United States
International Trade Commission

Recent Trends in U.S. Services Trade:

2024 Annual Report

May 2024
Publication Number: 5512
Investigation Number: 332-601

Commissioners

David S. Johanson, Chairman

Rhonda K. Schmidtlein

Jason E. Kearns

Amy A. Karpel

Catherine DeFilippo
Director, Office of Operations

Jeremy Wise
Director, Office of Industry and Competitiveness Analysis

Address all communications to
Office of External Relations
(externalrelations@usitc.gov)
United States International Trade Commission
Washington, DC 20436

Recent Trends in U.S. Services Trade:

2024 Annual Report

May 2024
Publication Number: 5512
Investigation Number: 332-601

This report was prepared principally by:

Project Leader
Rudy Telles Jr.

Deputy Project Leader
Theron Gray

Office of Industry and Competitiveness Analysis
Eric Forden, Junie Joseph, Tamar Khachaturian, Sarah Oliver, Jennifer Powell, Isaac Wohl

Office of Analysis and Research Services
Cindy Payne

Content Reviewers
Lin Jones, Kelsi Van Veen

Editorial Reviewers
Judy Edelhoff, Ronald Docksai, Brian Rose

Legal Reviewer
Eric Heath

Statistical Reviewers
Conor Hargrove, Laura Thayn, Aaron Woodward

Interactive Tables
Statistical Analysis and Methodology Division

Production Support
David Lahrmer, Fara Ndiaye

Under the direction of
Martha Lawless, Chief
Services Division
Office of Industry and Competitiveness Analysis

Preface

This report is the 28th in a series of annual reports on recent trends in U.S. services trade published by the U.S. International Trade Commission (Commission or USITC). Conducted under an investigation instituted by the Commission in 1993 under section 332(b) of the Tariff Act of 1930,[1] these reports draw on discussions with representatives from industry, academia, and international organizations as well as published sources to apprise the Commission's requestors and the public of global industry trends, regional developments, and competitiveness issues related to trade in services.

[1] On August 27, 1993, acting on its own motion under section 332(b) of the Tariff Act of 1930 (19 U.S.C. 1332(b)), the Commission instituted investigation no. 332-345, Annual Reports on U.S. Trade Shifts in Selected Industries. On December 20, 1994, the Commission unilaterally expanded the scope of this report to include more detailed coverage of services industries. Under the expanded scope, the Commission publishes two annual reports, *Shifts in U.S. Merchandise Trade* and *Recent Trends in U.S. Services Trade* (*Recent Trends*).

Table of Contents

Boxes

Figures

Tables

Abbreviations and Acronyms

Terms	Definitions
3PL	third-party logistics
AI	artificial intelligence
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
Cat	Catastrophe (bonds)
CISA	Cybersecurity and Infrastructure Security Agency
COVID-19	coronavirus disease 2019
D&O	directors and officers (insurance)
DOJ	U.S. Department of Justice
ESG	environmental and social governance
EU	European Union
FTE	full-time equivalent
GATS	General Agreement on Trade in Services
GDP	gross domestic product
GenAI	generative artificial intelligence
GHG	greenhouse gas
GSP	Generalized System of Preferences
IAIS	International Association of Insurance Supervisors
ICT	information and communications technology
ILS	insurance-linked security
IMF	International Monetary Fund
IoT	Internet of Things
IP	intellectual property
IPCC	Intergovernmental Panel on Climate Change
IT	information technology
LECZ	low-elevation coastal zone
LLM	large language model
M&A	mergers and acquisitions
ML	machine learning
MOU	memorandum of understanding
MNE	multinational enterprise
MOFA	majority-owned foreign affiliate
MOUSA	majority-owned U.S. affiliate
NAIC	National Association of Insurance Commissioners
NZIA	Net Zero Banking Alliance
OCC	Office of the Comptroller of the Currency
P2P	peer-to-peer
P&C	property and casualty (insurance)
SEC	U.S. Securities and Exchange Commission
SMEs	small and medium-sized enterprises
TCFD	Task Force on Climate-related Financial Disclosures
UBO	ultimate beneficial owner
UK	United Kingdom
PRB	United Nations Principles for Responsible Banking
USDOC	U.S. Department of Commerce
USITC	U.S. International Trade Commission
WTO	World Trade Organization

Executive Summary

This report describes recent trends in U.S. services trade and developments in U.S. services industries' competitiveness. Specifically, it focuses on recent developments in U.S. trade in financial services[2], notably in the context of a pronounced increase in global inflation from 2021 to 2022 and subsequent volatility in global interest rates. The report also includes specific discussions of recent global developments in banking, insurance, and securities services, which are addressed in two chapters that focus on two overarching themes. One discusses how financial services firms are embracing digitalization and looking to incorporate new artificial intelligence (AI) technologies. The other focuses on the rising demand for new financial products and services that address concerns for sustainability and financial inclusion, and support growth in emerging markets.

Trade in services falls into two categories: cross-border transactions and transactions by foreign-owned affiliates. In 2022, the United States continued to be the world's largest exporter and importer of services.[3] In that year, U.S. cross-border services exports totaled $900 billion (or 12.8 percent of global services exports), and imports totaled $671.4 billion (or 10.3 percent of global services imports). Sales of services by foreign affiliates of U.S.-owned firms (referred to here as affiliate sales) totaled $2.0 trillion in 2021 (the latest year available). Purchases of services from U.S. affiliates of foreign-owned firms in that year totaled $1.3 trillion. Given the inherent need for many services to be provided locally—for example, some services may require in-person delivery or provision by locally regulated entities—U.S. sales of services through foreign affiliates of U.S.-owned firms are consistently larger than U.S. cross-border services exports.

Report Highlights

The United States Continues to Run a Trade Surplus in both Cross-Border Services Trade and Foreign Affiliate Sales

In 2022, U.S. cross-border services exports exceeded imports, resulting in a trade surplus of $228.6 billion. U.S. cross-border trade surpluses were recorded in most major services sectors, with the largest surpluses in professional services and financial services. The largest destination for U.S. services exports in 2022 was Ireland, followed by the United Kingdom (UK), Canada, and Switzerland. In that same year, the largest source of U.S. services imports was the UK, followed by Canada, Germany, Japan, and China.

In 2021, the most recent year for which data were available, sales of services by U.S.-owned foreign affiliates exceeded purchases from foreign-owned U.S. affiliates by $629.5 billion. Overall, the UK was

[2] Beginning in 2013, *Recent Trends* has rotated its coverage on an annual basis between four services industry categories: financial services, professional services, digital and electronic services, and distribution services. This year's report focuses on financial services; the 2023 report focused on distribution services. The most recent report covering financial services was published in September 2020.
[3] This report uses the U.S. Department of Commerce, Bureau of Economic Analysis' statistics and definitions of cross-border trade (see box 1.1).

the largest market for services sales by U.S.-owned foreign affiliates, followed by Ireland and Canada. Affiliates of German-owned firms in the United States accounted for the largest share of services purchased from all foreign-owned affiliates in the United States, followed by affiliates in the United States owned by firms in the UK and Canada.

Financial Services Contributed 21 Percent of U.S. Cross-Border Services Exports in 2022 and 18 Percent of U.S. Foreign Affiliate Sales in 2021

Financial services—the focus of this report—include a broad range of financial service providers responsible for facilitating monetary transactions, lending to consumers and firms, mobilizing and managing savings, providing liquidity to debt and equity capital markets, advising and underwriting corporate finance transactions, and developing instruments that manage risk.

In 2022, financial services accounted for $190.4 billion (or 21.2 percent) of total cross-border services exports and $117.2 billion (or 17.5 percent) of imports, resulting in a cross-border surplus of $73.2 billion. Top markets for U.S. cross-border exports of financial services included the UK overseas territories (the British Virgin Islands, the Cayman Islands, Montserrat, and the Turks and Caicos Islands), the UK, and Canada. Top sources of imports were Bermuda, the UK, and the UK overseas territories. In 2021, foreign financial services affiliates of U.S.-owned companies recorded services sales of $341.7 billion (accounting for 17.5 percent of total U.S. affiliate sales of services). Purchases of services from U.S. financial services affiliates of foreign-owned companies totaled $223.1 billion (or 16.9 percent of the total).

Financial Services Firms Respond to Global Inflation and Interest Rate Shocks

Between January 2021 and June 2022, the average global cost of living increased more than during the entire 2015–20 period. Monetary authorities around the world responded quickly; central banks in most major economies increased interest rates over the period, which directly affected firms in the banking, insurance, and securities services sectors. High inflation and the rapid increase in policy rates not only adversely affected demand for banking services and credit risk exposure but increased banks' net interest margins as well. In the insurance sector, both the revenue and investment income streams of global nonlife (property and casualty) and life insurance companies came under pressure. During this period, securities firms initially benefited from higher transaction volumes. Sharp rises in inflation and interest rates created financial market volatility and macroeconomic uncertainty that led these transaction volumes to decrease, but elevated policy rates may have affected securities borrowers and lenders differently.

Financial Services Firms Embrace Digitalization and Look to Incorporate New AI Technologies

Increased digitalization in the banking industry has created new opportunities for banks to use advanced analytics in novel applications throughout their operations. On the consumer-facing side, banks are using AI and machine learning to provide virtual services that replace traditional in-person services. Middle- and back-office operations are using AI to improve fraud detection, risk management, and credit approvals. With the increased adoption of digital technologies, however, cybersecurity is a growing priority for the banking industry.

In the insurance sector, digital data and sophisticated algorithms are increasingly used to sort high-volume claims and underwriting requests, as well as to calculate risk scores, complete policy applications, and verify application data. AI, machine learning, and other advanced technologies are being implemented by many insurance companies in operational functions ranging from pricing to claims processing to underwriting. The majority of these companies are experimenting with these technologies or incorporating them into some operational functions. Cyber liability insurance has recently emerged to cover a wide variety of costs associated with cyberattacks, most notably ransomware attacks.

In securities services, investment banks, hedge funds, and other institutional market participants were early adopters of digital technology, including algorithmic trading strategies driven by machine learning and the creation of new tokenized asset classes, which rely on blockchain technologies. On the consumer-facing side, the expansion of automated financial advice and mobile trading platforms have increased consumer access to securities services. The use of digital technology in this sector, however, is still evolving. Recent cybersecurity breaches, the collapse of some cryptocurrency markets, and volatility in the retail investing market have destabilized the financial services sector in recent years.

Financial Services Firms Expand Products and Services that Address Demand for Sustainability and Financial Inclusion, and Support Growth in Emerging Markets

A growing demand for sustainable investments and the increasing number of international frameworks focused on environmental and social issues has led banks to recently identify sustainability as a priority area, especially as it relates to climate change (mitigation and adaptation), gender equality, and financial inclusion. Various sustainability-focused international alliances have been established, and sustainable finance has increased to meet demand. Sustainability has also become a larger focus of international and domestic lending activities.

Global property and casualty insurance companies are facing changing demand conditions related to extreme weather. Global insured losses, including in the United States, have risen sharply over the past 30 years. Reasons for the higher losses include increased population and construction in coastal and other vulnerable areas, rising construction costs, and the increased insurable value of physical assets in

those areas. As the incidence and value of weather-related losses have grown, global insurers providing traditional property and casualty insurance have become more selective about which risks they cover. The selectivity has negatively impacted the availability and affordability of insurance for consumers in disaster-prone areas. At the same time, the increase in weather-related risks reportedly has led global property and casualty insurers to introduce new products and risk diversification tools.

In the securities sector, in emerging economies—particularly in large economies like China and India—rising incomes and demand for securities and asset management services have led to deeper capital markets. Over the past 5–10 years, China has focused on developing its securities markets and encouraging the internationalization of the Chinese renminbi. Although India has market access factors that can inhibit growth in the provision of some securities services, many foreign securities firms are increasingly investing there. In comparison, China's securities markets have recently been negatively affected by real estate overinvestment, though its securities sector remains significantly larger than India's.

Chapter 1
Introduction

The services sector is the largest sector of the U.S. economy, and the United States is the world's top cross-border exporter and importer of services.[4] In 2022, the U.S. services sector contributed 80.4 percent of U.S. gross domestic product (GDP) and 77 percent of total U.S. private employment based on real value added.[5]

This report, *Recent Trends in U.S. Services Trade* (*Recent Trends*), published annually by the U.S. International Trade Commission (Commission or USITC), examines trends in U.S. services trade, the global market and competitive conditions in services trade, and important U.S. trading partners for services, both in the aggregate and in selected industries. Each year, *Recent Trends* focuses on a specific category of services. This year, the report concentrates on financial services, including banking, insurance, securities, and rental and leasing services. Financial services were last covered in the 2020 report. Three other services categories, covered in a four-year rotation, include professional services, digital and electronic services, and distribution services (last covered in 2021, 2022, and 2023, respectively).[6]

This report is organized into five chapters. Chapter 1 gives an overview of the domestic U.S. services sector, global cross-border trade in services, and U.S. services trade (both cross-border and affiliate transactions) by services sector. It also provides a description of the data sources used throughout the report. Chapter 2 offers an overview of trends in cross-border trade and foreign affiliate sales and purchases in the financial services category. Chapter 2 also looks at this category's major component industry sectors: banking, insurance, securities, and in the case of affiliate sales/purchases, rental and leasing.

Chapters 3 and 4 highlight important or emerging trends in selected subsectors of financial services. Chapter 3 focuses on the effect of new technologies, digitalization, and related digital trade policies on suppliers' business models and competitiveness. Chapter 4 concentrates on rising demand for new financial products and services that address concerns related to sustainability and financial inclusion, and that support growth in emerging markets.

Finally, chapter 5 summarizes the views expressed by participants at the Commission's 17th annual Services Roundtable, held November 2, 2023. The report also includes three appendixes. Appendix A

[4] WTO, "Trade in Commercial Services," accessed February 5, 2024.
[5] USDOC, BEA, "Real Value Added by Industry," December 21, 2023; USDOC, BEA, table 6.5D, "Full-Time Equivalent Employees, by Industry," September 29, 2023. Real value added is a measure of an industry's contribution to GDP and is the difference between the value of an industry's gross output and the cost of intermediate inputs, adjusted for inflation. Services-supplying industries include utilities; wholesale trade; retail trade; transportation and warehousing; information; finance; insurance; real estate, rental and leasing; professional and business services; educational services; healthcare and social assistance; arts, entertainment, recreation, accommodation, and food services; and other services except government services. Goods-producing services include mining; construction; manufacturing; and agriculture, forestry, fishing, and hunting.
[6] For a comprehensive listing of the services that comprise the broader service categories of financial services, professional services, digital and electronic services, and distribution services see appendix C.

summarizes recent services-related Commission publications and staff research; appendix B presents underlying data for the figures included in this report; and appendix C provides information on how the Commission categorizes services data from the Bureau of Economic Analysis (BEA) at the U.S. Department of Commerce (USDOC). In addition, web-based interactive charts and tables associated with this report are available on the Commission's website, allowing users to explore U.S. services trade trends over time and for selected industries and countries.[7]

Data Sources, Categories, and Limitations

Data on trade in services tend to be more limited than data on trade in goods, partly because of the lack of customs data on services trade. As a result, this report relies on a variety of sources to present a comprehensive picture of trade in services. Official U.S. services trade data used in this report come from the BEA, which publishes annual data on both cross-border trade and affiliate transactions. These annual data are produced from a combination of surveys of U.S. firms, other administrative data sources (such as financial reports from the U.S. Department of State), and data from non-U.S. government sources.[8] Cross-border trade and foreign affiliate transactions cover a vast majority of total U.S. services trade via all four modes of supply specified in the World Trade Organization (WTO) General Agreement on Trade in Services (GATS).[9] Box 1.1 and figure 1.A explain and illustrate the four modes of supply for services trade, as well as where each mode falls within the trade statistics.

Box 1.1 Services Trade "Modes of Supply" under the World Trade Organization General Agreement on Trade in Services

The General Agreement on Trade in Services (GATS) identifies four modes of supply for services trade, or four ways that services can be traded:[a]

Mode 1 is cross-border supply. In this mode, a service is supplied by an individual or firm in one country to an individual or firm in another country (i.e., the service crosses national borders). An example is a firm emailing (i.e., exporting) a digital file of an architectural design to a foreign client. This mode also captures transportation services, such as a ship delivering goods from a port in one country to a port in another country.

Mode 2 is consumption abroad. In this mode, an individual from one country travels to another country and consumes a service in that country. For example, a U.S. export of tourism services occurs when a foreign tourist purchases souvenirs, food, and lodging while vacationing in the United States.

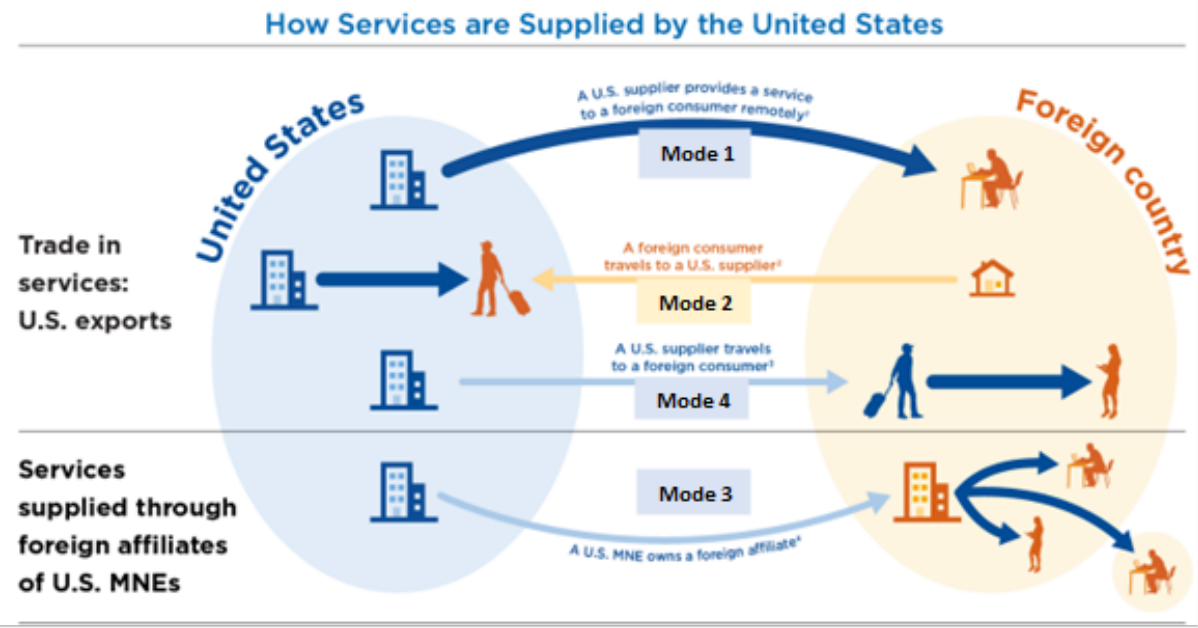
Mode 3 is commercial presence. In this mode, a firm based in one country establishes a local affiliate in another country and supplies services through that affiliate. An example is a U.S.-based retailer establishing a local affiliate in a foreign country for the purpose of selling products to consumers in that market.

[7] Interactive charts and associated alternative text associated with this report can be found at: https://www.usitc.gov/publications/industry_econ_analysis_332/2024/recent_trends_us_services_trade_2024_annual_report.
[8] For a list of the data the BEA use to compile trade in services statistics, see USDOC, BEA, "U.S. International Economic Accounts: Concepts and Methods," June 2022, 17–19.
[9] WTO, "Basic Purpose and Concepts," accessed January 11, 2023.

Mode 4 is the temporary presence of natural persons. In this mode, an individual from one country travels short term to another country to supply a service—for instance, as a consultant, contract employee, or intracompany transferee at a foreign affiliate. An example is a U.S.-based airplane technician traveling abroad to service or repair an aircraft.

Figure 1.A summarizes how U.S. services are exported via these four modes of supply, as well as how the modes are differentiated in BEA data.[b] Modes 1, 2, and 4 appear in the top half of the figure, under "trade in services." Mode 3 appears under "services supplied through foreign affiliates of U.S. multinational enterprises (MNEs)."

Figure 1.A Modes of supply in U.S. services trade



Source: USDOC, BEA, "The Basics of How International Services Are Supplied and Received by the United States," October 19, 2022.
Note: MNEs = multinational enterprises
[a] WTO, "Basic Purpose and Concepts," accessed January 11, 2023.
[b] After income generated through affiliate transactions has been repatriated to the United States, it appears as direct investment income in the U.S. balance of payments. USDOC, BEA, "U.S. International Economic Accounts: Concepts and Methods," June 2022, 122.

As defined by the BEA, cross-border services trade occurs when suppliers in one country sell services to consumers in another country, with people, information, or money crossing national borders. Firms also provide services to foreign consumers through affiliates established in host (i.e., foreign) countries.[10] After income generated through affiliate transactions has been repatriated to the United States, it appears as direct investment income in the U.S. balance of payments.[11]

[10] USDOC, BEA, "U.S. International Economic Accounts: Concepts and Methods," June 2022, 262.
[11] USDOC, BEA, "U.S. International Economic Accounts: Concepts and Methods," June 2022, 122.

GATS mode 1 and mode 2 transactions, as well as some mode 4 transactions, are generally grouped together in BEA data on cross-border trade. Mode 3 transactions are included, with some exceptions, in BEA affiliate transactions data.[12]

This report focuses on BEA "private services" data.[13] As a result, the export and import data presented throughout this report exclude government transactions, which primarily consist of services supplied in support of operations of the U.S. military and U.S. embassies in foreign countries.

Aggregated data on cross-border trade in services appear in the balance of payments statistics published quarterly for the United States by the BEA, and annually in the WTO's global services trade data.[14] The term "commercial services" used in WTO services trade data is roughly equivalent to the term "private services" used in BEA services trade data.[15] Like BEA cross-border trade data, WTO cross-border trade data roughly correspond to modes 1, 2, and 4, as specified in GATS.[16]

The BEA also uses survey data to publish more detailed annual statistics for cross-border services trade and foreign affiliate transactions of the United States. These data are sorted by partner country and by industry at the finest level of detail that BEA survey and confidentiality policies allow.[17] Statistics on cross-border trade and foreign affiliate transactions are available for three subcategories of financial services: banking services, insurance services, and securities services. More information on the data coverage for financial services is available in chapter 2.

Beginning in 2009, the BEA began efforts to restructure its international trade data following the release by the International Monetary Fund (IMF) of *Balance of Payments and International Investment Position Manual, Sixth Edition* (*BPM6*). The BEA implemented changes to gradually bring U.S. services trade statistics in line with *BPM6*, expanding detail in its international trade in services statistics in 2014 and 2020.[18] Most recently, the BEA updated the services trade statistics for its July 2022 release by incorporating data from the 2019 *Benchmark Survey of Financial Services Transactions Between U.S.*

[12] USDOC, BEA, "U.S. International Economic Accounts: Concepts and Methods," June 2022, 263. Some statistics on services supplied through mode 4 may also be commingled with statistics on compensation of employees. Similarly, services supplied by employees that have been temporarily transferred to foreign affiliates may appear in foreign affiliate sales rather than cross-border statistics. The channel of delivery that service providers use is determined primarily by the nature of the service. For example, retail services are generally supplied through affiliates, but transportation services are generally supplied through cross-border trade.

[13] In BEA data, "private services" include all (total) services excluding the category government goods and services, not included elsewhere.

[14] WTO, "Trade in Commercial Services," accessed January 4, 2023; USDOC, BEA, table 1.1, "U.S. International Transactions," September 22, 2022.

[15] BEA private services are the same as the WTO's commercial services in aggregate. The WTO, however, defines services based on the fourth (1977) and fifth (1993) editions of the IMF *Balance of Payments and International Investment Position Manual*, while the BEA defines them based on the sixth version (2009) of the manual. See the WTO technical notes and BEA's U.S. International Accounts: Concepts and Methods for more detailed information.

[16] WTO, *World Trade Statistical Review 2022*, August 31, 2022.

[17] Data are suppressed for certain industries or sectors for which disclosure could potentially reveal confidential information about individual companies. USDOC, BEA, "U.S. International Economic Accounts: Concepts and Methods," June 2022, 24, 247–48.

[18] USDOC, BEA, "U.S. International Economic Accounts: Concepts and Methods," June 2022, 11, 13–14.

Financial Services Providers and Foreign Persons into estimates of cross-border financial services imports and exports.[19]

The BEA collects and publishes survey-based statistics in two different ways. For cross-border services trade, statistics are based on the type of service traded. For services supplied through affiliates, statistics are based on the affiliates' primary industry.[20] As a result, comparability at the sector level between statistics for cross-border trade and foreign affiliate sales is limited. For example, a company like Walmart, Inc.—a retail firm focusing on traditional brick-and-mortar retail and e-commerce—would likely report cross-border trade data for different segments of its business, including insurance services, but will be classified as a retail service provider in its affiliate transactions.[21] Thus, any foreign affiliate sales of insurance services could appear as retail services, rather than under the finance and insurance services category, in BEA affiliate transactions data.[22]

This report uses the latest available services trade data for each source described above. As of the date of publication of this report, WTO cross-border trade in services data were available through 2022. Annual data on cross-border trade from the BEA were available through 2022 (with preliminary data available for 2023); however, BEA data on affiliate transactions were available only through 2021. Accordingly, data on market conditions for each specific industry covered in this report may span different years.

U.S. Services Sector

The U.S. services sector made up the largest share of the U.S. economy in 2022. In real value-added terms, U.S. private service-supplying industries contributed $15.8 trillion, or 81.8 percent, to U.S. GDP. By comparison, goods-producing industries contributed $3.5 trillion, or 18.2 percent.[23]

Services-supplying industries also supplied the majority of full-time equivalent (FTE) employees in the U.S. economy in 2022, with private employment encompassing 82.1 percent, or 100.9 million FTE employees. Goods-producing industries, by contrast, accounted for private employment of 17.9 percent, or 22 million FTE employees.

---

[19] With this update, the BEA has incorporated newly available and revised source data for 2019–21 and updated seasonal adjustments for 2017–21 for most statistical series. The BEA conducts Benchmark Surveys every five years to collect information from the entire population—or universe—of services trading companies. The 2019 Benchmark Survey covered all U.S. financial services providers that engaged in financial services transactions with foreign persons. Estimates for 2015–21 financial services exports and imports and related taxes, which were previously based on both the 2014 Benchmark Survey and the quarterly surveys, have been replaced with estimates that are informed by the results of the 2019 Benchmark Survey. USDOC, BEA, "Annual Update of the U.S. International Transactions Accounts," July 2022, 3.

[20] USDOC, BEA, "U.S. International Economic Accounts: Concepts and Methods," June 2022, 251. See chapter 2 for further discussion of the ways that services trade data are classified, as well as information about sector-specific data collection and classification.

[21] Walmart offers health care insurance for persons under 65, Medicare insurance, and pet insurance. Walmart Inc., "Walmart Insurance Services," accessed February 13, 2024.

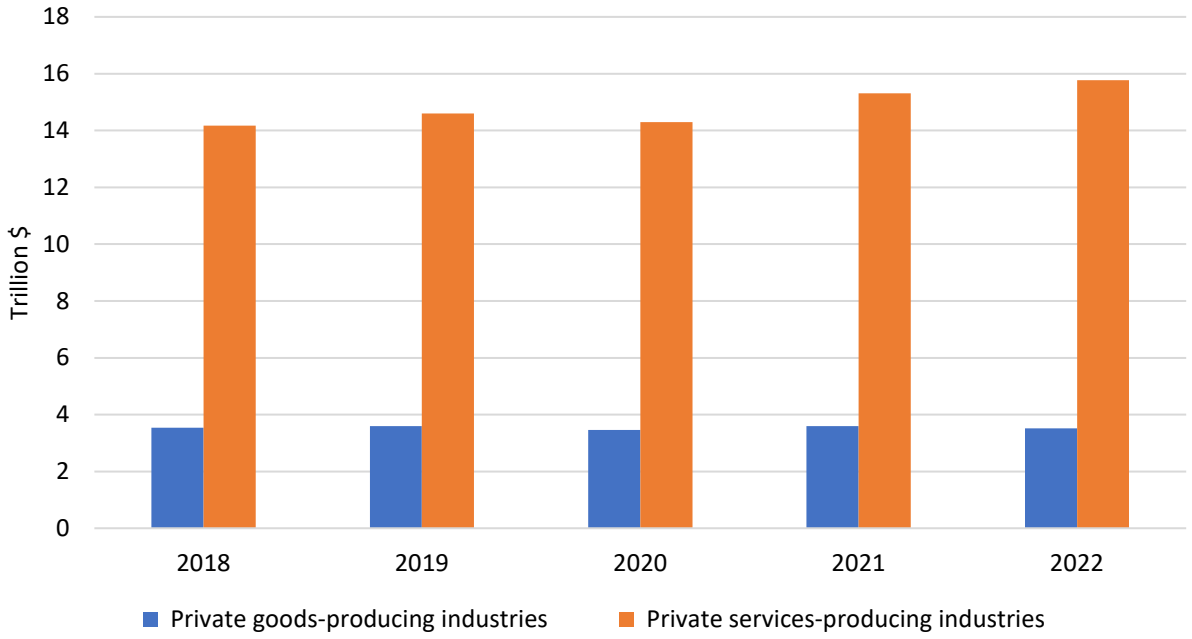
[22] Affiliate transactions are reported by industry rather than type of product, and the affiliate transaction data include ancillary services provided by firms in the agriculture, manufacturing, and mining industries. USDOC, BEA, "U.S. International Economic Accounts: Concepts and Methods," June 2022, 241.

[23] USDOC, BEA, "Real Value Added by Industry," September 28, 2023.

Between 2018 and 2022, real value added by private U.S. services-supplying industries increased by 11.2 percent, from $14.2 trillion to $15.8 trillion (figure 1.1), recording an average annual growth rate of 2.3 percent. By contrast, real value added attributable to private goods-producing industries was essentially flat during the same period. The number of FTE employees in U.S. services-supplying industries increased by 4.0 percent from 2018 through 2022, whereas employment in goods-producing industries increased by 2.5 percent during the same period.[24]

Figure 1.1 Real value added by U.S. industry, 2018–22

In trillions of dollars. Underlying data for this figure can be found in appendix B, table B.1.



Source: USDOC, BEA, "Real Value Added by Industry," September 28, 2023.
Note: Estimates are chained (inflation-adjusted) 2017 dollars. Private goods-producing industries include agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing. Private service-producing industries include utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other services, except government services.

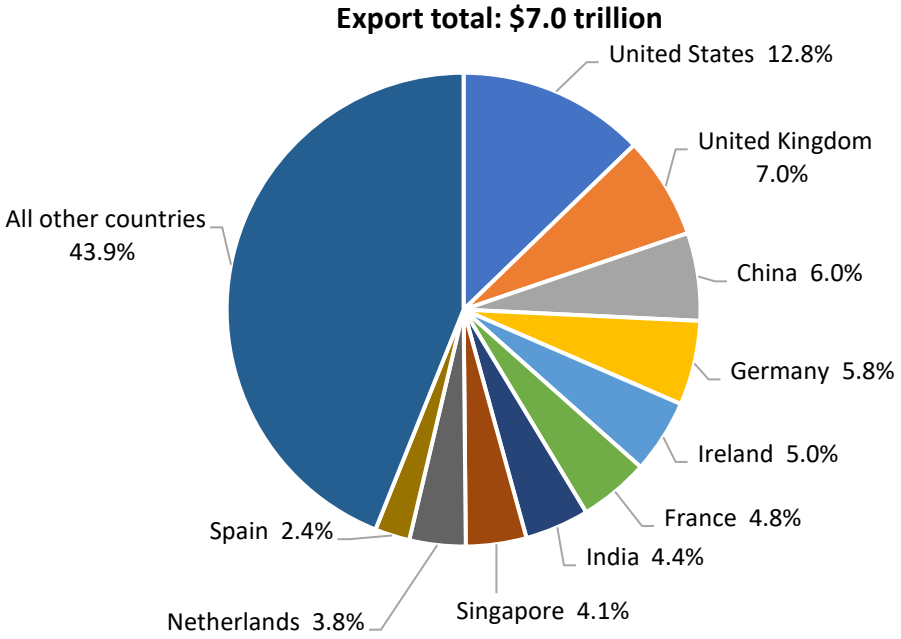
Global Services Trade

The United States was the world's largest cross-border exporter of commercial services in 2022, supplying $900 billion (12.8 percent) of global services exports. Other leading services exporters were the United Kingdom (UK) (7.0 percent), China (6.0 percent), Germany (5.8 percent), and Ireland (5.0 percent); see figure 1.2. The United States was also the largest global importer of services, representing 10.3 percent ($671.4 billion) of total cross-border services imports in 2022. Other leading importers of commercial services included China (7.1 percent), Germany (7.0 percent), Ireland (5.7 percent), and the UK (4.8 percent); see figure 1.3.

[24] USDOC, BEA, table 6.5D, "Full-Time Equivalent Employees, by Industry," September 29, 2023.

Figure 1.2 Global services: Cross-border exports of commercial services, by country, 2022

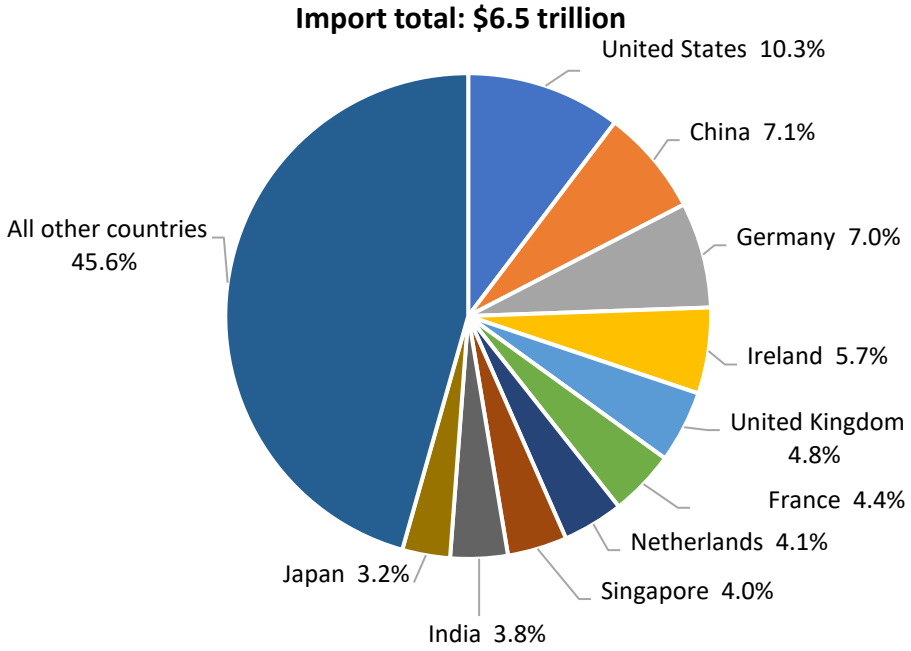
In percentages. Underlying data for this figure can be found in appendix B, table B.2.



Source: WTO, Statistics Database, Time Series on International Trade, "Trade in Commercial Services," July 2023.
Note: Exports of commercial services exclude public sector transactions. Because of difficulty measuring and reporting services trade data, total services exports do not equal total services imports. Because of rounding, figures may not add to 100 percent.

Figure 1.3 Global services: Cross-border imports of commercial services, by country, 2022

In percentages. Underlying data for this figure can be found in appendix B, table B.3.



Source: WTO, Statistics Database, Time Series on International Trade, "Trade in Commercial Services," July 2023.
Note: Imports of commercial services exclude public sector transactions. Because of difficulty measuring and reporting services trade data, total services exports do not equal total services imports. Because of rounding, figures may not add to 100 percent.

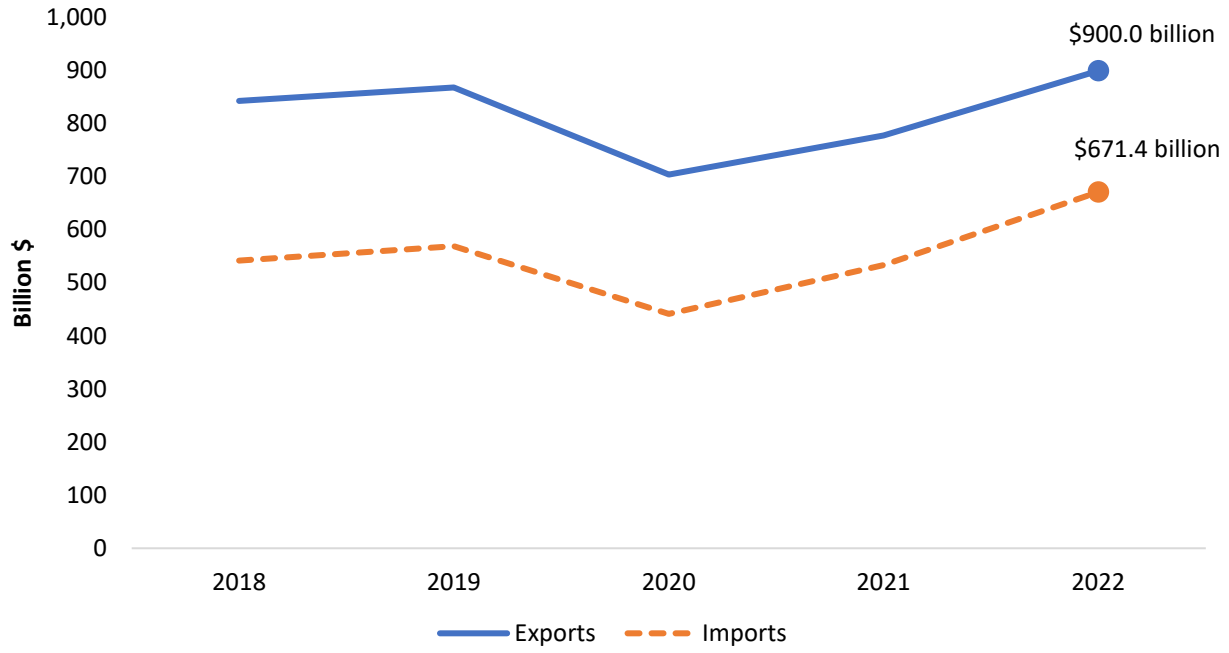
U.S. Cross-Border Services Trade

In 2022, the United States had a cross-border trade surplus of $228.6 billion and was the largest net exporter of commercial services by a wide margin. In 2022, cross-border services exports increased by 15.7 percent to $900 billion, continuing a rebound started in 2021 from a COVID-19 pandemic-related low of $704.3 billion in 2020. U.S. imports of services increased by even more, 25.7 percent to $671.4 billion in 2022, similarly extending a rebound from a 2020 low (figure 1.4).[25]

[25] USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.

