between Intercontinental Exchange, Inc., as issuer, and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 20, 2020, File No. 001-36198).
4.20	—	Form of 0.700% Senior Notes due 2023 (included as an exhibit to the Third Supplemental Indenture dated as of August 20, 2020) (incorporated by reference to Exhibit 4.3 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 20, 2020, File No. 001-36198).
4.21	—	Form of 1.850% Senior Notes due 2032 (included as an exhibit to the Third Supplemental Indenture dated as of August 20, 2020) (incorporated by reference to Exhibit 4.4 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 20, 2020, File No. 001-36198).
4.22	—	Form of 2.650% Senior Notes due 2040 (included as an exhibit to the Third Supplemental Indenture dated as of August 20, 2020) (incorporated by reference to Exhibit 4.5 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 20, 2020, File No. 001-36198).
4.23	—	Form of 3.000% Senior Notes due 2060 (included as an exhibit to the Third Supplemental Indenture dated as of August 20, 2020) (incorporated by reference to Exhibit 4.6 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 20, 2020, File No. 001-36198).
4.24	—	Registration Rights Agreement, dated September 4, 2020, by and between Intercontinental Exchange, Inc. and Ellie Mae Parent, LP. (incorporated by reference to Exhibit 4.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on September 4, 2020, File No. 001-36198).
4.25		Description of ICE's Securities Registered under Section 12 of the Exchange Act.
10.1	—	Employment Agreement dated February 24, 2012 between Intercontinental Exchange Holdings, Inc. and Jeffrey C. Sprecher (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on February 24, 2012, File No. 001-32671).
10.2	—	Employment Agreement, dated as of May 15, 2021, between Intercontinental Exchange Holdings, Inc. and Warren Gardiner (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Amendment No. 1 to Current Report on Form 8-K filed with the SEC on May 20, 2021, File No. 001-36198).
10.3	—	Employment Agreement dated February 24, 2012 between Intercontinental Exchange Holdings, Inc. and David S. Goone (incorporated by reference to Exhibit 10.3 to Intercontinental Exchange Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on February 24, 2012, File No. 001-32671).
10.4	—	Employment Agreement dated February 24, 2012 between Intercontinental Exchange Holdings, Inc. and Scott A. Hill (incorporated by reference to Exhibit 10.5 to Intercontinental Exchange Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on February 24, 2012, File No. 001-32671).
10.5	—	Employment Agreement dated August 1, 2016 between Intercontinental Exchange Holdings, Inc. and Benjamin Jackson (incorporated by reference to Exhibit 10.6 to Intercontinental Exchange, Inc.'s Annual Report on Form 10-K filed with the SEC on February 7, 2018, File No. 001-36198).
10.6	—	Employment Agreement dated as of February 1, 2021 between ICE Data, LP, a wholly-owned subsidiary of Intercontinental Exchange, Inc. and Lynn Martin (incorporated by reference to Exhibit 10.3 to Intercontinental Exchange, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on April 29, 2021, File No. 001-36198).
10.7	—	Form of Employment Agreement between Intercontinental Exchange Holdings, Inc. and the other U.S. officers (incorporated by reference to Exhibit 10.6 to Intercontinental Exchange Holdings, Inc.'s Current Report on Form 8-K filed with the SEC on February 24, 2012, File No. 001-32671).
10.8	—	Transition and Separation Agreement, dated as of March 2, 2021, between Intercontinental Exchange, Inc. and Scott A. Hill (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on March 2, 2021, File No. 001-36198).

10.9	—	Intercontinental Exchange Holdings, Inc. 2003 Restricted Stock Deferral Plan for Outside Directors, as amended effective December 31, 2008 (incorporated by reference to Exhibit 10.7 to Intercontinental Exchange Holdings, Inc.'s Annual Report on Form 10-K filed with the SEC on February 11, 2009, File No. 001-32671).
10.10	—	Intercontinental Exchange Holdings, Inc. Executive Bonus Plan (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 5, 2009, File No. 001-32671).
10.11	—	Intercontinental Exchange Holdings, Inc. 2009 Omnibus Incentive Plan (incorporated by reference to Exhibit 10.2 to Intercontinental Exchange Holdings, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 5, 2009, File No. 001-32671).
10.12	—	Intercontinental Exchange Holdings, Inc. 2013 Omnibus Employee Incentive Plan (incorporated by reference to Exhibit 4.1 to Intercontinental Exchange Holdings, Inc.'s Registration Statement on Form S-8, filed with the SEC on May 24, 2013, File No. 333-188815).
10.13	—	Intercontinental Exchange Holdings, Inc. 2013 Omnibus Non-Employee Director Incentive Plan (incorporated by reference to Exhibit 4.2 to Intercontinental Exchange Holdings, Inc.'s Registration Statement on Form S-8, filed with the SEC on May 24, 2013, File No. 333-188815).
10.14	—	Amendment No. 1 to the Intercontinental Exchange Holdings, Inc. 2013 Omnibus Non-Employee Director Incentive Plan (incorporated by reference to Exhibit 10.2 to Intercontinental Exchange, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on August 3, 2017, File No. 001-36198).
10.15	—	Intercontinental Exchange, Inc. 2017 Omnibus Employee Incentive Plan (incorporated by reference to Exhibit 4.1 to Intercontinental Exchange, Inc.'s Form S-8 filed with the SEC on May 22, 2017, File No. 333-218619).
10.16	—	Intercontinental Exchange, Inc. 2018 Employee Stock Purchase Plan (incorporated by reference to Exhibit 4.3 to Intercontinental Exchange, Inc.'s Registration Statement on Form S-8, filed with the SEC on May 21, 2018, File No. 333-225065).
10.17	—	Form of Performance-Based Restricted Stock Unit Award Agreement (EBITDA and TSR) used with respect to grants of performance-based restricted stock units by the Company under the Intercontinental Exchange, Inc. 2017 Omnibus Employee Incentive Plan (incorporated by reference to Exhibit 10.17 to Intercontinental Exchange, Inc.'s Annual Report on Form 10-K filed with the SEC on February 7, 2018, File No. 001-36198).
10.18	—	Form of Performance-Based Restricted Stock Unit Award Agreement (Relative 3-Year TSR) used with respect to grants of performance-based restricted stock units by the Company under the Intercontinental Exchange, Inc. 2017 Omnibus Employee Incentive Plan (incorporated by reference to Exhibit 10.18 to Intercontinental Exchange, Inc.'s Annual Report on Form 10-K filed with the SEC on February 7, 2018, File No. 001-36198).
10.19	—	Contribution and Asset Transfer Agreement, dated as of May 11, 2000, by and between IntercontinentalExchange, LLC, Continental Power Exchange, Inc., and Jeffrey C. Sprecher (incorporated by reference to Exhibit 10.31 to Intercontinental Exchange Holdings, Inc.'s Registration Statement on Form S-1 filed with the SEC on October 25, 2005, File No. 333-123500).
10.20	—	First Amendment to Contribution and Asset Transfer Agreement, dated as of May 17, 2000, by and among IntercontinentalExchange, LLC, Continental Power Exchange, Inc., and Jeffrey C. Sprecher (incorporated by reference to Exhibit 10.32 to Intercontinental Exchange Holdings, Inc.'s Registration Statement on Form S-1 filed with the SEC on October 25, 2005, File No. 333-123500).
10.21	—	Second Amendment to Contribution and Asset Transfer Agreement, dated as of October 24, 2005, by and among Intercontinental Exchange Holdings, Inc., Continental Power Exchange, Inc., and Jeffrey C. Sprecher (incorporated by reference to Exhibit 10.33 to Intercontinental Exchange Holdings, Inc.'s Registration Statement on Form S-1 filed with the SEC on October 25, 2005, File No. 333-123500).
10.22	—	Aircraft Time Sharing Agreement dated as of March 4, 2021 between Intercontinental Exchange Holdings, Inc. and Jeffrey C. Sprecher (incorporated by reference to Exhibit 10.5 to Intercontinental Exchange, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on April 29, 2021, File No. 001-36198).
10.23	—	Aircraft Time Sharing Agreement dated as of February 2, 2022 between Intercontinental Exchange Holdings, Inc. and Warren Gardiner.
10.24		Aircraft Time Sharing Agreement dated as of March 4, 2021 between Intercontinental Exchange Holdings, Inc. and David S. Goone (incorporated by reference to Exhibit 10.6 to Intercontinental Exchange, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on April 29, 2021, File No. 001-36198).
10.25	—	Aircraft Time Sharing Agreement dated as of February 6, 2019 between Intercontinental Exchange Holdings, Inc. and Scott A. Hill (incorporated by reference to Exhibit 10.34 to Intercontinental Exchange, Inc.'s Annual Report on Form 10-K filed with the SEC on February 7, 2019, File No. 001-36198).
10.26	—	Aircraft Time Sharing Agreement dated as of March 4, 2021 between Intercontinental Exchange Holdings, Inc. and Benjamin R. Jackson (incorporated by reference to Exhibit 10.7 to Intercontinental Exchange, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on April 29, 2021, File No. 001-36198).

10.27	—	Aircraft Time Sharing Agreement dated as of March 4, 2021 between Intercontinental Exchange Holdings, Inc. and Lynn Martin (incorporated by reference to Exhibit 10.4 to Intercontinental Exchange, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on April 29, 2021, File No. 001-36198).
10.28	—	Form of Agreement Relating to Noncompetition and Other Covenants signed by each of the non-employee directors and by Intercontinental Exchange, Inc. (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on May 17, 2016, File No. 001-36198).
10.29	—	Credit Agreement dated as of April 3, 2014 among Intercontinental Exchange, Inc. and ICE Europe Parent Limited, as borrowers, Wells Fargo Bank, National Association, as administrative agent, issuing lender and swingline lender, Bank of America, N.A., as syndication agent, and each of the lenders party thereto for an aggregate $3.0 billion five-year senior unsecured revolving credit facility (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on April 7, 2014).
10.30	—	First Amendment to Credit Agreement dated as of May 15, 2015 amending Credit Agreement originally dated April 3, 2014 among Intercontinental Exchange, Inc. (formerly known as IntercontinentalExchange Group, Inc.) and ICE Europe Parent Limited, as borrowers, Wells Fargo Bank, National Association, as administrative agent, issuing lender and swingline lender, Bank of America N.A., as syndication agent, and each of the lenders party thereto for an aggregate $3.0 billion five-year senior unsecured revolving credit facility (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on May 19, 2015, File No. 001-36198).
10.31	—	Second Amendment to Credit Agreement dated as of November 9, 2015 among Intercontinental Exchange, Inc. and ICE Europe Parent Limited, as borrowers, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, amending that certain Credit Agreement, dated April 3, 2014 (as amended by the First Amendment to Credit Agreement, dated as of May 15, 2015) among Intercontinental Exchange, Inc. and ICE Europe Parent Limited, as borrowers, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on November 13, 2015, File No. 001-36198).
10.32	—	Third Amendment to Credit Agreement dated as of November 13, 2015 among Intercontinental Exchange, Inc. and ICE Europe Parent Limited, as borrowers, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, amending that certain Credit Agreement, dated as of April 3, 2014 (as amended by the First Amendment to Credit Agreement, dated as of May 15, 2015 and the Second Amendment to Credit Agreement, dated as of November 9, 2015) among Intercontinental Exchange, Inc. and ICE Europe Parent Limited, as borrowers, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, (incorporated by reference to Exhibit 10.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on November 13, 2015, File No. 001-36198).
10.33	—	The Fourth Amendment to Credit Agreement, dated as of August 18, 2017 among Intercontinental Exchange, Inc. as borrower, NYSE Holdings LLC as guarantor, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, amending that certain Credit Agreement, dated as of April 3, 2014 among Intercontinental Exchange, Inc. and ICE Europe Parent Limited, as borrowers, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent (as amended by the First Amendment to Credit Agreement, dated as of May 15, 2015, the Second Amendment to Credit Agreement, dated as of November 9, 2015, and the Third Amendment to Credit Agreement, dated as of November 13, 2015) (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 21, 2017, File No. 001-36198).
10.34	—	The Fifth Amendment to Credit Agreement, dated as of August 18, 2017 among Intercontinental Exchange, Inc. as borrower, NYSE Holdings LLC as guarantor, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, amending that certain Credit Agreement, dated as of April 3, 2014 among Intercontinental Exchange, Inc. and ICE Europe Parent Limited, as borrowers, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent (as amended by the First Amendment to Credit Agreement, dated as of May 15, 2015, the Second Amendment to Credit Agreement, dated as of November 9, 2015, the Third Amendment to Credit Agreement, dated as of November 13, 2015 and the Fourth Amendment to Credit Agreement, dated as of August 18, 2017) (incorporated by reference to Exhibit 10.2 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 21, 2017, File No. 001-36198).
10.35	—	The Sixth Amendment to Credit Agreement, dated as of August 9, 2018 among Intercontinental Exchange, Inc. as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, amending that certain Credit Agreement, dated as of April 3, 2014 among Intercontinental Exchange, Inc., as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent (as amended by the First Amendment to Credit Agreement, dated as of May 15, 2015, the Second Amendment to Credit Agreement, dated as of November 9, 2015, the Third Amendment to Credit Agreement, dated as of November 13, 2015, the Fourth Amendment to Credit Agreement, dated as of August 18, 2017, and the Fifth Amendment to Credit Agreement, dated as of August 18, 2017) (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 9, 2018, File No. 001-36198).