Figure 1.4 U.S. services: Cross-border exports and imports, 2018–22

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.4.



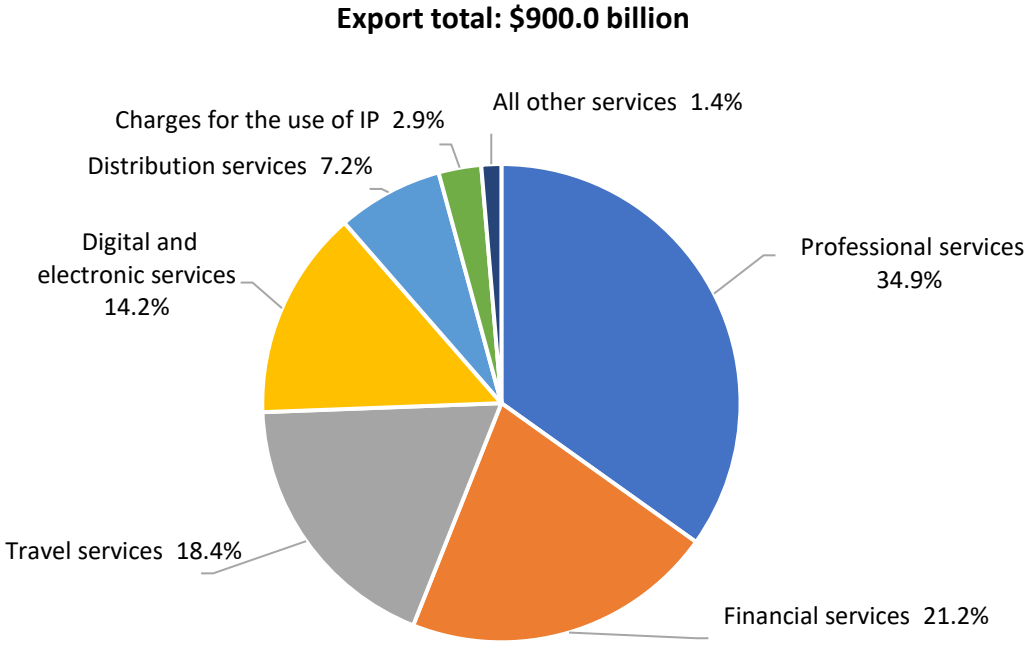
Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.

In 2022, professional services continued to compose the largest share of both U.S. cross-border exports and imports of services.[26] Cross-border exports of professional services during 2022 totaled $313.8 billion, or 34.9 percent of total U.S. cross-border services exports, followed by financial services ($190.4 billion; 21.2 percent) and travel services ($165.5 billion; 18.4 percent); see figure 1.5. Professional services also represented the largest share of U.S. cross-border services imports, accounting for 24.8 percent ($166.6 billion) of such imports in 2022, followed by travel services ($161.9 billion; 24.1 percent) and financial services ($117.2 billion; 17.5 percent); see figure 1.6.

[26] For a comprehensive listing of the services that comprise the broader service categories of financial services, professional services, digital and electronic services, and distribution services, see appendix C.

Figure 1.5 U.S. services: Cross-border exports, by category, 2022

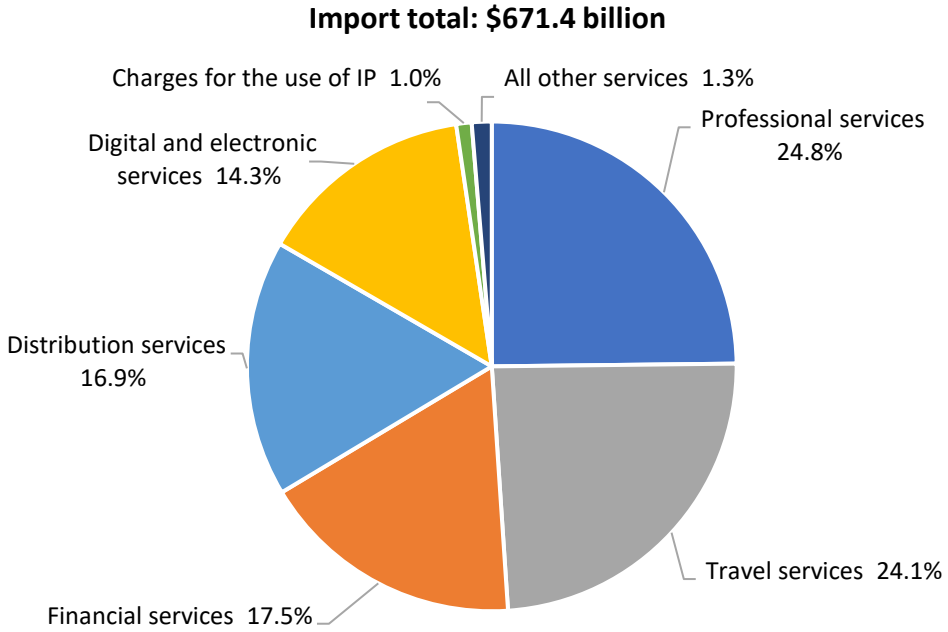
In percentages. IP = Intellectual property. Underlying data for this figure can be found in appendix B, table B.5.



Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Professional services are underreported because of the suppression of data for confidentiality. The "All other services" category includes these suppressed data. Because of rounding, figures may not add to 100 percent.

Figure 1.6 U.S. services: Cross-border imports, by category, 2022

In percentages. IP = Intellectual property. Underlying data for this figure can be found in appendix B, table B.6.



Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Professional services are underreported because of the suppression of data. The "All other services" category includes these suppressed data. Because of rounding, figures may not add to 100 percent.

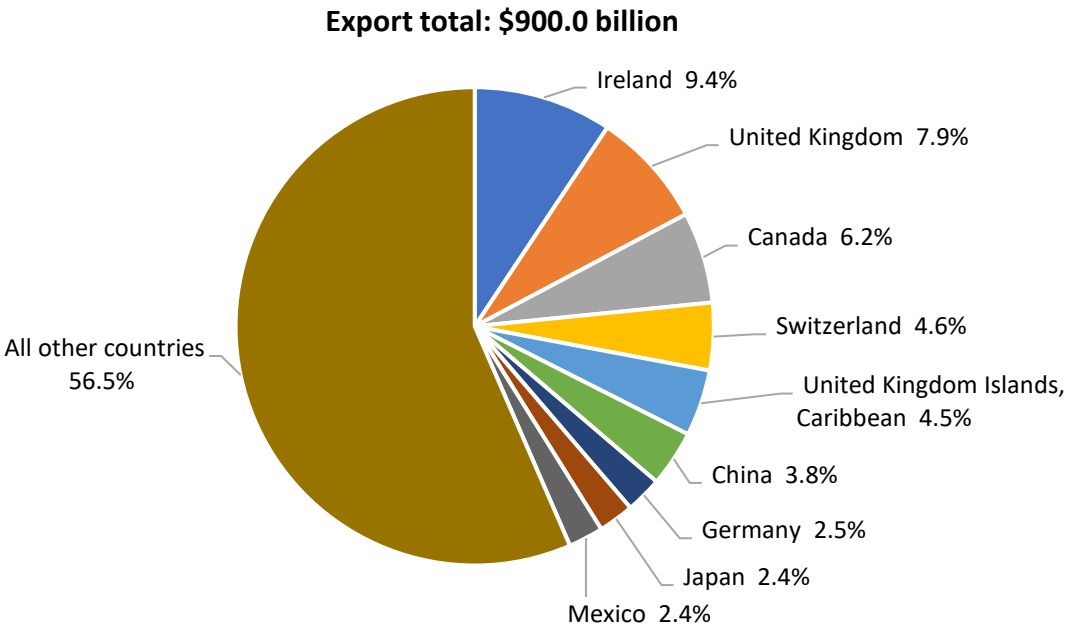
In 2022, all U.S. services categories except one recorded a cross-border trade surplus, with the largest surplus in professional services ($147.1 billion), followed by financial services ($73.2 billion) and digital and electronic services ($31.6 billion). The distribution services category was the only category to register a deficit ($49.3 billion).[27]

In 2022, Ireland was the largest recipient of U.S. cross-border private services exports, totaling $84.3 billion, or 9.4 percent of total U.S. services exports. Other leading recipients of U.S. services exports included the UK ($70.8 billion; 7.9 percent), Canada ($55.6 billion; 6.2 percent), and Switzerland ($41 billion; 4.6 percent); see figure 1.7. In 2022, the largest source of U.S. private services imports was the UK ($72.6 billion; 10.8 percent), followed by Canada ($44.4 billion; 6.6 percent) and Germany ($38.8 billion; 5.8 percent); see figure 1.8.[28]

[27] USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.
[28] USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type of Service," July 6, 2023; USODC, BEA, table 2.3, "U.S. Trade in Services, by Country or Affiliation," July 6, 2023.

Figure 1.7 U.S. services: Cross-border exports, by country, 2022

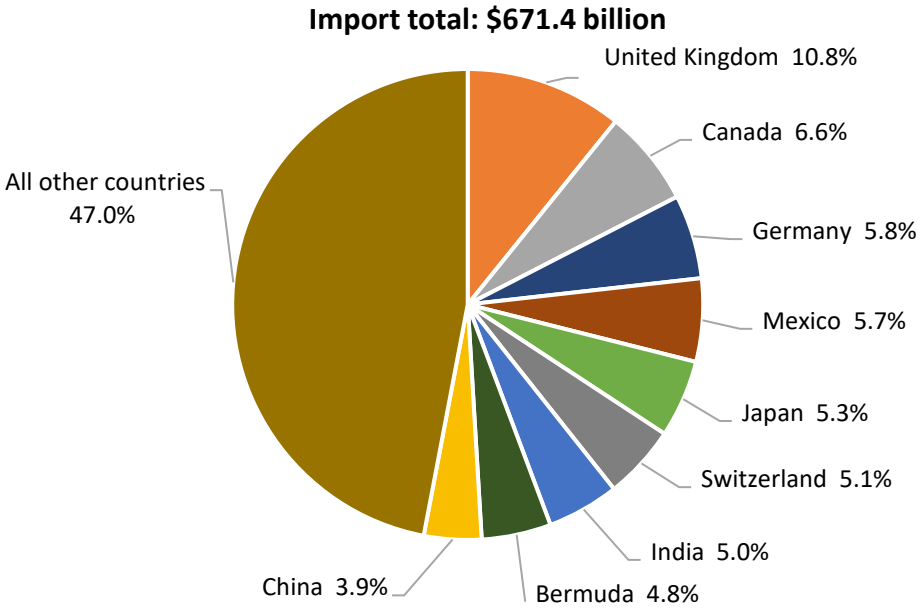
In percentages. Underlying data for this figure can be found in appendix B, table B.7.



Source: USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Notes: Data for government goods and services not included elsewhere for Mexico, Switzerland, India, Bermuda, and South Korea are suppressed. As a result, data presented for those countries are total services trade, which is greater than their private services trade. Because of rounding, figures may not add to 100 percent. The BEA category "United Kingdom Islands, Caribbean" includes the following UK overseas territories: the British Virgin Islands, the Cayman Islands, Montserrat, and the Turks and Caicos Islands.

Figure 1.8 U.S. services: Cross-border imports, by country, 2022

In percentages. Underlying data for this figure can be found in appendix B, table B.8.



Source: USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Data for government goods and services not included elsewhere for Mexico, Switzerland, India, Bermuda, and South Korea are suppressed. As a result, data presented for those countries are total services trade, which is greater than their private services trade. Because of rounding, figures may not add to 100 percent.

Cross-Border Trade: Preliminary 2023 Data

In addition to the cross-border trade data presented above for 2022, preliminary cross-border services trade data are also available for 2023.[29] Preliminary data on U.S. cross-border services trade for 2023 show that total private services exports were 7.3 percent higher in 2023 compared to 2022 (table 1.1). During this period, exports in most sectors experienced small growth. The most notable increase was in travel and passenger fares, for which exports increased by 28.8 percent. Other sectors with the largest increases in exports during this period included telecommunications, computer, and information services (9.0 percent increase) and technical, trade-related, and other business services (7.6 percent increase). In contrast, sea transport services and other services, not included elsewhere (n.i.e.), saw decreases in exports between 2022 and 2023 (−7.3 percent and −0.9 percent, respectively).[30]

[29] These data include more aggregated services categories than the individual distribution services categories presented in chapter 2 of this report.
[30] USDOC, BEA, table 3.1, "U.S. International Trade in Services," March 21, 2024.

Table 1.1 Total U.S. private cross-border services exports (preliminary), by category, 2022–23
In billions of dollars. n.i.e. = not included elsewhere.

Services category	2022	2023
Travel and passenger fares	165.5	213.1
Financial services	167.7	174.8
Professional and management consulting services	143.6	145.7
Telecommunications, computer, and information services	66.2	72.2
Research and development services	57.8	58.3
Technical, trade-related, and other business services	43.9	47.2
Air transport (excludes passenger fares)	36.2	36.6
Personal, cultural, and recreational services	26.8	27.6
Insurance services	22.7	24.0
Sea transport	21.0	19.4
Other services, n.i.e.	148.7	147.4
Total cross-border exports	900.0	966.1

Source: USDOC, BEA, table 3.1, "U.S. International Trade in Services," March 21, 2024.

Preliminary data on U.S. cross-border services imports in 2023 also show moderate increases in sector-specific imports compared to 2022 (table 1.2). Travel and passenger fares posted the largest growth in imports (33.0 percent), followed by professional and management consulting services (6.5 percent) and financial services (6.0 percent). Several import categories decreased, with the largest decreases in sea transport (−41.6 percent), other services, not included elsewhere (n.i.e.) (−13.0 percent), and air transport (−4.8 percent).

Table 1.2 Total U.S. private cross-border services imports (preliminary), by category, 2022–23
In billions of dollars. n.i.e. = not included elsewhere.

Services category	2022	2023
Travel and passenger fares	161.9	215.4
Professional and management consulting services	66.9	71.2
Financial services	57.7	61.2
Insurance services	59.5	58.4
Telecommunications, computer, and information services	53.6	55.5
Sea transport	76.3	44.6
Technical, trade-related, and other business services	37.5	37.9
Research and development services	33.6	33.6
Personal, cultural, and recreational services	29.6	31.3
Air transport (excludes passenger fares)	30.4	29.0
Other services, n.i.e.	64.2	55.9
Total cross-border imports	671.4	694.1

Source: USDOC, BEA, table 3.1, "U.S. International Trade in Services," March 21, 2024.

Affiliate Transactions

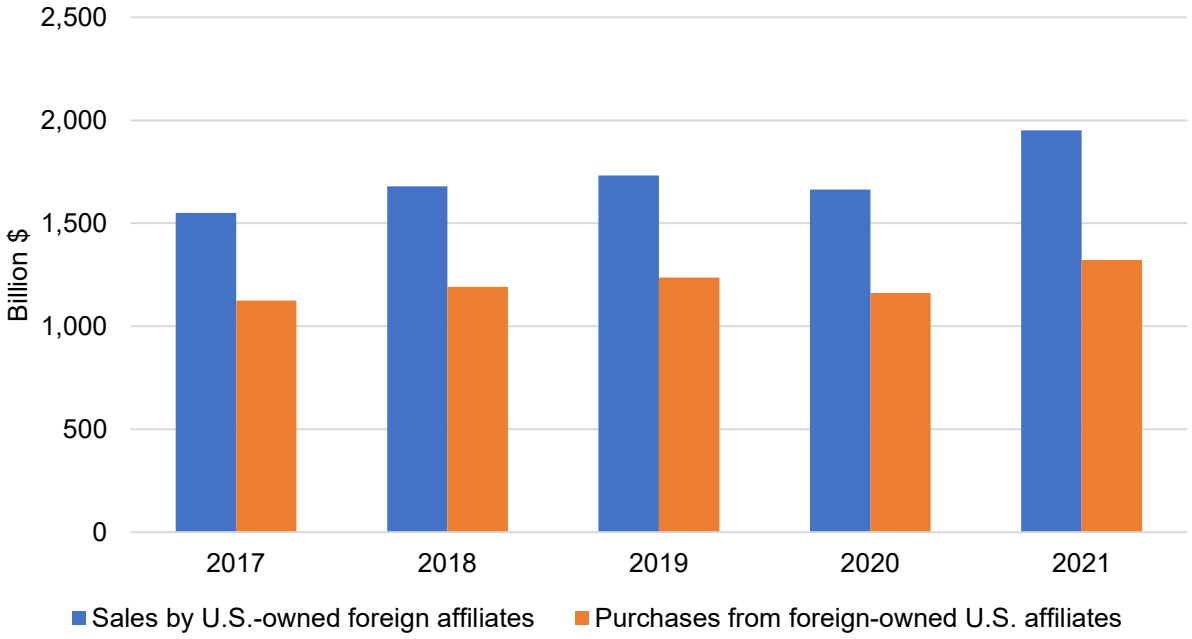
Sales of services by the affiliates of U.S. companies abroad exceeded purchases within the United States from the affiliates of foreign companies in every year from 2017 through 2021, the last year for which such data are available.[31] During this period, sales of U.S. affiliates abroad increased at an average annual rate of 5.2 percent from $1.5 trillion in 2017 to $2.0 trillion in 2021. Such sales dipped slightly in

[31] For affiliate transactions, sales of services by U.S. affiliates abroad are treated as services exports, while purchases from the affiliates of foreign firms in the United State are treated as services imports.

2020, likely because of COVID-19 pandemic-related effects. Similarly, purchases from the affiliates of foreign firms in the United States grew at an average annual rate of 3.5 percent from $1.1 trillion in 2017 to $1.3 trillion in 2021. Like affiliate sales, affiliate purchases also declined slightly in 2020 (figure 1.9).[32]

Figure 1.9 U.S. services: Affiliate sales and purchases, 2017–21

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.9.



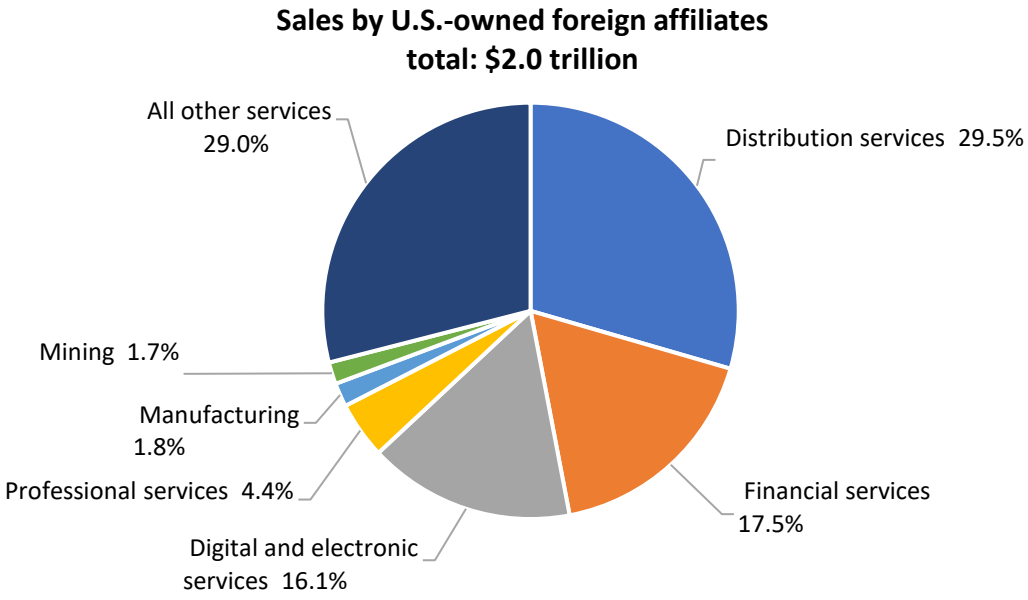
Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs Through Their MOFAs," October 5, 2023; table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.
Note: MNEs = multinational enterprises. Sales by U.S.-owned foreign affiliates include services supplied by majority-owned foreign affiliates of U.S. parent firms. Purchases from foreign-owned U.S. affiliates include services supplied by majority-owned U.S. affiliates of foreign parent firms.

[32] USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs," October 5, 2023; table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.

In 2021, distribution services accounted for the largest share of U.S.-owned foreign affiliates sales, amounting to $575.5 billion, or 29.5 percent of total foreign affiliate sales, followed by financial services ($341.7 billion; 17.5 percent) and digital and electronic services ($313.4 billion; 16.1 percent); see figure 1.10.[33] The top markets for the sales of services through U.S. affiliates abroad were the UK ($317.2 billion), Ireland ($190.0 billion), and Canada ($146.8 billion).[34]

Figure 1.10 U.S. services: Affiliate sales by U.S.-owned foreign affiliates, by industry, 2021

In percentages. Underlying data for this figure can be found in appendix B, table B.10.



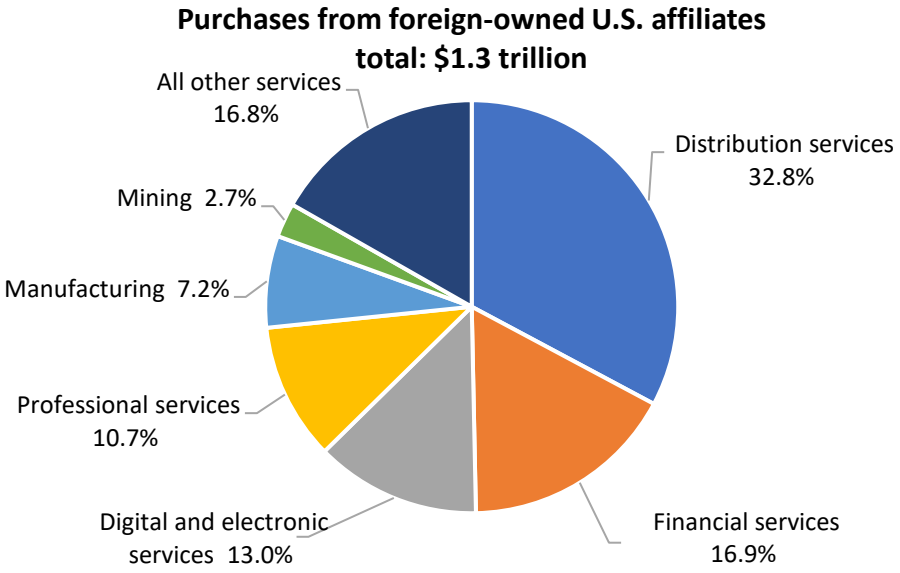
Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs," October 5, 2023.
Note: "Manufacturing" includes ancillary services provided by goods manufacturers. Other services include services supplied by majority-owned foreign affiliates of U.S. parent firms. Digital and electronic services, and professional services are underreported because of suppression of data. The "All other services" category includes suppressed data. MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates. Because of rounding, figures may not add to 100 percent.

Purchases of services from affiliates in the distribution services sector accounted for the largest share of purchases from foreign-owned affiliates in the United States in 2021, with such purchases totaling $433.7 billion, or 32.8 percent of total foreign affiliate purchases. In that same year, financial services represented $223.1 billion (16.9 percent) of total affiliate purchases, whereas digital and electronic services totaled $171.4 billion (13 percent); see figure 1.11. German companies with U.S.-based affiliates were the largest source of foreign affiliate purchases in 2021 ($196.3 billion), followed by UK-owned affiliates ($172.2 billion) and Canadian-owned affiliates ($165 billion).[35]

[33] For a comprehensive listing of the services that compose the broader service categories of financial services, professional services, digital and electronic services, and distribution services, see appendix C.
[34] USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs Through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5, 2023.
[35] USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.

Figure 1.11 U.S. services: Purchases from foreign-owned U.S. affiliates, by industry, 2021

In percentages. Underlying data for this figure can be found in appendix B, table B.11.



Source: USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs, " October 5, 2023.
Notes: Digital and electronic services are underreported because of the suppression of data. The "All other services" category includes suppressed data. "Manufacturing" includes ancillary services provided by goods manufacturers. "Other" includes ancillary services provided in the mining, agriculture, and other sectors, as well as suppressed data. Beginning with the 2018 *Recent Trends in U.S. Services Trade* report, software publishing was reallocated from "Other Services" to "Digital and Electronic Services" to better reflect the industry composition. Therefore, digital and electronic services data in this report, and in all *Recent Trends* reports published in 2018 and later, cannot be directly compared with such data in USITC reports published before 2018. MNEs = multinational enterprises. Because of rounding, figures may not add to 100 percent.

Bibliography

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Annual Update of the U.S. International Transactions Accounts." *Survey of Current Business* 102, no. 7 (July 2022). https://apps.bea.gov/scb/issues/2022/07-july/pdf/0722-annual-international-transactions.pdf.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). Table 1.1. "U.S. International Transactions." International Transactions, International Services and International Investment Position Tables, September 22, 2022. https://apps.bea.gov/iTable/?ReqID=62&step=1#eyJhcHBpZCI6NjIsInN0ZXBzIjpbMSwyLDYsNl0sImRhdGEiOltbIlByb2R1Y3QiLCIxIl0sWyJUYWJsZUxpc3QiLCIxIl0sWyJGaWx0ZXJfIzEiLFsiMSIsIjIiLCIziwiNCIsIjUiXV0sWyJGaWx0ZXJfIzIiLFsiMSJdXSxbIkZpbHRlcl8jMyIsWyIwIl1dLFsiRmlsdGVyXyM0IixbIjAiXV0sWyJGaWx0ZXJfIzUiLFsiMCJdXV19.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "How Are BEA's Statistics on the Activities of U.S. Multinational Enterprises (MNEs) Affected by the Complex Corporate Structures of MNEs," January 23, 2020. https://www.bea.gov/help/faq/1402.

U.S. Department of Commerce (USDOC), Bureau of Economic Analysis (BEA). "The Basics of How International Services Are Supplied and Received by the United States." International Services, October 19, 2022. https://apps.bea.gov/scb/issues/2022/10-october/1022-international-services-supply-types.htm.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Real Value Added by Industry," September 28, 2023. https://apps.bea.gov/iTable/?reqid=150&step=2&isuri=1&categories=gdpxind&_gl=1*yluslj*_ga*Mjg0ODU2NzYyLjE3MDc1MzExMjc.*_ga_J4698JNNFT*MTcwNzUzMTE2MC4xLjAuMTcwNzUzMTE2MC42MC4wLjA.#eyJhcHBpZCI6MTUwLCJzdGVwcyI6WzEsMiwzXSwiZGF0YSI6W1siY2F0ZWdvcmllcyIsIkdkcHhJbmQiXSxbIlRhYmxlX0xpc3QiLCIxIl1dfQ==

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Real Value Added by Industry," December 21, 2023. https://apps.bea.gov/iTable/iTable.cfm?reqid=150&step=2&isuri=1&categories=gdpxind.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). Table 2.1. "U.S. Trade in Services, by Type of Service," July 6, 2023. https://apps.bea.gov/iTable/iTable.cfm?ReqID=62&step=1.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). Table 2.2. "U.S. Trade in Services, by Type of Service and by Country or Affiliation," July 6, 2023. https://apps.bea.gov/iTable/iTable.cfm?ReqID=62&step=1.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). Table 2.2. "U.S. Trade in Services, by Type of Service and by Country or Affiliation," July 6, 2023. https://apps.bea.gov/iTable/iTable.cfm?ReqID=62&step=1.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). Table 3.1. "U.S. International Trade in Services," December 20, 2023. https://apps.bea.gov/iTable/?reqid=62&step=6&isuri=1&tablelist=51&product=1.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). Table 4.1. "Services Supplied to Foreign Persons by U.S. MNEs Through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5, 2023. https://apps.bea.gov/iTable/iTable.cfm?ReqID=62&step=1.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). Table 5.1. "Services Supplied to U.S. Persons by Foreign MNEs Through Their MOUSAs, by Industry of Affiliate and by Country of UBO," October 5, 2023. https://apps.bea.gov/iTable/iTable.cfm?ReqID=62&step=1.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Table 6.5D. Full-Time Equivalent Employees, by Industry," September 29, 2023. https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "U.S. International Economic Accounts: Concepts and Methods," June 2022. https://www.bea.gov/international/concepts_methods.htm.

Walmart. "Walmart Insurance Services." Accessed February 13, 2024. https://www.walmart.com/cp/walmart-insurance-services/8910931.

World Trade Organization (WTO). "Basic Purposes and Concepts." Accessed January 11, 2023. https://www.wto.org/english/tratop_e/serv_e/cbt_course_e/c1s3p1_e.htm.

World Trade Organization (WTO). "FATS-Sales by Service Sector (Outward)." *WTO STATS*. Accessed January 4, 2023. https://stats.wto.org/.

World Trade Organization (WTO). "Trade in Commercial Services." *WTO STATS*. Accessed February 5, 2024. https://stats.wto.org/.

World Trade Organization (WTO). *World Trade Statistical Review 2022.* August 31, 2022. https://www.wto.org/english/res_e/booksp_e/wtsr_2022_c4_e.pdf.

Chapter 2
Financial Services

Overview

A well-developed financial services sector is essential to the global economy and commerce. It promotes economic efficiency, lowers the cost of transactions, directs savings to economically productive activities, and facilitates international trade. Thus, the financial services sector provides the economic infrastructure necessary for a modern economy to function.[36]

The financial services sector comprises a broad range of financial services providers. They are responsible for facilitating monetary transactions; lending to consumers and firms; mobilizing and managing savings; providing liquidity in debt and equity capital markets;[37] advising and underwriting corporate finance transactions; and developing instruments that manage risk. Generally, these providers are included within two main categories: financial intermediaries and direct finance institutions. Financial intermediaries include deposit-taking entities like banks, thrifts, and savings institutions. Other financial intermediaries are nonbank entities, such as insurance, leasing, and investment companies. Both types of financial intermediaries facilitate flows of funds between individuals or entities with excess funds and borrowers who need funds. Direct finance institutions, mainly brokerage and securities firms, operate in capital markets by facilitating direct transactions between the providers and users of funds, mainly by underwriting and selling bonds and equities.[38] This report focuses primarily on the banking, insurance, and securities industries.[39]

Financial services consumers encompass a broad spectrum of individuals, businesses, and governments, each with unique needs and preferences. Household consumers use financial services to finance the purchase of goods and services, manage their wealth and savings, and mitigate risk via insurance products. Commercial enterprises rely on a wide range of financial products that manage cash flow, raise capital, facilitate transactions, and mitigate risk. Advances in digital technology have broadened both household and business consumer bases by expanding convenience and accessibility in financial services.[40] The globalization of financial markets led to an increase in cross-border transactions, attracting consumers who require international banking services, foreign exchange solutions, and investment opportunities beyond their domestic markets.[41]

---

[36] World Bank, "Financial Sector," accessed March 1, 2024; SF Fed, "Please Explain How . . . Economic Performance," January 1, 2005.
[37] Financial services firms that provide liquidity to debt and equity capital markets are known as "market makers." Citadel Securities, "What Is a Market Maker?," accessed December 7, 2023. For more information on market-making services, see box 2.1.
[38] Dobson, *Financial Services and International Trade Agreements*, in *A Handbook of International Trade in Services,* 2008, 289–90.
[39] For a listing of the services that financial services comprise, see appendix C.
[40] Czímer et al., "The Future of Banks: A $20 Trillion Opportunity," December 20, 2022.
[41] JPMorgan Chase, "Three Megatrends Disrupting the Cross-Border Payments Landscape," October 6, 2021.

Cross-Border Exports and Imports

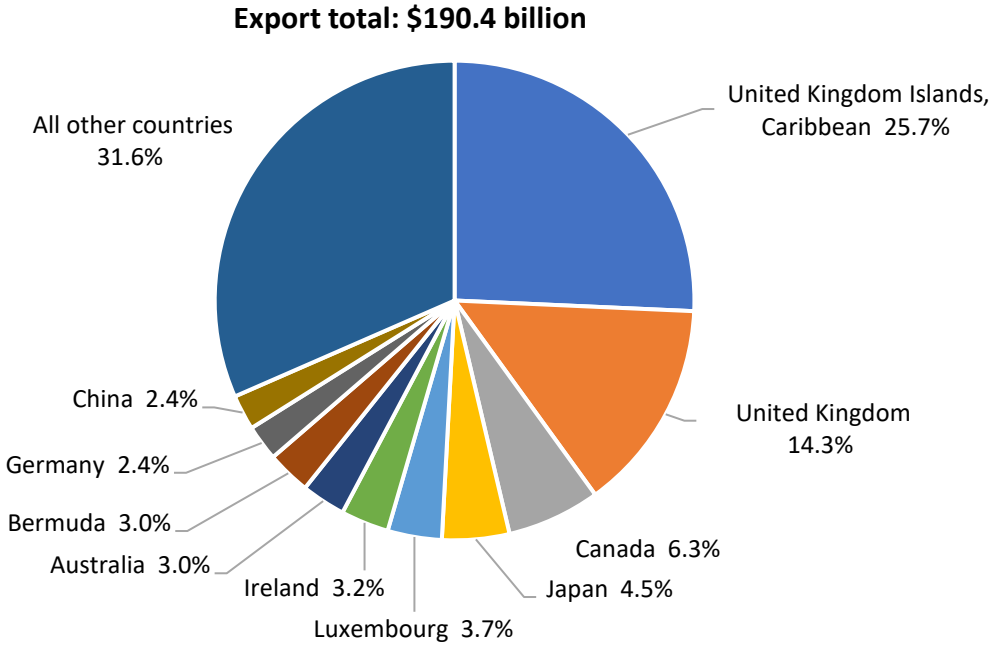
Looking at cross-border trade, BEA data on financial services encompass banking services (financial management, financial advisory, custody services, credit card services, and other credit-related services); insurance services (direct insurance, reinsurance, and auxiliary insurance); and securities services (securities brokerage, underwriting). The broad financial services category also covers securities lending, electronic funds transfer, and other related services.

In 2022, U.S. cross-border exports of financial services, totaling $190.4 billion, represented 21.2 percent of all U.S. cross-border services exports, a 2 percent decline in value from 2021. Collectively, several United Kingdom (UK) Caribbean territories (the British Virgin Islands, the Cayman Islands, Montserrat, and the Turks and Caicos Islands), were the destination for 25.7 percent of U.S. financial services exports in 2022 (figure 2.1).[42] U.S. financial services exports to the UK Caribbean territories likely consist of financial transactions services, brokerage, and other financial management services.[43] The Cayman Islands, for instance, reportedly offers favorable regulations, streamlined company registration procedures, and zero percent taxation rates for most types of income, including earned income and corporate income.[44] Other leading destinations for U.S. exports of financial services include the UK (14.3 percent), Canada (6.3 percent), Japan (4.5 percent), and Luxembourg (3.7 percent); see figure 2.1.

[42] This report will refer to the British Caribbean islands and territories as the "UK Caribbean territories" or "UK Caribbean islands" to remain consistent with BEA services terminology. Bermuda is a UK overseas territory; the BEA presents transactions with Bermuda separately from the UK to allow for more granular geographic detail. For more detail on BEA country classifications, see USDOC, BEA, "Guide to Reporting Countries on BEA Surveys," accessed March 1, 2024.
[43] Campbell, "Offshore Financial Centres in the Caribbean," In *Money Laundering, Terrorist Financing, and Tax Evasion,* 2021, 11–64; Fichtner, "The Cayman Conundrum," November 11, 2017. CIMA, "Regulated Sectors," accessed February 13, 2024.
[44] Dunne, "Doing Business in Cayman Islands," accessed February 12, 2024.

Figure 2.1 Financial services: U.S. cross-border exports, by country, 2022

In percentages. Underlying data for this figure can be found in appendix B, table B.12.



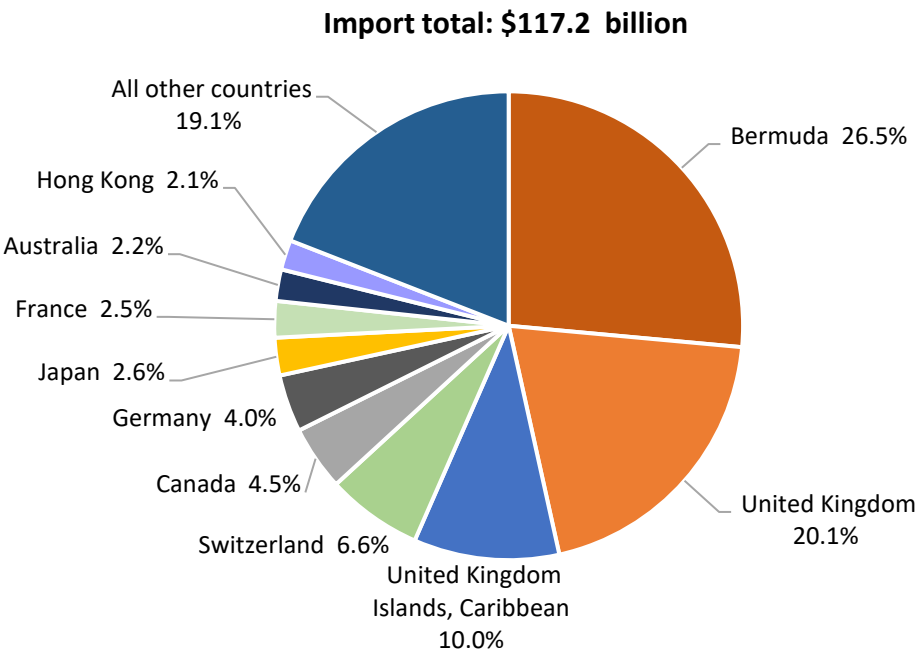
Source: USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type," July 6, 2023.
Note: Financial services as defined in this report is composed of data from both the insurance services and financial services categories as defined by the U.S. Bureau of Economic Analysis (BEA). The BEA category "United Kingdom Islands, Caribbean" includes the following UK Caribbean territories: the British Virgin Islands, the Cayman Islands, Montserrat, and the Turks and Caicos Islands. The BEA lists Bermuda, one of the UK overseas territories, as a separate category. Because of rounding, figures may not add to 100 percent.

In 2022, U.S. cross-border imports of financial services increased by 6.6 percent to $117.2 billion compared to 2021 and accounted for 17.5 percent of total U.S. cross-border services imports. Top sources of cross-border imports in 2022 included Bermuda (26.5 percent), the UK (20.1 percent), the UK Caribbean territories (10 percent), Switzerland (6.6 percent), and Canada (4.5 percent); see figure 2.2.[45] Overall, the United States recorded a cross-border financial services trade surplus of $73.2 billion in 2022, because U.S. cross-border exports of financial services exceeded imports of these same services by a wide margin.

[45] USDOC, BEA, table 2.3, "U.S. Trade in Services, by Country or Affiliation," July 6, 2023. Imports from Bermuda are primarily insurance services; exports to the UK Caribbean territories are primarily noninsurance financial services.

Figure 2.2 Financial services: U.S. cross-border imports, by country, 2022

In percentages. Underlying data for this figure can be found in appendix B, table B.13.