10.36	—	The Seventh Amendment to Credit Agreement, dated as of August 14, 2020 among Intercontinental Exchange, Inc. as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, amending that certain Credit Agreement, dated as of April 3, 2014 among Intercontinental Exchange, Inc., as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent (as amended by the First Amendment to Credit Agreement, dated as of May 15, 2015, the Second Amendment to Credit Agreement, dated as of November 9, 2015, the Third Amendment to Credit Agreement, dated as of November 13, 2015, the Fourth Amendment to Credit Agreement, dated as of August 18, 2017, the Fifth Amendment to Credit Agreement, dated as of August 18, 2017 and the Sixth Amendment to Credit Agreement, dated as of August 9, 2018) (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 18, 2020, File No. 001-36198).
10.37	—	The Eighth Amendment to Credit Agreement, dated as of August 21, 2020 among Intercontinental Exchange, Inc. as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, amending that certain Credit Agreement, dated as of April 3, 2014 among Intercontinental Exchange, Inc., as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent (as amended by the First Amendment to Credit Agreement, dated as of May 15, 2015, the Second Amendment to Credit Agreement, dated as of November 9, 2015, the Third Amendment to Credit Agreement, dated as of November 13, 2015, the Fourth Amendment to Credit Agreement, dated as of August 18, 2017, the Fifth Amendment to Credit Agreement, dated as of August 18, 2017, the Sixth Amendment to Credit Agreement, dated as of August 9, 2018 and the Seventh Amendment to Credit Agreement, dated as of August 14, 2020) (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on August 25, 2020, File No. 001-36198).
10.38	—	The Ninth Amendment, dated as of March 8, 2021, by and among Intercontinental Exchange, Inc., as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, amending that certain Credit Agreement, dated as of April 3, 2014, by and among Intercontinental Exchange, Inc., as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent (as amended by the First Amendment to Credit Agreement, dated as of May 15, 2015, the Second Amendment to Credit Agreement, dated as of November 9, 2015, the Third Amendment to Credit Agreement, dated as of November 13, 2015, the Fourth Amendment to Credit Agreement, dated as of August 18, 2017, the Fifth Amendment to Credit Agreement, dated as of August 18, 2017, the Sixth Amendment to Credit Agreement, dated as of August 9, 2018, the Seventh Amendment to Credit Agreement, dated as of August 14, 2020 and the Eighth Amendment to Credit Agreement, dated as of August 21, 2020) (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Quarterly Report on Form 10-Q filed with the SEC on April 29, 2021, File No. 001-36198).
10.39	—	The Tenth Amendment, dated as of October 15, 2021, by and among Intercontinental Exchange, Inc., as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent, amending that certain Credit Agreement, dated as of April 3, 2014, by and among Intercontinental Exchange, Inc., as borrower, the lenders party thereto and Wells Fargo Bank, National Association, as administrative agent (as amended by the First Amendment to Credit Agreement, dated as of May 15, 2015, the Second Amendment to Credit Agreement, dated as of November 9, 2015, the Third Amendment to Credit Agreement, dated as of November 13, 2015, the Fourth Amendment to Credit Agreement, dated as of August 18, 2017, the Fifth Amendment to Credit Agreement, dated as of August 18, 2017, the Sixth Amendment to Credit Agreement, dated as of August 9, 2018, the Seventh Amendment to Credit Agreement, dated as of August 14, 2020, the Eighth Amendment to Credit Agreement, dated as of August 21, 2021, and the Ninth Amendment to Credit Agreement, dated as of March 8, 2021) (incorporated by reference to Exhibit 10.1 to Intercontinental Exchange, Inc.'s Current Report on Form 8-K filed with the SEC on October 18, 2021, File No. 001-36198).
21.1	—	Subsidiaries of Intercontinental Exchange, Inc.
23.1	—	Consent of Ernst & Young LLP, Independent Registered Public Accounting Firm.
24.1	—	Power of Attorney (included with signature page hereto).
31.1	—	Rule 13a -14(a)/15d -14(a) Certification of Chief Executive Officer.
31.2	—	Rule 13a -14(a)/15d -14(a) Certification of Chief Financial Officer.
32.1	—	Section 1350 Certification of Chief Executive Officer.
32.2	—	Section 1350 Certification of Chief Financial Officer.
101	—	The following materials from Intercontinental Exchange, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2021 formatted in Inline XBRL (Extensible Business Reporting Language): (i) the Consolidated Balance Sheets, (ii) the Consolidated Statements of Income, (iii) the Consolidated Statements of Changes in Equity and Redeemable Non-Controlling Interest, (iv) the Consolidated Statements of Comprehensive Income, (v) Consolidated Statements of Cash Flows and (vi) Notes to Consolidated Financial Statements, tagged as blocks of text.

104	—	The cover page from Intercontinental Exchange, Inc.'s Annual Report on Form 10-K for the fiscal year ended December 31, 2021, formatted in Inline XBRL.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

Intercontinental Exchange, Inc.
(Registrant)

Date: February 3, 2022

By: /s/ Jeffrey C. Sprecher
Jeffrey C. Sprecher
Chief Executive Officer

KNOW ALL MEN BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Jeffrey C. Sprecher and A. Warren Gardiner, and each of them his or her true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments to this Annual Report in 2021 and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite or necessary to be done, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents or any of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated as of the date indicated.

Signatures	Title	Date
/s/ Jeffrey C. Sprecher Jeffrey C. Sprecher	Chairman of the Board and Chief Executive Officer (principal executive officer)	February 3, 2022
/s/ A. Warren Gardiner A. Warren Gardiner	Chief Financial Officer (principal financial officer)	February 3, 2022
/s/ James W. Namkung James W. Namkung	Chief Accounting Officer and Corporate Controller (principal accounting officer)	February 3, 2022
/s/ Sharon Y. Bowen Sharon Y. Bowen	Director	February 3, 2022
/s/ Shantella E. Cooper Shantella E. Cooper	Director	February 3, 2022
/s/ Charles R. Crisp Charles R. Crisp	Director	February 3, 2022
/s/ Duriya M. Farooqui Duriya M. Farooqui	Director	February 3, 2022

/s/ Lord Hague of Richmond The Rt. Hon. the Lord Hague of Richmond	Director	February 3, 2022
/s/ Mark F. Mulhern Mark F. Mulhern	Director	February 3, 2022
/s/ Thomas E. Noonan Thomas E. Noonan	Director	February 3, 2022
/s/ Frederic V. Salerno Frederic V. Salerno	Director	February 3, 2022
/s/ Caroline L. Silver Caroline L. Silver	Director	February 3, 2022
/s/ Judith A. Sprieser Judith A. Sprieser	Director	February 3, 2022
/s/ Vincent Tese Vincent Tese	Director	February 3, 2022

Exhibit 4.25

Description of Intercontinental Exchange, Inc.'s Securities Registered Under Section 12 of the Exchange Act

The following summary of the capital stock of Intercontinental Exchange, Inc. ("ICE") is based on and qualified by ICE's fifth amended and restated certificate of incorporation (the "certificate of incorporation") and ICE's eighth amended and restated bylaws (the "bylaws"). For a complete description of the terms and provisions of ICE's capital stock, refer to the certificate of incorporation and the bylaws, both of which are filed as exhibits to this Annual Report on Form 10-K. Throughout this exhibit, references to "we," "our," "us" and "the Company" refer to ICE.

General

Pursuant to the certificate of incorporation, ICE's authorized capital stock consists of one billion six hundred million (1,600,000,000) shares, each with a par value of $0.01 per share, of which:

- one hundred million (100,000,000) shares are designated as preferred stock; and
- one billion five hundred million (1,500,000,000) shares are designated as common stock.

Common Stock

Holders of ICE's common stock have the following rights, privileges and limitations:

- *Voting*: Each share of common stock is entitled to one vote per share, *provided* that for so long as ICE directly or indirectly controls a national securities exchange registered under Section 6 of the Exchange Act (each such national securities exchange so controlled, an "Exchange"), no person, either alone or together with its related persons (as that term is defined in Article V of the certificate of incorporation), is entitled to vote or cause the voting of shares of ICE stock representing in the aggregate more than 10% of the then outstanding votes entitled to be cast on such matter. ICE will disregard any votes cast in excess of the 10% voting limitation unless the ICE board of directors expressly permits a person, either alone or together with its related persons, to exercise a vote in excess of the voting limitation and the Securities and Exchange Commission (the "SEC") approves such vote.

- *Ownership*: For so long as ICE directly or indirectly controls an Exchange, no person, either alone or together with its related persons, may beneficially own shares of stock representing in the aggregate more than 20% of the then outstanding votes entitled to be cast on any matter. The 20% ownership limitation will apply unless the ICE board of directors expressly permits a person, either alone or together with its related persons, to own shares in excess of limitation and the SEC approves such exception. If no such permission is granted and approved, any person who owns shares of ICE stock in excess of the 20% ownership threshold will be obligated to sell, and ICE will be obligated to purchase, at par value the number of shares held by such person above the ownership limitation.

- *Dividends and distributions*: The holders of shares of ICE common stock have the right to receive dividends and distributions, whether payable in cash or otherwise, as may be declared from time to time by the ICE board of directors from legally available assets or funds.

- *Liquidation, dissolution or winding-up*: In the event of the liquidation, dissolution or winding-up of ICE, holders of the shares of common stock are entitled to share equally, share-for-share, in the assets available for distribution after payment of all creditors and the liquidation preferences of any ICE preferred stock.

- *Restrictions on transfer*: Neither the certificate of incorporation nor the bylaws contain any restrictions on the transfer of shares of ICE common stock, although restrictions on transfer may be imposed under applicable securities laws.

- *Redemption, conversion or preemptive rights*: Holders of shares of common stock have no redemption or conversion rights or preemptive rights to purchase or subscribe for ICE securities.

- *Other provisions*: There are no sinking fund provisions applicable to the common stock, nor is the common stock subject to calls or assessments by ICE.

The rights, preferences, and privileges of the holders of shares of ICE common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that ICE may designate and issue in the future.

Limitation of Liability and Indemnification Matters

The certificate of incorporation provides that no ICE director will be liable to ICE or its stockholders for monetary damages for breach of fiduciary duty as a director, except in those cases in which liability is mandated by the Delaware General Corporation Law, and except for liability for breach of the director's duty of loyalty, acts or omissions not in good faith or involving intentional misconduct or a knowing violation of law, or any transaction from which the director derived any improper personal benefit. The bylaws provide for indemnification, to the fullest extent permitted by law, of any person made or threatened to be made a party to any action, suit or proceeding by reason of the fact that such person is or was a director or senior officer of ICE or, at the request of ICE, serves or served as a director, officer, partner, member, employee or agent of any other enterprise, against all expenses, liabilities, losses and claims actually incurred or suffered by such person in connection with the action, suit or proceeding. The bylaws also provide that, to the extent authorized from time to time by the ICE board of directors, ICE may provide to any one or more other persons rights of indemnification and rights to receive payment or reimbursement of expenses, including attorneys' fees.

Section 203 of the Delaware General Corporation Law

ICE is subject to the provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a business combination with an interested stockholder for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner or a certain level of stock is acquired upon consummation of the transaction in which the person became an interested stockholder. A business combination includes, among other things, a merger, asset sale or a transaction resulting in a financial benefit to the interested stockholder. Subject to certain exceptions, an interested stockholder is a person who, together with affiliates and associates, owns (or, in certain cases, within three years prior, did own) 15% or more of the corporation's outstanding voting stock. Under Section 203 of the Delaware General Corporation Law, a business combination between ICE and an interested stockholder is prohibited during the relevant three-year period unless it satisfies one of the following conditions:

- prior to the time the stockholder became an interested stockholder, the ICE board of directors approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;

- on consummation of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of ICE voting stock outstanding at the time the transaction commenced (excluding, for purposes of determining the number of shares outstanding, shares owned by persons who are directors and officers); or

- the business combination is approved by the ICE board of directors and authorized at an annual or special meeting of the stockholders by the affirmative vote of at least 66 2/3% of ICE outstanding voting stock that is not owned by the interested stockholder.

Certain Anti-Takeover Matters
The certificate of incorporation and bylaws include a number of provisions that may have the effect of encouraging persons considering unsolicited tender offers or other unilateral takeover proposals to negotiate with the ICE board of directors rather than pursue non-negotiated takeover attempts. These provisions include:

<u>Board of Directors</u>

Vacancies and newly created seats on the ICE board may be filled only by the ICE board of directors. Generally, only the ICE board of directors may determine the number of directors on the ICE board of directors. However, if the holders of any class or classes of stock or series thereof are entitled to elect one or more directors, then the number of directors elected by the holders of such stock will be determined according to the terms of the stock and pursuant to the resolutions relating to the stock. The inability of stockholders to determine the number of directors or to fill vacancies or newly created seats on the board makes it more difficult to change the composition of the ICE board of directors. These provisions are designed to promote a continuity of existing management.

<u>Advance Notice Requirements</u>

The bylaws establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of ICE stockholders. These procedures provide that notice of such stockholder proposals must be timely given in writing to the ICE secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at the principal executive offices of ICE not less than 90 days nor more than 120 days prior to the first anniversary date of the annual meeting for the preceding year. The notice must contain certain information specified in the bylaws.

<u>Proxy Access</u>

The bylaws provide that qualified stockholders can nominate candidates for election to the board of directors if such stockholders comply with the requirements contained in our bylaws within the designated time periods. Under the proxy access provisions of our bylaws, any stockholder (or group of up to 20 stockholders) owning 3% or more of our common stock continuously for at least three years may nominate up to two individuals or 20% of our board of directors, whichever is greater, as director candidates for election to the board of directors, and require us to include such nominees in our annual meeting proxy statement if the stockholders and nominees satisfy the requirements contained in our bylaws. These procedures provide that notice of such stockholder proposals must be timely given in writing to the ICE secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at the principal executive offices of ICE no earlier than the close of business 150 calendar days and no later than the close of business 120 calendar days before the anniversary date that we mailed our proxy materials for the annual meeting for the preceding year. The notice must contain certain information specified in the bylaws.

<u>Adjournment of Meetings of Stockholders Without a Stockholder Vote</u>

The bylaws permit the chairman of the meeting of stockholders, who is appointed by the board of directors, to adjourn any meeting of stockholders for a reasonable period of time without a stockholder vote.

<u>Special Meetings of Stockholders</u>

The bylaws provide that special meetings of the stockholders may be called by the board of directors, the chairman of the board, the chief executive officer, or at the request of holders of at least 50% of the shares of common stock outstanding at the time that would be entitled to vote at the meeting.

<u>No Written Consent of Stockholders</u>

The certificate of incorporation requires all stockholder actions to be taken by a vote of the stockholders at an annual or special meeting. The certificate of incorporation does not permit holders of shares of ICE common stock to act by written consent without a meeting.