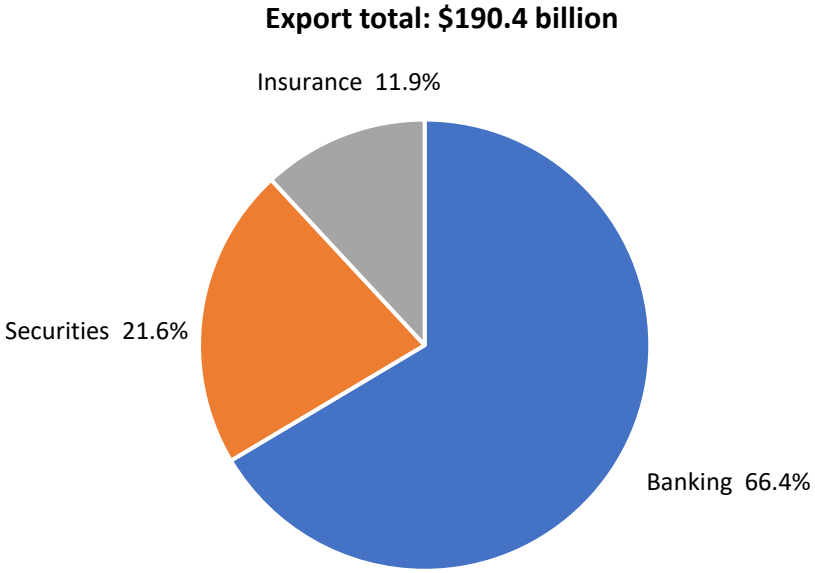


Source: USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Financial services as defined in this report is composed of data from both the insurance services and financial services categories as defined by the U.S. Bureau of Economic Analysis (BEA). The BEA category "United Kingdom Islands, Caribbean" includes the following UK Caribbean territories: the British Virgin Islands, the Cayman Islands, Montserrat, and the Turks and Caicos Islands. The BEA lists Bermuda, one of the UK overseas territories, as a separate category. Because of rounding, figures may not add to 100 percent.

In 2022, banking services accounted for the largest share of U.S. exports of financial services (66.4 percent), followed by securities services (21.6 percent), and insurance services (11.9 percent); see figure 2.3. By contrast, insurance services accounted for the largest share (50.8 percent) of U.S. cross-border imports of financial services, followed by banking services (38.3 percent) and securities services (10.9 percent); see figure 2.4.

Figure 2.3 Financial services: U.S. cross-border exports, by industry, 2022

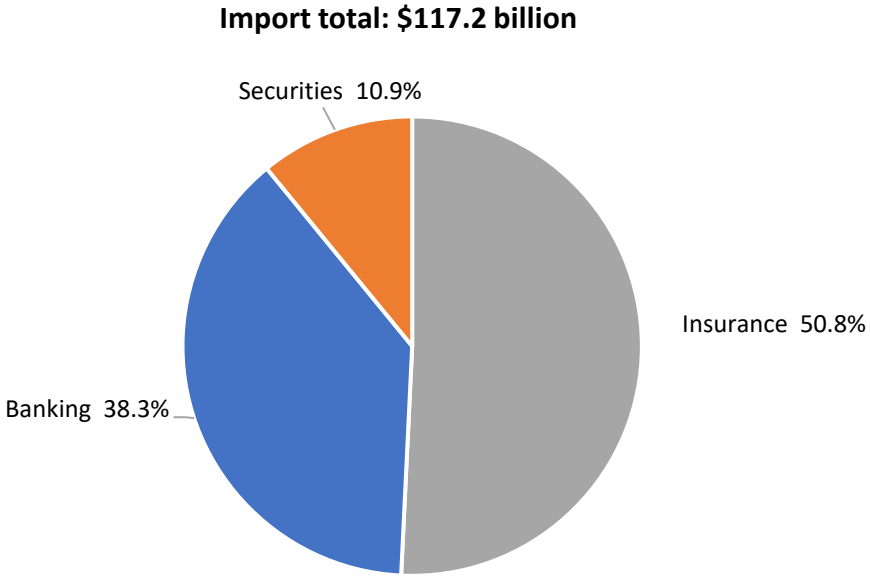
In percentages. Underlying data for this figure can be found in appendix B, table B.14.



Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Financial services as defined in this report is composed of data from both the insurance services and financial services categories as defined by the U.S. Bureau of Economic Analysis (BEA). Because of rounding, figures may not add to 100 percent.

Figure 2.4 Financial services: U.S. cross-border imports, by industry, 2022

In percentages. Underlying data for this figure can be found in appendix B, table B.15.



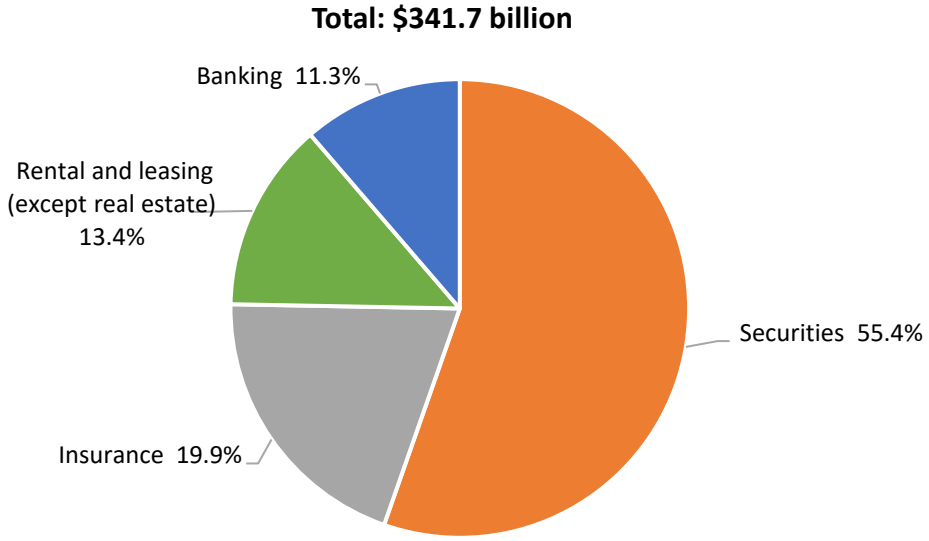
Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Financial services as defined in this report comprise data from both the insurance services and financial services categories as defined by the U.S. Bureau of Economic Analysis (BEA). Because of rounding, figures may not add to 100 percent.

Foreign Affiliate Sales[46]

In 2021, the latest year for which data were available, sales of financial services by U.S.-owned foreign affiliates abroad totaled $341.7 billion, whereas purchases of such services from foreign-owned affiliates in the United States were $223.1 billion. During 2021, securities services accounted for the largest share of U.S.-owned foreign affiliate sales (55.4 percent), followed by insurance services (19.9 percent); see figure 2.5. Insurance services represented the largest share of purchases from foreign-owned U.S. affiliates (37.6 percent); securities services were the second-largest share of affiliate purchases (37.4 percent); see figure 2.6).

Figure 2.5 Financial services: Sales by U.S.-owned foreign affiliates, by industry, 2021

In percentages. Underlying data for this figure can be found in appendix B, table B.16.

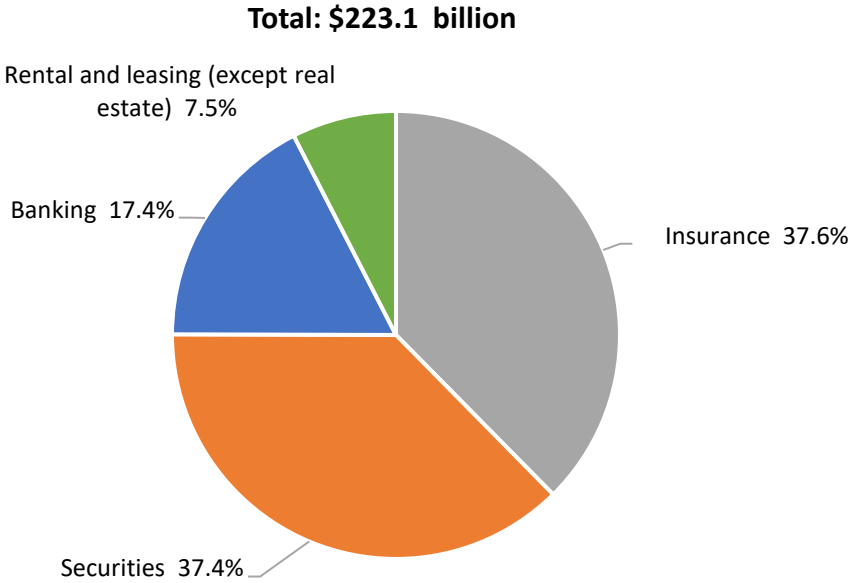


Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs Through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5, 2023.
Note: MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates.

[46] For the purposes of this report, affiliate sales and purchases of financial services encompass the following BEA categories: Finance and insurance services, including depository credit intermediation (banking) and insurance carriers and related activities, and rental and leasing services (except real estate).

Figure 2.6 Financial services: Purchases from foreign-owned U.S. affiliates, by industry, 2021

In percentages. Underlying data for this figure can be found in appendix B, table B.17.



Source: USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.
Note: MNEs = multinational enterprises. Because of rounding, figures may not add to 100 percent.

Financial Services by Sector: Background, Definitions, and Trade Trends

This section provides background on the banking, insurance, and securities industries. They are represented in both cross-border trade and affiliate transactions data above. Rental and leasing (except real estate) are included only in affiliate transactions data. This section also presents international trade data for these subsectors of financial services. A special topic section at the end of this chapter gives background on the rise in global inflation and interest rates since 2021 and the impact that it had on both subsectors. More focused discussions of recent developments and trends in several of these subsectors are described in chapters 3 and 4. Additional detail on services trade—including data on the industry composition of U.S. services trade with major trading partners, and data on U.S. trade in services industries not covered in this report—is available in the interactive tables accompanying this report.[47]

Banking Services

The banking industry provides a variety of services, including deposit-taking, lending, and fee-based services.[48] Banks are generally categorized into three segments: retail banks, commercial banks, and

[47] Interactive charts and alternative text are available at: https://www.usitc.gov/publications/industry_econ_analysis_332/2024/recent_trends_us_services_trade_2024_annual_report.

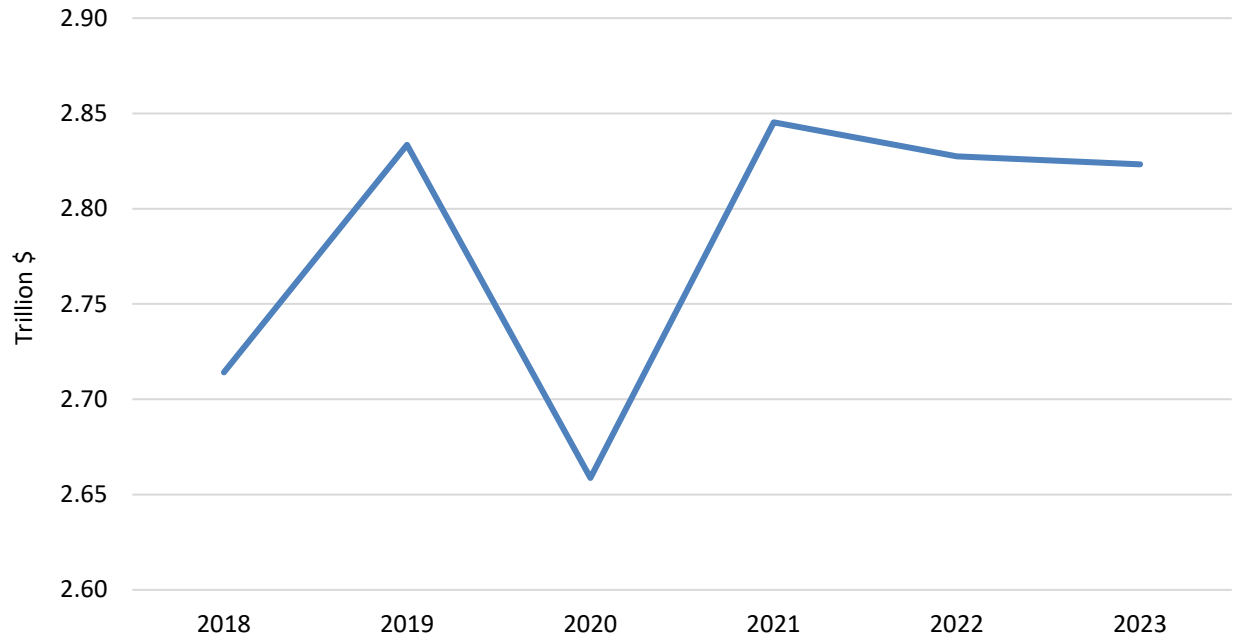
[48] Fee-based banking services include financial management and transaction services, advisory services, custody services, credit card services, and other credit-related services.

investment banks. Retail and commercial banks are distinguished by their target consumers—either individual customers (retail banks) or businesses (commercial banks)—and provide traditional services like deposit-taking, providing loans, transaction services, and credit cards. Investment banks generally provide securities-related services like underwriting, dealing, and brokerage to companies and institutional investors. This section focuses on the retail and commercial banking industry, while investment banking is covered in the securities sections of this chapter.

According to industry sources, global banking revenues increased at an average annual rate of 0.8 percent during 2018–23, reaching $2.8 trillion despite a steep decline in 2020 from pandemic-related effects (figure 2.7).[49]

Figure 2.7 Global banking revenues, 2018–23

In trillions of dollars. Underlying data for this figure can be found in appendix B, table B.18.



Source: IBISWorld, *Global Commercial Banks*, September 2023, 60.
Note: Totals include revenues for retail and commercial banking services; revenues for 2023 are estimates.

Geographically, North America accounted for about 30 percent of global banking services revenue in 2022 (the most recent year available), the largest share by geographic region. North Asia and Europe were the next largest, each with shares of about 25 percent.[50] In terms of assets, China was the global banking leader in 2022 with $47.2 trillion, followed by the United States ($30.3 trillion), Japan ($17.7 trillion), and the UK ($16.9 trillion).[51]

The top four global banks in 2023, measured by total revenue, were Wells Fargo (12 percent of global banking revenue), JPMorgan Chase (8.7 percent), Bank of America (8.1 percent), and Industrial and

[49] Estimates of revenues include retail and commercial banking services. *Global Commercial Banks*, September 2023.
[50] North Asia includes China, Japan, and South Korea. IBISWorld, *Global Commercial Banks*, September 2023, 36.
[51] Financial Stability Board, *Global Monitoring Report on Non-Bank Financial Intermediation 2023*, December 18, 2023.

Commercial Bank of China (3.9 percent); see table 2.1. Overall, the share of global banking revenues generated by these four firms increased from 10.5 percent in 2022 to 32.8 percent in 2023, reportedly boosted by technology improvements that reduced costs and expanded operations for large banks as a result of economies of scale.[52]

Table 2.1 Top four global banks by revenue, 2023
In billions of dollars, percentages, and trillions of dollars.

Bank	Country	Global revenue (billion $)	Global revenue share (%)	Total assets as of 2022 (trillion $)
Wells Fargo	United States	338.9	12	1.9
JPMorgan Chase	United States	246.7	8.7	3.7
Bank of America	United States	229.4	8.1	3.1
Industrial and Commercial Bank of China	China	110.3	3.9	5.7

Source: IBISWorld, *Global Commercial Banks*, September 2023, 47; Khan et al., *The World's 100 Largest Banks, 2023*, April 26, 2023.

[52] IBISWorld, *Global Commercial Banks*, September 2023.

Box 2.1 Recent Additions to BEA Financial Services Trade Data

In June 2020, BEA added estimates of financial intermediation services indirectly measured (FISIM) and market-making services to its financial services trade data to address coverage gaps.[a]

FISIM quantifies deposit-taking and lending services provided by banks for which no explicit charges are made. Financial institutions generate revenue in part by charging higher interest rates for the loans that they provide than the interest rate that they pay depositors, as well as by charging explicit fees for banking services such as electronic transfers and credit card services. However, banks charge nonbank customers a higher interest rate for loans and pay nonbank customers a lower interest rates for their deposits than they would other financial firms. The difference between the rates that banks charge other banks, known as the reference rate,[b] and what they charge nonbank customers is considered the *implicit* charge for the services that firms provide nonbank customers, such as record keeping, safekeeping, payment processing, risk management, advice, and liquidity (the ability to access cash whenever they need it).[c] In the context of international trade, the U.S. exports FISIM when U.S. banks make loans and hold deposits for foreign customers, and imports FISIM when foreign banks make loans or hold deposits for U.S. customers.[d]

Market-making services are a type of securities service that involves buying and selling securities. Earnings from market-making services are measured as the margins on buying and selling both equity and debt securities. Typically, financial firms earn revenue by using a bid-ask spread (buying securities at a slightly lower rate and selling them at a slightly higher rate) when they facilitate customer transactions.[e] Financial firms can charge direct and explicit fees for providing brokerage services. They can also earn revenue via implicit service fees when they complete debt and equity transactions on behalf of their customers. Firms that provide these types of services are considered "market-makers" and take on some risk when they hold an asset after it is purchased but before it is sold. These firms make profits with a bid-ask spread as compensation.[f] In the context of international trade, the U.S. exports a market-making service when a U.S. dealer provides debt and equity transactions to a foreign resident, and it imports a market-making service when a foreign dealer provides those transactions to a U.S. resident.

The BEA had not recorded implicit services fees prior to 2020. It now estimates market-making services dating to 2006, and FISIM dating to 1999.[g]

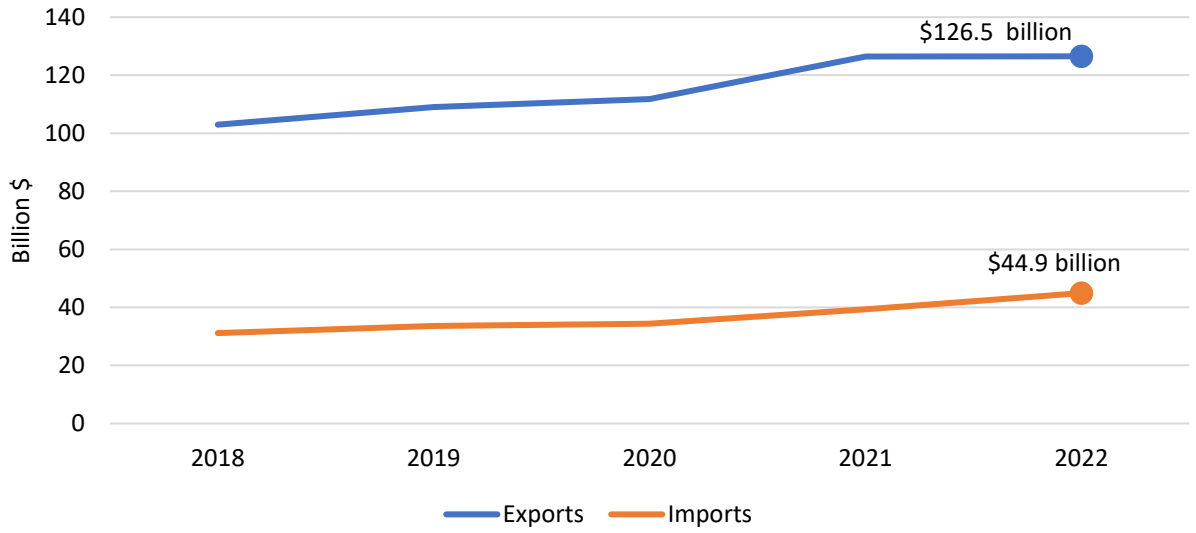
[a] The BEA updated its financial services data after USITC's Recent Trends 2020 report on financial services was published. These data are found in BEA International Transactions table 3.1 and International Services table 2.1. FISIM is also found in BEA International Transactions table 4.1 as interest in "Other investment income." USDOC, BEA, table 3.1, "Table 3.1 U.S. International Trade in Services," March 29, 2024; USDOC, BEA, table 2.1, "Table 2.1 U.S. Trade in Services, by Type of Service," July 6, 2023; USDOC, BEA, table 4.1, "Table 4.1 U.S. International Transactions in Primary Income," March 29, 2024. Telles Jr., Martinez, and Peck, "Annual Update of the U.S. International Transactions Accounts," July 2020.
[b] The reference rate is based on the five-year Treasury rate.
[c] Reinsdorf, Measurement of Implicitly-Priced Output of Commercial Banks, March 2011.
[d] The BEA considers banks to be the primary producers of FISIM in the context of international trade; it does not estimate FISIM if no transacting parties are banks or if both transacting parties are banks. Telles Jr., Martinez, and Peck, "Annual Update of the U.S. International Transactions Accounts," July 2020.
[e] Telles Jr., Martinez, and Peck, "Annual Update of the U.S. International Transactions Accounts," July 2020.
[f] After the 2008 global financial crisis, many governments adopted new regulations to strengthen market-makers and reduce their risk of becoming illiquid, though such regulations may have increased the costs of market-makers' services. Beau, Market-Making and Proprietary Trading, November 2014, 2.
[g] Telles Jr., Martinez, and Peck, "Annual Update of the U.S. International Transactions Accounts," July 2020.

Cross-Border Trade

U.S. cross-border exports of banking services grew at an average annual rate of 5.3 percent from $103 billion in 2018 to $126.5 billion in 2022. Imports of banking services also grew, increasing at an average annual rate of 9.6 percent from $31.1 billion in 2018 to $44.9 billion in 2022 (figure 2.8).

Figure 2.8 Banking: U.S. cross-border exports and imports, 2018–22

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.19.



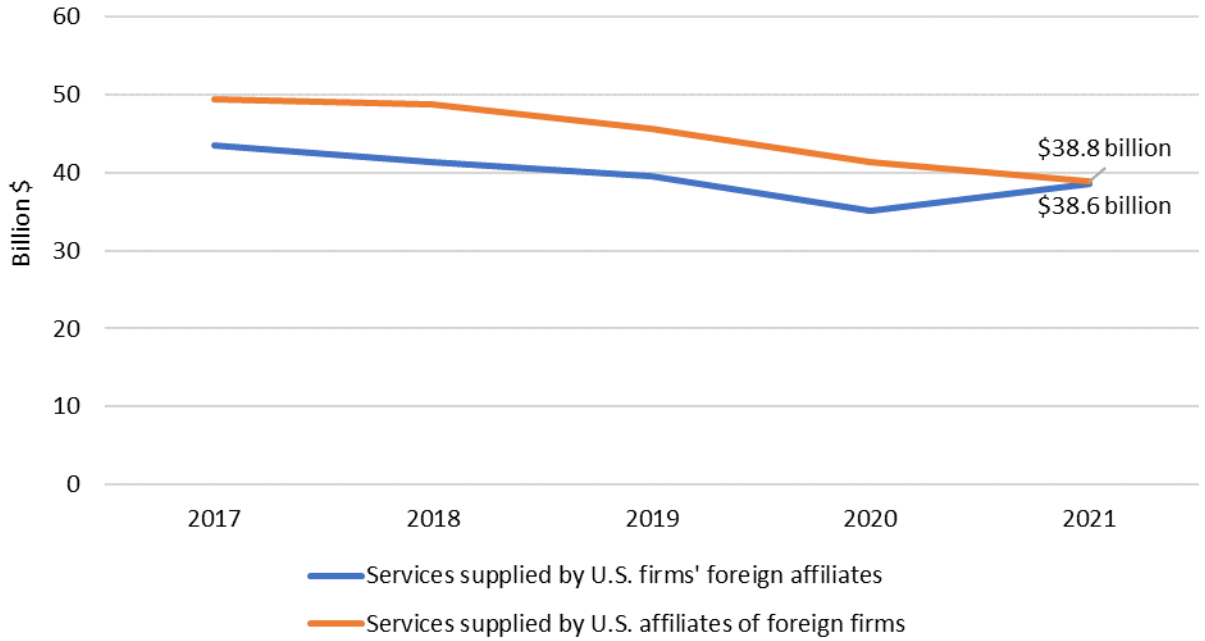
Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.

Affiliate Transactions

During the period examined—from 2017 through 2021—both U.S. affiliate sales abroad and purchases of foreign banking services in the United States declined. Sales of banking services by affiliates of U.S. companies in foreign countries declined at a gradual average annual rate of 2.9 percent, from $43.4 billion in 2017 to $38.6 billion by the end of 2021. Similarly, purchases from affiliates of foreign firms in the United States fell at an average annual rate of 5.9 percent, from $49.5 billion in 2017 to $38.8 billion in 2021 (figure 2.9).

Figure 2.9 Banking: U.S. affiliate sales and purchases, 2017–21

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.20.



Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs," October 5, 2023; USDOC, BEA, table 5.12, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.
Note: MNEs = multinational enterprises.

Insurance Services

The insurance industry plays an integral role in the global economy by enabling individuals and businesses to manage risk. In general, the insurance industry can be grouped into four main segments: life, property and casualty (P&C), reinsurance, and auxiliary services.[53] Typically, insurers underwrite a wide variety of individual and commercial risks—that is, they accept liability and guarantee payment in the case of insured loss—by selling life and P&C products. Firms in the insurance sector also provide other services, such as reinsurance—transactions in which a reinsurance company agrees to cover all or part of the losses, loss-adjustment, or both of a primary insurer—and marine, aviation, and transport insurance, which covers goods in transit. Auxiliary services include insurance brokerage, in which companies sell and service insurance policies.[54] Firms in the insurance sector generate net income through collected premiums and investment income, minus claims paid to policyholders.

Insurance encourages economic activity in several ways. First, it mitigates the risk of project failures for business owners, encouraging investment and additional economic activity. Second, insurance can mitigate the financial impact of supply chain disruptions.[55] Third, insurance increases the volume of investable funds by pooling the premiums of small investors, encouraging the development of stable

[53] P&C insurance is often called nonlife insurance outside the United States (outside, nonlife insurance includes health insurance; in the United States, private health insurance is a separate category and not generally included in data on cross-border trade in insurance services).
[54] NAIC, "Glossary of Insurance Terms," accessed February 9, 2024.
[55] Weisbart, *How Insurance Drives Economic Growth*, June 2018, 10–15.

capital markets.[56] Insurance can also encourage preferred social behavior by offering insured parties discounts for low-risk behavior, such as safe driving.[57]

The United States continues to be the largest market for insurance, accounting for 43.7 percent of the value of global premiums in 2022. The next largest markets were China (10.3 percent), the UK (5.4 percent), and Japan (5.0 percent). The United States and China saw 8.6 percent and 0.2 percent growth, respectively, from 2021, when most other major markets saw decreases, including the UK (−2.8 percent), Japan (−15.1 percent), and France (−10.7 percent). Conversely, India and Brazil saw substantial premium growth of 6.5 percent and 20.7 percent, respectively, in 2022.[58]

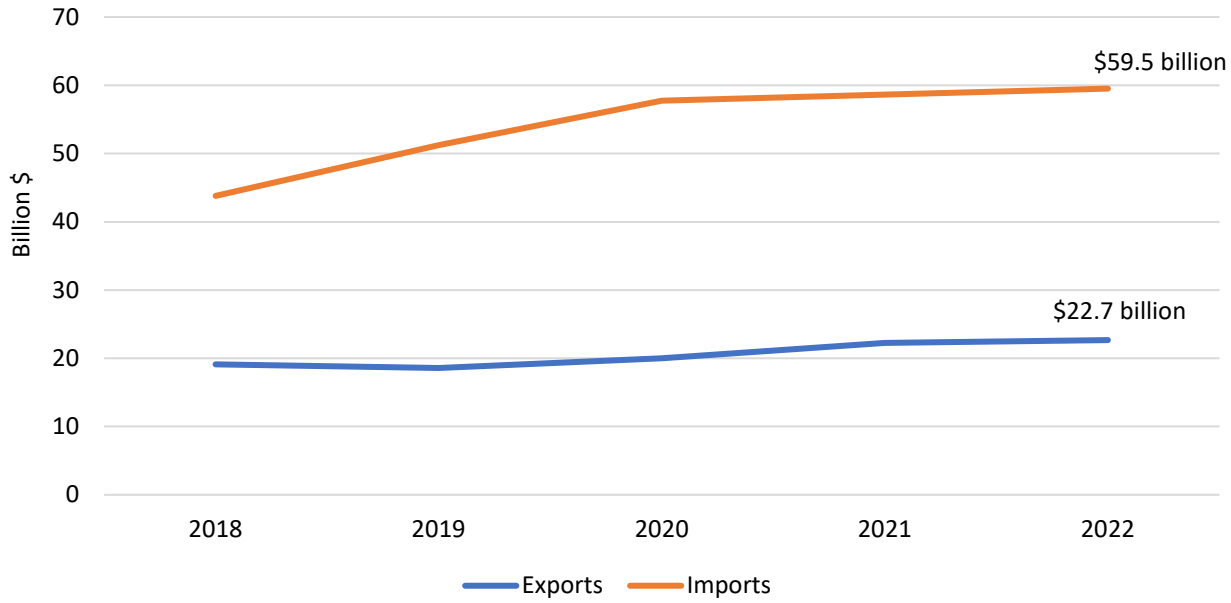
Cross-Border Trade

U.S. exports of insurance services grew at an average annual rate of 4.4 percent, from $19.1 billion in 2018 to $22.7 billion in 2022. Imports of these same services increased by 31.8 percent, from $43.8 billion in 2018 to $57.7 billion in 2020, but grew very gradually thereafter, increasing at an average annual rate of only 1.5 percent over the next two years, to $59.5 billion by the end of 2022 (figure 2.10).

[56] CCMC, "The Role of Insurance Investment in the U.S. Economy," 2019, 5.
[57] *U.S. News & World Report*, "How Do Those Car Insurance Tracking Devices Work?," accessed March 1, 2024. Forty-eight U.S. states require some form of auto insurance although they vary in type (e.g., collision, comprehensive, medical payments coverage, personal injury protection, among others), minimum-liability coverage requirements, and cost. Robinson and Mitchner, "Why Is Car Insurance Mandatory?," December 27, 2023.
[58] Casanova Aizpun et al., "Sigma 3/2023 I World Insurance," July 10, 2023, 15.

Figure 2.10 Insurance: U.S. cross-border exports and imports, 2018–22

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.21.



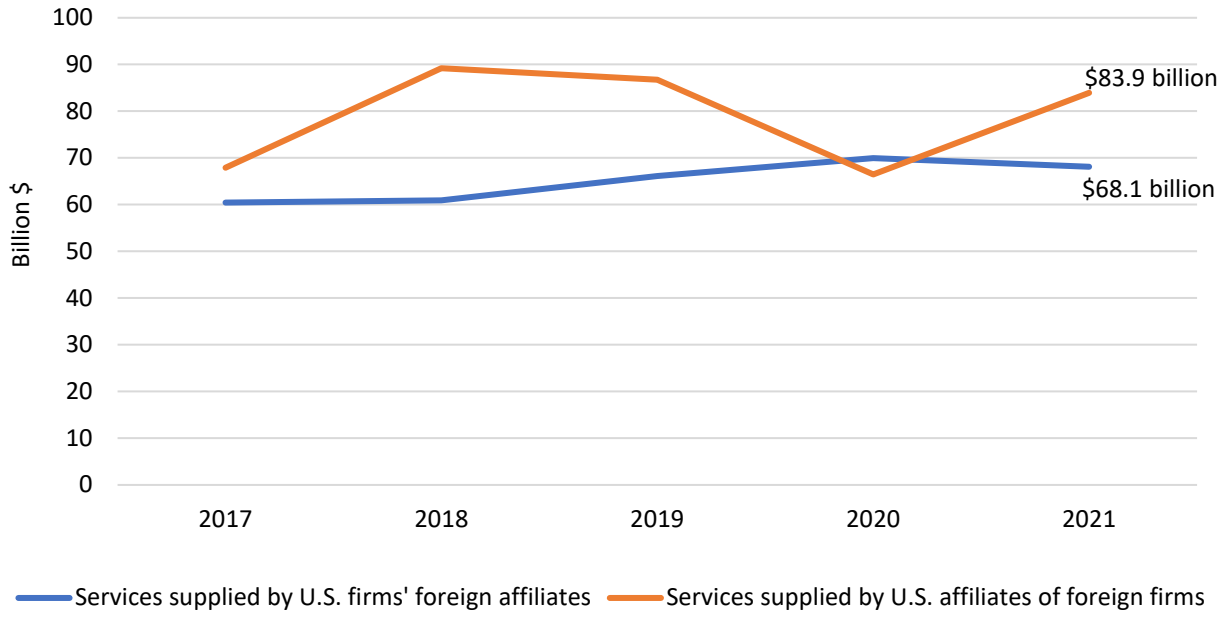
Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.

Affiliate Transactions

Insurance services supplied by affiliates of U.S. companies in foreign countries grew at a gradual average annual rate of 3 percent, from $60.4 billion in 2017 to $68.1 billion in 2021. By contrast, purchases of insurance services from U.S. affiliates of foreign firms experienced significant fluctuation during the period examined, rising by 31.3 percent to $89.2 billion in 2018, before declining by 25.5 percent over the next two years. In 2021, however, such purchases jumped by 26.3 percent to $83.9 billion (figure 2.11).

Figure 2.11 Insurance: U.S. affiliate sales and purchase, 2017–21

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.22.



Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs," October 5, 2023; USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.
Note: MNEs = multinational enterprises.

Securities Services

Securities services firms raise capital and liquidity for firms and sovereign borrowers (arranging share and bond issues) and advise on and underwrite mergers and acquisitions (M&A) deals and other corporate finance transactions.[59] They also provide brokerage services activities (such as securities sales and trading), invest on behalf of clients, operate trading platforms, and provide financial advice.[60] The largest firms in this segment are investment banks, which had combined global revenue of $342.7 billion in 2022. U.S. firms are key global players, with JPMorgan Chase, Citigroup, Goldman Sachs, and Morgan Stanley together making up 41 percent of the global market in 2022.[61] The U.S. share of global investment banking has increased since the global financial crisis in 2008, as European-based banks have become less prominent.[62]

While investment banks typically provide a variety of the securities services described above, other firms specialize in particular investment activities, such as creation of diversified mutual funds, long-term investments, and trading platforms operations. Table 2.2 shows the activities conducted by the most common types of securities services providers and examples of U.S. firms in each category.

[59] This includes market-making services as discussed in box 2.1.
[60] Wooldridge, "What to Know About Investment Banking," accessed December 6, 2023; SEC, *What Is a Broker Dealer?*, accessed January 16, 2024.
[61] IBISWorld, *Global Investment Banking & Brokerage*, September 2023, 11, 50.
[62] Deloitte Center for Financial Services, *2023 Banking and Capital Markets Outlook*, 2022, 6, 46.

Table 2.2 Securities services providers—activities and examples

Type of provider	Major activities	U.S. firm examples
Investment banks	Raise capital and liquidity, advise on and underwrite mergers and acquisitions, conduct broker-dealer and market-making activities, provide financial advice. May also participate in other securities segments described below.	JPMorgan Chase & Co.; Citigroup Inc.; The Goldman Sachs Group, Inc.; Morgan Stanley
Mutual funds	Pool money from many investors and create portfolios of securities—such as stocks, bonds, and short-term debt—in which investors can buy shares. Funds are typically diversified across companies and industries, highly liquid, and affordable for small investors.	The Vanguard Group, Inc.; BlackRock, Inc.; Fidelity Investments
Hedge funds	Make investments on behalf of institutional investors, such as pension funds and insurance companies, and high-income individuals. More flexible in their investment strategies than mutual funds.	Bridgewater Associates, LP; Renaissance Technologies LLC
Private equity	Make investments on behalf of institutional investors and high-income individuals, focusing on long-term investments (10 years or longer).	Blackstone, Inc.; Apollo Global Management, Inc.
Market-makers	Engage directly in the buying and selling of securities and provide liquidity by facilitating instant securities transactions on behalf of other companies. Make money in the "spread" between the price bid to buy and the asking price for securities.	Citadel Securities LLC; Virtu Financial Inc.; Jane Street Group, LLC
Retail investment platforms	Platforms on which individuals can buy and sell a range of funds, stocks, bonds, and other securities for their own portfolios.	Robinhood Markets, Inc.; Webull Financial LLC; The Charles Schwab Corporation

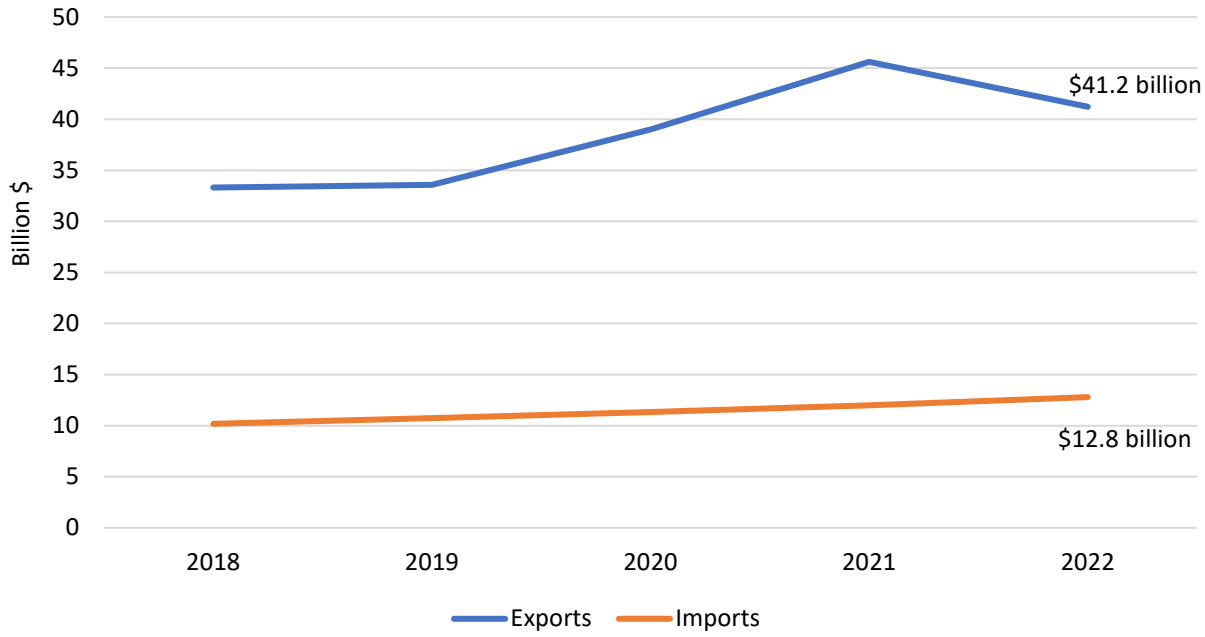
Sources: Benson, "11 Best Stock Apps of January 2024," January 2, 2024; Baldridge, "Top 10 Hedge Funds Of January 2024," December 1, 2023; IBISWorld, *Global Investment Banking & Brokerage*, September 2023, 11, 50. Liberto, "Investment Platforms Explained," February 19, 2021; Detrixhe, "Citadel Securities Gets Almost as Much Trading Volume as Nasdaq," February 5, 2021; Baldridge, "Top 10 U.S. Private Equity Firms of January 2024," December 1, 2023; Citadel Securities, "What Is a Market Maker?," accessed December 7, 2023; SEC, "Private Equity Funds," accessed December 7, 2023; SEC, *Investor Bulletin: Hedge Funds*, February 2013; Cheema, "15 Biggest Mutual Fund Companies In The World," March 29, 2023; SEC, "Mutual Funds," accessed December 7, 2023. Wooldridge, "What to Know About Investment Banking," accessed December 6, 2023.