Amendment of Certificate of Incorporation and Bylaws

Under the Delaware General Corporation Law, unless a corporation's certificate of incorporation imposes a higher vote requirement, a corporation may amend its certificate of incorporation upon the submission of a proposed amendment to stockholders by the board of directors and the subsequent receipt of the affirmative vote of a majority of its outstanding voting shares and the affirmative vote of a majority of the outstanding shares of each class entitled to vote thereon as a class. Under the certificate of incorporation, the affirmative vote of the holders of not less than 66 2/3% of the voting power of all outstanding shares of common stock and all other outstanding shares of stock of ICE entitled to vote on such matter is required to amend, modify in any respect or repeal any provision of the certificate of incorporation related to: (i) considerations of the board of directors in taking any action; (ii) limitations on stockholder action by written consent; (iii) the required quorum at meetings of the stockholders; (iv) the amendment of the bylaws by the stockholders; (v) the location of stockholder meetings and records; (vi) limitations on voting and ownership of ICE common stock and (vii) the provisions in Article X requiring such a supermajority vote.

Subject to certain exceptions, the ICE board of directors is expressly authorized to adopt, amend or repeal any or all of the bylaws of ICE at any time. ICE stockholders may adopt, amend or repeal any of the ICE bylaws by an affirmative vote of the holders of not less than 66 2/3% of the voting power of all outstanding ICE common stock entitled to vote on the matter.

For so long as ICE shall control, directly or indirectly, any Exchange, before any amendment or repeal of any provision of the bylaws or the certificate of incorporation may become effective, it must be submitted to the boards of directors of each Exchange. If any of these boards of directors determines that the amendment or repeal must be filed with, or filed with and approved by, the SEC under Section 19 of the Exchange Act, then the amendment or repeal shall not be effectuated until filed with, or filed with and approved by, as applicable, the SEC.

Listing

ICE's common stock is listed on the New York Stock Exchange under the symbol "ICE".

Transfer Agent

The transfer agent for ICE common stock is Computershare Investor Services.

Blank Check Preferred Stock

The certificate of incorporation provides for one hundred million (100,000,000) authorized shares of preferred stock. The existence of authorized but unissued shares of preferred stock may enable the board of directors to render more difficult or to discourage an attempt to obtain control of ICE by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, the ICE board of directors were to determine that a takeover proposal is not in the best interests of ICE, the board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, the certificate of incorporation grants the ICE board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of such holders and may have the effect of delaying, deterring or preventing a change in control. The ownership limitations described above under "Common Stock" are applicable to holders of preferred stock, and, to the extent holders of shares of preferred stock are entitled to vote on a matter, the voting limitations described above under "Common Stock" would also be applicable to holders of preferred stock. The board of directors currently does not intend to seek stockholder approval prior to any issuance of shares of preferred stock, unless otherwise required by law.

AIRCRAFT TIME SHARING AGREEMENT

This Aircraft Time Sharing Agreement (the "***Agreement***"), is made and entered into this 2nd day of February, 2022, by and between Intercontinental Exchange Holdings, Inc., a Delaware corporation (the "***Operator***" or the "***Company***"), and Warren Gardiner (the "***Passenger***").

RECITALS

WHEREAS, Operator is the beneficial owner, operator or lessor of the aircraft (individually and/or collectively, as the case may be, the "***Aircraft***") listed on Schedule A hereto, which may be updated from time to time to reflect changes to the available Aircraft, for business use by employees and non-employee directors of the Company in accordance with 14 C.F.R. Part 91of the Federal Aviation Regulations (as found at 14 C.F.R. Parts 1-199 generally, the "***FAR***") and the Company's internal policies regarding the use of corporate aircraft (the "***Aircraft Policy***");

WHEREAS, Operator has the right and lawful authority to enter into time sharing agreements, as provided in §91.501 of the FAR, to provide its senior executives with personal travel consistent with the Company's Aircraft Policy;

WHEREAS, Operator has agreed to make the Aircraft, with flight crew, when the Aircraft and flight crew are not otherwise needed for business purposes, available to Passenger for Passenger's personal travel in accordance with the Aircraft Policy on a non-exclusive time-sharing basis in accordance with §91.501 of the FAR; and

WHEREAS, Passenger agrees to reimburse the Operator for all personal use of the Aircraft as permitted under the FAR and as pursuant to the terms of this Agreement, which sets forth the understanding of the parties.

NOW THEREFORE, Operator and Passenger declaring their intention to enter into and be bound by this Agreement, and for the good and valuable consideration set forth below, hereby covenant and agree as follows:

1. Provision of Aircraft and Crew. Subject to Aircraft availability, Operator (or its designee or affiliate) agrees to provide to Passenger the Aircraft and flight crew on a time sharing basis in accordance with the provisions of FAR Part 91, including §§ 91.501(b)(6), 91.501(c)(1) and 91.501(d) of the FAR. Operator shall provide, at its sole expense, qualified flight crew for all flight operations under this Agreement. If Operator is no longer the operator of any of the Aircraft, Schedule A shall be deemed amended to delete any reference to such Aircraft and this Agreement shall be terminated as to such Aircraft but shall remain in full force and effect with respect to each of the other Aircraft identified thereon, if any. No such termination shall affect any of the rights and obligations of the parties accrued or incurred prior to such termination. If Operator becomes the operator of any aircraft not listed on Schedule A hereto, Schedule A shall be modified to include such aircraft as an Aircraft covered by this Agreement, and thereafter this Agreement shall remain in full force and effect with respect to such Aircraft and each of the other Aircraft identified thereon, if any.

2. ***Term***. The term of this Agreement (the "***Term***") shall commence on the date hereof and shall continue until terminated by either party on written notice to the other party, such termination to become effective 30 days from the date of the notice; provided, however, that this Agreement shall terminate automatically on the date that the Passenger's employment with the Company ceases, and provided further that this Agreement may be terminated by Operator on such shorter notice as may be required for Operator to comply with applicable law, regulations, the requirements of any financial institution with a security or other interest in the Aircraft, insurance requirements, or in the event the insurance required hereunder is not in full force and effect. Notwithstanding the foregoing, any provisions directly or indirectly related to Passenger's payment obligations for flights completed prior to the date of termination and the limitation of liability provisions in Section 10 shall survive the termination of this Agreement.

3. ***Reimbursement of Expenses***. In accordance with and pursuant to the terms of Company's Corporate Aircraft Policy, for each Trip or Round Trip (as such terms are defined below) conducted under this Agreement, Passenger shall pay Operator an amount (as determined by Operator) equal to the actual expenses of operating such Trip as such amount may be computed under the disclosure rules of the Securities Exchange Act of 1934, as amended (to include non-occupied legs, or "dead-head" flights, needed by Operator to position the aircraft for business use); provided, however, that the amounts reimbursed under this Section 3 shall not in any event exceed the sum of the following expenses as permitted pursuant to FAR § 91.501(d):

a. Fuel, oil, lubricants, and other additives;

b. Travel expenses of the crew, including food, lodging, and ground transportation;

c. Hangar and tie-down costs away from the Aircraft's base of operation;

d. Insurance obtained for the specific flight as per Section 8(b);

e. Landing fees, airport taxes, and similar assessments;

f. Customs, foreign permit, and similar fees directly related to the flight;

g. In-flight food and beverages;

h. Passenger ground transportation;

i. Flight planning and weather contract services; and

j. An additional charge equal to one hundred percent (100%) of the expenses listed in subsection (a) above.