Cross-Border Trade

U.S. exports of securities services were essentially flat during 2018 and 2019 before surging by more than 35 percent to $45.6 billion by the end of 2021. In 2022, however, exports of securities services recorded a decline of 9.6 percent to $41.2 billion. Imports of securities services, by contrast, increased at a steady average annual rate of 5.9 percent from $10.2 billion in 2018 to $12.8 billion in 2022 (figure 2.12).

Figure 2.12 Securities: U.S. cross-border exports and imports, 2018–22

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.23.



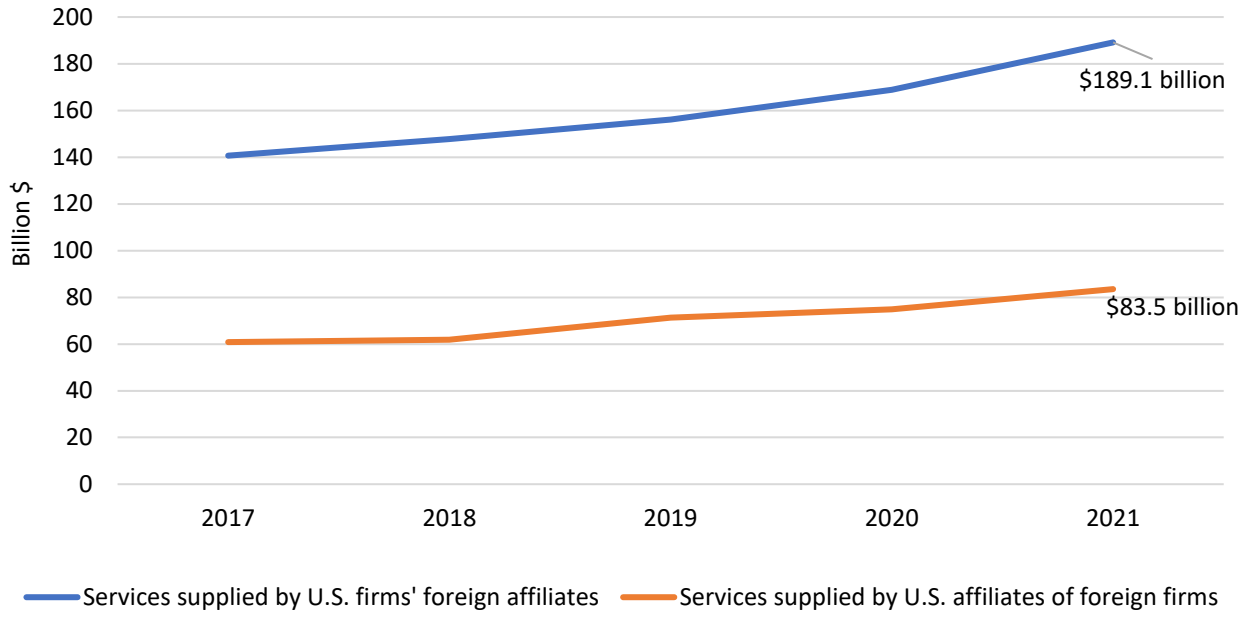
Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.

Affiliate Transactions

Sales of services by foreign-based affiliates of U.S. firms in the securities sector increased at a relatively consistent rate of 7.7 percent a year from $140.7 billion in 2017 to $189.1 in 2021. Purchases from U.S.-based affiliates of foreign companies in this sector grew steadily at an average annual rate of 8.2 percent from $60.8 billion in 2017 to $83.5 billion in 2021 (figure 2.13).

Figure 2.13 Securities: U.S. affiliate sales and purchases, 2017–21

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.24.



Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs," October 5, 2023; USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.
Note: MNEs = multinational enterprises.

Rental and Leasing Services (Except Real Estate)

Rental and leasing services (except real estate) includes firms that rent or lease tangible goods such as automobiles, computers, consumer goods, and industrial machinery and equipment. The subsector includes firms that are engaged in renting or leasing consumer goods and equipment and firms that are engaged in leasing machinery and equipment, often used for business operations.[63]

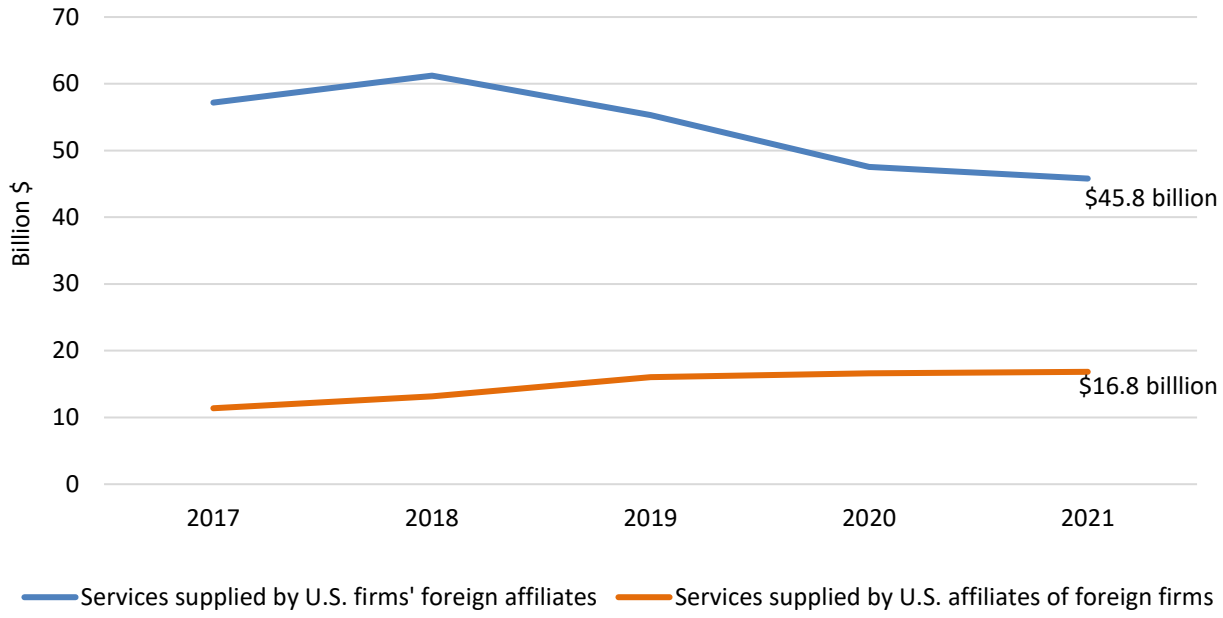
Affiliate Transactions

Sales of rental and leasing services by the foreign affiliates of U.S. firms declined at an average annual rate of 5.4 percent, from $57.2 billion in 2017 to $45.8 billion in 2021. By contrast, purchases of rental and leasing services from U.S. affiliates of foreign companies grew at an average of 10.3 percent a year from $11.4 billion in 2017 to $16.8 billion by the end of 2021 (figure 2.14).

[63] For the purposes of this report, rental and leasing services (excluding real estate) are referred to in discussions of economic and affiliate trade data, where applicable. The BEA does not record cross-border trade data in rental and leasing services.

Figure 2.14 Rental and leasing (except real estate): U.S. affiliate sales and purchases, 2017–21

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.25.



Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs Through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5,2023; USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign Multinational Enterprises Through Their Majority Owned U.S. Affiliates, by Industry of Affiliate and by Country of Ultimate Beneficial Owner," October 5, 2023.
Note: MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates; MOUSAs = majority-owned U.S. affiliates; UBO = ultimate beneficial owner.

Special Topic: The Impact of Global Inflation and Higher Interest Rates

A major economic trend in 2021 and 2022 was the rise in average inflation rates globally, when world average consumer prices increased by 4.7 percent in 2021 and 8.7 percent in 2022.[64] This increase in inflation rates represents a departure from global inflation trends since the 2008 Global Financial Crisis—annual inflation rates were below 4 percent globally on average between 2009 and 2019 and below 2 percent on average for advanced economies.[65]

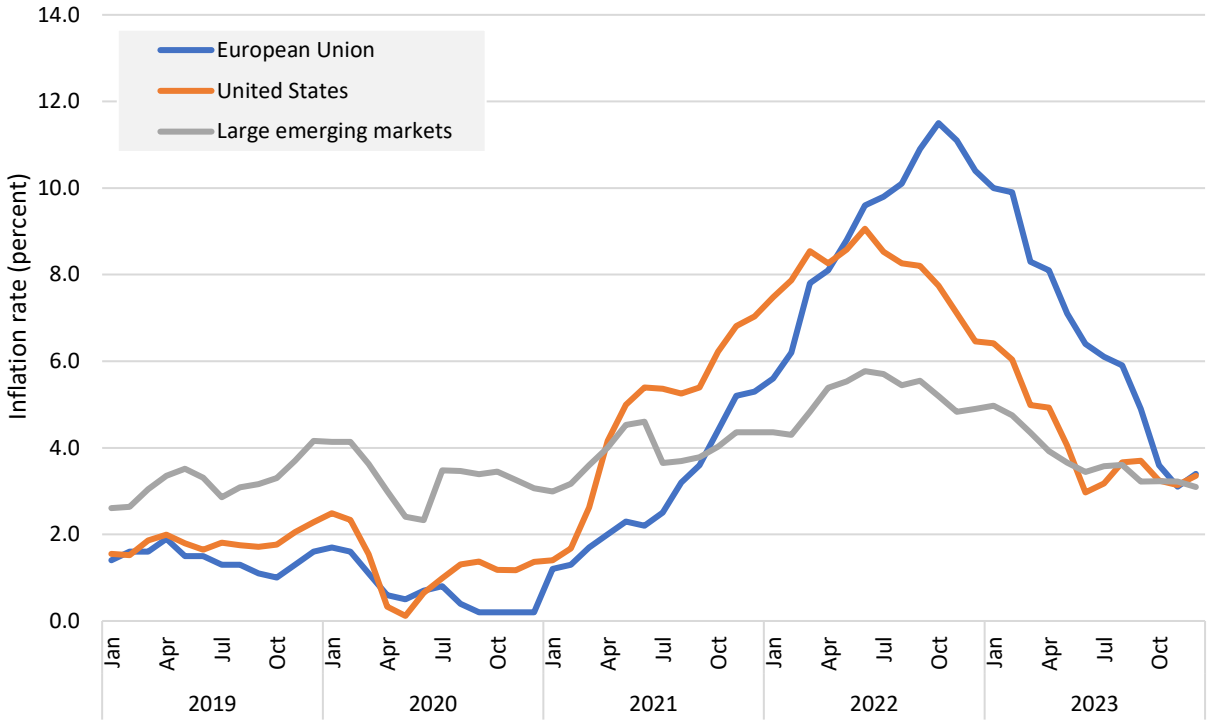
Some of the main drivers of increasing inflation globally during 2021–22 included rising oil prices, the Russian invasion of Ukraine, supply chain disruptions, consumer spending funded by fiscal stimulus payments related to the COVID-19 pandemic, and low unemployment rates, among others.[66] Figure 2.15

[64] Compared to historical data, one trend in global inflation rates since 2001 has been an increase in the synchronization of rates across different markets, with developing and advanced economy inflation movements becoming more similar over time. Ha, Kose, and Ohnsorge, *Global Inflation Synchronization*, February 2019; IMF, "Inflation Rate, Average Consumer Prices," October 2023.
[65] "Advanced economies" is an aggregate category of 41 economies designated by the International Monetary Fund (IMF). IMF, "Inflation Rate, Average Consumer Prices," October 2023; IMF, "Statistical Appendix," October 2023, 100.
[66] Ha, Kose, and Ohnsorge, "Is the Great Inflation Scare Over?," December 18, 2023; Vasquez, "Unpacking the Causes of Pandemic-Era Inflation in the US," September 1, 2023; Hobjin et al., "What Is Driving U.S. Inflation?," August 2022.

shows the monthly inflation rates for the United States and European Union, and average rates for large emerging markets.[67] In the United States and large emerging markets, inflation rates peaked in July 2022, while inflation rates in the European Union peaked in October 2022. In the period following their peaks in 2022, these markets saw a steady drop in inflation rates.

Figure 2.15 Annual percentage change in average consumer prices, January 2019–December 2023

Consumer prices annual percentage change. Underlying data for this figure can be found in appendix B, table B.26.



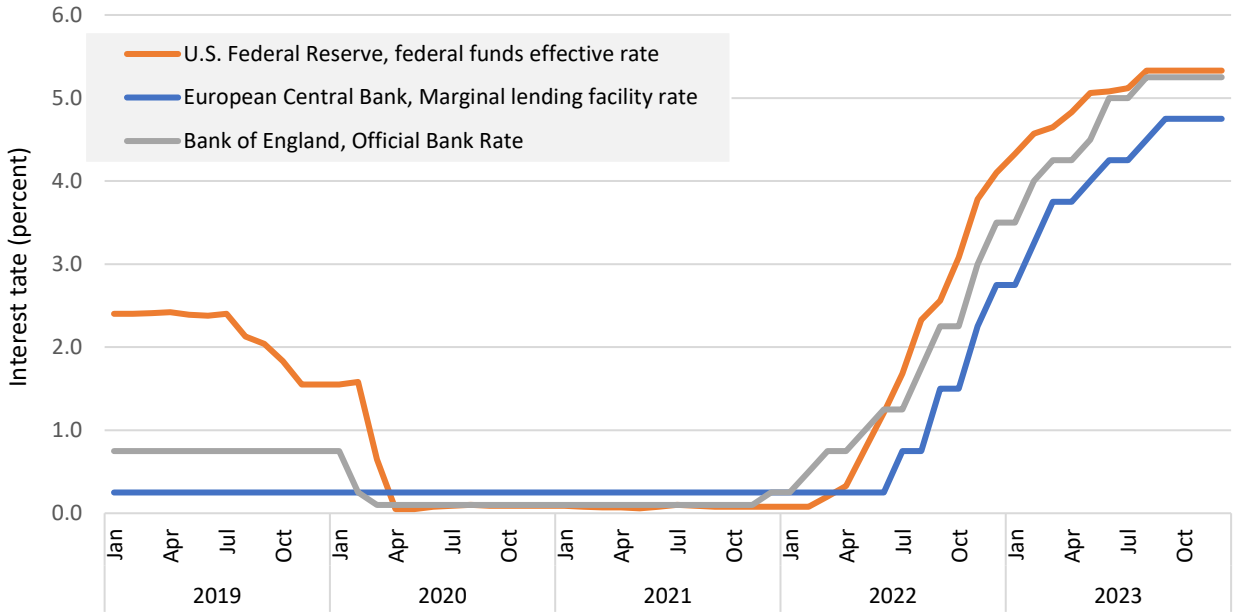
Source: OECD, "Consumer Prices," 2018, accessed February 28, 2024.
Notes: The European Union excludes the UK for all years. Large emerging markets include Brazil, China, India, Indonesia, Saudi Arabia, and South Africa.

In response to these global inflation trends, many central banks began raising interest rates to reduce demand for borrowing. As inflation intensified globally, many emerging market central banks responded relatively quickly with interest rate increases, while advanced economy central banks did not start raising rates until the end of 2021.[68] Figure 2.16 shows the trajectory of interest rates from central banks in three major global financial markets: the U.S. Federal Reserve, the European Central Bank, and the Bank of England. These rates represent the cost of borrowing for commercial banks from the central bank. All other interest rates in these economies (e.g., interest rates on consumer or business loans) typically adjust in response to changes in these rates.[69]

[67] The category "large emerging markets" includes Brazil, China, India, Indonesia, Saudi Arabia, and South Africa.
[68] Adrian and Natalucci, "Central Banks Hike Interest Rates," August 10, 2022.
[69] Curry, "Understanding the Federal Funds Rate," November 1, 2023.

Figure 2.16 Central bank interest rates, January 2019–December 2023

In percent. Underlying data for this figure can be found in appendix B, table B.27.



Sources: FRED, "Federal Funds Effective Rate," accessed January 8, 2024; BoE, "Interest Rates and Bank Rate," December 14, 2023; ECB, "Key ECB Interest Rates," December 13, 2023.

In addition to the tightening in interest rates by central banks, other factors such as the decrease in pandemic-related disruptions, improvement in supply chains, and the fall in fuel prices helped slow the pace of inflation in 2023. Industry experts expect the pace of global inflation to ease slightly in 2024, after declining sharply in 2023.[70]

The increase in interest rates, driven by the efforts of central banks to fight global inflation, has also directly impacted the global banking, insurance, and securities services sectors. The remainder of this section details the specific impacts of higher inflation and interest rates on these three major financial services sectors.

Banking Services

Banking services serve as critical infrastructure to the economy by facilitating transactions, savings and investment, and credit provision.[71] High inflation and sharply higher central bank interest rates, or policy rates, in 2022 have affected banking services demand, net interest margins, and credit risk.[72]

In general, the most direct impact of monetary tightening on banks is the reduced demand for credit and other banking services. Central banks raise policy rates to slow credit demand, intending to ease

[70] Authers, "Inflation Has Stopped Falling," January 12, 2024; Faller, "2023 in Review," December 15, 2023.
[71] In response to the pandemic, large volumes of fiscal spending in advanced and emerging markets were funneled through banks via loans to businesses or into bank deposits via transfer payments to households. IMF, "Fiscal Monitor Database," October 2021.
[72] Policy rates are interest rates set by central banks to implement monetary policy. BIS, "Central Bank Policy Rates," January 17, 2024.

inflation.[73] As intended, the rapid succession of policy rate hikes since 2022 has increased the cost of borrowing and reduced credit demand in major markets.[74] In the United States, the percentage of consumers surveyed by the Federal Reserve in its annual SCE Credit Access Survey applying for any kind of consumer credit—including credit cards, auto loans, and mortgages—during the year fell from 45 percent in 2022 to 41 percent in 2023 (the rate in 2019 was 45.8 percent).[75] Since 2022, mortgage loan demand has also slowed in the euro area.[76]

The tougher macroenvironment has also reduced demand for deposit services, as consumers decrease their saving partially because of the rising cost of debt.[77] This trend is especially evident in the United States, where personal savings rates reached 10-year lows in 2022 and 2023. The annual average personal savings rate in the United States was 3.3 percent in 2022 and 4.5 percent in 2023, compared to over 10 percent during 2020–21.[78] As a result of the reduced demand for deposit services, deposits fell for the total U.S. banking industry in 2023.[79]

Global banks may have seen their profitability boosted in the short term, however, as rising interest rates also tend to widen net interest margins (NIMs).[80] A bank's NIM is the difference between its interest income (what the bank earns from loans and other credit) and interest paid (what the bank pays for deposits). A wider NIM suggests more profit from a bank's lending and deposit-taking activities.[81] Compared to 2020, following interest rate increases, NIMs increased in 2022 and grew or remained elevated into 2023, for the 100 largest debt-issuing banks across developed markets.[82] This trend was evident for smaller banks, such as U.S. community banks, as well.[83] In 2022, NIMs for U.S. community banks increased and remained above U.S. industry averages.[84]

The overall increase in NIMs has supported banks' revenue growth as they earned more on new credit and only gradually offered increased rates to depositors. Despite slowing credit demand for large banks, these

[73] Mathai, "Monetary Policy," June 15, 2021.
[74] Adrian, "Higher-for-Longer Interest Rate Environment Is Squeezing More Borrowers," October 10, 2023.
[75] Federal Reserve Bank of New York, "Consumers Expect Further Decline in Credit Applications and Rise in Rejection Rates," November 20, 2023.
[76] O'Brien, "Decade-Low European Mortgage Growth Forecast," December 11, 2023.
[77] Hayes, "Bankers Lower Deposit Hopes," August 23, 2023; Waters, "Americans Are Saving Far Less than Normal," April 27, 2023; Riordan and Ramos, "European Bank Deposits Fall," August 29, 2023.
[78] Personal savings also decreased in the EU, though to a lesser extent. In the EU, the annual personal savings rate fell to 12.5 percent in 2022, after 10-year period highs of 18.5 percent and 16.4 percent in 2020 and 2021, respectively. USDOC, BEA, table 2.6, "Personal Income and Its Disposition, Monthly," January 26, 2024; Eurostat, "Annual Sector Accounts, Gross Household Saving Rate," January 26, 2024.
[79] Despite increasing interest rates and high inflation, deposits increased for community banks while they fell for the total U.S. banking industry in 2023. FDIC, *2023 Risk Review*, August 14, 2023, 58–59; Hayes, "Bankers Lower Deposit Hopes," August 23, 2023; Riordan and Ramos, "European Bank Deposits Fall," August 29, 2023.
[80] Net interest income contributes approximately 70 percent of bank revenues, which contributes to the popularity of NIM as a measure of profitability. *Global Commercial Banks*, September 2023, 9; Hinton and Polson, "The Historic Relationship . . . Short-Term Interest Rates," 2021, 31.
[81] NIM is normalized by bank assets, resulting in a measure that is comparable across banks and time. Hinton and Polson, "The Historic Relationship . . . Short-Term Interest Rates," 2021, 31.
[82] Fitch Ratings, "Many DM100 Bank Net Interest Margins Have Peaked," November 27, 2023.
[83] Historically, community banks and banks with a lower proportion of long-term assets are relatively more responsive to short-term interest rate changes. Hinton and Polson, "The Historic Relationship . . . Short-Term Interest Rates," 2021, 39, 41.
[84] FDIC, *2023 Risk Review*, August 14, 2023, 63.

factors contributed to net positive growth in U.S. banking revenues in 2022.[85] In the latter half of 2023, however, average NIMs began to narrow for U.S. banks, as competition for deposits was fierce while interest rates remained elevated and loan growth continued to slow.[86] As a result, U.S. banking revenues are expected to decline in 2024.[87]

In the current macroeconomic environment, credit risk associated with outstanding debt is also a growing concern for the global banking industry.[88] Loans, the main source of credit risk for most banks, typically comprise a large share of banks' balance sheets.[89] To assess a bank's health, bank supervision institutions such as the Federal Reserve and the European Banking Authority conduct stress testing, which typically indicates whether banks have sufficient liquid assets to cover losses under various scenarios. Although stress tests results conducted by bank supervision institutions indicated that banks were broadly resilient in 2023, sustained high interest rates and inflation coupled with slowing economic growth may increase the credit risk faced by banks in major markets.[90]

The amount of nonperforming loans—loans that are subject to nonpayment or late payment—started to increase in 2023 for U.S. and EU banks, especially for consumer loans.[91] For the U.S. banking industry, other sources of credit risk have also raised alarm, such as credit card delinquencies. By 2023, U.S. bank credit card delinquency rates had risen to 2.82 percent, up significantly from their 2021 value (1.64 percent) and exceeding their pre-pandemic level.[92] In response to anticipated increases in default rates and higher lending costs, more U.S. and EU banks reported tightening lending standards for consumer loans in 2023.[93]

Although inflation has declined, interest rates remain near their recent highs, maintaining positive effects on revenue in the global banking industry—at least in the short run.[94] Looking further out, industry

[85] IBISWorld, *Commercial Banking in the US*, November 2023, 17, 22, 72.
[86] Fitch Ratings, "U.S. Banks Report Weak 4Q23 Results; Signal Lower Net Interest Income in 2024," January 22, 2024; Graf and Gull, "Expected Fed Rate Cuts Unlikely to Reduce NIM Pressure in 2024," December 27, 2023.
[87] IBISWorld, *Commercial Banking in the US*, November 2023, 26, 72.
[88] Credit risk is the potential for a borrower or counterparty to fail to meet an obligation or repay debt. Federal Reserve, "Credit Risk Management," December 15, 2023; BIS, "Principles for the Management of Credit Risk," September 27, 2000.
[89] Federal Reserve, "Credit Risk Management," December 15, 2023.
[90] Despite three major bank failures in 2023 (Silicon Valley Bank and Signature Bank of New York in the United States and Credit Suisse in Switzerland), action by the Federal Reserve Board and the Swiss National Bank may have reduced the negative impacts of these failures. Čihák, Oura, and Schumacher, "Back to Basics," September 2019; IMF, "Global Financial Stability Report, April 2023," April 2023, 2-3, 53; FDIC, *2023 Risk Review*, August 14, 2023, 5; ECB, "The Impact of Short-Term Interest Rates," December 2007; Fitch Ratings, "Core Inflation, Rising Rates Remain Main Credit Risks," August 17, 2023.
[91] Gandel, "Largest US Banks Set to Log . . . Bad Loans," January 8, 2024; Arnold, "ECB Warns of 'Early Signs of Stress,'" November 22, 2023; ECB, "Financial Stability Review, November 2023," November 22, 2023.
[92] Conversely, in Europe and the UK, credit card delinquencies have not changed considerably in the last three years. Philip Bane, "European and U.K. Credit Card ABS Index Report Q3 2023," November 9, 2023; FRED, "DRCCLACBS," January 18, 2024.
[93] Many U.S. banks reported tightening standards for loans to firms as well. Federal Reserve Board of Governors, "Senior Loan Officer Opinion Survey on Bank Lending Practices," October 2023; Federal Reserve Board, "Transcript of Chair Powell's Press Conference," July 6, 2023, 3; ECB, "July 2023 Euro Area Bank Lending Survey," July 25, 2023.
[94] IBISWorld, *Global Commercial Banks*, September 2023, 16, 61; S&P Global, *Global Banks Country-By-Country Outlook 2024: Forewarned Is Forearmed*, 2024, 2; Sanglap and Taqi, "Most Large Asia-Pacific Banks Set for Lending Income Growth in 2023, 2024," June 21, 2023.

observers in the United States anticipate credit losses and slower revenue growth in the banking sector in the next few years because of slower loan growth and increased competition in the sector with the growth of digital banks, among other factors.[95]

Insurance Services

The recent inflationary environment and subsequent increase in interest rates have affected both the revenue and investment income streams of global nonlife (P&C) and life insurance companies.[96] Reportedly, insurers have been less affected, however, than banks by the surge in inflation and interest rates because of the nature of their business. Insurers accumulate new long-term liabilities gradually over time as they underwrite new insurance. They then match these liabilities with similar duration investments, making the insurers less sensitive to swings in market rates.[97]

Inflation can affect P&C and life insurance companies in similar and different ways. Inflation can directly reduce the profitability of P&C insurance companies through increased claims costs.[98] During periods of high inflation, claims costs can increase over the course of an insurance contract because of increased replacement costs.[99] However, inflation can have conflicting effects on the profitability of global life insurers. Many life insurance products (liabilities to the insurer) are nominally fixed and therefore less sensitive to the costs of future claims payouts increasing because of inflation.[100] Also, inflation can decrease demand for life insurance products because inflation erodes both real households' incomes and the present value of life insurance products with fixed future payments.[101] In 2022, inflation reduced the value of payouts in the life insurance sector and the real growth rate of premiums written was −4.5 percent.[102] Also, insurers' other expenses can increase during inflationary periods, negatively impacting profitability.[103]

Higher interest rates impact life insurance companies to varying degrees, depending on the composition of their investment portfolios.[104] Life insurance policies tend to be longer-term contracts, and life insurers often attempt to match the duration of their assets (e.g., bonds) and liabilities (e.g., expected future payouts on policies). Because life insurers tend to hold bonds until maturity, life insurers may still be

[95] Wade et al., *2024 Banking and Capital Markets Outlook*, August 2023, 17; IBISWorld, *Commercial Banking in the US*, November 2023, 17, 72.
[96] Property and casualty (P&C) insurance is often called nonlife insurance outside the United States major distinction that nonlife insurance includes health insurance, while in the United States, private health insurance is a separate category). III, "Background on: Insurance Accounting," October 20, 2020.
[97] Casanova Aizpun et al., "Sigma 3/2023 I World Insurance," July 10, 2023.
[98] Insurance company profits are generally calculated as premiums collected plus investment returns less claims paid and expenses. Turturescu, *Impact of Inflation on the Insurance Sector*, October 5, 2023, 10.
[99] Replacement costs often refer to payments by P&C insurers to rebuild and repair property damaged after an event. Leonard, "Inflation and Insurance Replacement Costs," November 9, 2023.
[100] Turturescu, *Impact of Inflation on the Insurance Sector*, October 5, 2023, 10.
[101] Turturescu, *Impact of Inflation on the Insurance Sector*, October 5, 2023, 10–11.
[102] The study covered 35 OECD countries and 20 other jurisdictions in Africa, Asia, Europe, and Latin America. For more information see OECD, *Global Insurance Market Trends*, July 2023, 1.
[103] OECD, Global Insurance Market Trends 2023, December 20, 2023.
[104] The focus is on life insurers; however, high interest rates may have offsetting effects on P&C insurers. For example, although increased borrowing costs may reduce demand for P&C insurance (cost-of-funds effect), the increased value of assets—and the associated increase in insured values and premiums—could offset the cost of funds effect. KASE Insurance, "Rising Interest Rates Impact on Home Builders Insurance," January 24, 2023.

holding bonds with a lower yield (e.g., from the low interest rate environment following the 2008 financial crisis) that would lose value as interest rates increase. Because prices for previously issued bonds fall when interest rates rise, the investment returns of global insurance companies with large exposures to bonds suffer during periods of high interest rates.[105]

This effect was more pronounced for U.S. life insurers because 68.3 percent of their assets were invested in bonds at year-end 2022 (compared to 50.2 percent for U.S. P&C insurers).[106] To the extent that insurers held investments with floating interest rates during the recent high-interest-rate environment, however, their investment income on these assets has increased. This effect will be short-lived if interest rates fall back to lower levels.[107]

In the current high-interest-rate environment, life insurers have also faced increased "surrender risk" as some policyholders have sought to terminate their policies to switch to higher-yield investments.[108] When life insurance policies are surrendered early, life insurers must simultaneously sell the corresponding asset (e.g., bonds). Because many of the existing bonds sold by insurers in response to surrenders likely paid below market coupons (annual interest paid on bonds at any given time), they had to be sold at heavily discounted prices, offsetting gains from insurers buying new high-yield bonds.[109] Surrender rates have increased in every world region and among advanced and emerging market and developing economies. Global surrender rates increased 17.7 percent from 2019 to 2022, with the Asia and Oceania region seeing the largest increase among regions at 57.8 percent.[110]

In 2024, global insurance companies will likely be impacted by lower inflation and structurally high interest rates that may not decline as quickly as previously expected. Declining economic growth rates (induced by heightened interest rates) may dampen global premium growth. A large reinsurer predicts that global insurance premiums will grow 2.2 percent—a rate higher than in recent years but still below pre-pandemic growth rates.[111] P&C insurers may see increased profitability because forecasted lower interest rates could spur economic growth, thus boosting demand for P&C insurance (e.g., to insure new construction); coupled with slower inflation that may reduce increases in the costs of claims.[112]

For life insurers, persistent high interest rates will continue to buoy demand for savings-type products such as life insurance.[113] For both P&C and life insurers, profitability may be boosted by higher investment

[105] Wong, *Capital Markets Special Report*, accessed December 1, 2023, 1–2; Charles Schwab, "What Happens to Bonds When Interest Rates Rise?," March 7, 2023.
[106] Wong, *Capital Markets Special Report*, accessed December 1, 2023, 2.
[107] NAIC, "Interest Rates and Insurance," August 24, 2023.
[108] Many life insurance policies include a surrender option that allows the policyholder to exchange their current contract for a specified cash surrender value. This represents a risk because it directly affects the cash flow of life insurers. Liu and Liu, "Surrender Risk in Life Insurance Policies," April 19, 2015, 1–2, 5, 11, 17–18, 23–24. This can lead to increased cash flow obligations for insurers and affect insurers' liquidity. IAIS, *GIMAR*, December 6, 2023, 5.
[109] NAIC, "Interest Rates & Insurance," August 24, 2023.
[110] The increased surrender rates in global regions and economic groupings as follows: Asia and Oceania (+57.8 percent), Europe and Africa (+31.1 percent), Americas (+4.9 percent), emerging market and development economies (+24.7 percent), and advanced economies (+17.7 percent). IAIS, *GIMAR*, December 6, 2023, 18.
[111] Swiss Re, "Risks on the Rise as Headwinds Blow Stronger," November 21, 2023.
[112] Dai and Chen, "China's Property Market Downturn," January 10, 2024; Hersch et al., "2024 Insurance Outlook," July 27, 2023.
[113] Although expectations are that interest rates will decline, the U.S. federal funds rate has yet to decline.

yields on their recent bond purchases, although it may take time for these gains to materialize (as an example, the average time to maturity in the U.S. P&C insurance industry bond portfolio is six years).[114]

Securities Services

The recent sharp increase in inflation and interest rates has affected firms providing securities services in complicated ways. A significant rise in interest rates may have benefited some securities lenders (like investment companies and sovereign wealth funds) and hurt some securities borrowers (like brokers and dealers). Securities lenders, who typically transfer securities to large borrowers in exchange for collateral in the form of bonds or shares, have been able to charge higher rates. However, securities borrowers have faced higher liability costs and lower investment values.[115] Investment banks, fund managers, and other securities firms have three main concerns when facing a higher interest rate environment: whether their assets and liabilities are significantly mismatched in terms of duration and credit quality; the degree to which their asset positions are exposed to movements in commercial and residential property prices or other interest-rate sensitive parts of the economy; and whether they have diversified their funding sources.[116]

The quick shift in expectations for the economy when inflation and interest rates rose sharply coming out the global pandemic created a volatile market environment and raised the level of risk for investment banks.[117] At the same time, some financial customers expressed concern about sudden rate hikes and made quick withdrawals, a behavior that raised the risk of runs on unprofitable investment funds.[118] Before the onset of the COVID-19 pandemic in early 2020, about 20 percent of U.S. financial assets were investment securities, primarily mortgage-backed securities, and U.S. Treasury securities. By the end of 2021, this amount had increased to 25 percent, largely because of purchases of securities with longer maturities.[119] However, compared to short-term securities, firms' existing holdings of long-term securities decreased in value because of the rise in interest rates.[120] Banks with unrealized losses (i.e., decreases in value before they are sold) on their trading books likely become reluctant to sell their securities.[121] When securities must be sold for liquidity, securities firms have actual losses that can lead to restrictions on borrowing capacity, declining market valuations, and negative effects on M&A.[122]

---

[114] Swiss Re, "Risks on the Rise as Headwinds Blow Stronger," November 21, 2023; Holzheu, "Higher Interest Rates Are Raising the Bar," November 29, 2023.
[115] IMF, "Global Financial Stability Report, April 2023," April 2023, 10; BlackRock, "Securities Lending," accessed February 27, 2024; SEC, "Securities Lending," accessed February 29, 2024.
[116] White, "Rising Interest Rates Complicate Banks' Investment Portfolios," February 9, 2023; Faridi et al., "Five Big Shifts Shaping a New World," December 18, 2023, 16.
[117] Faridi et al., "Five Big Shifts Shaping a New World," December 18, 2023, 2.
[118] Adrian and Oura, "Tracking Global Financial Stability Risks," August 8, 2023.
[119] White, "Rising Interest Rates Complicate Banks' Investment Portfolios," February 9, 2023.
[120] White, "Rising Interest Rates Complicate Banks' Investment Portfolios," February 9, 2023.
[121] According to the Federal Reserve Board, unrealized losses was one of the factors contributing to the failure of Silicon Valley Bank in March 2023. Marsh and Laliberte, "The Implications of Unrealized Losses for Banks," April 11, 2023, 6; Board of Governors of the Federal Reserve System (Federal Reserve Board), Material Loss Review of Silicon Valley Bank, September 25, 2023.
[122] In August 2023, Moody's lowered the credit ratings of several small and midsized U.S. banks citing interest rate risks and noted that unrealized losses are not captured by regulatory capital ratios but may still affect market size and consumer confidence. White, "Rising Interest Rates Complicate Banks' Investment Portfolios," February 9, 2023; Smith, "Moody's Cuts Ratings of 10 U.S. Banks," August 8, 2023.

The volume of M&A deals transacted globally surged in 2021 as the world emerged from the pandemic. But volume fell sharply in 2022 and 2023, as volatile financial markets and an uncertain macroeconomic outlook reduced demand for corporate finance transactions.[123] Leading investment banks' M&A revenues plummeted in 2023, and many firms moved to cut staff.[124] However, there is evidence that M&A activity has rebounded in the first quarter of 2024.[125]

Higher U.S. interest rates have also increased the financial costs in emerging markets of both making interest payments and managing dollar-denominated foreign exchange debt. In emerging markets, banks often have a larger role in the financial system compared to advanced economies, which may lead to greater negative consequences of volatility.[126] Emerging market banks have avoided massive losses in their securities portfolios to date as a result of stable deposit funding, but these markets typically hold some securities assets with low credit quality.[127] In 2022, several emerging market governments defaulted on their debts, and about one-fifth of emerging markets liquidated more than 15 percent of their official reserves in response to the decline in their domestic currencies.[128]

High interest rates, like high inflation, may lessen over time. If inflation continues to ease, interest rates in most major markets are expected to fall back toward their pre-COVID-19-pandemic levels, though by how much might depend on several factors like government debt and financial fragmentation.[129] This dynamic landscape will impact securities services providers because factors such as the growth of private (not publicly listed) capital affect the competitive positioning of securities firms.[130]

[123] Henry and Oostende, "Top M&A Trends in 2024," February 20, 2024, 4.
[124] Walker, "Banks Shed 60,000," December 26, 2023; Natarajan, "Morgan Stanley Plans 3,000 More Job Cuts," May 1, 2023.
[125] Zhuo, "Global M&A Drought Ends," March 28, 2024.
[126] IMF, "Global Financial Stability Report, April 2023," April 2023, xiii.
[127] IMF, "Global Financial Stability Report, April 2023," April 2023, xiii.
[128] World Bank, "Global Economic Prospects," June 2023, 109–14.
[129] IMF, "World Economic Outlook, April 2023," April 2023, 45-47.
[130] Wade et al., "2024 Banking and Capital Markets Outlook," 2023.

Bibliography

Adrian, Tobias. "Higher-for-Longer Interest Rate Environment Is Squeezing More Borrowers." International Monetary Fund (IMF), October 10, 2023. https://www.imf.org/en/Blogs/Articles/2023/10/10/higher-for-longer-interest-rate-environment-is-squeezing-more-borrowers.