The term "***Trip***" shall mean a flight from a departure point to a single destination. A "***Round Trip***" shall mean a flight from a departure point to one destination and back to the same departure point. In the event that Passenger travels from a departure point to multiple destinations, Operator will provide a separate invoice or such other documentation as reasonably agreed upon by Operator and Passenger for each Trip. All costs of repositioning an aircraft to accommodate a Trip shall be included on the invoice related to such Trip.

4. Invoicing and Payment. All payments to be made to Operator by Passenger hereunder shall be paid in the manner set forth in this Section 4. Operator will pay, or cause to be paid, all expenses related to the operation of the Aircraft hereunder in the ordinary course. Within 30 days of the end of each Trip or Round Trip, Operator shall provide or cause to be provided to Passenger an invoice showing all personal use of the Aircraft by Passenger pursuant to this Agreement during that Trip or Round Trip and a complete accounting detailing all amounts that are payable by Passenger pursuant to Section 3 for that Trip or Round Trip (plus applicable domestic or international air transportation excise taxes, and any other fees, taxes or charges assessed on passengers by and remitted to a government agency or airport authority). Passenger shall pay all amounts due under the invoice in a manner reasonably acceptable to Operator not later than 30 days after receipt thereof. In the event Operator has not received all supplier invoices for reimbursable charges relating to such Trip or Round Trip prior to such invoicing, Operator shall issue a supplemental invoice(s) for such charge(s) to Passenger, and Passenger shall pay each supplemental invoice within 30 days after receipt thereof.

5. Flight Requests. Passenger shall provide the Operator's aviation department or designated point of contact with Trip requests for Passenger's personal travel to be undertaken pursuant to this Agreement and proposed flight schedules as far in advance of Passenger's desired departure as possible, and at least 24 hours prior to Passenger's planned departure or as may be required by law. The advance notice requirement in this Section 5 may be waived by Operator in its discretion. All flight requests for travel under this Agreement shall be in accordance with all reasonable policies established by Operator. Flight requests shall be made by Passenger in a form that is acceptable to Operator. Operator shall have sole and exclusive authority over the scheduling of the Aircraft. Operator shall not be liable to Passenger or any other person for loss, injury, or damage occasioned by the delay or failure to furnish the Aircraft and crew pursuant to this Agreement for any reason. In addition to requested schedules and departure times, Passenger shall provide at least the following information for each proposed flight reasonably in advance of the desired departure time as required by Operator or its flight crew:

a. Departure point;

b. Destination;

c. Date and time of flight;

d. Number and identity of anticipated passengers;

e. Date and time of return flight, if any; and *f.* Any other information concerning the proposed flight that may be pertinent to or required by Operator, its flight crew, or governmental entities.

6. ***Operational Authority and Control***.

a. Operator (or its designee or affiliate) shall be responsible for the physical and technical operation of the Aircraft and the safe performance of all flights under this Agreement, and shall retain full authority and control, including exclusive operational control and exclusive possession, command and control of the Aircraft for all flights under this Agreement.

b. Operator (or its designee or affiliate) shall furnish a fully qualified flight crew with appropriate credentials to conduct each flight undertaken under this Agreement and included on the insurance policies that Operator is required to maintain hereunder. In accordance with applicable FAR, the qualified flight crew provided by Operator will exercise all required and/or appropriate duties and responsibilities in regard to the safety of each flight conducted hereunder. The pilot-in-command shall have absolute discretion in all matters concerning the preparation of the Aircraft for flight and the flight itself, the load carried and its distribution, the decision whether or not a flight shall be undertaken, the route to be flown, the place where landings shall be made, and all other matters relating to operation of the Aircraft. Passenger specifically agrees that the flight crew shall have final and complete authority to delay or cancel any flight for any reason or condition that in the sole judgment of the pilot-in-command could compromise the safety of the flight, and to take any other action that in the sole judgment of the pilot-in-command is necessitated by considerations of safety. No such action of the pilot-in-command shall create or support any liability to Passenger or any other person for loss, injury, damage or delay. Operator's operation of the Aircraft hereunder shall be strictly within the guidelines and policies established by Operator and FAR Part 91.

c. Subject to Aircraft and crew availability, Operator shall use its good faith efforts, consistent with its approved policies, to accommodate Passenger's needs and avoid conflicts in scheduling. Although every good faith effort shall be made to avoid its occurrence, any flights scheduled under this Agreement are subject to cancellation by either party without incurring liability to the other party. In the event of a cancellation, the canceling party shall provide the maximum notice reasonably practicable.

d. In the absence of another flight scheduled on the aircraft by Passenger or another scheduled business trip, the Aircraft may remain at the destination until its next required use. If the next use of the Aircraft is a business use, Operator shall not charge the Passenger for expenses associated with hangar and tie-down costs away from the Aircraft's base of operation; if, however, the next use of the Aircraft is by Passenger, Operator shall have the option of returning the Aircraft to its base of operations or permitting it to remain at the destination. In either event, Passenger shall pay for the associated costs.

7. ***Aircraft Maintenance***. Operator (or its designee or affiliate) shall, at its own expense, cause the Aircraft to be inspected, maintained, serviced, repaired, overhauled, and tested in accordance with FAR Part 91 so that the Aircraft will remain in good operating condition and in a condition consistent with its airworthiness certification and shall take such requirements into account in scheduling the Aircraft hereunder, including but not limited compliance with applicable airworthiness directives and service bulletins. Performance of maintenance, preventive maintenance or inspection shall not be delayed or postponed for the purpose of scheduling the Aircraft unless such maintenance or inspection can safely be conducted at a later time in compliance with applicable laws, regulations and requirements, and such delay or postponement is consistent with the sound discretion of the pilot-in-command. In the event that any non-standard maintenance is required during the term and will interfere with Passenger's requested or scheduled flights, Operator, or Operator's pilot-in-command, shall notify Passenger of the maintenance required, the effect on the ability to comply with Passenger's requested or scheduled flights and the manner in which the parties will proceed with the performance of such maintenance and conduct of such flight(s). In no event shall Operator be liable to Passenger or any other person for loss, injury or damage occasioned by the delay or failure to furnish the Aircraft under this Agreement, whether or not maintenance-related.

8. ***Insurance***.

a. Operator, at its expense, will maintain or cause to be maintained in full force and effect throughout the Term of this Agreement an aviation liability and hull insurance policy including: aviation liability insurance against bodily injury and property damage claims arising out of the use of the Aircraft in an amount not less than $100 Million for each occurrence; and hull insurance for the Aircraft in amounts determined by Operator at its sole discretion. The aviation liability coverage shall include Passenger as an insured, and include a severability of interest provision providing that the insurance shall apply separately to each insured against whom a claim is made, except as respects the limits of liability. The aviation liability and hull insurance coverage shall include provisions whereby the insurer(s) waive all rights of subrogation they may have or acquire against Passenger and shall permit the use of the Aircraft by Operator for compensation or hire as provided in §91.501 of the FAR.

b. Operator shall use reasonable commercial efforts to provide such additional insurance for specific flights under this Agreement as Passenger may reasonably request. Passenger acknowledges that any trips scheduled to areas not currently covered by existing policies may require Operator to purchase additional insurance to comply with applicable regulations, and Operator shall be required to maintain or cause to be maintained such additional insurance.

The cost of all flight-specific insurance shall be borne by Passenger as provided in Section 3(d) above.