Adrian, Tobias, and Fabio Natalucci. "Central Banks Hike Interest Rates in Sync to Tame Inflation Pressures." *IMF Blog*. August 10, 2022. https://www.imf.org/en/Blogs/Articles/2022/08/10/central-banks-hike-interest-rates-in-sync-to-tame-inflation-pressures.

Adrian, Tobias, and Hiroko Oura. "Tracking Global Financial Stability Risks From Higher Interest Rates." International Monetary Fund (IMF), August 8, 2023. https://www.imf.org/en/Blogs/Articles/2023/08/08/tracking-global-financial-stability-risks-from-higher-interest-rates.

Arnold, Martin. "ECB Warns of 'Early Signs of Stress' at Eurozone Banks as Default Rates Rise." November 22, 2023. https://www.ft.com/content/353938c0-ac30-4021-887d-9327875026b1.

Authers, John. "Slower for Longer: Inflation Has Stopped Falling." *Bloomberg.com*, January 12, 2024. https://www.bloomberg.com/opinion/articles/2024-01-12/inflation-is-coming-down-slower-for-longer-leaving-fed-less-room-for-cuts.

Baldridge, Rebecca. "Top 10 Hedge Funds Of January 2024." Forbes Advisor, December 1, 2023. https://www.forbes.com/advisor/investing/top-hedge-funds/.

Baldridge, Rebecca. "Top 10 U.S. Private Equity Firms of January 2024." Forbes Advisor, December 1, 2023. https://www.forbes.com/advisor/investing/best-private-equity-firms/.

Bane, Philip. "European And U.K. Credit Card ABS Index Report Q3 2023." S&P Global Ratings, November 9, 2023. https://www.spglobal.com/ratings/en/research/articles/231109-european-and-u-k-credit-card-abs-index-report-q3-2023-12896338.

Bank for International Settlements (BIS). "Central Bank Policy Rates." January 17, 2024. https://www.bis.org/statistics/cbpol.htm.

Bank for International Settlements (BIS). "Principles for the Management of Credit Risk." September 27, 2000. https://www.bis.org/publ/bcbs75.htm.

Bank of England (BoE). "Interest Rates and Bank Rate." December 14, 2023. https://www.bankofengland.co.uk/-/media/boe/files/monetary-policy/baserate.xls.

Beau, Denis, ed. *Market-Making and Proprietary Trading: Industry Trends, Drivers and Policy Implications*. Basle: Bank for International Settlements, Committee on the Global Financial System. CGFS Papers No. 52, November 2014. https://www.bis.org/publ/cgfs52.pdf.

Benson, Alana. "11 Best Stock Apps of January 2024." NerdWallet, January 2, 2024. https://www.nerdwallet.com/best/investing/stock-apps.

BlackRock. "Securities Lending." BlackRock. Accessed February 27, 2024. https://www.blackrock.com/lu/individual/education/securities-lending.

Board of Governors of the Federal Reserve System (Federal Reserve Board). *Material Loss Review of Silicon Valley Bank*. September 25, 2023. https://oig.federalreserve.gov/reports/board-material-loss-review-silicon-valley-bank-sep2023.pdf.

Board of Governors of the Federal Reserve System (Federal Reserve Board). "Senior Loan Officer Opinion Survey on Bank Lending Practices." Board of Governors of the Federal Reserve System, October 2023. https://www.federalreserve.gov/data/sloos/sloos-202310.htm.

Board of Governors of the Federal Reserve System (Federal Reserve Board). "Credit Risk Management." December 15, 2023. https://www.federalreserve.gov/supervisionreg/topics/credit_risk.htm.

Board of Governors of the Federal Reserve System (Federal Reserve Board). "Delinquency Rate on Credit Card Loans, All Commercial Banks." FRED, Federal Reserve Bank of St. Louis, January 18, 2024. https://fred.stlouisfed.org/series/DRCCLACBS.

Board of Governors of the Federal Reserve System (Federal Reserve Board). "Transcript of Chair Powell's Press Conference." July 6, 2023. https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20230726.pdf.

Campbell, Aretha. "Offshore Financial Centres in the Caribbean." In *Money Laundering, Terrorist Financing, and Tax Evasion: The Consequences of International Policy Initiatives on Financial Centres in the Caribbean Region*, Palgrave Macmillan, 2021, 11–64. https://www.researchgate.net/publication/355186156_Offshore_Financial_Centres_in_the_Caribbean.

Casanova Aizpun, Fernando, Loïc Lanci, Roman Lechner, Arnaud Vanolli, and Li Xing. "Sigma 3/2023 I World Insurance." Swiss Re, July 10, 2023. https://www.swissre.com/institute/research/sigma-research/sigma-2023-03.html.

Cayman Islands Monetary Authority (CIMA). "Regulated Sectors." Accessed February 13, 2024. https://www.cima.ky/.

Center for Capital Markets Competitiveness (CCMC). "The Role of Insurance Investment in the U.S. Economy." U.S. Chamber of Commerce, 2019. https://www.centerforcapitalmarkets.com/wp-content/uploads/2019/03/CCMC_InsurancePaper_v5-Digital.pdf.

Charles Schwab. "What Happens to Bonds When Interest Rates Rise?" March 7, 2023. https://www.schwab.com/learn/story/what-happens-to-bonds-when-interest-rates-rise.

Cheema, Ramish. "15 Biggest Mutual Fund Companies In The World." Yahoo Finance, March 29, 2023. https://finance.yahoo.com/news/15-biggest-mutual-fund-companies-121318637.html.

Citadel Securities. "What Is a Market Maker?" Accessed December 7, 2023. https://www.citadelsecurities.com/what-we-do/what-is-a-market-maker/.

Curry, Benjamin. "Understanding the Federal Funds Rate." Forbes Advisor, November 1, 2023. https://www.forbes.com/advisor/investing/federal-funds-rate/.

Czímer, Balázs, Miklós Dietz, Valéria László, and Joydeep Sengupta. "The Future of Banks: A $20 Trillion Opportunity." December 20, 2022. https://www.mckinsey.com/industries/financial-services/our-insights/the-future-of-banks-a-20-trillion-dollar-breakup-opportunity.

Dai, Xin, and Yaxin Chen. "China's Property Market Downturn." Swiss Re, January 10, 2024. https://www.swissre.com/institute/research/sigma-research/Economic-Insights/china-property-market.html.

Deloitte Center for Financial Services. *2023 Banking and Capital Markets Outlook*. Deloitte Insights. 2022. https://www2.deloitte.com/content/dam/Deloitte/at/Documents/financial-services/at-banking-capital-markets-outlook-2023.pdf.

Detrixhe, John. "Citadel Securities Gets Almost as Much Trading Volume as Nasdaq." Quartz, February 5, 2021. https://qz.com/1969196/citadel-securities-gets-almost-as-much-trading-volume-as-nasdaq.

Dobson, Wendy. *Financial Services and International Trade Agreements: The Development Dimension*. In *A Handbook of International Trade in Services.* Oxford, 2008. https://eds.p.ebscohost.com/eds/ebookviewer/ebook?sid=3d449ead-45d8-4750-a1d8-1e70261f6fd6%40redis&ppid=pp_289&vid=0&format=EB

Dunne, Nick. "Doing Business in Cayman Islands: Overview." Practical Law. Accessed February 12, 2024. http://uk.practicallaw.thomsonreuters.com/5-557-3005?transitionType=Default&contextData=(sc.Default)&firstPage=true.

European Central Bank (ECB). "July 2023 Euro Area Bank Lending Survey." Press release, July 25, 2023. https://www.ecb.europa.eu/press/pr/date/2023/html/ecb.pr230725~8358d3939d.en.html.

European Central Bank (ECB). *Financial Stability Review, November 2023*. November 22, 2023. https://www.ecb.europa.eu/pub/financial-stability/fsr/html/ecb.fsr202311~bfe9d7c565.en.html.

European Central Bank (ECB). "The Impact of Short-Term Interest Rates on Bank Credit Risk-Taking." *Financial Stability Review* (December 2007): 163–67. https://www.ecb.europa.eu/pub/pdf/fsr/art/ecb.fsrart200712_02.en.pdf.

European Central Bank (ECB). "Key ECB Interest Rates." European Central Bank, December 13, 2023. https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html.

Eurostat. "Annual Sector Accounts, Gross Household Saving Rate." January 26, 2024. https://doi.org/10.2908/NASA_10_KI.

Faller, Madison. "2023 in Review: Rates, Rallies and Reflections." J. P. Morgan Wealth Management, December 15, 2023. https://www.chase.com/personal/investments/learning-and-insights/article/tmt-december-fifteen-twenty-three.

Faridi, Fuad, Rushabh Kapashi, Vince Marriott, Matthieu Lemerie, and Ammar Zahid. "Five Big Shifts Shaping a New World for Corporate and Investment Banks." McKinsey, December 18, 2023.https://www.mckinsey.com/industries/financial-services/our-insights/five-big-shifts-shaping-a-new-world-for-corporate-and-investment-banks.

Federal Deposit Insurance Corporation (FDIC). *2023 Risk Review*. August 14, 2023. https://www.fdic.gov/analysis/risk-review/2023-risk-review.html.

Federal Reserve Bank of New York. "Consumers Expect Further Decline in Credit Applications and Rise in Rejection Rates." Press release, November 20, 2023. https://www.newyorkfed.org/newsevents/news/research/2023/20231120.

Federal Reserve Bank of San Francisco (SF Fed). "Please Explain How Financial Markets May Affect Economic Performance." January 1, 2005. https://www.frbsf.org/research-and-insights/publications/doctor-econ/2005/01/financial-markets-economic-performance.

Federal Reserve Bank of St. Louis (FRED). "Federal Funds Effective Rate, Percent, Monthly, Not Seasonally Adjusted." Accessed January 8, 2024. https://fred.stlouisfed.org/series/FEDFUNDS.

Fichtner, Jan. "The Cayman Conundrum: Why Is One Tiny Archipelago the Largest Financial Centre in Latin America and the Caribbean?" London School of Economics and Political Science. U.S. American Politics and Policy (blog). November 11, 2017. https://blogs.lse.ac.uk/usappblog/2017/11/11/the-cayman-conundrum-why-is-one-tiny-archipelago-the-largest-financial-centre-in-latin-america-and-the-caribbean/.

Financial Stability Board. *Global Monitoring Report on Non-Bank Financial Intermediation 2023*. December 18, 2023. https://www.fsb.org/2023/12/global-monitoring-report-on-non-bank-financial-intermediation-2023/.

Fitch Ratings. "Core Inflation, Rising Rates Remain Main Credit Risks." August 17, 2023. https://www.fitchratings.com/research/banks/core-inflation-rising-rates-remain-main-credit-risks-17-08-2023.

Fitch Ratings. "Many DM100 Bank Net Interest Margins Have Peaked in 2023." November 27, 2023. https://www.fitchratings.com/research/banks/many-dm100-bank-net-interest-margins-have-peaked-in-2023-27-11-2023.

Fitch Ratings. "U.S. Banks Report Weak 4Q23 Results; Signal Lower Net Interest Income in 2024." January 22, 2024. https://www.fitchratings.com/research/banks/us-banks-report-weak-4q23-results-signal-lower-net-interest-income-in-2024-22-01-2024.

Gandel, Stephen. "Largest US Banks Set to Log Sharp Rise in Bad Loans." *Financial Times*, January 8, 2024. https://www.ft.com/content/e7361b25-1082-4b18-852a-dea85ccef7d4.

Gilchrist, Karen. "Bank of England Rate Cuts Likely Later but Larger, Goldman Sachs Says." CNBC, February 20, 2024. https://www.cnbc.com/2024/02/20/bank-of-england-rate-cuts-likely-later-but-larger-goldman-sachs-says.html.

Graf, Alex and Zuhaib Gull. "Expected Fed Rate Cuts Unlikely to Reduce NIM Pressure in 2024." *S&P Global Market Intelligence*, December 27, 2023. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/expected-fed-rate-cuts-unlikely-to-reduce-nim-pressure-in-2024-79863643.

Ha, Jongrim, M. Ayhan Kose, and Franziska Ohnsorge. "Is the Great Inflation Scare over? The Case for Cautious Optimism." *World Bank Blogs*. December 18, 2023. https://blogs.worldbank.org/voices/great-inflation-scare-over-case-cautious-optimism.

Ha, Jongrim, M. Ayhan Kose, and Franziska L. Ohnsorge. *Global Inflation Synchronization*. Policy Research Working Paper 8768. Washington, DC: The World Bank Group, February 2019. https://documents.worldbank.org/curated/en/733211551994244422/pdf/WPS8768.pdf.

Hayes, David. "Bankers Lower Deposit Hopes; Deposit Rate Specials to Continue." S&P Global Market Intelligence, August 23, 2023. https://www.spglobal.com/marketintelligence/en/news-insights/research/bankers-lower-deposit-hopes-deposit-rate-specials-to-continue-s-p-survey.

Henry, Jake, Mieke Van Oostende. "Top M&A Trends in 2024: Blueprint for Success in the next Wave of Deals." McKinsey & Company, February 20, 2024. https://www.mckinsey.com/capabilities/m-and-a/our-insights/top-m-and-a-trends-in-2024-blueprint-for-success-in-the-next-wave-of-deals.

Hersch, Karl, James Colaço, and Michelle Canaan. "2024 Insurance Outlook." Deloitte, July 27, 2023. https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-outlooks/insurance-industry-outlook.html.

Hinton, Angela, and Chester Polson. "The Historic Relationship Between Bank Net Interest Margins and Short-Term Interest Rates." *Federal Deposit Insurance Corporation (FDIC) Quarterly* 15, no. 2 (2021): 31–41. https://www.fdic.gov/analysis/quarterly-banking-profile/fdic-quarterly/2021-vol15-2/article1.pdf.

Hobjin, Bart, Russell Miles, James Royal, and Jing Zhang. "What Is Driving U.S. Inflation amid a Global Inflation Surge?" *Chicago Fed Letter* no. 470 (August 2022). https://www.chicagofed.org/publications/chicago-fed-letter/2022/470.

Holzheu, Thomas. "Higher Interest Rates Are Raising the Bar for Us Property & Casualty Insurance Profitability." Swiss Re, November 29, 2023. https://www.swissre.com/reinsurance/insights/us-p-and-c-insurance-profitability.html.

IBISWorld. *Commercial Banking in the US*. Industry Report 52211, November 2023. https://www.ibisworld.com/united-states/market-research-reports/commercial-banking-industry/.

IBISWorld. *Global Commercial Banks*. Industry Report J5511-GL, September 2023. https://www.ibisworld.com/global/market-research-reports/global-commercial-banks-industry/.

IBISWorld. *Global Investment Banking & Brokerage*. Industry Report J5521-GL, September 2023. https://my.ibisworld.com/gl/en/industry/j5521-gl/at-a-glance.

Insurance Information Institute (III). "Background on: Insurance Accounting." October 20, 2020. https://www.iii.org/article/background-on-insurance-accounting.

International Association of Insurance Supervisors (IAIS). *Global Insurance Market Report (GIMAR)*. December 6, 2023. https://www.iaisweb.org/uploads/2023/12/Global-Insurance-Market-Report-2023.pdf.

International Monetary Fund (IMF). *Appendix 3: Financial Intermediation Services Indirectly Measured*. 2014. https://www.imf.org/external/pubs/ft/bop/2014/pdf/BPM6_A3F.pdf.

International Monetary Fund (IMF). "Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic." October 2021. https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19.

International Monetary Fund (IMF). *Global Financial Stability Report*. April 2023. https://www.imf.org/en/Publications/GFSR/Issues/2023/04/11/global-financial-stability-report-april-2023.

International Monetary Fund (IMF). "Inflation Rate, Average Consumer Prices." October 2023. https://www.imf.org/external/datamapper/PCPIPCH@WEO.

International Monetary Fund (IMF). "Statistical Appendix." In *World Economic Outlook: Navigating Global Divergences*. October 2023. https://www.imf.org/-/media/Files/Publications/WEO/2023/October/English/statsappendix.ashx.

International Monetary Fund (IMF). *World Economic Outlook, April 2023: A Rocky Recovery*. April 2023. https://www.imf.org/en/Publications/WEO/Issues/2023/04/11/world-economic-outlook-april-2023.

JPMorgan Chase. "Three Megatrends Disrupting the Cross-Border Payments Landscape." October 6, 2021. https://www.jpmorgan.com/insights/payments/cross-border-payments/three-megatrends-disrupting-cross-border-payments.

KASE Insurance. "Rising Interest Rates Impact On Home Builders Insurance." January 24, 2023. https://kaseinsurance.com/news/impact-of-rising-interest-rates-home-builders-insurance/.

Khan, Zia, Harry Terris, Ben Meggeson, and Mohammad Taqi. *The World's 100 Largest Banks, 2023*. S&P Global Market Intelligence, April 26, 2023. https://www.spglobal.com/marketintelligence/en/news-insights/research/the-world-s-100-largest-banks-2023.

Klein, Rachel. "Insurance Companies: Investing the Float to Create a Stream of Revenue." GAAP Dynamics, February 8, 2022. https://www.gaapdynamics.com/insights/blog/2022/02/08/insurance-companies-investing-the-float-to-create-a-stream-of-revenue/.

Leonard, Michel. "Inflation and Insurance Replacement Costs." International Insurance Society, November 9, 2023. https://www.internationalinsurance.org/intelligence_economics_inflation_and_insurance_replacement_costs.

Liberto, Daniel. "Investment Platforms Explained." *NerdWallet UK*, February 19, 2021. https://www.nerdwallet.com/uk/investing/investment-platforms-explained/.

Liu, Karen, and Suying Liu. "Surrender Risk in Life Insurance Policies." Scientific Social Research Network. Rochester, NY, April 19, 2015. https://doi.org/10.2139/ssrn.3039562.

Marsh, W. Blake, and Brendan Laliberte. "The Implications of Unrealized Losses for Banks." *The Federal Reserve Bank of Kansas City Economic Review* (April 11, 2023): 5–24. https://doi.org/10.18651/ER/v108n2MarshLaliberte.

Mathai, Koshy. "Monetary Policy: Stabilizing Prices and Output." *International Monetary Fund (IMF), F&D Magazine*, June 15, 2021. https://www.imf.org/en/Publications/fandd/issues/Series/Back-to-Basics/Monetary-Policy.

Natarajan, Sridhar. "Morgan Stanley Plans 3,000 More Job Cuts as Dealmaking Slumps." *Bloomberg.com*, May 1, 2023. https://www.bloomberg.com/news/articles/2023-05-01/morgan-stanley-plans-3-000-more-job-cuts-amid-dealmaking-slump.

National Association of Insurance Commissioners (NAIC). "Glossary of Insurance Terms." Accessed February 9, 2024. https://content.naic.org/consumer_glossary.

National Association of Insurance Commissioners (NAIC). "Interest Rates & Insurance." August 24, 2023. https://content.naic.org/cipr-topics/low-interest-rates.

O'Brien, Gigi. "Decade-Low European Mortgage Growth Forecast This Year and Next, as High Borrowing Costs and a Weak Economy Drive down Demand." Press Release, EY, December 11, 2023. https://www.ey.com/en_gl/news/2023/12/decade-low-european-mortgage-growth-forecast-this-year-and-next-as-high-borrowing-costs-and-a-weak-economy-drive-down-demand.

Organisation for Economic Co-operation and Development (OECD). "Consumer Prices." https://doi.org/10.1787/0f2e8000-en, 2018. https://www.oecd-ilibrary.org/content/data/0f2e8000-en.

Organisation for Economic Co-operation and Development (OECD). *Global Insurance Market Trends 2023*, December 20, 2023. https://www.oecd-ilibrary.org/finance-and-investment/global-insurance-market-trends-2023_e141d5ff-en.

Organisation for Economic Co-operation and Development (OECD). *Global Insurance Market Trends - Preliminary 2022 Data*. July 2023. https://www.oecd.org/daf/fin/private-pensions/GIMT-Preliminary-2022.pdf.

Reinsdorf, Marshall. *Measurement of Implicitly-Priced Output of Commercial Banks in the U.S. National Accounts*. Studies in Methods (Ser. F). United Nations, March 2011. https://unstats.un.org/unsd/nationalaccount/rameetings/tfmar2011/pp12-1.pdf.

Riordan, Darragh, and Marissa Ramos. "European Bank Deposits Fall as Customers Seek out Higher Interest Rates." S&P Global Market Intelligence, August 29, 2023. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/european-bank-deposits-fall-as-customers-seek-out-higher-interest-rates-77188919.

Robinson, Daniel, and Rashawn Mitchner. "Why Is Car Insurance Mandatory?" MarketWatch - Guides, December 27, 2023. https://www.marketwatch.com/guides/insurance-services/why-is-car-insurance-mandatory/.

S&P Global. *Global Banks Country-By-Country Outlook 2024: Forewarned Is Forearmed*. 2024. https://www.spglobal.com/ratings/en/research/pdf-articles/231116-global-banks-country-by-country-outlook-2024-forewarned-is-forearmed-101589446.

Sanglap, Ranina, and Mohammad Taqi. "Most Large Asia-Pacific Banks Set for Lending Income Growth in 2023, 2024." S&P Global Market Intelligence, June 21, 2023. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/most-large-asia-pacific-banks-set-for-lending-income-growth-in-2023-2024-76170687.

Smith, Elliot. "Moody's Cuts Ratings of 10 U.S. Banks and Puts Some Big Names on Downgrade Watch." CNBC, August 8, 2023. https://www.cnbc.com/2023/08/08/moodys-cuts-ratings-of-10-us-banks-and-puts-some-big-names-on-downgrade-watch.html.

Swiss Re. "Risks on the Rise as Headwinds Blow Stronger." November 21, 2023. https://www.swissre.com/institute/research/sigma-research/sigma-2023-06-global-outlook.html.

Telles Jr., Rudy, Nick Martinez, and Ted Peck. "Annual Update of the U.S. International Transactions Accounts." *Survey of Current Business, BEA* Volume 100, no. Number 7 (July 2020). https://apps.bea.gov/scb/issues/2020/07-july/0720-annual-international-transactions.htm.

Turturescu, Eveline. *Impact of Inflation on the Insurance Sector*. EIOPA-BoS-23/360. European Insurance and Occupational Pensions Authority, October 5, 2023. https://www.eiopa.europa.eu/system/files/2023-10/Report%20on%20the%20impact%20of%20inflation%20on%20the%20insurance%20sector.pdf.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Guide to Reporting Countries on BEA Surveys." Accessed March 1, 2024. https://www.bea.gov/system/files/2024-01/Guide-to-Reporting-Countries-on-BEA-Surveys.pdf.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Table 2.1. U.S. Trade in Services, by Type of Service." July 6, 2023. https://apps.bea.gov/iTable/?reqid=62&step=6&isuri=1&tablelist=245&product=4.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Table 2.2. U.S. Trade in Services, by Type of Service and by Country or Affiliation." July 6, 2023. https://apps.bea.gov/iTable/iTable.cfm?ReqID=62&step=1.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA), "Table 2.3. U.S. Trade in Services, by Country or Affiliation and by Type of Service," July 6, 2023. https://apps.bea.gov/iTable/iTable.cfm?ReqID=62&step=1.

U.S. Department of Commerce (USDOC). U.S. Bureau of Economic Analysis (BEA). "Table 2.6. 'Personal Income and Its Disposition, Monthly.'" Accessed January 26, 2024. https://apps.bea.gov/iTable/?reqid=19&step=3&isuri=1&1921=survey&1903=76.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). Table 3.1. "U.S. International Trade in Services." December 20, 2023. https://apps.bea.gov/iTable/?reqid=62&step=6&isuri=1&tablelist=51&product=1.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Table 4.1. Services Supplied to Foreign Persons by U.S. MNEs Through Their MOFAs, by Industry of Affiliate and by Country of Affiliate." October 5, 2023. https://apps.bea.gov/iTable/iTable.cfm?ReqID=62&step=1.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Table 4.1. U.S. International Transactions in Primary Income." March 21, 2024.https://apps.bea.gov/iTable/?reqid=62&step=6&isuri=1&6210=1&6200=56.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Table 5.1. Services Supplied to U.S. Persons by Foreign MNEs Through Their MOUSAs, by Industry of Affiliate and by Country of UBO." October 5, 2023. https://apps.bea.gov/iTable/iTable.cfm?ReqID=62&step=1.

U.S. Department of the Treasury (U.S. Treasury). "TIC Forms and Instructions." March 19, 2024. https://home.treasury.gov/data/treasury-international-capital-tic-system-home-page/tic-forms-instructions.

U.S. International Trade Commission (USITC). *Recent Trends in U.S. Services Trade 2020 Annual Report*. 5094. Washington, DC, July 2020. https://www.usitc.gov/sites/default/files/publications/332/pub5094.pdf.

U.S. News & World Report. "How Do Those Car Insurance Tracking Devices Work?" Accessed March 1, 2024. https://www.usnews.com/insurance/auto/how-do-those-car-insurance-tracking-devices-work.

U.S. Securities and Exchange Commission (SEC). *Investor Bulletin: Hedge Funds*. SEC Pub. 139 (2/13). Office of Investor Education and Advocacy, February 2013. https://www.sec.gov/files/ib_hedgefunds.pdf.

U.S. Securities and Exchange Commission (SEC). "Mutual Funds." Investor.gov. Accessed December 7, 2023. https://www.investor.gov/introduction-investing/investing-basics/investment-products/mutual-funds-and-exchange-traded-1.

U.S. Securities and Exchange Commission (SEC). "Private Equity Funds." Investor.gov. Accessed December 7, 2023. https://www.investor.gov/introduction-investing/investing-basics/investment-products/private-investment-funds/private-equity.

U.S. Securities and Exchange Commission (SEC). "Securities Lending." Accessed February 29, 2024. https://www.investor.gov/introduction-investing/investing-basics/glossary/securities-lending.

U.S. Securities and Exchange Commission (SEC). Office of the Advocate for Small Business Capital Formation. *What Is a Broker Dealer?* Accessed January 16, 2024. https://www.sec.gov/files/oasb-broker-dealer-building-block.pdf.

Vasquez, Leonardo. "Unpacking the Causes of Pandemic-Era Inflation in the US." National Bureau of Economic Research, September 1, 2023. https://www.nber.org/digest/20239/unpacking-causes-pandemic-era-inflation-us.

Wade, Mike, Neil Tomlinson, and Val Srinivas. *2024 Banking and Capital Markets Outlook*. Deloitte, August 2023. https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-outlooks/banking-industry-outlook.html.

Walker, Owen. "Banks Shed 60,000 Jobs in One of Worst Years for Cuts since Financial Crisis." *Financial Times*, December 26, 2023. https://www.ft.com/content/cbc6e15d-3c63-49af-9f98-ef8f478431bd.

Wade, Mike, Neil Tomlinson, and Val Srinivas. "2024 Banking and Capital Markets Outlook." Deloitte, 2023. https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-outlooks/banking-industry-outlook.html.

Waters, Carlos. "Americans Are Saving Far Less than Normal in 2023. Here's Why." CNBC, April 27, 2023. https://www.cnbc.com/2023/04/27/us-personal-savings-rate-falls-near-record-low-as-consumers-spend.html.

Weisbach, Annette. "Markets Could Be about to Get a Big Clue on When the European Central Bank Will Cut Rates." CNBC, March 6, 2024. https://www.cnbc.com/2024/03/06/when-will-european-central-bank-cut-rates-markets-could-soon-get-clues.html.

Weisbart, Steven. *How Insurance Drives Economic Growth*. Insurance Information Institute, June 2018. https://www.iii.org/sites/default/files/docs/pdf/insurance-driver-econ-growth-053018.pdf.

White, Carl. "Rising Interest Rates Complicate Banks' Investment Portfolios." Federal Reserve Bank of St. Louis, February 9, 2023. https://www.stlouisfed.org/on-the-economy/2023/feb/rising-rates-complicate-banks-investment-portfolios.

Wong, Michele. *Capital Markets Special Report*. National Association of Insurance Commissioners. Accessed December 1, 2023. https://content.naic.org/sites/default/files/capital-markets-special-reports-asset-mix-ye2022.pdf.

Wooldridge, Leslie Quander. "What to Know About Investment Banking and the Professionals Driving the Biggest Deals on Wall Street." Business Insider. Accessed December 6, 2023. https://www.businessinsider.com/personal-finance/investment-banking.

World Bank. *Global Economic Prospects*. June 2023. https://openknowledge.worldbank.org/server/api/core/bitstreams/6e892b75-2594-4901-a036-46d0dec1e753/content.

World Bank. "Financial Sector." Accessed March 1, 2024. https://www.worldbank.org/en/topic/financialsector/overview.

Zhuo, Tee. “Global M&A Drought Ends as Blockbuster Deals Double in First Quarter.” Financial Times, March 28, 2024. https://www.ft.com/content/9f324c88-4f9a-4d07-be5f-b83b71c7e4f9.

Chapter 3
Financial Services Firms Embrace Digitalization and Look to Incorporate New AI Technologies

This chapter highlights increased digitalization and the adoption of new technologies in the major financial services industries of banking, insurance, and securities services. Financial services firms rely heavily on complex modeling and data analysis tools to create the products that they market to consumers—whether they be car loans, life insurance policies, or securitized assets. Also, insurers, banks, and securities firms are incentivized to adopt technologies that improve both their product offerings and their digital infrastructures. Thus, these firms have begun to incorporate recent advancements in machine learning (ML) and artificial intelligence (AI), including generative AI (GenAI), to both improve their products and power their digital trading engines, online customer platforms, middle-office risk management, and back-end information technology (IT) processes.[131]

ML refers to statistical algorithms that process and learn from sets of data to generalize unseen data, and thus can perform tasks without explicit instructions.[132] References to AI in this report refer to the application of advanced algorithms such as ML in financial services products and processes. Generative AI technologies utilize sophisticated large content machine learning models to generate high quality original output such as text and images.[133] Cross-border data flows are critical to financial services firms' ability to use AI efficiently to aggregate, store, process, and transmit data globally.[134]

In the banking industry, advances in AI have led to the development of hyper-personalized products and services, like advanced chatbots and virtual assistants, and growth in cashless payment services. Technological advances have also improved banks' risk modeling for regulatory compliance, fraud detection, and back-office IT operations. In the insurance industry, firms are exploring how to integrate ML and AI technologies into their underwriting and claims management, while web-based digital platforms are becoming increasingly integral for sales and marketing. At the same time, these advances have increased concerns of cybersecurity attacks in the financial services industries and have encouraged new market entrants in the cyber insurance industry, which insures policyholders against cyberattacks.[135]

In the securities industry, investment banks and funds have widely adopted ML, AI, and other sophisticated technology tools across their operations. Use of these tools has resulted in advances in

[131] Martineau, "What Is Generative AI?," April 20, 2023. IBM, "What Is Artificial Intelligence in Finance?," accessed March 7, 2024.
[132] Columbia, "Artificial Intelligence (AI) vs. Machine Learning," accessed April 16, 2024.
[133] Zewe, "Explained: Generative AI," November 9, 2023.
[134] OECD, Artificial Intelligence, Machine Learning and Big Data in Finance, August 11, 2021, 38.
[135] The technical methods of gaining unauthorized access can take many forms, including phishing, spoofing, insider threat actors, and DNS Tunneling, among others. Baker, "10 Most Common Types of Cyber Attacks," November 9, 2023.

algorithmic trading strategies,[136] a proliferation of tokenized assets,[137] and growth in consumer-facing services, such as retail investing platforms and robo-advisory services.[138] Digitalization in securities services has also fundamentally changed firms' processes for handling transactions.

Banking Services: Moves Toward More Advanced Digitalization Use and Adopting New AI Technologies

Over the past five years, the banking industry has increasingly moved services and functions to digital and online processes.[139] One notable development has been the introduction of open banking technology, which enables the integration of banking, transactions, and other financial data between banks and nonbanks.[140] Beginning as a response to the European Union (EU) Payment Services Directive in 2015, open banking has since spread globally, with 130 million people expected to use open banking in 2024 (an increase of fivefold increase over four years).[141] Open banking offers banks the ability to collaborate with tech firms, improve customer experience, acquire customer behavior data, and integrate banking services with the services offered by a wide variety of other industries.[142] As a result, banks have more data at their disposal to use in AI applications (apps).[143]

[136] Algorithmic trading strategies use AI to analyze market trends and historical data to make decisions and execute trades faster than humans. IBM, "What Is Artificial Intelligence in Finance?," accessed March 7, 2024.
[137] Tokenized assets can include cryptocurrency, representations of tangible assets such as real estate, financial assets such as bonds and equities, and digital assets such as art, all of which are stored, shared, and traded on public and permanent digital ledgers that are often referred to as the "blockchain." Banerjee et al., "Tokenization: A Digital-Asset Déjà Vu," August 5, 2023.
[138] Robo-advisory services are algorithm-driven applications that provide automated investing advice.
[139] Lamarre et al., "The Value of Digital Transformation," July 31, 2023; *American Banker*, "The State of Digital Banking," June 28, 2023.
[140] Harrison, "What Is Open Banking?," November 23, 2022; Barber, "America Embraces Open Banking," November 7, 2023; Rangachari, *The Open Banking Transformation*, 2018. For more on digital transformation and open banking, see USITC, *Recent Trends 2020*, July 2020, 56.
[141] Building on previous laws that established payment rules throughout the EU such as the Payment Services Directive in 2007, the 2015 EU Payment Services Directive specifically considers digital payment services in its rules including provisions that promote innovation in digital payment services and that facilitate easier and safer use of internet payment services. European Parliament and the Council of the European Union, *Directive (EU) 2015/2366 on Payment Services in the Internal Market*, November 25, 2015, at (4); Barber, "America Embraces Open Banking," November 7, 2023; Abbott, "Top 10 Banking Trends for 2023," 2023; Al-Sharaf, "How Open Banking Is Levelling the Financial Playing Field in the Middle East," November 22, 2023.
[142] Harrison, "What Is Open Banking?," November 23, 2022; Barber, "America Embraces Open Banking," November 7, 2023; Rangachari, *The Open Banking Transformation*, 2018. For more on open banking, see USITC, *Recent Trends 2020*, July 2020, 56.
[143] Challapalli, "Fintech Data Integration Challenges and Effective Strategies," July 3, 2023; Zubenko, "How Big Data Changes the Scope," September 19, 2023; Imeson, "Big Data Makes a Big Difference to Banks," December 3, 2012.

Banks Use Advanced Technology to Improve Service and Back-Office Operations

Many banks are using AI in order to improve customer experience, using advanced analytics to provide hyper-personalized products and services to meet customer expectations.[144] For example, in 2018, Bank of America launched Erica, a virtual assistant for retail banking services built using AI. In October 2022, Bank of America reported that the platform has assisted over 32 million users in reviewing finances and completing transactions.[145] Similarly, Citibank uses advanced analytical tools in its U.S. personal banking business to provide customer service via phone, internet, and mobile banking that is reportedly comparable to service in-person.[146]

Banks have also been employing advanced technology integrations in the commercial banking segment. Citibank has developed and invested in digital tools for commercial/institutional clients to assist in wealth management, third-party service integration, workflow automation, and business intelligence. These tools include financial coaching apps that, according to Citibank, teach customers how to invest and automation that saves resources by integrating third-party services to create financial plans and quarterly performance documents faster.[147] Similarly, Bank of America states that it offers Banker Assist, an AI virtual assistant for its business clients, which uses the same technology as Erica.[148]

These technologies have also allowed banks to better serve particular market segments. For example, in 2023, OneUnited Bank, the largest Black-owned bank in the United States, launched WiseOne Insights. As stated by OneUnited Bank, WiseOne Insights is a financial wellness companion app aimed at reducing the racial wealth gap. The app uses AI to provide personalized financial advice, such as personalized debt payoff strategies, and reduce financial stress.[149] Similarly, Mauritius Commercial Bank, a foreign bank based in Fort Louis, Mauritius, and founded in 1838, has developed JuicePro, a mobile platform designed for small and medium-sized enterprise customers built on AI. JuicePro currently serves over 20,000 businesses with services such as faster interbank transfers and instant credit options.[150]

In addition to client-facing applications, banks employ AI to improve back-office operations and processes, often partnering with technology firms. According to an industry survey, banks use AI most heavily in fraud detection and optimizing IT operations. Other applications include risk management and credit scoring.[151] For example, J. P. Morgan Chase states that it has used AI since 2021 to screen payment validations, resulting in lower levels of fraud, fewer false positives, and better customer

[144] Francis, Jacob, and Zoghby, *The Data and Analytics Edge in Corporate and Commercial Banking*, March 9, 2023, 2; Wade et al., *2024 Banking and Capital Markets Outlook*, August 2023, 14–15.
[145] Bank of America, "Bank of America's Erica . . . 1 Billion Client Interactions," October 12, 2022; Cross, "The AI Use Cases," September 20, 2023.
[146] Goodwin, "Citi US Personal Banking Turns to AI," June 16, 2023.
[147] *PYMNTS*, "Citi Says AI Will Personalize Treasury," July 5, 2023; Zec, Arnon, and Chin, "How AI Is Transforming Wealth Management," August 23, 2023; Clarke, "Citigroup CEO Jane Fraser Lays out AI Plans," July 12, 2023.
[148] Bank of America "Bank of America's Erica . . . 1 Billion Client Interactions," October 12, 2022.
[149] OneUnited Bank, "OneUnited Bank Introduces WiseOne Insights," October 26, 2023.
[150] Qazini, "From Threat to Solution," June 1, 2023; Mauritius Commercial Bank, *Annual Report 2023*, September 25, 2023, 11, 37,71–72; Backbase, "Mauritius Commercial Bank Launches Backbase-Built SME Banking Platform," August 24, 2020.
[151] EIU, *Banking on a Game-Changer: AI in Financial Services*, 2022.