9. ***Use of Aircraft***. Passenger warrants that:

a. Passenger has all necessary powers to enter into the transactions contemplated in this Agreement and has taken actions required to authorize and approve this Agreement;

b. Passenger will use the Aircraft under this Agreement for and only for its own account, including the carriage of its guests, and will not use the Aircraft for the purpose of providing transportation of passengers or cargo for compensation or hire or for common carriage;

c. Passenger will not permit any lien, security interest or other charge or encumbrance to attach against the Aircraft as a result of his actions or inactions, and shall not attempt to convey, mortgage, assign, lease or in any way alienate the Aircraft or Operator's rights hereunder or create any kind of lien or security interest involving the Aircraft or do anything or take any action that might mature into such a lien;

d. During the Term of this Agreement, Passenger will abide by and conform to all such laws, governmental and airport orders, rules, and regulations as shall from time to time be in effect relating in any way to the operation or use of the Aircraft by a lessee under a time sharing arrangement and all applicable policies of Operator; and

e. Passenger acknowledges that its discretion in determining the origin and destination of flights under this Agreement shall be subject to the following: such origin and destination, and the routes to reach such origin and destination, are not within or over (i) an area of hostilities, (ii) an area excluded from coverage under the insurance policies maintained by Operator with respect to the Aircraft, or (iii) a country or jurisdiction for which exports or transactions are subject to specific restrictions under any United States export or other law or United Nations Security Council Directive, including without limitation, the Trading with the Enemy Act, 50 U.S.C. App. Section 1 et seq., the International Emergency Economic Powers Act, 50 U.S.C. App. Section 1700 et seq., and the Export Administration Act, 50 U.S.C. App. Sections 2401 et seq.

10. ***Limitation of Liability***. **NEITHER OPERATOR (NOR ITS AFFILIATES) MAKES, HAS MADE OR SHALL BE DEEMED TO MAKE OR HAVE MADE ANY WARRANTY OR REPRESENTATION, EITHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, WITH RESPECT TO ANY AIRCRAFT TO BE USED HEREUNDER OR ANY ENGINE OR COMPONENT THEREOF INCLUDING, WITHOUT LIMITATION, ANY**

WARRANTY AS TO DESIGN, COMPLIANCE WITH SPECIFICATIONS, QUALITY OF MATERIALS OR WORKMANSHIP, MERCHANTABILITY, FITNESS FOR ANY PURPOSE, USE OR OPERATION, AIRWORTHINESS, SAFETY, PATENT, TRADEMARK OR COPYRIGHT INFRINGEMENT OR TITLE. IN NO EVENT SHALL OPERATOR OR ITS AFFILIATES BE LIABLE FOR OR HAVE ANY DUTY FOR INDEMNIFICATION OR CONTRIBUTION TO PASSENGER OR ITS EMPLOYEES, AGENTS OR GUESTS FOR ANY CLAIMED INDIRECT, SPECIAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES, REGARDLESS OF WHETHER IT KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGE, LOSS OR EXPENSE. The provisions of this Section 10 shall survive the termination or expiration of this Agreement.

11. Base of Operations. For purposes of this Agreement, the base of operation of the Aircraft is Atlanta, Georgia, provided that such base may be changed at Operator's sole discretion upon notice from Operator to Passenger.

12. Notices and Communications. All notices and other communications under this Agreement shall be in writing (except as permitted in Section 5) and shall be given (and shall be deemed to have been duly given upon receipt or refusal to accept receipt) by personal delivery, by facsimile or electronic mail (with a simultaneous confirmation copy sent by first class mail properly addressed and postage prepaid), or by a reputable overnight courier service, addressed as follows:

If to Operator: Intercontinental Exchange Holdings, Inc.
5660 New Northside Drive
Atlanta, GA 30328
Attn: Legal Department
Facsimile: 770-937-0020
E-mail: Andrew.Surdykowski@ice.com

If to Passenger: Warren Gardiner
5660 New Northside Drive
Atlanta, GA 30328
Facsimile: 770-937-0020
E-mail: warren.gardiner@ice.com

or, to such other person or address as either party may from time to time designate in writing to the other party.

13. Entire Agreement. This Agreement constitutes the entire understanding between the parties with respect to its subject matter, and there are no representations, warranties, rights, obligations, liabilities, conditions, covenants, or agreements relating to such subject matter that are not expressly set forth herein. There are no third-party beneficiaries of this Agreement.

14. Further Acts. Operator and Passenger shall from time to time perform such other and further acts and execute such other and further instruments as may be required by law or may be reasonably necessary (i) to carry out the intent and purpose of this Agreement, and (ii) to establish, maintain and protect the respective rights and remedies of the other party.

15. Successors and Assigns. Passenger shall not have the right to assign, transfer or pledge this Agreement. This Agreement shall be binding on the parties hereto and their respective heirs, executors, administrators, successors and assigns, and shall inure to the benefit of the parties hereto, and, except as otherwise provided herein, their respective heirs, executors, administrators, other legal representatives, successors and permitted assigns.

16. Taxes. Passenger shall be responsible for paying, and Operator shall be responsible for collecting from Passenger and paying over to the appropriate authorities, all applicable Federal excise taxes imposed under IRC §4261 and all sales, use and other excise taxes imposed by any authority in connection with the use of the Aircraft by Passenger hereunder.

17. Governing Law and Consent to Jurisdiction. This Agreement shall be governed by the laws of the State of Georgia, without regard to its choice of law principles. The parties hereby consent and agree to submit to the exclusive jurisdiction and venue of any state or federal court in Georgia in any proceedings hereunder, and each hereby waives any objection to any such proceedings based on improper venue or forum non-conveniens or similar principles. The parties hereto hereby further consent and agree to the exercise of such personal jurisdiction over them by such courts with respect to any such proceedings, waive any objection to the assertion or exercise of such jurisdiction and consent to process being served in any such proceedings in the manner provided for the giving of notices hereunder.

18. Severability. If any provision of this Agreement is held to be illegal, invalid or unenforceable, the legality, validity and enforceability of the remaining provisions shall not be affected or impaired.

19. Amendment or Modification. This Agreement may be amended, modified or terminated only in writing duly executed by the parties hereto.

20. Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, and all of which shall constitute one and the same Agreement, binding on all the parties notwithstanding that all the parties are not signatories to the same counterpart. Each party may transmit its signature by facsimile, and any faxed counterpart of this Agreement shall have the same force and effect as a manually-executed original.

[signatures and truth-in-leasing notice follows]

21. Truth-in-Leasing Compliance. Operator, on behalf of Passenger, shall (i) deliver a copy of this Agreement to the Federal Aviation Administration, Aircraft Registration Branch, Attn: Technical Section, P.O. Box 25724, Oklahoma City, Oklahoma 73125 within 24 hours of its execution, (ii) notify the appropriate Flight Standards District Office at least 48 hours prior to the first flight under this Agreement of the registration number of the Aircraft, and the location of the airport of departure and departure time for such flight, and (iii) carry a copy of this Agreement onboard the Aircraft at all times when the Aircraft is being operated under this Agreement.