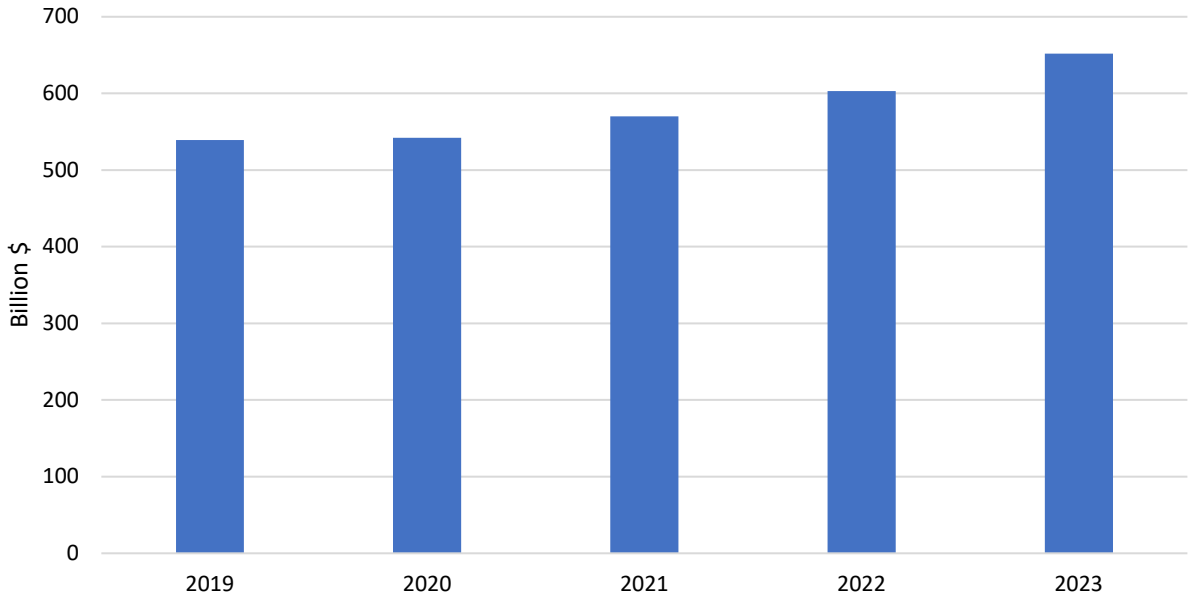
experience.[152] In 2022, Deutsche Bank partnered with NVIDIA to use AI to reportedly improve risk management, boost efficiency, and improve customer service.[153] In Latin America, banks have partnered with Microsoft to integrate AI into their operations, which has reportedly led to faster credit approvals for retail and commercial bank customers.[154]

Because of these efficiency gains, technology spending among global banks—particularly in advanced analytics—has increased and is anticipated to continue to grow in the next few years.[155] Gartner, a tech industry observer, estimates that technology spending in the global banking sector increased by 4.1 percent to $603 billion in 2022, and it forecast an 8.1 percent increase for 2023 (figure 3.1).[156] In 2022, North American retail banks were the leaders in technology spending worldwide, with the largest growth occurring in the Middle East and Africa, Latin America, and Asia Pacific.[157] Because of the high cost of development and implementation, large multinational banks and banks operating in large markets are better poised to benefit from technology spending because they can take advantage of economies of scale.[158] However, a recent survey of global banks indicates that regional/community banks and credit unions also have several key technology spending priorities. These include enhancing security, fraud mitigation, customer onboarding/origination, process automation, and digital payments.[159]

[152] JPMorgan Chase, "How AI Will Make Payments More Efficient and Reduce Fraud," November 20, 2023; Crosman, "JPMorgan Chase Using Advanced AI to Detect Fraud," July 3, 2023.
[153] Deutsche Bank, "Deutsche Bank Partners with NVIDIA," December 7, 2022; Deutsche Bank, "How Artificial Intelligence Is Changing Banking," accessed November 30, 2023.
[154] Amador, "Open Finance and AI," June 26, 2023; Briggs, "Bringing Financial Inclusion to Latin America with Fintech and AI," March 15, 2023; BNamericas, "'All LatAm Banks Knocked on Our Door," June 28, 2023.
[155] *American Banker*, "A Deep Dive into the Tech Priorities," July 10, 2023; Mason, "Banks Still Plan to Increase Tech Spend in 2023," May 4, 2023; Gartner, "Gartner Forecasts . . . $652 Billion in 2023," July 21, 2023; *American Banker*, "A Deep Dive into the Tech Priorities," July 10, 2023.
[156] Gartner, "Gartner Forecasts . . . $652 Billion in 2023," July 21, 2023.
[157] Hines and Lodge, "Retail Banking Technology Spending Forecasts 2022–27," August 25, 2022; Hines, "Retail Banking Tech Spending Trends Reflect Multiple Challenges," November 10, 2022.
[158] Fernández, *AI in Banking*, October 31, 2023.
[159] *American Banker*, "A Deep Dive into the Tech Priorities," July 10, 2023.

Figure 3.1 Global technology spending for banking and investment services, 2019–23

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.28.



Source: "Global Banking & Securities IT Spending 2025," April 2021; Hines and Lodge, "Retail Banking Technology Spending Forecasts 2022-2027," August 25, 2022; Gartner, "Gartner Forecasts . . . Spending to Reach $652 Billion in 2023," July 21, 2023.

Cybersecurity in Banking

The increase in digital interconnectedness, as well as the increased use of sophisticated technologies like AI that rely on large amounts of data, has led banks to devote more resources toward cybersecurity.[160] Besides health care, financial services is the industry most impacted by cybersecurity incidents, with cybersecurity attacks on banks becoming more frequent, sophisticated, and costly.[161] According to an Ernst & Young[162] and Institute of International Finance banking industry survey, 72 percent of global banks view cybersecurity threats as their top near-term risk.[163]

Cybersecurity concerns include data breaches, ransomware,[164] cloud security, AI attacks, phishing attacks, and legacy IT system attacks.[165] For firms, cybersecurity incidents threaten operational

[160] S&P Global, *Global Bank Country-By-Country Outlook 2023*, November 17, 2022, 9; S&P Global, *Global Banks Country-By-Country Outlook 2024: Forewarned Is Forearmed*, November 16, 2023, 8; Wade et al., *2024 Banking and Capital Markets Outlook*, August 2023, 14.
[161] Kellermann, *Cyber Bank Heists: Threats to the Financial Sector*, 2023; SentinelOne, "Cyber Attacks on Financial Institutions | Why Banks Are Caught in the Crosshairs," August 22, 2023; IBM, "Cost of a Data Breach Report 2023," July 2023, 13.
[162] Ernst & Young is one of the "big four" accounting firms.
[163] Graham, "Cybersecurity Is Number One Risk for Global Banks, but Geopolitical Risk Tops European Banks' Concerns," January 11, 2023.
[164] In a ransomware attack, malicious software is downloaded onto a computer or network that ultimately encrypts data, files, devices, or systems, with the perpetrator of such an attack restricting access or use until a ransom is paid. Shea and Irei, "What Is Ransomware?," accessed December 18, 2023.
[165] McKnight and Tipton, "10 Risks and Cybersecurity Strategies for Banks," March 23, 2023.

disruption, financial loss, and brand reputation.[166] Costs to firms include ransom payments, forensic analysis fees, public relations and crisis management costs, legal fees, remediation costs, and increased insurance premiums. These costs vary by the industry, severity, and breadth of the attack.[167] Data breaches, for instance, had an average cost of $5.9 million in 2023 for financial firms globally—$1.45 million higher than the average across industries, according to IBM.[168] Furthermore, these costs increased with the number of records lost, with mega data breaches—data breaches of 1 million records or more—averaging $36 million in costs for breaches of 1 million to 10 million records to $332 million in average costs for breaches of 50 million to 60 million records in 2023.[169]

Cybersecurity attacks increasingly target banks of varying sizes and in different regions.[170] One example is SOVA, a banking trojan or application disguised as a legitimate banking app, which targeted entities based in Russia, Spain, and the United States in 2021, and India in 2022.[171] Large international banks as well as local community banks have been targets of cybersecurity incidents, resulting in a variety of operational issues. In 2023, a ransomware attack on the U.S. arm of Industrial and Commercial Bank of China caused trade failures in the U.S. Treasury market.[172] In that same year, U.S. community bank Tri Counties Bank also suffered a ransomware attack, which disclosed identity documents of bank clients and caused automated teller machine (ATM) outages.[173]

In other cases, bank customers are indirectly affected via third-party providers, such as the over 57,000 accounts serviced by Bank of America that were subject to a data breach of Infosys McCamish, a financial software provider, in November 2023.[174] Industry participants note that community banks and other small banks, compared to large banks, face greater risks of cybersecurity incidents and long-term damage because of limited resources for cybersecurity.[175] Furthermore, because of the interconnectedness of the banking system, cybersecurity attacks may spread between banks via third-party providers.[176]

Regulatory efforts to address cybersecurity threats vary by region. In the United States, the Cybersecurity and Infrastructure Security Agency (established in 2018 and part of the U.S. Department

[166] Fowler et al., "Cybersecurity Threats and Incidents Differ by Region," August 14, 2023.
[167] SentinelOne, "Cyber Attacks on Financial Institutions | Why Banks Are Caught in the Crosshairs," August 22, 2023.
[168] IBM, "Cost of a Data Breach Report 2023," July 2023, 10.
[169] IBM, "Cost of a Data Breach Report 2023," July 2023, 47.
[170] Banks in the United States, Argentina, Brazil, and China are particularly frequent targets of cybersecurity attacks. Kellermann, *Cyber Bank Heists: Threats to the Financial Sector*, 2023; SentinelOne, "Cyber Attacks on Financial Institutions | Why Banks Are Caught in the Crosshairs," August 22, 2023.
[171] Flashpoint, "Flashpoint Year in Review," December 21, 2022.
[172] Pape, "Chico Bank Suffers Data Breach after February Cyber Attack," March 23, 2023; Pape, "Ransomware Attack on Chinese Bank Interrupts U.S. Treasury Trading," November 10, 2023.
[173] Pape, "Chico Bank Suffers Data Breach after February Cyber Attack," March 23, 2023.
[174] Pape, "Data Breach Affects 57,000 Bank of America Accounts," February 13, 2024.
[175] U.S. Congress. House. Financial Services Committee, Subcommittee on Consumer Protection and Financial Institutions, Cyber Threats, Consumer Data, and the Financial System, November 3, 2021; Ratnam, "Small Banks Facing Greater Cyber Risks Urge Congress to Act," November 9, 2021.
[176] U.S. Congress. House. Financial Services Committee, Subcommittee on Consumer Protection and Financial Institutions, *Cyber Threats, Consumer Data, and the Financial System*, November 3, 2021; Ratnam, "Small Banks Facing Greater Cyber Risks Urge Congress to Act," November 9, 2021; Eisenbach et al., *Cyber Risk and the U.S. Financial System: A Pre-Mortem Analysis*, May 2021, 2–4.

of Homeland Security) and various executive orders have sought to improve cybersecurity across industries.[177] Further, the U.S. Consumer Financial Protection Bureau has adapted existing regulations to address cybersecurity and data protection issues, and the Federal Deposit Insurance Corporation, the Board of Governors of the Federal Reserve System, and the Office of the Comptroller of the Currency recently issued a final rule on bank responsibilities in notifying the primary federal regulator and customers of any significant cybersecurity incident.[178]

In addition to general regulations, the EU has dedicated cybersecurity regulations for the finance sector, such as the Digital Operational Resilience Act (2022).[179] The EU also continues to consider modifying existing regulations—such as its cybersecurity certification regulation—to include banks.[180] In China, regulators have reportedly increased supervision of banks and screening for risks.[181] In response to increased cross-border cybersecurity risks, plurilateral efforts to address concerns have also increased throughout the world. One example is the joint tests conducted in 2023 by the United States and Singapore to strengthen cross-border coordination and management of cybersecurity attacks.[182]

Payments Services for an Increasingly Cashless World

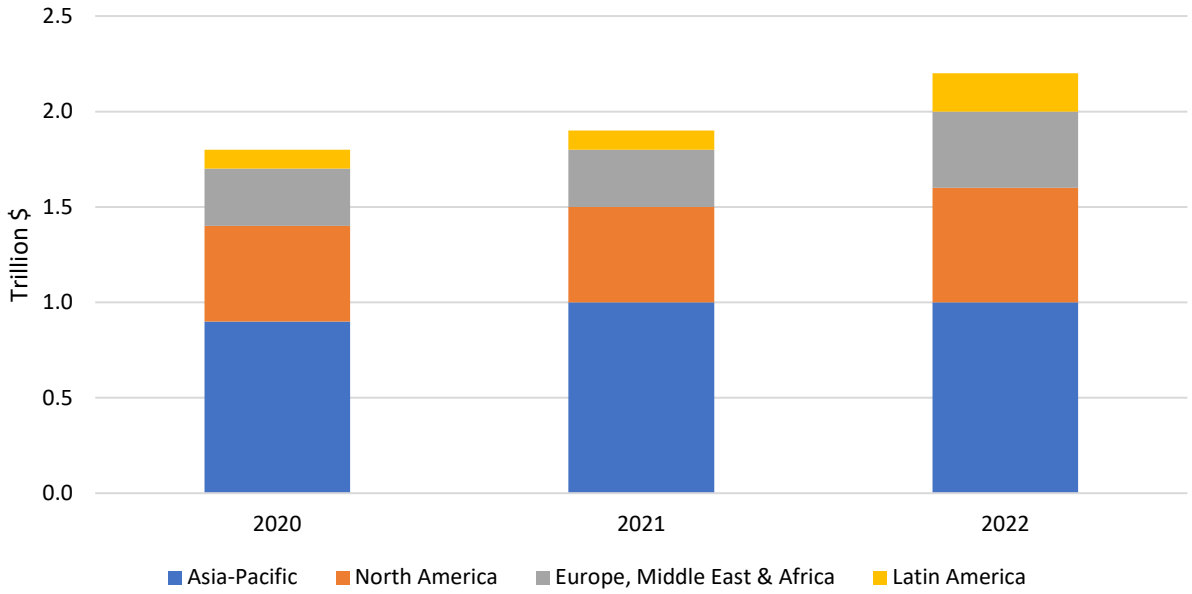
Payment services comprise the facilitation of domestic and cross-border monetary transactions between entities for services or goods purchases, money transfers, remittances, and credit card payments. Payment transaction services are provided by banks directly to their commercial and retail customers, and indirectly to firms and individuals via the credit card companies and other newer online transactions apps. From 2020 to 2022, global payment services revenues increased by 22.2 percent, to $2.2 trillion (figure 3.2).[183] Geographically, the Asia-Pacific region accounted for 45 percent of global payment revenues in 2022, followed by North America (27 percent) and Europe, the Middle East, and Africa (18 percent). Latin America experienced the fastest growth during 2020–22, effectively doubling to $200

[177] Cybersecurity and Infrastructure Security Agency Act, Pub. L. No. 115–278, § 2202, 132 Stat. 4168, 4169 (November 16, 2018) (redesignating the National Protection and Programs Directorate of the Department of Homeland Security as the Cybersecurity and Infrastructure Security Agency); CISA, "Shields Up," accessed November 30, 2023; CISA, "Cyber Safety Review Board (CSRB)," accessed November 30, 2023; The White House, "Office of the National Cyber Director," accessed November 30, 2023; Pape, "Here's How the White House's Cyber Initiatives Could Affect Banks," July 13, 2023; 86 Fed. Reg. 26633 (May 17, 2021); 87 Fed. Reg. 14143 (March 14, 2022); 88 Fed. Reg. 75191 (November 1, 2023); 89 Fed. Reg. 15421 (March 1, 2024).
[178] CFPB, "CFPB Issue Spotlight Analyzes 'Artificial Intelligence' Chatbots in Banking," June 6, 2023; CFPB, "Laying the Foundation for Open Banking in the United States," June 12, 2023; Federal Reserve Board, "Agencies Approve Final Rule," November 18, 2021; 86 Fed. Reg. 66424 (November 23, 2021).
[179] "Digital Operational Resilience Act (DORA) - Regulation (EU) 2022/2554," accessed December 20, 2023.
[180] Krüger and Brauchle, *The European Union, Cybersecurity, and the Financial Sector*, March 16, 2021; Chee, "EU Mulls Wider Scope for Cybersecurity Certification Scheme," November 27, 2023; Naydenov and Theocharidou, *EU Cybersecurity Initiatives in the Finance Sector*, March 2023.
[181] Bradsher and Che, "Why China Is Tightening Its Oversight of Banking and Tech," March 9, 2023; Gong et al., "China Cybersecurity and Data Protection," October 24, 2022.
[182] Monetary Authority of Singapore, "U.S. Treasury and Monetary Authority of Singapore … Crisis Management," May 2, 2023.
[183] McKinsey, *Global Payments Report*, September 18, 2023, 6.

billion in 2022.[184] In terms of revenue, U.S. firms American Express, Visa, Mastercard, and Block were the leading global providers of electronic payment transaction services in 2021.[185]

Figure 3.2 Global payment revenues by region, 2020–22

In trillions of dollars. Underlying data for this figure can be found in appendix B, table B.29.



Source: McKinsey Global Payments Report, September 18, 2023, 6.

Global cross-border payment revenues have posted considerable growth, increasing by 17 percent to $240 billion during 2022–23. In 2023, 69 percent of these revenues were from cross-border commercial payments. The remaining revenue was from cross-border consumer payments, such as remittances, which have relatively higher margins and are projected to grow more rapidly than commercial cross-border payments in the next five years.[186]

Key Trend in Payment Services—Cashless Payments

Worldwide, consumer transactions are becoming increasingly cashless,[187] a trend that has accelerated since the beginning of the 2020 pandemic. Digital wallets encompass an increasing share of payments as cash use has declined across all regions.[188] Asia leads this trend with 76 percent of the population using digital wallets in 2022, compared to the global average of 56 percent.[189]

Peer-to-Peer (P2P) payments—or cashless transactions that occur between consumers—have seen a particularly rapid increase. Traditionally carrying higher margins for payment providers, this segment has been one of the fastest-growing payment services segments as new service providers employ

[184] McKinsey, *Global Payments Report*, September 18, 2023, 6.
[185] GlobalData, "Top 10 Payment Companies in the World in 2021 by Revenue," 2022.
[186] McKinsey, *Global Payments Report*, September 18, 2023, 7.
[187] ECB, "Study on the Payment Attitudes of Consumers in the Euro Area (SPACE)—2022," December 20, 2022.
[188] Accenture, *Payments Gets Personal*, 2022.
[189] Accenture, *Payments Gets Personal*, 2022.

technology to offer cheaper and more convenient options. A 2023 industry survey documented a 25 percent increase in P2P transaction volume between December 2021 and March 2023, resulting from the growth in mobile apps and P2P payment providers such as Zelle and PayPal.[190] An estimated 40 percent of U.S. P2P payments and 10 percent of EU P2P payments were made using a mobile device in 2022.[191]

Contactless payments and Internet of Things (IoT) payments—which include payments using voice-enabled, wearable, or other technologies—have also increased in recent years. Examples include chip-embedded credit/debit cards, mobile phones, and smart watches that can be used to make payments at retail points of sale. The onset of the 2020 pandemic accelerated contactless payments because of their increased convenience and security, especially as consumers shifted from physical cash and more toward online and mobile banking.[192] Pioneers in IoT payments have predominately been nonfinancial service firms with experience in developing IoT devices, such as Apple and Google. However, incumbent payment firms such as MasterCard and Visa have made significant technology investments in this area as well.[193]

In the future, the payments industry expects continued growth in cashless payments, especially in IoT payments.[194] Costs, processing capacity, cybersecurity, and data protection concerns remain industry challenges because of payment services' reliance on technology.[195]

Outlook

In the next five years, industry observers and surveys predict greater AI adoption in the banking services sector, particularly in compliance and customer interaction, as well as the use of generative AI (GenAI).[196] Many of these recent banking applications of AI cited already use GenAI. Some industry observers suggest that in the future, GenAI may improve efficiency, decision-making, compliance reporting, and risk management in banking.[197] McKinsey estimates that GenAI adoption in areas such as product research and development, customer operations, and marketing and sales could reduce operating expenditures between $200 billion and $340 billion, or 2.8 to 4.7 percent of industry revenue.[198] Similarly, as banks employ more advanced technologies, cybersecurity spending by banks is expected to increase in the next few years.[199]

---

[190] *PYMNTS*, "P2P Transaction Volume up 25% as Firms Rush to the Space," August 9, 2023.
[191] Moore, *P2P Payment Methods: So Many Options, So Little Money?*, September 21, 2023; ECB, "Study on the Payment Attitudes of Consumers in the Euro Area (SPACE)—2022," December 20, 2022.
[192] Precedence Research, "P2P Payment Market Size to Hit Over USD 11.62 Trillion by 2032," September 2023; BIS, *Covid-19 Accelerated the Digitalisation of Payments*, December 9, 2021.
[193] Accenture, *Payments Gets Personal*, 2022.
[194] Stfalcon, "Application of the IoT Technology in Payment," June 7, 2023; Mastercard, *How IOT Will Shape the Future of Payments*, May 2021.
[195] Mastercard, *How IOT Will Shape the Future of Payments*, May 2021.
[196] Agarwal et al., *How Generative AI Can Help Banks*, March 1, 2024, 2; Marous, *2024 Retail Banking Trends and Priorities*, January 2024, 12.
[197] Fernández, *AI in Banking*, October 31, 2023; Shabsigh and Boukherouaa, "Generative Artificial Intelligence in Finance," August 22, 2023, 4.
[198] Bhattacharyya et al., *Global Banking Annual Review 2023*, October 10, 2023, 18; Chui et al., *The Economic Potential of Generative AI*, accessed January 16, 2024, 25, 28.
[199] IBISWorld, *Global Commercial Banks*, September 2023, 24.

Insurance Services: Digital Technologies Have Become Integral to Insurers' Operations

The adoption of digital technologies and the use of digitized data across insurance industry operations has been a gradual process over the past several decades. In the 1990s, the introduction of algorithms allowed insurance companies to better price insurance premiums. By the late 1990s and into the early 2000s, insurance companies began to develop websites that allowed customers to research products, get online quotes, and locate insurance agents, among other tasks[200]—a method of lead generation that is still actively used in 2023.[201] Digitalization has also impacted the distribution and marketing activities of insurers and streamlined the claims process. In recent years, global insurers have incorporated more advanced technologies such as cloud services that can be affected by data restrictions. As data protection becomes increasingly important, cyber insurance has grown in relevance while "insurtech" has gained prominence.

Distribution and Marketing

Indeed, in terms of distribution and marketing, web-based digital platforms are crucial tools for sales, service, and agent relations. For example, according to a 2022 consumer survey by Swiss Re, a global provider of reinsurance and insurance, online sales via insurers' websites or mobile phone apps contribute an average of 50 percent of total insurance sales in emerging markets, and 40 percent in advanced markets, although the majority of customers who buy insurance online consult with an agent[202] or broker[203] prior to making the purchase.[204]

Online price comparison platforms, which display insurance products and prices from multiple companies, have also been an important sales tool for insurance companies. The most advanced of these platforms use data verification tools to generate binding quotes that allow customers to complete the sales process online.[205] Further, updated broker portals and platforms are reportedly crucial to the retention of brokers and agents, because they provide self-service access to critical tools and information.[206] For example, myAIG—a new broker portal introduced by AIG in March 2023—reportedly allows brokers and agents complete access to customer accounts and policies, a document hub, customer activity trackers, and a tool to conduct loss runs.[207]

---

[200] WalkMe, "The Impact of Digital Transformation in the Insurance Industry," May 2, 2023.
[201] See, for example, State Farm, "Create an Affordable Price, Just for You," accessed February 13, 2024.
[202] An insurance agent is defined as a person who represents an insurance company and sells its insurance products. Captive agents are employed exclusively by a particular insurance company whereas independent agents sell insurance from multiple insurance companies. *Economic Times*, "What Is 'Agent,'" accessed February 9, 2024.
[203] An insurance broker is defined as a person or company that gives independent advice about insurance products from competing companies. *Cambridge Dictionary*, "Insurance Broker," accessed February 9, 2024.
[204] Swiss Re, *The Economics of Digitalization*, 2023, 29.
[205] Swiss Re, *The Economics of Digitalization*, 2023, 29.
[206] Swiss Re, *The Economics of Digitalization*, 2023, 28.
[207] AIG, "A Reimagined Broker Portal," accessed December 19, 2023; Smith, "AIG Launches Refreshed Website," May 7, 2023.

Claims

Many insurers are also turning to new digital technologies for claims processing. Some companies, for example, are using data on risks and hazards collected via aerial photography—taken from satellites, aircraft, and drones—to assess damage caused by natural disasters and adverse events. In some cases, insurers use such data to preemptively notify policyholders of risks and hazards before an insurable event occurs. Some companies that offer crop insurance, for example, use satellite-based remote sensing technologies to collect information on soil and crop conditions, and process these data with specialized algorithms that allow them to better assess weather-driven crop damage.[208]

Digital technologies are also being used to identify fraud and abuse in the claims management process. For example, some companies are using AI technologies to identify the reuse of photos in fraudulent claims. A recent analysis by Versik Analytics used AI technologies to compare a sample group of 768,000 images contained in their ClaimsSearch database. The analysis revealed 1,967 duplicates, including one photo used in 44 different claims. These duplicate images were linked to 1,475 separate claims, which had resulted in claims payouts of $5.3 million.[209]

Some insurers, seeking to reduce the costs of processing claims through automation, have begun to digitize the workflow processing tasks associated with triaging, routing, and validating insurance claim submissions. For example, a new service launched by American Claims Management uses AI to search for subrogation opportunities. Subrogation is defined as the legal right insurance companies have under written policies to request reimbursement from an at-fault party, after a claim has been paid. Such reimbursement is typically paid by the at-fault party's insurance company. AI searches, scans, and evaluates claims adjustor notes and other documentation.[210] In many cases, digitizing and automating claims processing tasks also results in shorter response times. After Hurricane Ian hit Florida in September 2022, Swiss Re's Rapid Damage Assessment claims processing platform[211] used proprietary hazard models, aerial imagery, and AI to respond, which reportedly allowed the firm to efficiently deploy adjusters, inspect properties, and perform claims triage remotely.[212]

AI and Cloud Computing Technologies

AI technologies can increase the accuracy of insurance pricing and risk assessment by analyzing both structured and unstructured data—from both internal and external sources—and identifying complex data interactions. This, in turn, allows better price differentiation among policyholders.[213] As noted above, AI and other advanced technologies are being implemented—at least on a trial basis—by a number of insurance companies in operational functions ranging from claims processing to underwriting.

[208] Seifert and Yahaya, *Property & Casualty Insurance*, July 2023, 31.
[209] Verisk, "Insurance Fraud Finds a New Enemy," June 14, 2023.
[210] Carrier Management, "The Latest Launches from FastTrack," February 11, 2022; Progressive, "What is Subrogation?," accessed February 9, 2024.
[211] Swiss Re, "Swiss Re Rapid Damage Assessment," accessed December 18, 2023.
[212] Swiss Re, "Looking Up During a Storm," December 19, 2022.
[213] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 15.

Indeed, industry regulators and observers note the growing use of such technologies in the insurance industry. A 2019 survey by LexisNexis Risk Solutions covering 100 insurance companies in the United States, for example, revealed that 44 percent had incorporated AI into their operations, 39 percent were running pilot programs, and 42 percent planned to launch AI projects within the next 12 months. In addition, 58 percent of the companies were applying (or planning to apply) these technologies to tasks related to pricing and underwriting. Among these 100 companies, the use of AI was reportedly highest in the automobile insurance (68 percent) and life insurance (65 percent) segments.[214]

A 2021 survey by the National Association of Insurance Commissioners (NAIC) reported that 87.6 percent of companies offering private passenger automobile insurance either used, planned to use, or were exploring the use of AI, with 18 percent applying these technologies to underwriting tasks and 27 percent to pricing tasks. An additional 13 percent were developing underwriting and pricing applications.[215]

Similarly, a 2023 NAIC study found that 70 percent of surveyed large residential property insurers used, planned to use, or were exploring the use of AI. In addition, 67 percent were applying such technologies to underwriting and 50 percent to pricing. Another 15 percent were examining these technologies for use in underwriting tasks and 11 percent in pricing tasks.[216] Globally, regulators in South Africa, Japan, and the UK (among others) also reported that insurance companies in their respective jurisdictions were using AI, ML, and other data tools.[217]

Cloud computing services, which are typically offered by third-party companies, appear to be an increasingly important means for insurance companies to access software and platforms necessary for core business operations. Insurers also use cloud services to build and maintain extensive databases and analytical tools based on AI that can be used for pricing and risk assessment tasks.[218] Duck Creek Technologies, for example, offers a wide variety of products and services related to core insurance functions, including sales, billing, and claims, as well as a variety of data analytics services.[219] Other companies operating in this insurance industry segment include Guidewire, Majesco, Insurity, OneShield Software, and Insuresoft.[220]

According to a 2023 survey conducted by the Organisation for Economic Co-operation and Development (OECD), about two-thirds of responding insurance companies (including reinsurers and intermediaries) were either examining the use of cloud computing functions or were incorporating them into tasks associated with risk assessment or policyholder risk reduction, particularly in North and South America. By contrast, only about half of European insurance companies reported using (or examining the use of) cloud services for these functions.

Another study conducted by European Insurance and Occupational Pensions Authority in 2019, focusing on insurance companies and intermediaries in the European automobile and health sectors, found that

[214] Overall, 38 percent of surveyed respondents were assessed to be non-adopters of AI. OECD, *Leveraging Technology in Insurance*, December 13, 2023, 16.
[215] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 16–17.
[216] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 16–17.
[217] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 16.
[218] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 18.
[219] Duck Creek Technologies, "Products," accessed January 25, 2023.
[220] Gartner, "Duck Creek Alternatives," January 26, 2024.

only about a third of insurance companies were using cloud computing services in their operations. However, 32 percent of surveyed companies indicated that they were evaluating such services and would likely adopt them for at least some functions within the next three years.[221] According to the OECD, insurers in India, Indonesia, Malaysia, and Nepal are also incorporating cloud-based services and tools into their operations, although government-mandated data localization requirements may limit the ability of insurers to fully benefit from such services (see data localization section below).[222]

Although a growing number of insurance companies are using third-party, AI-based underwriting and pricing tools via cloud platforms, many have shown a preference for developing such tools in-house, at least for certain business applications. For example, NAIC surveys conducted with automobile insurers (2021) and residential property insurers (2023) revealed that only 11 percent and 16 percent, respectively, used tools provided by third-party providers to develop risk pools and rating classes.

Similarly, the 2019 survey by LexisNexis Risk Solutions of the 100 largest insurance companies mentioned above reported that 65 percent of companies that adopted AI developed their own in-house tools and applications, with only 14 percent indicating the use of third-party applications or services.[223] However, according to the OECD, some insurers in Indonesia, India, Malaysia, and Nepal noted that the widespread adoption of third-party cloud and analytics services was hindered by the lack of tailoring to local market conditions.[224]

Underwriting processes at many companies are reportedly characterized by badly integrated technology systems, clunky pricing models, and an array of time-consuming manual tasks, including the need for underwriters to manually enter data into pricing models.[225] Insurance underwriting has been increasingly digitized over the past couple of decades, however, and insurance companies are gradually deploying AI and other new technologies. Although AI, ML, and other advanced technologies are expected to be used in risk assessment and underwriting, deployment will likely be slow because current AI technologies are reportedly not accurate or trusted enough for widespread use in underwriting processes. As a result, the industry is not yet ready to fully rely on algorithms to conduct risk assessment, except for relatively simple insurance lines like automobile insurance. Nonetheless, according to Swiss Re, digitalization and AI technologies can complement existing underwriting processes, including classifying and segmenting for more accurate pricing.[226]

In some cases, insurance companies are using new technologies for triage[227] and routing,[228] processes in which advanced algorithms can be used to sort high-volume inflows of claims and underwriting requests. Prudential Financial, for example, has integrated ML models into its underwriting process in its Life & Health unit, a development that has reduced underwriting times from 22 days to a few seconds. Similarly, the digitalization of model inputs like personal, geographic, and asset information has made

[221] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 18.
[222] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 18.
[223] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 19.
[224] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 18.
[225] Chamberlain, *The Vision and Road to Underwriting 3.0*, accessed February 9, 2024.
[226] Swiss Re, *The Economics of Digitalisation*, 2023, 30.
[227] Triaging involves sorting high-volume claims submissions by selected metrics, including value, complexity, and urgency.
[228] Routing involves directing claims to specialized claims departments based upon metrics like cost, duration, or complexity.

various tasks easier, including completing applications, calculating risk scores, and verifying the quality of application data. Such digital inputs have enabled Chubb to process 85 percent of policy submissions by small and medium-sized enterprises (SMEs)[229] without human intervention. The Travelers Companies estimates that the use of AI technologies in its select-accounts business has improved the efficiency of its business classification process by more than 30 percent.[230]

In the auto insurance industry, the availability of driving data collected by telematic devices has spurred the proliferation of usage-based insurance (UBI) and offered a competitive advantage to large, well-known auto insurers like Allstate or State Farm. Telematic systems use global positioning system technologies and onboard diagnostics to monitor and collect driving data from cars and trucks, including rates of speed and acceleration, braking and lane change habits, and vehicle location. The collection and analysis of such information is an increasingly important aspect of auto insurance underwriting, allowing insurance companies to better evaluate risks and fine-tune pricing, though this data collection has also raised privacy concerns. Reportedly, automakers and insurance companies may be collecting sensitive data without the full consent of consumers, drawing the attention of regulators.[231]

The use of such data is also pivotal to UBI insurance policies, which are priced on the basis of drivers' habits, with low-risk habits qualifying for lower auto insurance premiums than high-risk habits. These "pay-as-you-drive" policies have been available for more than a decade but have recently gained greater acceptance as younger customers have become more accepting of real-time monitoring by auto insurance companies. UBI represented 12–15 percent of direct auto insurance premiums ($270 billion) in 2022.[232]

Restrictions on Cross-Border Dataflows: Balancing Firms' Process Efficiency Against Regulators' Concerns

Many economies have implemented policies regarding data protection and privacy, often referring to the analysis and recommendations from the OECD for handling the inherent tension between enabling free flow of data to achieve economic and social benefits and retaining necessary controls to ensure data security and to protect against illegal or unethical use of data.[233] Looking broadly at all types of data regulations, according to information that the United Nations Conference on Trade and Development (UNCTAD) published in December 2021, 71 percent of countries have enacted legislation pertaining to data and privacy protection. An additional 9 percent are drafting similar legislation.[234] Further, national governments and/or insurance regulators in some countries have established rules or regulations requiring that data collected by insurance companies must be stored in data centers located

[229] Chubb's program is tailored to its customers with less than $30 million in revenue. Simpson, "InsurTechs Take Note," February 13, 2019.
[230] Swiss Re, *The Economics of Digitalisation*, 2023, 30.
[231] For example, California's privacy regulator is investigating these data collection practices. Hill, "Automakers Are Sharing Consumers' Driving Behavior with Insurance Companies," March 11, 2024.
[232] Seifert and Yahaya, *Property & Casualty Insurance*, July 2023, 31.
[233] OECD, Leveraging Technology in Insurance, December 13, 2023, 51; OECD, Going Digital Guide to Data Governance Policy Making, December 14, 2022, 22–23.
[234] UNCTAD, "Data Protection and Privacy Legislation," December 14, 2021.

within that country, referred to as "data localization."[235] While this report covers data localization hereunder insurance, most data localization requirements are not sector-specific and have implications for other global financial services sectors.

There are several reported motivations for the data localization regulations that insurers in many countries around the world encounter. First, some governments are concerned that citizens' data stored outside of jurisdictional boundaries are less secure and, as a result, could be subject to foreign government access, surveillance, or interference.[236] Second, law enforcement issues are sometimes cited, with concerns centering around impaired access to information necessary for legal investigations.[237] Third, some countries may see economic benefits coming from localization requirements, as increased investment by domestic and international companies in local servers and data centers could spur local economic growth—including the development of local information technology companies—and employment. Relatedly, such restrictions may be motivated by the desire to develop or maintain a technological edge by incentivizing domestic investment in advanced software and equipment technologies.[238]

In October 2023, the Office of the U.S. Trade Representative (USTR) announced that the United States, a leading participant in the ongoing WTO Joint Statement Initiative on E-Commerce (WTO JSI) negotiations, had withdrawn its support for WTO JSI proposals addressing data flows, data localization, and source code. USTR explained that national governments may require domestic policy space to examine its approaches to these issues and that the proposed trade rules could "prejudice or hinder those domestic policy considerations."[239] Supporters of this policy shift argue that large technology companies have misused trade deals to undermine competition and that it is important for countries to have freedom to ensure adequate data protection for their citizens.[240] Those opposed say that the withdrawal of the United States' support for provisions to ensure free cross-border data flows will undermine U.S. competitiveness as regulations on digital protectionism proliferate around the world.[241]

According to representatives in the insurance industry, data localization requirements have the potential to increase costs and they may limit the ability of insurance companies to collect or process data in these countries which, in turn, could have several downstream impacts.[242] For example, they claim that the inability to include data from some countries could limit the usefulness of datasets used for predictive analytics. They also allege that such requirements have the potential to limit the ability of

[235] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 45.
[236] Burman and Sharma, *How Would Data Localization Benefit India?*, April 2021, 9; Wu, *Sovereignty and Data Localization*, July 2021, 14–17.
[237] Wu, *Sovereignty and Data Localization*, July 2021, 15; Burman and Sharma, *How Would Data Localization Benefit India?*, April 2021, 9.
[238] Burman and Sharma, *How Would Data Localization Benefit India?*, April 2021, 9; Wu, *Sovereignty and Data Localization*, July 2021, 14–15.
[239] USTR, "USTR Statement on WTO E-Commerce Negotiations," October 24, 2023; Palmer, "Tai Says Digital Trade Move Avoided 'Policy Suicide,'" December 7, 2023; Monicken, "Pagán: U.S. Pulled Back on WTO E-Commerce Proposals," November 1, 2023.
[240] For example, see Members of the U.S. Congress, "Final Letter to Biden in Support of USTR Digital Trade Work," November 6, 2023; "Letter Supporting Ambassador Katherine Tai's Approach to Worker-Centered Trade Policy," February 12, 2024.
[241] Broadbent, "USTR Upends U.S. Negotiating Position on Cross-Border Data Flows," December 12, 2023.
[242] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 45.

insurance companies to use third-party datasets and processing/analytics capacity available from third-party providers based in affected countries.