22. TRUTH-IN-LEASING STATEMENT PURSUANT TO SECTION 91.23 OF THE FEDERAL AVIATION REGULATIONS.

OPERATOR HAS REVIEWED THE AIRCRAFT'S MAINTENANCE RECORDS AND OPERATING LOGS AND HAS FOUND THAT, DURING THE TWELVE (12) MONTHS PRECEDING THE DATE OF THIS AGREEMENT, THE AIRCRAFT HAS BEEN MAINTAINED AND INSPECTED UNDER PART 91 OF THE FAR, AND OPERATOR AND PASSENGER FURTHER CERTIFY THAT OPERATOR WILL MAINTAIN, INSPECT AND OPERATE THE AIRCRAFT UNDER FAR PART 91 FOR ALL OPERATIONS TO BE CONDUCTED UNDER AGREEMENT. OPERATOR, WHO IS:

NAME (For Operator):	Intercontinental Exchange Holdings, Inc.
ADDRESS:	5660 New Northside Drive Atlanta, GA 30328

FURTHER CERTIFIES THAT OPERATOR AND NOT PASSENGER IS RESPONSIBLE FOR OPERATIONAL CONTROL OF THE AIRCRAFT UNDER THIS AGREEMENT, AND THAT OPERATOR UNDERSTANDS OPERATOR'S RESPONSIBILITIES FOR COMPLIANCE WITH THE APPLICABLE FAR. THE PARTIES UNDERSTAND THAT AN EXPLANATION OF FACTORS BEARING ON OPERATIONAL CONTROL AND THE PERTINENT FAR CAN BE OBTAINED FROM THE NEAREST FAA FLIGHT STANDARDS DISTRICT OFFICE.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed on the day and year first above written. The persons signing below warrant their authority to sign.

Intercontinental Exchange Holdings, Inc.

By: /s/ Andrew Surdykowski
Name: Andrew Surdykowski
Title: General Counsel

Warren Gardiner

/s/ Warren Gardiner
Individually

A legible copy of this Agreement shall be kept in the Aircraft for all operations conducted hereunder.

Exhibit 21.1

The following is a list of Intercontinental Exchange, Inc.'s significant legal entity subsidiaries as of December 31, 2021, as defined by SEC rules, and the states or jurisdictions in which they are organized. The list includes the parent company of significant subsidiaries even if the parent company did not meet the definition of a significant subsidiary. Excluded from the list are subsidiaries that, if considered in the aggregate, would not constitute a "significant subsidiary" as that term is defined in Rule 1-02(w) of Regulation S-X under the Securities Exchange Act of 1934.

Name of Subsidiary	**Jurisdiction of Incorporation or Organization**
Intercontinental Exchange Holdings, Inc.	Delaware, U.S.A.
ICE Data Management Group, LLC	Delaware, U.S.A.
ICE Data Investment Group, LLC	Delaware, U.S.A.
ICE Data, LP	Delaware, U.S.A.
ICE Futures U.S., Inc.	Delaware, U.S.A.
ICE Clear U.S., Inc.	New York, U.S.A.
ICE US Holding Company GP LLC	Delaware, U.S.A.
ICE US Holding Company LP LLC	Delaware, U.S.A.
ICE US Holding Company L.P.	Cayman Islands
ICE Clear Credit LLC	Delaware, U.S.A.
NYSE Holdings LLC	Delaware, U.S.A.
NYSE Group, Inc.	Delaware, U.S.A.
NYSE Arca, Inc.	Delaware, U.S.A.
NYSE American LLC	Delaware, U.S.A.
New York Stock Exchange LLC	New York, U.S.A.
NYSE Market (DE), Inc.	Delaware, U.S.A.
IntercontinentalExchange International, Inc.	Delaware, U.S.A.
ICE UK GP, LLC	Delaware, U.S.A.
ICE UK LP, LLC	Delaware, U.S.A.
ICE Europe Partners LP	United Kingdom
ICE Europe Parent Limited	United Kingdom
Aether IOS Limited	United Kingdom
IntercontinentalExchange Holdings	United Kingdom
ICE Clear Europe Limited	United Kingdom
ICE Futures Holdings Limited	United Kingdom
ICE Futures Holdco No. 1 Limited	United Kingdom
ICE Futures Holdco No. 2 Limited	United Kingdom
ICE Futures Europe	United Kingdom
Interactive Data Holdings Corporation	Delaware, U.S.A.
Igloo Intermediate Corporation	Delaware, U.S.A.
ICE Data Services, Inc.	Delaware, U.S.A.
ICE Data Pricing & Reference Data, LLC	Delaware, U.S.A.
ICE Mortgage Technology Holdings, Inc.	Delaware, U.S.A.
ICE Mortgage Technology, Inc.	Delaware, U.S.A.

EXHIBIT 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statement (Form S-3 No. 333-253816) of Intercontinental Exchange, Inc.,

(2) Registration Statement (Form S-8 No. 333-225065) pertaining to the Intercontinental Exchange, Inc. 2018 Employee Stock Purchase Plan,

(3) Registration Statement (Form S-8 No. 333-218169) pertaining to the Intercontinental Exchange, Inc. 2017 Omnibus Employee Incentive Plan, and

(4) Registration Statement (Form S-8 No. 333-192301) pertaining to the IntercontinentalExchange, Inc. 2013 Omnibus Employee Incentive Plan, the IntercontinentalExchange Group, Inc. 2013 Omnibus Non-Employee Director Incentive Plan, the IntercontinentalExchange, Inc. 2009 Omnibus Incentive Plan, the IntercontinentalExchange, Inc. 2003 Restricted Stock Deferral Plan for Outside Directors, the IntercontinentalExchange, Inc. 2000 Stock Option Plan, and the NYSE Euronext Omnibus Incentive Plan;

of our reports dated February 3, 2022, with respect to the consolidated financial statements of Intercontinental Exchange, Inc. and Subsidiaries and the effectiveness of internal control over financial reporting of Intercontinental Exchange, Inc. and Subsidiaries included in this Annual Report (Form 10-K) of Intercontinental Exchange, Inc. for the year ended December 31, 2021.

/s/ Ernst & Young LLP

Atlanta, Georgia
February 3, 2022

EXHIBIT 31.1

CERTIFICATIONS

I, Jeffrey C. Sprecher, certify that:

1. I have reviewed this Annual Report on Form 10-K of Intercontinental Exchange, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: February 3, 2022

/s/ Jeffrey C. Sprecher

Jeffrey C. Sprecher
Chairman of the Board and
Chief Executive Officer

EXHIBIT 31.2

CERTIFICATIONS

I, A. Warren Gardiner, certify that:

1. I have reviewed this Annual Report on Form 10-K of Intercontinental Exchange, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: February 3, 2022

/s/ A. Warren Gardiner

A. Warren Gardiner
Chief Financial Officer

EXHIBIT 32.1

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report of Intercontinental Exchange, Inc. (the “Company”) on Form 10-K for the period ended December 31, 2021 as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Jeffrey C. Sprecher, Chairman and Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 3, 2022

/s/ Jeffrey C. Sprecher

Jeffrey C. Sprecher
Chairman of the Board and
Chief Executive Officer

EXHIBIT 32.2

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Intercontinental Exchange, Inc. (the “Company”) on Form 10-K for the period ended December 31, 2021 as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, A. Warren Gardiner, Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that, to the best of my knowledge:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 3, 2022

/s/ A. Warren Gardiner

A. Warren Gardiner
Chief Financial Officer