An OECD survey of businesses and legal practitioners in the insurance industry revealed that about 20 percent of respondents identified data localization requirements as an obstacle (or potential obstacle) to accessing data, particularly among participants in the Asia-Pacific region as well as reinsurers and intermediaries. In Indonesia, for example, insurance companies noted that data localization requirements posed an impediment to accessing cloud services, including those developed by insurers' foreign affiliates. In response, some foreign cloud service providers have begun to build data centers within Indonesia for the purpose of serving Indonesian insurance companies.[243]

Cyber Insurance

When U.S. and global economies grew increasingly internet-connected over the past 20–30 years, the insurance industry moved to create policies that cover new types of risks. Specifically, as a growing number of companies and organizations pursue the digitalization of organizational processes—and adopt emerging technologies like AI, blockchain, cloud computing, and advanced analytics—they face the growing risk of cybersecurity threats, including cyberattacks.[244]

Ransomware attacks increased significantly over the past few years.[245] Overall, in 2022, the most recent period for which data is available, there were about 2,500 ransomware incidents,[246] up 80 percent compared to the previous year. Between January and May 2023, the cumulative number of incidents was 48 percent higher compared to same period in 2022.[247] In November 2023, Boeing Company reported that ransomware group LockBit hacked into the network of its parts and distribution division and stole a large amount of sensitive information, threatening to post this information online unless a ransom was paid.[248]

The increasing frequency of ransomware attacks is fueled in large part by the increasing availability of Ransomware-as-a-Service kits. Low prices, start at $40 per month, allow budding cyber criminals to quickly and inexpensively hack into company networks and encrypt data. LockBit is the most deployed ransomware variant worldwide, with more than 1,700 attributed attacks in the United States since 2020, resulting in ransom payments of about $91 million.[249] At the company level, ransom payments have ranged from less than $20,000 to more than $100 million, with 40 percent of U.S. companies reporting payments of at least $1 million in 2023, up from 11 percent reporting payments within similar ranges in

[243] OECD, *Leveraging Technology in Insurance*, December 13, 2023, 45.
[244] Saeed et al., "Digital Transformation and Cybersecurity Challenges," July 25, 2023.
[245] Ransomware attacks accounted for 24 percent of all cyber security breaches in 2023, with 66 percent of organizations experiencing such an attack over the same period. Shea and Irei, "What Is Ransomware?," accessed December 18, 2023.
[246] In comparison, the total number of cybercrime incidents during November 2021-October 2022 was estimated at 16,312. Statista, *Cyber Insurance*, December 2022.
[247] Tenenbaum et al., Cyber Insurance, 2023, 10.
[248] Insinna and Siddiqui, "Boeing Says, 'Cyber Incident' Hit Parts Business," November 2, 2023.
[249] *Cyber Security Trends 2023*, October 2023, 7.

2022.[250] According to Allianz Risk Barometer, corporate risk managers ranked cyber incidents as the leading business risk in 2022 and 2023.[251]

Companies, governments, and other organizations can protect against ransomware and other cyberattacks by deploying robust IT systems and software and maintaining up-to-date internal protocols and processes. As a last line of defense, however, a growing number of organizations are purchasing cyber insurance policies. Cyber insurance, also referred to as cyber risk insurance or cyber liability insurance, is a type of liability insurance designed to protect the policyholder from the costs associated with a network breach and the loss or exposure of confidential, electronically stored data.

Although coverage varies by company and policy, such insurance is intended to cover (or defray) a wide variety of costs associated with a conventional ransomware attack (in which data are encrypted but not leaked), potentially including lost income, extortion payments, recovery expenses, and forensics expenses. Ransomware attacks that result in data being stolen and leaked often perpetuate additional costs. These include costs of monitoring, customer notification, and public relations, as well as regulatory fines and legal expenses.[252]

The global cyber insurance market—measured by gross direct premiums—tripled over the past five years, reaching an estimated $13 billion in 2022. It is forecasted to grow to $23 billion by the end of 2025. Such rapid growth can be attributed to increased ransomware attacks, which have resulted in significant increases in premiums by companies in the sector.[253] In 2021, the top five cyber insurers in the United States, measured by direct cyber insurance premiums written, were Chubb Ltd. ($473.1 million), Fairfax Financial Holdings ($436.5 million), AXA ($421.0 million), Tokio Marine ($249.8 million), and American International Group ($240.6 million).[254] In 2021, insurance paid out in 98 percent of reported ransomware incidents; insurance paid cleanup costs in 77 percent of incidents, paid ransom in 40 percent of disclosed incidents, and paid other costs in 27 percent of reported incidents.[255]

When the number of cyberattacks soared over the past couple of years, some cyber insurers started experimenting with alternative arrangements to shield themselves from increasingly steep losses in a segment of the market that has the potential to become, ultimately, uninsurable.[256] One such arrangement is the use of catastrophe bonds (cat bonds) specifically focused on cybersecurity incidents. Cat bonds, which are more commonly associated with natural disasters (see chapter 4), are sold to investors with above-average returns; they also come with significant risk, including the possibility of losing—in part or in full—invested funds. Loss modeling also tends to be based on limited data, increasing risks for investors. As a result, cyber cat bonds have been limited to private debt markets, where investors have greater ability to negotiate contract terms.[257]

[250] Tenenbaum et al., *Cyber Insurance*, 2023, 12.
[251] Swiss Re, *The Economics of Digitalisation*, 2023, 19.
[252] *Cyber Security Trends 2023*, October 2023, 9.
[253] Swiss Re, "What You Need to Know About the Cyber Insurance Market," August 28, 2023.
[254] Other leading insurers in the cyber insurance sector include Travelers Companies, Inc., Beazley Plc, CNA Financial Corp., Arch Capital, and AXIS Capital Holdings Ltd. Statista, *Cyber Insurance*, December 2022, 20.
[255] Statista, *Cyber Insurance*, December 2022, 25.
[256] Naik, "Cyber 'Catastrophe Bonds' Move Step Closer," November 13, 2023.
[257] Naik, "AXIS Capital Sponsors First Cyber-Catastrophe Bond," November 29, 2023.

To date, few cyber cat bonds have been issued in private markets, among which were three bonds issued by UK insurers Beazley in 2023. In an industry first, Long Walk Reinsurance Ltd. issued a $75 million cat bond, sponsored by AXIS Capital, into public debt markets in November 2023. This cat bond insures AXIS and its affiliates against a cyberattack over a two-year period starting in January 2024, with investors receiving an annual return of 9.75 percent above the return of the U.S. Treasury money market fund into which collateral is invested.[258] Beazley, too, according to industry sources, is considering launching a cyber cat bond in public debt markets for $100 million. The security issued by Long Walk Reinsurance, and any bond potentially issued by Beazley, are notable because their appearance in public debt markets will spread risk exposure to a larger group of potential investors, including hedge funds and pension funds, among others.[259]

Insurtech

The term "insurtech"—a combination of the words "insurance" and "technology"—can be defined as the application of new or existing technologies, particularly digital and online technologies, to reduce costs and improve process efficiency in the insurance industry supply chain. A variant of the widely used "fintech" label, insurtech also commonly refers to a company that uses digital and online technologies to offer new or innovative insurance products and services.[260]

Although companies that could be classified as an insurtech have been operating for about 20 years, a large increase in start-up activity occurred during 2012–16, when about 75 companies were founded. By contrast, during 2017–18, only 6 insurtech companies were founded.[261] The vast majority of insurtech companies are based in the United States, with other such companies in China, Germany, India, Singapore, the UK, and other countries.[262]

Insurtech companies conduct a wide variety of industry activities, including managing general agent (MGA)[263] services, operations, administration, policy servicing, claims, and pricing and underwriting.[264] A managing general agent is a company authorized by an insurance company to manage all or part of its business activities in a designated geographic area. Activities that managing general agents offer on behalf of insurers may include issuing policies, collecting premiums, paying claims, underwriting, and marketing. In 2022, global insurtech revenues were valued at $6.5 billion, with North America encompassing 55 percent. The insurtech market is expected to grow at an average annual rate of 28.9 percent to $82.3 billion in 2032. Cloud computing services compose the largest share of the technological segment of the insurtech space. Key players in the cloud computing insurtech market include DXC Technology Company (USA), Insurance Technology Services (USA), Majesco (USA), Shift Technology (France), Wipro Limited (India), and ZhonAn (China).[265]

---

[258] Naik, "AXIS Capital Sponsors First Cyber-Catastrophe Bond," November 29, 2023.
[259] Naik, "Cyber 'Catastrophe Bonds' Move Step Closer," November 13, 2023.
[260] Seifert and Yahaya, *Property & Casualty Insurance*, July 2023, 45; *Oxford English Dictionary,* "Insurtech," December 2023.
[261] During 2017–18, only 6 insurtech companies were founded. Milken Institute, *Insurtech Market Overview*, 2018.
[262] Milken Institute, *Insurtech Market Overview*, 2018, 6.
[263] NAIC, *State Licensing Handbook*, 2020, 91.
[264] Swiss Re, *The Economics of Digitalisation*, 2023, 33.
[265] Brainy Insights, "Insurtech Market Size," October 23, 2023.

Insurance companies (including reinsurers) are significant investors in insurtech companies, with 31 of the largest insurers, measured by assets, having invested in insurtechs as of March 2023. In general, insurance companies focus their insurtech investment in digital insurers, aggregators, MGAs, and distributors. The bulk of cumulative insurtech investment, about one-third, has been directed to companies that focus on improving the sales of insurance products via various distribution channels, particularly those that improve companies' interactions with policyholders. Over the past seven to eight years, however, the focus of insurers' investments in the insurtech sector has been shifting from companies that focus on distribution to those that focus on increasing the efficiency of underwriting.[266]

Many insurtech firms are disruptors—market entrants that leverage technology to start up quickly and often become more agile and efficient[267] than their incumbent competitors.[268] In the U.S. auto insurance market, firms such as Metromile and Root Insurance, using onboard telematic devices to offer UBI, compete with large, well-established insurance companies in the auto insurance segment. Although both companies have gained market shares in the auto insurance segment, they are not currently profitable because they have neither the scale nor financial strength of market leaders like Progressive or Allstate.[269] Lemonade sells insurance directly to customers via a mobile phone app, rather than through a broker or agent, and also processes claims through the app. Currently, Lemonade offers renters, homeowners, car, pet, and life insurance.[270] Other leading U.S. insurtech companies in the consumer-facing segment include Next Insurance, Policygenius, Clearcover, and Oscar Health.[271]

Responding to the large number of newly created insurtechs, a surge of financing activity started in 2017–18, with funds being sourced from angel investors,[272] private equity, and venture capital investors,[273] as well as from insurance companies themselves.[274] From 2018 through 2021, annual financing for insurtech companies increased steadily from $4.9 billion to $16.7 billion. In 2022, however, the value of financial deals slowed dramatically to only $4.9 billion in the first half of that year.[275]

This decline resulted from several factors, including higher interest rates (which increase the cost of financing) and perhaps more importantly, the dramatic price declines of several insurtech companies' stock prices following the public listing of their shares.[276] Root Insurance, for example, was valued at about $6.8 billion following its initial public offering in October 2020, dropping to only $67.2 million by mid-2023. Lemonade was listed on the New York Stock Exchange at $29 per share in July 2020, declining

[266] Swiss Re, *The Economics of Digitalisation*, 2023, 33.
[267] Although these disruptors may see quick revenue growth, they may not see a profit. Dennis, "The 'Profitless Prosperity' Of Retail Disruptor Brands," March 9, 2022.
[268] Nelis, "5 Disruptors of the P&C Insurance Industry," March 2, 2018.
[269] Seifert and Yahaya, *Property & Casualty Insurance*, July 2023, 32.
[270] Lemonade, "Lemonade Insurance," accessed December 20, 2023.
[271] Betz, "49 Insurtech Companies Making Coverage Simpler," December 12, 2023.
[272] Angel investors provide seed money to start-up companies, typically in exchange for equity ownership in the company. Ghanti, "Angel Investor Definition," September 29, 2023.
[273] Private equity investors pool capital for the purpose of investing in private companies, either by providing venture capital to start-up companies or by taking over the restructuring of mature companies via leveraged buyouts. Swedroe, "What's Unique About Private Equity?," February 7, 2024.
[274] Boldan et al., *Insurance Investors: Priorities and Opportunities*, October 30, 2023, 8; Swiss Re, *The Economics of Digitalisation*, 2023, 32.
[275] Statista, *Insurtech*, 2023.
[276] Boldan et al., *Insurance Investors: Priorities and Opportunities*, October 30, 2023, 7.

to $17 in December 2023.[277] Similarly, Hippo, which offers homeowners insurance, went public via a special purpose acquisition company[278] and was listed at about $5 billion in August 2021, dropping to $440 million by mid-2023.[279]

According to Insurtech Advisors, the decline in insurtech stock prices reflects growing financial market concerns over profitability, high customer acquisition costs, and inadequate loss ratios[280] on the part of some of these companies.[281] By mid-2022, the decline of stock prices in the insurtech sector had impelled some companies to shift management focus from sales growth to profitability, with several companies announcing layoffs and other cost-cutting measures, including significant reductions in sales and marketing expenses.[282]

Outlook

Although operational implementation of GenAI remains limited, global insurance companies continue to assess the impending impact of AI and GenAI on the industry. For example, 52 percent of global insurance CEOs plan significant investments in AI by July 2024. Additionally, 59 percent believe that insurance sector jobs would be impacted but counterbalanced by new positions. Insurers plan to incorporate AI mostly to predict trends and demand; improve customer satisfaction and optimize operations; and create self-service platforms that improve customer and employee experience.[283]

Insurers are likely to continue refining their large language models[284] with AI. For example, these models can be trained to perform actuarial, underwriting, and claims-adjusting tasks. Impending regulations may both incentivize and restrict the implementation of these AI functions, and insurers will likely need to determine when human intervention is necessary. Further, these technological advances can be employed by bad actors, and cyberattacks using large language models have been documented.[285]

[277] Witkowski, "Lemonade Logs Best U.S. IPO," July 2, 2020; Google Finance, "Lemonade Inc. (LMND) Stock Price & News," accessed February 13, 2024.
[278] A special purpose acquisition company (SPAC) is a publicly traded corporation with a two-year life span formed with the sole purpose of effecting a merger, or "combination," with a privately held business to enable it to go public. SPACs raise money largely from public-equity investors and have the potential to reduce risk and shorten the initial public offering (IPO) process for their target companies. Often SPACs offer better terms than a traditional IPO would. Bazerman and Patel, "SPACs: What You Need to Know," July 1, 2021.
[279] Wilhelm and Heim, "Despite Messy IPOs, There's Good Reason to Be Optimistic," May 19, 2019.
[280] The term loss ratio is defined as the share of insurance claims paid (losses) to insurance premiums earned. Hayes, "Loss Ratio: What It Is, How It's Calculated, Types," November 15, 2020.
[281] Jacobs, *Profitability Concerns Drive September Swoon*, September 29, 2023.
[282] Mason, "U.S. Insurtech Market Report: What to Cut?," August 16, 2022.
[283] Santenac et al., *2024 Global Insurance Outlook*, November 29, 2023, 7–8.
[284] Large language models are algorithms that allow computers to interpret, comprehend, process, analyze, and manipulate human language.
[285] For example, large language models can be used to train and improve malware and phishing attacks (including emails) to make them more convincing. Santenac et al., *2024 Global Insurance Outlook*, November 29, 2023, 10–11, 14–18; Hendler, "Council Post," October 27, 2023.

Securities Services: Further Advances in Digital Transformation

The global securities services market has been transformed by the adoption of new digital technologies such as blockchain and ML. In recent years, securities services providers have adopted digital technologies for their securities trading and customer-facing activities to improve operational efficiency and increase their customer base. The sector has successfully integrated ML technology into trading strategies and advisory services and introduced new digital asset classes. GenAI is another new technology that can further digitize securities services, enabling improvements in financial research productivity and updates to legacy code. However, digitalization of securities services has also introduced additional risks in the sector related to accuracy, cybersecurity, and market volatility. In particular, the recent collapse of major cryptocurrency markets (like FTX Capital Markets, LLC) and volatility associated with retail investor decisions suggest that the use of digital technologies in the sector is still evolving.

Digital Technology in Securities Trading

One of the major shifts in securities trading in the past 20 years has been the shift from trading securities in person (i.e., on a trading floor or at a stock exchange) to trading online.[286] Along with this shift, securities services firms have developed algorithmic trading strategies to automate online trading of securities. An algorithmic trading strategy is a computer program designed to solve problems and make decisions in a standardized, deterministic way. Typically, these programs make decisions about the type of securities in which to invest, the price of bids, optimal order size, risk assessments, timing of trades, and broker choice for orders.[287]

In a recent report on algorithmic trading in the United States, the U.S. Securities and Exchange Commission (SEC) found that algorithmic trading in equities and debt markets has improved measures of market quality, enabled efficient provision of liquidity, helped manage risk, and introduced new types of trading services.[288] On the other hand, algorithmic trading systems can exacerbate market volatility through errors in technology development, testing, and implementation and through system failures and capacity constraints.[289] As of 2017, the last year of available estimates, the United States was a global leader in adoption of algorithmic trading, with about 65 percent of all trades conducted via algorithm, compared to 30 to 40 percent of trades in Europe and Asia. These shares likely represent a lower bound for current conditions, given technological advancements since 2017.[290]

[286] In particular, in 2005 the U.S. Securities and Exchange Commission adopted new regulations that eliminated trade-through protections that were only available for manual, in-person trades, facilitating the adoption of automated trades that could be completed online by major stock exchanges such as the New York Stock Exchange. SEC, *Concept Release on Equity Market Structure*, January 21, 2010, 3595.
[287] SEC, "Staff Report on Algorithmic Trading in U.S. Capital Markets," August 5, 2020, 6.
[288] SEC, "Staff Report on Algorithmic Trading in U.S. Capital Markets," August 5, 2020, 4.
[289] SEC, "Staff Report on Algorithmic Trading in U.S. Capital Markets," August 5, 2020, 43.
[290] Goldman Sachs, *Top of Mind: Liquidity, Volatility, Fragility*, June 12, 2018, 8.

Increasingly sophisticated algorithms and advances in ML have enabled further automation of the trading process.[291] For example, in 2017, Morgan Stanley invested in a new corporate bond pricing algorithm that increased the number of bonds that could be priced automatically from 500 to 10,000, allowing traders to focus on larger-risk transactions over more standard trades.[292] Similarly, in 2023, BlackRock, Inc. reported decreases in its use of human stock pickers in favor of algorithm-driven decisions.[293]

One challenge with the rise of algorithmic trading strategies is that when systems fail because of internal risks, such as programming errors or external risks like cybersecurity breaches, banks may have to revert to manual trades. For example, in 2023, a ransomware attack on the Industrial and Commercial Bank of China Limited (ICBC) destabilized the U.S. Treasury securities market. The attack prevented the ICBC, a Chinese brokerage with a license to clear U.S. securities, from settling U.S. Treasury trades for some market participants.[294] After the hack, ICBC had to confirm all trades manually by communicating directly with the Fixed Income Clearing Corporation (FICC), resulting in costly delays.[295]

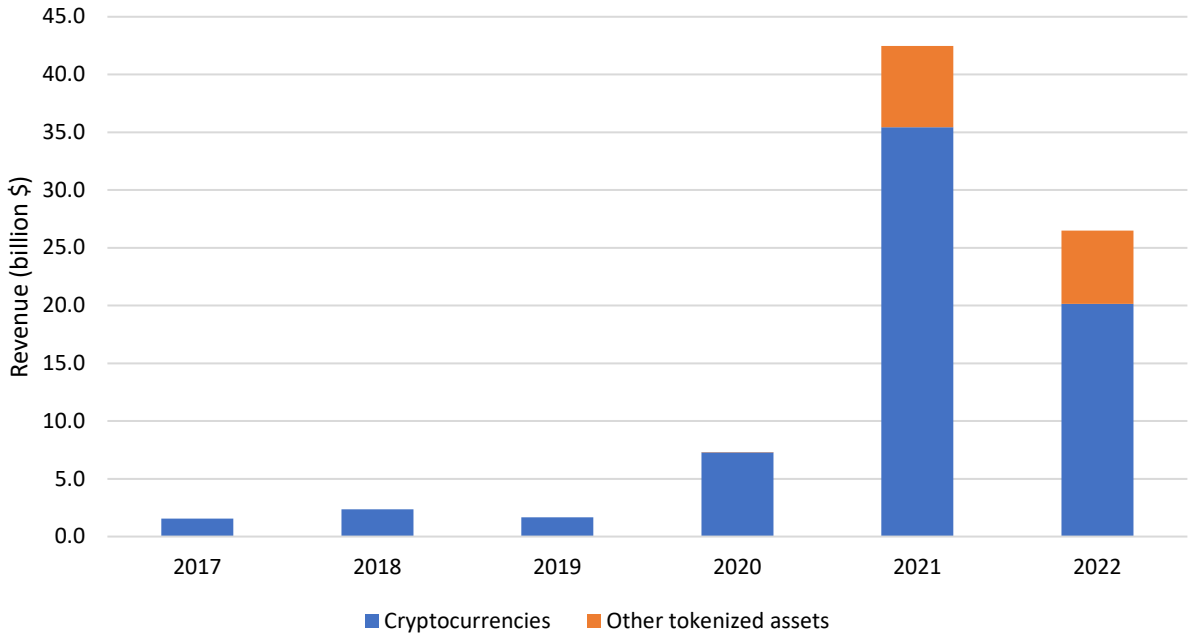
Another development in securities trading has been the rise of tokenized assets, which are stored and traded using blockchain technology. Blockchain enables the secure sharing of information via a ledger shared across a network of participants to create a permanent and transparent record of asset transactions. These tokenized assets can include cryptocurrency (Bitcoin), representations of tangible assets (real estate), financial assets (bonds, equities), and digital assets (digital art).[296]

Global revenues earned by tokenized asset exchanges totaled approximately $26.5 billion in 2022, with 76 percent of that revenue coming from cryptocurrencies (figure 3.3). Revenue from tokenized assets grew rapidly in 2021 as a result of growth in nonfungible tokens (tokenized digital art) and a rise in the price of major cryptocurrencies.[297] The primary investors in tokenized assets are individuals. A 2023 survey of institutional investors and high-net worth individuals in the United States show that only 1.5 percent of institutional investors' portfolios were tokenized, compared to 4.2 percent for individual investors.[298] In particular, cryptocurrencies attract smaller investors with high risk tolerance.[299]

[291] Gopalakrishnan et al., "Unleashing a New Era of Productivity in Investment Banking Through the Power of Generative AI," July 27, 2023.
[292] Whittall, "U.S. Banks Reap Boom in Bond, Portfolio, and Algo Trading," February 19, 2021.
[293] Cooper, "Rise of The AI Investment Bankers," April 20, 2023.
[294] The ICBC acts as an intermediary for governments, proprietary traders, and hedge funds wanting to buy and sell U.S. debt.
[295] The FICC is the agency responsible for clearing U.S. treasuries. Leng et al., "Cyber Attack Shines Light on China's Largest Lender," November 15, 2023.
[296] Digital assets are also referred to as Non-Fungible Tokens (NFTs). Banerjee et al., "Tokenization: A Digital-Asset Déjà Vu," August 5, 2023.
[297] Notably, in February 2021, the price of Bitcoin approached $54,000 per coin. Locke, "From Bitcoin Hitting $1 Trillion in Market Value to Elon Musk's Dogecoin Tweets," December 27, 2021; Pound, "Bitcoin Hits $1 Trillion in Market Value as Cryptocurrency Surge Continues," February 19, 2021.
[298] Elinson and Kher, "Tokenization in Asset Management," August 18, 2023.
[299] This high risk tolerance may suggest that small-scale investors are treating cryptocurrencies more like lottery tickets than investments. Darbyshire, "Generation Moonshot," July 20, 2022.

Figure 3.3 Revenue from tokenized assets worldwide, 2017–22

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.30.



Source: Statista, "Digital Assets - Worldwide," April 2023.

Despite their popularity among tokenized assets, volatility in the price of cryptocurrency and illegal activities of cryptocurrency trading platforms destabilized this asset class in recent years. The values of cryptocurrencies underwent especially large declines in 2022—due in part to the movement of investors away from risky assets in response to high inflation rates—which further destabilized cryptocurrency creators and lenders.[300] For example, in May 2022 the cryptocurrency TerraUSD collapsed, resulting in $40 billion in losses.[301] By June 2022, at least 12 hedge funds, exchanges, and lenders in this market had either filed for bankruptcy, frozen customer deposits, or sold off their assets.[302] Additionally, the two largest cryptocurrency exchanges—FTX Capital Markets, LLC and Binance—or individuals connected with them were found to have violated U.S. law. In November 2022, cryptocurrency exchange FTX filed for bankruptcy; its co-founder and former CEO, Sam Bankman-Fried, was convicted of securities fraud and money laundering in 2023.[303] In November 2023, Binance was fined $4.3 billion for violating anti-money laundering laws, and its CEO stepped down.[304]

Large global investment banks have adopted blockchain technology in more limited ways to facilitate digital exchange of collateral, in stock and bond trading, and in international transactions. Onyx, a blockchain-based trading platform by JPMorgan Chase, reportedly processes about $1 billion–$2 billion in tokenized assets per day.[305] According to JPMorgan Chase, the goal of Onyx is to facilitate

[300] Shubber and Oliver, "Inside Celsius," July 13, 2022.
[301] Yaffe-Bellany and Griffith, "How a Trash-Talking Crypto Founder Caused a $40 Billion Crash," May 18, 2022.
[302] Shubber and Oliver, "Inside Celsius," July 13, 2022.
[303] Huang, "Why Did FTX Collapse?," November 10, 2022; Martínez and Gura, "FTX Founder Sam Bankman-Friend Found Guilty," November 3, 2023.
[304] Collier, "Binance CEO Steps Down," November 21, 2023.
[305] Stafford, "How Can Blockchain Be Used to Trade Bonds?," October 23, 2023.

collateralization of assets and financing with collateral. The platform creates token representations of collateral and uses blockchain to track changes of ownership of the collateral (such as bonds) without transferring the physical asset.[306] A select group of JPMorgan Chase's clients can access and make transactions on the Onyx network. Other securities services firms that use blockchain for bond trading include UBS Group AG and BlackRock, Inc.[307]

Since 2021, HSBC Group and Wells Fargo & Company have used blockchain to settle foreign exchange transactions between the two banks. Historically, each bank maintained its own ledger, which then needed to be reconciled. Blockchain has enabled the creation of a shared private ledger, ensuring both banks have the same information about their trades and prices. This system has been particularly helpful for settling trades in Chinese renminbi, which is not covered by the CLS Group—the key currency settling firm.[308] Globally, central banks have experimented with using blockchain technology in foreign exchange transactions, including experiments with prototypes in various groupings of central banks in France and Switzerland; Australia, Malaysia, Singapore, and South Africa; and China, Hong Kong, Thailand, and the United Arab Emirates.[309]

Digital Technology in Consumer-Facing Services

As noted in chapter 2, key profit sources of securities services firms include creating investment funds (the role of mutual funds), providing financial advice, and managing assets on behalf of businesses or individual clients (the role of hedge funds and private equity firms).[310] Demand for these services is expected to grow in advanced economies because of aging populations with longer life spans, and in developing countries via greater accumulation of wealth.[311] In recent years, the integration of digital technology in these activities—including through robo-advisory services and mobile trading platforms—has expanded access to wealth management services to a greater range of customers. This increased access to securities by smaller investors has introduced new volatility, particularly in the U.S. market, via investment in cryptocurrency and the rise of "meme stock" trading.[312]

Robo-advisory services, which are algorithms that provide automated investing advice, have increased consumer access to wealth management services.[313] Typically, robo-advisory customers' input details—such as age, savings goals, and risk tolerance—are supplied to an algorithm that creates and manages a personalized investment portfolio. Robo-advisory services tend to be a less expensive option for consumers than traditional financial advice, with fees of 0.25–0.5 percent of client assets compared to fees of 1 percent of client assets for traditional financial advisors. In asset fee-based financial advice,

[306] J. P. Morgan Chase, "Tokenized Collateral Network," 2023.
[307] Stafford, "How Can Blockchain Be Used to Trade Bonds?," October 23, 2023.
[308] CLS stands for "continuously linked settlements," Mägerle and Maurer, The Continuous Linked Settlement Foreign Exchange Settlement System, November 2009; Asgari, "How Can Blockchain Platforms Make Currency Trading Cheaper?," November 2, 2023.
[309] Bech et al., "Using Cbdcs Across Borders," June 2022, 5–8.
[310] Deloitte, *2023 Banking and Capital Markets Outlook*, 2022, 24.
[311] See chapter 4 for more information on emerging market trends in securities services.
[312] As described in the following section "meme stocks" refer to stocks that are valued based on social media interest rather than company performance. Gravier, "Meme Stocks," October 4, 2023; Darbyshire, "Generation Moonshot," July 20, 2022.
[313] Abraham et al., "Robo-Advisors," February 2019.

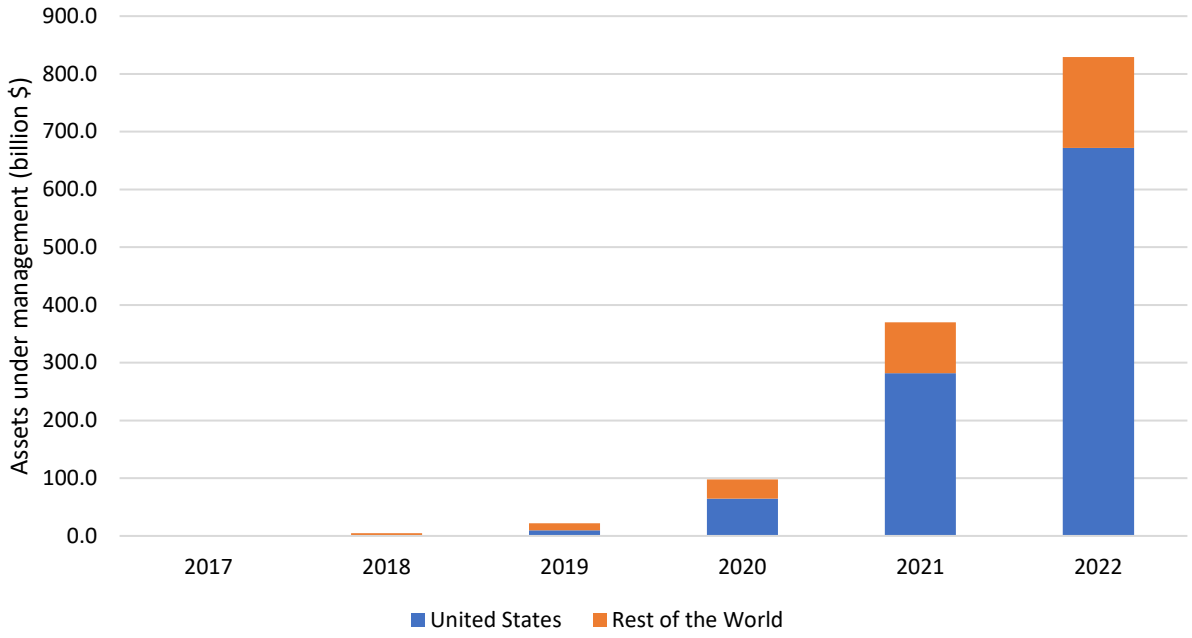
investment minimums for robo-advisors are also typically smaller, with minimums of $0–$3,000 compared to $250,000 for traditional investment advice.[314]

For consumers with small investment portfolios, these asset-based fees are typically smaller than fees for one-off meetings with financial advisors. For example, the price of an hourly meeting with a financial advisor in the United States ranges from $200 to $400, but a 0.5 percent fee on $5,000 of assets is $25.[315] Some other benefits of robo-advisory services relative to traditional or investor-led asset management are increased portfolio diversification, less volatility, and higher risk-adjusted returns.[316]

Between 2017 and 2022, global assets under management by robo-advisors grew rapidly, from $1.1 billion to $829.3 billion (figure 3.4), with U.S. users representing about 80 percent of all assets under management by 2022. The average amount of money managed by a robo-advisor is small relative to funds managed by traditional financial advisors, with robo-advisors managing an average of about $29,000 per user globally, and $37,000 per user in the United States in 2022.[317]

Figure 3.4 Global assets under management by robo-advisors, 2017–22

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.31.



Source: Statista, "Robo-Advisors - Worldwide, United States," accessed April 1, 2024.

Another trend in the consumer-facing global securities services market has been a rise in retail investors, which are individual, nonprofessional investors that make investments using their own money.[318] A key distinction between retail and institutional investors is the speed at which their trades occur; retail

[314] Iacurci, "Robo-Advisors . . . Replace a Human Financial Advisor?," January 16, 2022.
[315] Coombes, "How Much Does a Financial Advisor Cost?," January 5, 2024; Iacurci, "Robo-Advisors . . . Replace a Human Financial Advisor?," January 16, 2022.
[316] Brière, *Retail Investors' Behavior in the Digital Age*, June 2023, 5.
[317] Statista, "Robo-Advisors - Worldwide, United States," accessed December 14, 2023.
[318] Arora, "Council Post: The Rise of the Retail Investor," November 4, 2022.

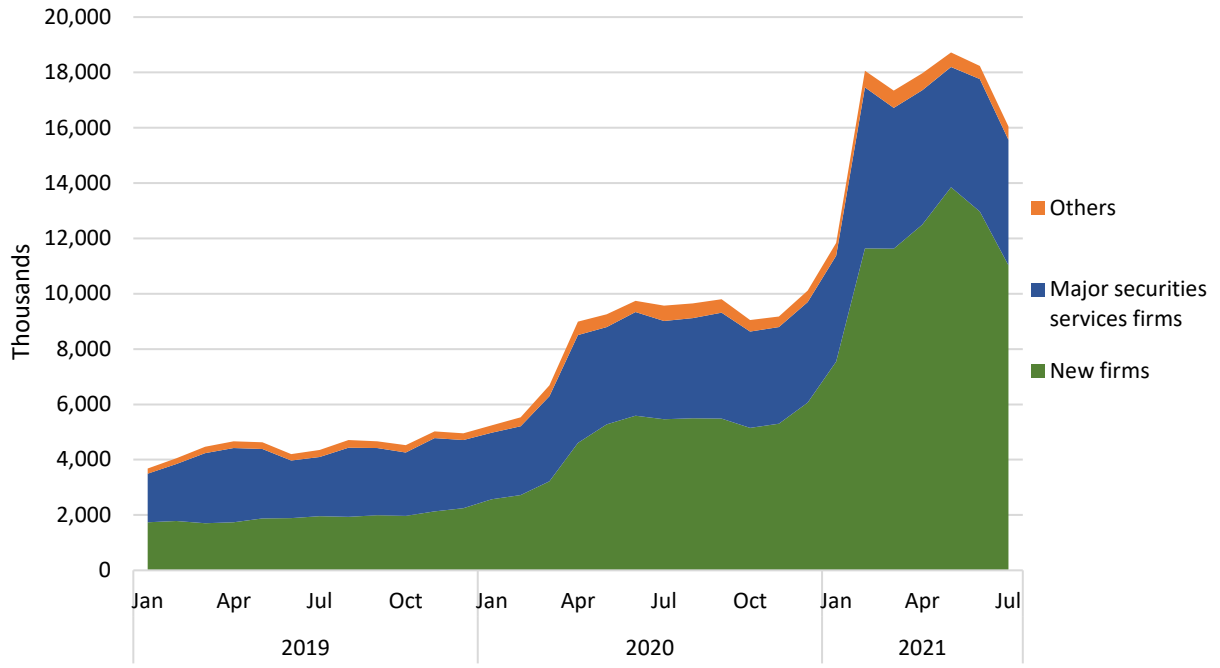
investors trades are slower because they do not typically rely on the algorithmic trading strategies described above.[319] Data are limited on the size of the retail investment market, between 2010 and 2020, but the share of stocks traded by retail investors increased from about 10 percent to 20 percent of all trades.[320] More recently, JPMorgan Chase reported that retail investor activity peaked in January 2023, accounting for 25 percent of all stock trading, but had declined to 15 percent in November 2023, following rising interest rates.[321]

The rise in retail investing has been driven in part by the growth of commission-free mobile trading platforms, which enable the purchase of stocks and other financial assets through a mobile device. Launched in 2015, Robinhood Markets, Inc. introduced a mobile trading platform that charged no commission fees for equity trading in the United States. By 2019, all U.S.-based mobile trading platforms—including those affiliated with traditional securities services firms—eliminated commission fees on their mobile platforms.[322] The global growth in the number of active mobile trading platforms users from 2019 to 2021 is shown on figure 3.5. The number of active users on online trading apps has grown steadily since 2019, with large increases in user activity in March 2020 and February 2021. The two largest apps are U.S.-based Robinhood Markets, Inc. and Webull Financial LLC, followed by platforms operated by traditional securities services firms Fidelity Investments and Morgan Stanley.[323]

[319] Mackintosh, "Who Counts as a Retail Investor?," December 17, 2020.
[320] Arora, "Council Post: The Rise of the Retail Investor," November 4, 2022; Singh, "Retail Traders Cash out as Market Rallies on Bets of End to Rate Hikes," November 16, 2023.
[321] Hughes, "Meme-Stock 2.0," February 17, 2023; Singh, "Retail Traders Cash out as Market Rallies on Bets of End to Rate Hikes," November 16, 2023.
[322] Darbyshire, "Generation Moonshot," July 20, 2022.
[323] Most top online share trading apps are U.S.-based; Israel-headquartered eToro is an example of a non-U.S. firm in this segment.

Figure 3.5 Number of monthly active users of selected leading apps, January 2019 to July 2021

In thousands of users. Underlying data for this figure can be found in appendix B, table B.32.



Source: Statista, "Monthly Active Users Online Share Trading," December 12, 2022.
Note: Data for Webull exclude Chinese users. Major securities services firms include TD AmeriTrade, Schwab Mobile, E*TRADE (Morgan Stanley), and Fidelity Investments. New firms include eToro, Webull, and Robinhood. Others includes Merrill Edge, Interactive Brokers, and TradeStation.

The growing number of retail investors led to increased market volatility stemming from the rise of trading strategies that are based on social media interest rather than company performance. These "meme stocks" are characterized by a sudden popularity for a specific company's stock among mobile platform traders. This leads to high prices and high trading volumes in that stock.[324] In January 2021, for example, users of the social media forum Reddit piqued interest in stock purchases in GameStop Corp (a video-game retailer) and AMC Entertainment Holdings, Inc., driving up the price of these stocks and leading to estimated losses of $19 billion for hedge funds that had short-sold the companies.[325] The collateral requirements for shorted stocks vary based on the price of the underlying assets and are tied to the two-day stock trade settlement system. When executing trades in the T+2 stock trade settlement system, brokerages like Robinhood are required to post collateral for the trades during the two-day period between when the trade is requested and settled. As the prices and volume of GameStop and AMC stocks increased, the collateral requirements for these brokerages also increased beyond the funds available to act as collateral.[326] As a result, the U.S. Securities and Exchange Commission (SEC)

[324] Gravier, "Meme Stocks," October 4, 2023.
[325] Short selling refers to the practice of borrowing stocks and reselling them with the expectation that the stock's value will decrease before the stocks are returned to the original owner. Robertson, "GameStop Day Traders Shook Markets," January 30, 2021.
[326] For example, between January 27 and January 28, 2021, total industry collateral requirements increased from $26 billion to $33.5 billion. Angel, "Gamestonk," March 1, 2021, 29–31.

announced that U.S. securities markets would move to a one-day trade settlement system, described in more detail in the next section.[327]

Digitalization in Securities Markets Enables U.S. Move to T+1 Settlement

Securities markets around the world have agreed conventions for executing securities market transactions. In the United States, Canada, and Mexico, the timeline and mechanics of transaction settlement was scheduled (at the time of writing) to change beginning in late May 2024, ahead of other regions like Europe. This change takes advantage of the capabilities that became available with fully electronic trading and more automated middle- and back-office functions, by shortening the time it takes for transactions to clear, from two business days to one business day. It is referred to in U.S. markets as moving to "T+1" from the current "T+2" rules. "T" refers to the moment when parties agree to conduct a transaction (selling a security in a given quantity at a given price). The "+1" or "+2" is the number of business days allowed for settlement of the transaction (i.e., when the buyer receives the securities in their account and the agreed funds are received by the seller).[328]

In September 2017, the SEC reduced the U.S. securities settlement cycle from T+3 to T+2; Canada, Mexico, Peru, and Argentina moved in tandem. Some countries had already transitioned from T+3 to T+2 by that point, including Australia, India, Indonesia, Japan, Hong Kong, South Korea, New Zealand, Singapore, and Taiwan. In February 2022, India's equity market started phasing in a "T+1" settlement regime, completing the transition in February 2023. To date, India's move has been largely successful with few significant reported problems.[329]

In February 2022, the SEC proposed shortening the U.S. equity trade settlement cycles from T+2 to T+1, and in March 2023 it confirmed these new rules with a projected compliance date of May 28, 2024.[330] Canada and Mexico planned to do the same on May 27. Several proponents supported the United States making this transition, including the Securities Industry and Financial Markets Association, the Investment Company Institute, and the Depository Trust and Clearing Corporation (DTCC). The DTCC's subsidiaries include the Depository Trust Company (DTC) and the National Securities Clearing Corporation (NSCC). These organizations worked with other industry groups to test different aspects of T+1 implementation, aiming to cover as many scenarios as possible. For example, for exchange activities, test trades were submitted to the technology company exchange Nasdaq and the derivatives network Chicago Board Options Exchange for execution, after which they were sent to the NSCC for

[327] Angel, "Gamestonk," March 1, 2021, 4,15; Shortening the Securities Transaction Settlement Cycle, 87 Fed. Reg. 10436, February 24, 2022.
[328] SEC Rule 15c6-1(a) under the Exchange Act (15 U.S.C. § 78a et seq). For example, under "T+2" two-day settlement rules, a buyer may purchase a company's shares on Friday; their broker would immediately debit the buyer's account for the total cost; and the buyer's status as a shareholder would be settled in the company's record books on Tuesday (or Wednesday, if Monday is a public holiday), making the buyer a "shareholder of record." Abdool, "T+1 Settlement Reaches America," April 28, 2022; Investopedia, "What Do T+1, T+2, and T+3 Mean?," May 5, 2022.
[329] Papillard et al., "T+1 Settlement," June 8, 2023.
[330] Shortening the Securities Transaction Settlement Cycle, 87 Fed. Reg. 10436, February 24, 2022; Shortening the Securities Transaction Settlement Cycle, 88 Fed. Reg. 13872, March 6, 2023.

clearance and the DTC for settlement.[331] Similar tests were applied to scenarios like institutional trade and option contracts.[332]

The SEC, in announcing the change, said that its goal was to benefit investors, reduce risk, and increase efficiency.[333] The most repeated argument in favor of T+1 is that the change would reduce the risk of counterparties not delivering on scheduled settlements, because this change may reduce the amount of time in which a counterparty could default on a payment by half (i.e., from two days down to one day). One survey found that the top potential benefit of shortened settlement cycles was believed to be greater efficiency in investment and trading, followed by increased market liquidity because intermediaries' balance sheets are encumbered for less time.[334] Additionally, a DTCC simulation predicted that moving to T+1 could reduce an intraday volatility component by 41 percent.[335] Recent market instabilities motivated support for this transition. The March 2020 volatility related to the effects of the COVID-19 pandemic and the January 2021 volatility related to GameStop illustrate risks that may be partially mitigated by T+1.[336]

The exact timing of each settlement stage may become more challenging when T+1 comes into force. The U.S. stock exchange open market trading starts at 9:30 a.m. and ends at 4:00 p.m. eastern time. The current T+2 cycle starts settlement during an open market, then one working day later (T+1) goes through trade allocation and affirmation by 11:30 a.m. The cycle ends with a DTC settlement deadline of one working day after that at 3:00 p.m. (T+2).[337] In contrast, a 2021 report recommended that the T+1 cycle have the same open market but then go through trade allocation the same day starting at 7:00 p.m., with affirmation by the cut-off time of 9:00 p.m., and ending with a DTC settlement deadline of 3:00 p.m. the next day, or one working day later (T+1).[338]

Some market participants, to adhere to the new settlement deadlines, have made or will soon make significant investments in technologies to improve trade execution efficiency and automate their processes. One example of technology is the "Match to Instruct" automated workflow, which triggers trade affirmation and delivery to the DTC for settlement.[339] Financial participants who may choose to adopt new technologies and improvements to existing technologies include custodians, broker-dealers, central securities depositors, and fund accountants.[340] Some were optimistic about new technological opportunities, citing platforms that simplify and consolidate transaction processing.[341]

---

[331] DTCC, *T+1 Test Approach*, July 2023, 6.
[332] DTCC, *T+1 Test Approach*, July 2023, 6.
[333] SEC, "SEC Finalizes Rules to Reduce Risks in Clearance and Settlement," February 15, 2023.
[334] Citi, *Securities Services Evolution 2022*, 2022, 9.
[335] The NSCC calculates a volatility component for each member's market price risk based on a "value at risk charge" methodology. SEC, "Order Approving Proposed Rule Change," March 13, 2023, 5; Self-Regulatory Organizations, 87 Fed. Reg. 63845, October 20, 2022; DTCC, "DTCC Proposes Approach to Shortening U.S. Settlement Cycle," February 24, 2021.
[336] Shortening the Securities Transaction Settlement Cycle, 87 Fed. Reg. 10437, February 24, 2022.
[337] Citi, *T+1*, 2023, 3.
[338] SIFMA, *Accelerating the U.S. Securities Settlement Cycle to T+1*, December 1, 2021, 5; Shortening the Securities Transaction Settlement Cycle, 87 Fed. Reg. 10454, February 24, 2022.
[339] Citi, *T+1*, 2023, 6.
[340] Citi, *T+1*, 2023, 5.
[341] Vazarkar, "T+1 and Beyond," accessed October 5, 2023.

Outdated manual systems that rely on emails remain in use but are expected to be replaced with automation.[342] One 2023 survey found that 81 percent of North American banks and brokers continue to use outdated manual systems during post-trade stages.[343] The transition to T+1 also poses challenges because of the reduced amount of time available to financial institutions. One such challenge is that different securities clients can encounter different tax rates and deadlines based on their location, and securities managers will now have less time to process trades.[344] If a transaction misses the new deadline and does not settle during the cycle, higher DTCC failure-to-settle interest charges and fees would apply.[345]

U.S. securities transactions often involve non-U.S. exchange-traded funds, depository receipts, or securities derivatives. Such transactions are more difficult for dealer-brokers to orchestrate all the settlement flows correctly; an added challenge is that all major markets are unlikely to adopt T+1 at the same time.[346] The adoption of T+1 in the United States, Canada, and Mexico may pressure Europe to follow; but Europe's financial markets can be more complex and smaller asset managers might be severely disadvantaged.[347] For example, the United States has two central securities depositories (Fedwire Securities Services for government securities and the DTC for all other securities), but Europe has 28 European Central Securities Depositories Association members.[348]

By one 2022 estimate, the change from T+2 to T+1 would limit Europe's post-trade processing time by 83 percent. The number of business hours available between the end of trading and the start of settlement would be reduced from 12 core business hours to 2 core business hours.[349] Financial firms traditionally use these core business hours to review transactions and identify errors or potential fraud prior to settlement. The shift to T+1 also affects countries like Australia and New Zealand, which can be "ahead" of the U.S. eastern time by 14 hours; essentially, a U.S. investment into Australia would face a "lost day."[350]

The adoption of a T+1 settlement basis for U.S. securities has also introduced misalignments between U.S. securities markets and the global foreign exchange markets (forex). Forex works on a two-day settlement basis and operates in a range of different time zones. Market participants thus must overcome significant inconsistency when a person based outside the United States is trading a U.S. security, as currency settlements are no longer aligned with the U.S. security settlement cycle. Both U.S. and European authorities are concerned about these misalignments and acknowledged that the EU rules are likely to move toward T+1 at some point. SEC Chair Gary Gensler has urged the foreign exchange markets to move to T+1. His EU counterpart, Mairead McGuinness, has said that it is a question of when

[342] Papillard et al., "T+1 Settlement," June 8, 2023.
[343] Daniel, "A Year to Go," June 8, 2023.
[344] Citi, *T+1*, 2023, 5.
[345] DTCC, *Guide to the 2024 DTC Fee Schedule*, 2024, 13; Papillard et al., "T+1 Settlement," June 8, 2023.
[346] Citi, *T+1*, 2023, 5.
[347] Papillard et al., "T+1 Settlement," June 8, 2023; Egghen, "Fund Managers Urge European Regulators to Mirror US Move to T+1," January 15, 2024.
[348] Slovak NCDCP is currently not a member of ECSDA. ECSDA, "List of European CSDs Authorized Under the CSDR," accessed October 5, 2023.
[349] AFME, *T+1 Settlement in Europe*, September 2022, 6.
[350] Papillard et al., "T+1 Settlement," June 8, 2023.

and how, not if, the EU will move to T+1 settlement.[351] The UK Treasury is also considering steps to implement the change to T+1, although the UK financial services industry is not unanimously in favor.[352]

The U.S. move to T+1 will likely reduce some risks (like counterparty credit risk) and increase others (like regulatory inconsistency).[353] Several firms made practical preparations for T+1 through gap analysis and by anticipating impacts related to back offices, forex management, and other potential events.[354] Ultimately, T+1 may simply impose longer working hours on some workers and reallocate others. For example, given the relative illiquidity of forex markets in developing countries, international investors may have to work more hours overnight.[355] Additionally, to synchronize with time zones closer to their Asia-Pacific clients, some European teams may move to the United States; similarly, some Canadian operators may move west from Toronto to Vancouver.[356]

Generative AI in Securities Services

In November 2022, the release of OpenAI's demo of ChatGPT introduced GenAI technology to a broader audience.[357] GenAI refers to algorithms that can be used to create new content, such as audio, code, images, and text. GenAI exceeds predictive models, which classify only existing images and text.[358] In recent years, in their adoption of AI-related technology, securities services providers tended to lag behind other types of services providers.[359] Industry reports, however, suggest several potential applications of GenAI in securities services, including information gathering, legacy code maintenance, and the provision of financial advice.

Securities services firms may lag in AI technology development in part because many firms focus on providing customized advisory services for each client.[360] But GenAI's capacity for summarizing and extracting information from financial documents, some sources indicated, could help securities services workers like financial advisors speed up their research time, allowing more time for direct client interactions.[361]

GenAI's applications vary. For example, financial advisors at investment advisory firm Condor Capital Wealth Management have used ChatGPT to develop macros to extract data from in-house reports to retrieve information about particular clients for advisors before their meetings.[362] Similarly, to aid its

[351] Asgari and Kissin, "SEC's Gensler Calls for Shorter Settlement Times in Currency Markets," January 25, 2024.
[352] Kissin, "City Stalls UK Drive to Shorten Settlement Times for Trades," December 13, 2023.
[353] AFME, *T+1 Settlement in Europe*, September 2022, 6.
[354] Citi, *T+1*, 2023, 6.
[355] Papillard et al., "T+1 Settlement," June 8, 2023.
[356] Citi, *T+1*, 2023, 7.
[357] Marr, "A Short History of ChatGPT," May 9, 2023.
[358] For example, while a predictive models can classify a particular image as a cat, a GenAI model can generate its own image of a cat based on existing images. McKinsey, "What Is Generative AI?," January 19, 2023.
[359] Giovine et al., "Been There, Doing That: How Corporate and Investment Banks Are Tackling Gen AI," September 25, 2023; Accenture, "The Art of AI Maturity," 2022, 11.
[360] Giovine et al., "Been There, Doing That: How Corporate and Investment Banks Are Tackling Gen AI," September 25, 2023.
[361] Dilmegani, "10+ Generative AI Finance Use Cases in 2023," October 12, 2023; O'Connor, "'AI Can Make Advice More Personal,'" December 6, 2023.
[362] Spiegel, "How Advisors Are Increasing Efficiency and Impact," August 30, 2023.

financial advisors, Morgan Stanley developed an in-house version of OpenAI's ChatGPT but built the tool to answer questions using only research vetted by the bank.[363] To facilitate creation of presentations for investment proposals, another investment bank built a GenAI to produce many of the slides typically included in such presentations and customizing each with relevant data for the specific proposal.[364]

A second application of GenAI in securities services is to help maintain and convert legacy computer code. In 2018, 43 percent of existing banking systems were reportedly using COBOL, a programming language first developed in 1959.[365] When COBOL programmers retire, GenAI technology can be used to help translate code across languages, detect and repair code, and rewrite legacy code to improve readability and testability.[366] For example, in August 2023, International Business Machines Corporation (IBM) launched watsonx Code Assistant, a GenAI program designed to transform COBOL code into Java (a newer programming language), while maintaining interoperability between the two types of code.[367]

Additionally, some securities services firms are working to develop their own versions of GenAI platforms specializing in financial advice. For example, Broadridge Financial Solutions launched BondGPT in June 2023, a GenAI application that integrates with its LTX trading platform, which helps users to identify corporate bonds based on individual target criteria and demand for liquidity.[368] Similarly, in May 2023, JPMorgan Chase applied for a trademark for "IndexGPT," with the goal of developing a GenAI platform that can analyze and select securities for individual customers.[369]

GenAI offers several potential uses in securities services but expansion of GenAI technology could pose challenges related to accuracy, risk management, and regulatory oversight in the sector. A noted problem with GenAI is its tendency to "hallucinate," after which it produces answers to questions using fabricated information. In securities services, this hallucination could lead to inaccurate profiles of customers, inappropriate financial advice, and if incorrect information is spread across different firms, systemic risk in asset markets.[370]

Even if the GenAI does not hallucinate, it may rely too heavily on public sentiment to price risk. The result could be particularly inaccurate if retail investors continue to invest in meme stocks.[371] Given the current concentration of the GenAI industry, if all traders take the same actions because they all rely on the same GenAI models, then herding behavior could emerge in securities services markets. Such herding could lead to liquidity issues and create self-reinforcing swings in securities market prices.[372] Additionally, the complexity of GenAI-based trading programs and the lack of understanding of their

[363] Son, "Morgan Stanley Is Testing an OpenAI-Powered Chatbot for Its 16,000 Financial Advisors," March 14, 2023.
[364] The specific investment bank implementing this program is not cited in the source. Giovine et al., "Been There, Doing That: How Corporate and Investment Banks Are Tackling Gen AI," September 25, 2023.
[365] Encyclopedia Britannica, "COBOL," December 14, 2023; Hartman, "COBOL Blues," 2018; Maruccia, "AI-Powered Cobol Translator in Watsonx," December 11, 2023.
[366] Giovine et al., "Been There, Doing That: How Corporate and Investment Banks Are Tackling Gen AI," September 25, 2023.
[367] IBM, "IBM Unveils Watsonx Generative AI Capabilities," August 22, 2023.
[368] Broadridge Financial Solutions Inc., "Broadridge Launches BondGPT," June 6, 2023.
[369] Son, "JPMorgan Is Developing a ChatGPT-Like A.I. Service That Gives Investment Advice," May 25, 2023.
[370] Shabsigh and Boukherouaa, *Generative Artificial Intelligence in Finance: Risk Considerations*, August 2023.
[371] Shabsigh and Boukherouaa, *Generative Artificial Intelligence in Finance: Risk Considerations*, August 2023, 11.
[372] Tett, "The Dangers of Letting AI Loose on Finance," April 27, 2023; Shabsigh and Boukherouaa, *Generative Artificial Intelligence in Finance: Risk Considerations*, August 2023.

decision-making processes may impact the ability of regulators, bankers, and traders to trust and verify output from these trading systems.[373]

Another concern related to the adoption of GenAI in the securities services industry is the potential for job shifting and/or loss. For example, developments in GenAI that automate research processes could decrease the need for human financial advisors.[374] The skills required for securities services professionals may shift toward the business, negotiation, and relationship management skills, which are critical in attracting and maintaining relationships with large investors.[375]

Outlook

Future adoption of digital technology in the securities services industry will likely be motivated by a desire to minimize operating costs. Given recent declines in fee revenue and decreasing net interest margins, increased adoption of digital technology could be used to save money by standardizing services across different clients.[376] For example, GenAI in the financial sector could reduce operating expenditures by $200 billion–$340 billion annually, according to McKinsey estimates.[377] In addition, the securities services industry may see increased investment in cryptocurrency assets as part of an overall investment strategy. In January 2024, U.S. securities firms were cleared to sell exchange-traded funds that include cryptocurrency as part of their regular investment options, rather than relying on cryptocurrency-specific trading firms.[378]

[373] Cooper, "Rise of The AI Investment Bankers," April 20, 2023; Dimension Market Research, "Generative AI in Trading Market," April 16, 2024.
[374] Son, "JPMorgan Is Developing a ChatGPT-Like A.I. Service That Gives Investment Advice," May 25, 2023.
[375] O'Farrell, "Is Investment Promotion Ready for AI?," October 16, 2023.
[376] Oliver Wyman, "Future of Securities Services," 2020, 3, 16.
[377] Chui et al., *The Economic Potential of Generative AI*, accessed January 16, 2024, 28.
[378] Vynck and Gregg, "SEC Makes It Easier to Trade Bitcoin in Landmark Decision," January 11, 2024.

Bibliography

Abbott, Michael. "Top 10 Banking Trends for 2023." Accenture, 2023. https://www.accenture.com/us-en/insights/banking/top-10-trends-banking.

Abdool, Kamalita. "T+1 Settlement Reaches America." Deutsche Bank, April 28, 2022. https://flow.db.com/securities-services/t1-settlement-reaches-america?language_id=1.

Abraham, Facundo, Sergio L. Schmukler, and Jose Tessada, "Robo-Advisors: Investing through Machines," World Bank. Research and Policy Briefs number 21, February 2019. https://documents1.worldbank.org/curated/en/275041551196836758/pdf/Robo-Advisors-Investing-through-Machines.pdf.

Accenture. "The Art of AI Maturity." 2022. https://www.accenture.com/us-en/insights/artificial-intelligence/ai-maturity-and-transformation.

Accenture. *Payments Gets Personal*. 2022. https://www.accenture.com/content/dam/accenture/final/industry/banking/document/Accenture-Payments-Gets-Personal.pdf#zoom=40.

Agarwal, Rahul, Andreas Kremer, Ida Kristensen, and Angela Luget. How Generative AI Can Help Banks Manage Risk & Compliance. McKinsey & Company. March 1, 2024. https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/how-generative-ai-can-help-banks-manage-risk-and-compliance.

AIG. "A Reimagined Broker Portal with Improved Ease and Self-Service Capabilities." Accessed December 19, 2023. https://www-1p.aig.com/login.

Al-Sharaf, Yasmeen. "How Open Banking Is Levelling the Financial Playing Field in the Middle East." World Economic Forum, November 22, 2023. https://www.weforum.org/agenda/2023/11/open-banking-middle-east/.

Amador, José Luis López. "Open Finance and AI: A New Era for the Latam Financial Sector." Mexico Business, June 26, 2023. https://mexicobusiness.news/tech/news/open-finance-and-ai-new-era-latam-financial-sector.

American Banker, "A Deep Dive into the Tech Priorities of the Banking Industry." July 10, 2023. https://www.americanbanker.com/list/a-deep-dive-into-the-tech-priorities-of-the-banking-industry.

Angel, James. "Gamestonk: What Happened and What to Do about It." Rochester, NY, March 1, 2021. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3782195.

Arasasingham, Aidan, and Matthew P. Goodman. "Operationalizing Data Free Flow with Trust (DFFT)." Center for Strategic and International Studies (CSIS), April 13, 2023. https://www.csis.org/analysis/operationalizing-data-free-flow-trust-dfft.

Arora, Krishan. "Council Post: The Rise of The Retail Investor." *Forbes*, November 4, 2022. https://www.forbes.com/sites/forbesagencycouncil/2022/11/04/the-rise-of-the-retail-investor/.

Asgari, Nikou. "How Can Blockchain Platforms Make Currency Trading Cheaper?" *Financial Times*, November 2, 2023. https://www.ft.com/content/10d1d7ed-6ae2-457a-a901-ff1937ec0f8f.

Asgari, Nikou, and Ellesheva Kissin. "SEC's Gensler Calls for Shorter Settlement Times in Currency Markets." *Financial Times*, January 25, 2024. https://www.ft.com/content/f89cfa41-85b6-4181-b065-d2a8346993c4.

Association for Financial Markets in Europe (AFME). *T+1 Settlement in Europe: Potential Benefits and Challenges*. September 2022. https://www.afme.eu/Portals/0/DispatchFeaturedImages/AFME_Tplus1Settlement_2022_04.pdf.

Backbase. "Mauritius Commercial Bank Launches Backbase-Built SME Banking Platform and Mobile App." Press release, August 24, 2020. https://www.backbase.com/press/.

Baker, Curt. "10 Most Common Types of Cyber Attacks." CrowdStrike, November 9, 2023. https://www.crowdstrike.com/cybersecurity-101/cyberattacks/most-common-types-of-cyberattacks/.

Banerjee, Anutosh, Ian De Bode, Matthieu de Vergnes, Matt Higginson, and Julian Sevillano. "Tokenization: A Digital-Asset Déjà Vu." McKinsey & Company. August 5, 2023. https://www.mckinsey.com/industries/financial-services/our-insights/tokenization-a-digital-asset-deja-vu.

Bank of America. "Bank of America's Erica Tops 1 Billion Client Interactions, Now Nearly 1.5 Million Per Day." Press Release, October 12, 2022. https://newsroom.bankofamerica.com/content/newsroom/press-releases/2022/10/bank-of-america-s-erica-tops-1-billion-client-interactions--now-.html.

Barber, Peter. "America Embraces Open Banking." *Financial Times*, November 7, 2023. https://www.ft.com/content/e0203daa-1eca-46fd-a122-f6b4e5e29ec2.

Bazerman, Max, and Paresh Patel. "SPACs: What You Need to Know." *Harvard Business Review*, July-August 2021. https://hbr.org/2021/07/spacs-what-you-need-to-know.

Bech, Morten, Codruta Boar, and Daniel Eidan. "Using CBDCS Across Borders: Lessons from Practical Experiments." *Bank of International Settlements (BIS) Innovation Hub* (June 2022). https://www.bis.org/publ/othp51.pdf.

Betz, Sunny. "49 Insurtech Companies Making Coverage Simpler." Built In. December 12, 2023. https://builtin.com/fintech/insurtech-companies.

Bhattacharyya, Debopriyo, Míklos Dietz, Alexander Edlich, Reinhard Höll, Asheet Mehta, Brian Weintraub, and Eckart Windhagen. *Global Banking Annual Review 2023*. McKinsey & Company. October 10, 2023. https://www.mckinsey.com/industries/financial-services/our-insights/global-banking-annual-review.McKinsey & Company. Global Payments Report. September 18, 2023. https://www.mckinsey.com/industries/financial-services/our-insights/the-2023-mckinsey-global-payments-report.

BNamericas. "'All LatAm Banks Knocked on Our Door for Generative AI,' Says Microsoft." June 28, 2023. https://www.bnamericas.com/en/news/all-latam-banks-knocked-on-our-door-for-generative-ai-says-microsoft.

Board of Governors of the Federal Reserve System (Federal Reserve Board). "Agencies Approve Final Rule Requiring Computer-Security Incident Notification." November 18, 2021. https://www.federalreserve.gov/newsevents/pressreleases/bcreg20211118a.htm.

Bolden, Cristian, Corey Bourbonais, Grier Tumas Dienstag, Doug McElhaney, Andrew Reich, and Matthew Scally. *Insurance Investors: Priorities and Opportunities*. McKinsey & Company, October 30, 2023. https://www.mckinsey.com/industries/financial-services/our-insights/insurance-investors-priorities-and-opportunities.

Bradsher, Keith, and Chang Che. "Why China Is Tightening Its Oversight of Banking and Tech." *New York Times*, March 9, 2023. https://www.nytimes.com/2023/03/09/business/china-peoples-congress-financial-regulation.html.

Brainy Insights. "Insurtech Market Size." October 23, 2023. https://www.thebrainyinsights.com/report/insurtech-market-13737.

Brière, Marie. *Retail Investors' Behavior in the Digital Age: How Digitalisation Is Impacting Investment Decisions*. Amundi Institute, June 2023. https://research-center.amundi.com/article/retail-investors-behaviour-digital-age-how-digitalisation-impacting-investment-decisions.

Briggs, Bill. "Bringing Financial Inclusion to Latin America with Fintech and AI." Source, March 15, 2023. https://news.microsoft.com/source/features/ai/fintech-ai-financial-inclusion-latin-america/.

Broadbent, Meredith. "USTR Upends U.S. Negotiating Position on Cross-Border Data Flows." Center for Strategic and International Studies, December 12, 2023. https://www.csis.org/analysis/ustr-upends-us-negotiating-position-cross-border-data-flows.

Broadridge Financial Solutions Inc. "LTX by Broadridge Launches BondGPT Powered by OpenAI GPT-4." June 6, 2023. https://www.broadridge.com/de/press-release/2023/ltx-by-broadridge-launches-bondgpt.

Burman, Anirudh, and Sharma, Upasana. *How Would Data Localization Benefit India?* Carnegie Endowment for International Peace. April 2021. https://carnegieendowment.org/files/202104-Burman_Sharma_DataLocalization_final.pdf.

Cambridge Dictionary. "Insurance Broker." Cambridge University Press. Accessed February 9, 2024. https://dictionary.cambridge.org/us/dictionary/english/insurance-broker.

Carrier Management. "The Latest Launches from FastTrack, American Claims Management, Policygenius." February 11, 2022. https://www.carriermanagement.com/news/2022/02/11/232652.htm.

Challapalli, Surendra. "Fintech Data Integration Challenges and Effective Strategies." FinTech Futures. July 3, 2023. https://www.fintechfutures.com/2023/07/fintech-data-integration-challenges-and-effective-strategies/.

Chamberlain, Tom. *The Vision and Road to Underwriting 3.0*. Hyperexponential. Accessed February 9, 2024. https://www.hyperexponential.com/resources/underwriting-3-0/?utm_source=insurance-times&utm_medium=paid-traffic%20the-vision-and-road-to-underwriting-3.0.

Chee, Foo Yun. "EU Mulls Wider Scope for Cybersecurity Certification Scheme." Reuters, November 27, 2023. https://www.reuters.com/technology/cybersecurity/eu-mulls-wider-scope-cybersecurity-certification-scheme-paper-2023-11-23/.

Chui, Michael, Eric Hazan, Roger Roberts, Alex Singla, Kate Smaje, Alex Sukharevsky, Lareina Yee, and Rodney Zemmel. *The Economic Potential of Generative AI*. McKinsey & Company. Accessed January 16, 2024. https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier.

Citi. *Securities Services Evolution 2022*. 2022. https://www.citibank.com/mss/docs/Citi_Securities_Services_Evolution_Whitepaper_2022_Final.pdf.

Citi. *T+1: A Race Against Time*. 2023. https://www.citibank.com/mss/docs/Citi-Thought-Leadership-T-1-A-Race-Against-Time.pdf.

Clarke, Paul. "Citigroup CEO Jane Fraser Lays out AI Plans." Financial News, July 12, 2023. https://www.fnlondon.com/articles/citigroup-generative-ai-20230712.

Collier, Kevin. "Binance CEO Steps down; Crypto Platform Hit with Record $4.3 Billion in Damages." NBC News, November 21, 2023. https://www.nbcnews.com/tech/tech-news/binance-ceo-steps-crypto-platform-hit-4-billion-fines-rcna126071.

Columbia University. "Artificial Intelligence (AI) vs. Machine Learning." *CU-CAI*. Accessed April 16, 2024. https://ai.engineering.columbia.edu/ai-vs-machine-learning/.

Coombes, Andrea. "How Much Does a Financial Advisor Cost?" NerdWallet, January 5, 2024. https://www.nerdwallet.com/article/investing/how-much-does-a-financial-advisor-cost.

Cooper, Mark. "Rise Of the AI Investment Bankers." *Forbes*, April 20, 2023. https://www.forbes.com/sites/forbesfinancecouncil/2023/04/20/rise-of-the-ai-investment-bankers/?sh=230c3ad048f7.

Crosman, Penny. "JPMorgan Chase Using Advanced AI to Detect Fraud." *American Banker*, July 3, 2023. https://www.americanbanker.com/news/jpmorgan-chase-using-chatgpt-like-large-language-models-to-detect-fraud.

Cross, Miriam. "The AI Use Cases Banks and the Federal Reserve Are Contemplating." *American Banker*, September 20, 2023. https://www.americanbanker.com/news/the-ai-use-cases-banks-and-the-federal-reserve-are-contemplating.

Cybersecurity and Infrastructure Security Agency (CISA). "Cyber Safety Review Board (CSRB)." Accessed November 30, 2023. https://www.cisa.gov/resources-tools/groups/cyber-safety-review-board-csrb.

Cybersecurity and Infrastructure Security Agency (CISA). "Shields Up!" Accessed November 30, 2023. https://www.cisa.gov/shields-up.

Cyber Security Trends 2023. Allianz Commercial, October 2023. https://commercial.allianz.com/news-and-insights/reports/cyber-security-trends-2023.html.

Daniel, Simon. "A Year to Go: How the Securities Industry Is Preparing for T+1." Swift, June 8, 2023. https://www.swift.com/news-events/news/year-go-how-securities-industry-preparing-t1.

Darbyshire, Madison. "Generation Moonshot: Why Young Investors Are Not Ready to Give up on Risk." *Financial Times*, July 20, 2022. https://www.ft.com/content/bce2ef2a-77d8-485e-ba69-92579f8fceb6.

Del Giovane, Chiara, Janos Ferencz, and Javier López González. *The Nature, Evolution and Potential Implications of Data Localization Measures*. Paris: OECD, November 10, 2023. https://doi.org/10.1787/179f718a-en.

Deloitte Center for Financial Services. *2023 Banking and Capital Markets Outlook*. Deloitte Insights. 2022. https://www2.deloitte.com/content/dam/Deloitte/at/Documents/financial-services/at-banking-capital-markets-outlook-2023.pdf.

Dennis, Steve. "The 'Profitless Prosperity' Of Retail Disruptor Brands." Forbes, March 9, 2022. https://www.forbes.com/sites/stevendennis/2022/03/09/the-profitless-prosperity-of-retail-disruptor-brands/.

Depository Trust and Clearing Corporation (DTCC). "DTCC Proposes Approach to Shortening U.S. Settlement Cycle to T+1 Within 2 Years." February 24, 2021. https://www.dtcc.com/news/2021/february/24/dtcc-proposes-approach-to-shortening-us-settlement-cycle-to-t1-within-two-years.

Depository Trust and Clearing Corporation (DTCC). *T+1 Test Approach: Detailed Testing Framework, Version 4*. July 2023. https://www.dtcc.com/ust1/-/media/Files/PDFs/T2/UST1-Detailed-Test-Document.pdf.

Depository Trust and Clearing Corporation (DTCC). *Guide to the 2024 DTC Fee Schedule*. 2024. https://www.dtcc.com/-/media/Files/Downloads/legal/fee-guides/DTC-Fee-Schedule.pdf.

Deutsche Bank. "Deutsche Bank Partners with NVIDIA to Embed AI into Financial Services." December 7, 2022. https://www.db.com/news/detail/20221207-deutsche-bank-partners-with-nvidia-to-embed-ai-into-financial-services?language_id=1.

Deutsche Bank. "How Artificial Intelligence Is Changing Banking." Accessed November 30, 2023. https://www.db.com/what-next/digital-disruption/better-than-humans/how-artificial-intelligence-is-changing-banking/index?language_id=1.

De Vynck, Gerrit, and Aaron Gregg. "SEC Makes It Easier to Trade Bitcoin in Landmark Decision." *Washington Post*, January 11, 2024. https://www.washingtonpost.com/business/2024/01/11/bitcoin-sec-approval-coinbase/.

"Digital Operational Resilience Act (DORA) - Regulation (EU) 2022/2554." Accessed December 20, 2023. https://www.digital-operational-resilience-act.com/.

Dilmegani, Cem. "10+ Generative AI Finance Use Cases in 2023." AIMultiple, October 12, 2023. https://research.aimultiple.com/generative-ai-finance/ .

Duck Creek Technologies. "Products." Duck Creek Technologies. Accessed January 25, 2023. https://www.duckcreek.com/product/#.

Economic Times. "What Is 'Agent.'" Accessed February 9, 2024. https://economictimes.indiatimes.com/definition/agent.

Economist Intelligence Unit (EIU). *Banking on a Game-Changer: AI in Financial Services*. 2022. https://impact.economist.com/perspectives/sites/default/files/aiinfinancialservices.pdf.

Egghen, Robert Van. "Fund Managers Urge European Regulators to Mirror US Move to T+1." *Financial Times*, January 15, 2024. https://www.ft.com/content/75e87a64-6163-49f2-9f63-bd80fa0180cb.

Eisenbach, Thomas M., Anna Kovner, and Michael Junho Lee. *Cyber Risk and the U.S. Financial System: A Pre-Mortem Analysis*. 909. Federal Reserve Bank of New York, May 2021. https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr909.pdf.

Elinson, Sara, and Prashant Kher. "Tokenization in Asset Management." EY Parthenon, August 18, 2023. https://www.ey.com/en_us/financial-services/tokenization-in-asset-management.

Encyclopedia Britannica. "COBOL." December 14, 2023. https://www.britannica.com/technology/COBOL.

European Central Bank (ECB). "Study on the Payment Attitudes of Consumers in the Euro Area (SPACE)—2022." December 20, 2022. https://www.ecb.europa.eu/stats/ecb_surveys/space/html/ecb.spacereport202212~783ffdf46e.en.html.

European Central Securities Depositories Association (ECSDA). "List of European CSDs Authorized Under the CSDR." Accessed October 5, 2023. https://ecsda.eu/facts.

European Parliament and of the Council of the European Union. *Directive (EU) 2015/2366 on Payment Services in the Internal Market*. November 25, 2015. http://data.europa.eu/eli/dir/2015/2366/oj/eng.

Fernández, Miriam. *AI in Banking: AI Will Be an Incremental Game Changer*. S&P Global, October 31, 2023. https://www.spglobal.com/en/research-insights/featured/special-editorial/ai-in-banking-ai-will-be-an-incremental-game-changer.Flashpoint.

Flashpoint. "Flashpoint Year in Review: 2022 Financial Threat Landscape." December 21, 2022. https://flashpoint.io/blog/risk-intelligence-year-in-review-financial/.

Fowler, Kevin, Kevin Urbanowicz, William Burns, Diana Kearns-Manolatos, and Iram Parveen. "Cybersecurity Threats and Incidents Differ by Region." Deloitte Insights, August 14, 2023. https://www2.deloitte.com/us/en/insights/topics/cyber-risk/global-cybersecurity-threat-trends.html.

Francis, Denis, Imke Jacob, and Fadi Zogbhy. *The Data and Analytics Edge in Corporate Banking*. McKinsey & Company. March 9, 2023. https://www.mckinsey.com/industries/financial-services/our-insights/the-data-and-analytics-edge-in-corporate-and-commercial-banking.

Gartner. "Duck Creek Alternatives." Gartner, January 26, 2024. https://www.gartner.com/reviews/market/p-c-insurance-core-platforms-north-america/vendor/duck-creek/alternatives.

Gartner. "Gartner Forecasts Worldwide Banking and Investment Services IT Spending to Reach $652 Billion in 2023." Press release, July 21, 2023. https://www.gartner.com/en/newsroom/press-releases/2023-06-21-gartner-forecasts-worldwide-banking-and-investment-services-it-spending-to-reach-652-billion-in-2023.

Ghanti, Akhilesh. "Angel Investor Definition and How It Works." Investopedia, September 29, 2023. https://www.investopedia.com/terms/a/angelinvestor.asp.

Giovine, Carolo, Larry Lerner, Jared Moon, and Stefan Schorsch. "Been There, Doing That: How Corporate and Investment Banks Are Tackling Gen AI." McKinsey & Company, September 25, 2023. https://www.mckinsey.com/industries/financial-services/our-insights/been-there-doing-that-how-corporate-and-investment-banks-are-tackling-gen-ai.

GlobalData. "Top 10 Payment Companies in the World in 2021 by Revenue." 2022. https://www.globaldata.com/companies/top-companies-by-sector/financial-services/global-payment-companies-by-revenue/.

Goldman Sachs Global Macro Research. *Top of Mind: Liquidity, Volatility, Fragility*. Goldman Sachs Research Newsletter 68. June 12, 2018. https://www.gsam.com/content/dam/gsam/pdfs/sg/en/commentary/GS_Top%20of%20Mind_June.pdf?sa=n&rd=n.

Gong, James, Clarice Yue, Tanya Luo, and Jacqueline Che. "China Cybersecurity and Data Protection: Monthly Update - September 2022 Issue." Lexology, October 24, 2022. https://www.lexology.com/library/detail.aspx?g=21927380-6795-4770-bf5f-2bf8976ddbab.

Goodwin, Bill. "Citi US Personal Banking Turns to AI to 'Delight' Customers with Personalised Services." ComputerWeekly, June 16, 2023. https://www.computerweekly.com/news/366541863/Citis-US-Personal-Banking-turns-to-AI-to-delight-customers-with-personalised-services.

Google Finance. “Lemonade Inc. (LMND) Stock Price & News.” Accessed February 13, 2024. https://www.google.com/finance/quote/LMND:NYSE.

Gopalakrishnan, Sriram, Val Srinvas, and Abhinav Chauhan. “Unleashing a New Era of Productivity in Investment Banking through the Power of Generative Ai.” Deloitte Insights, July 27, 2023. https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-predictions/2023/generative-ai-in-investment-banking.html.

Graham, Sarah. “Cybersecurity Is Number One Risk for Global Banks, but Geopolitical Risk Tops European Banks’ Concerns.” EY, January 11, 2023. https://www.ey.com/en_gl/news/2023/01/cybersecurity-is-number-one-risk-for-global-banks-but-geopolitical-risk-tops-european-banks-concerns.

Gravier, Elizabeth. “Meme Stocks: What Are They and Why You Should Be Careful Buying Them.” CNBC, October 4, 2023. https://www.cnbc.com/select/what-is-a-meme-stock/.

Hartman, Travis. “COBOL Blues.” Reuters, 2018. http://fingfx.thomsonreuters.com/gfx/rngs/USA-BANKS-COBOL/010040KH18J/index.html.

Harrison, Hayden. "What is Open Banking? Your Essential Guide." Mastercard. November 23, 2023. https://www.mastercard.com/news/perspectives/2022/open-banking-101/.

Hayes, Adam. “Loss Ratio: What It Is, How It’s Calculated, Types.” Investopedia, November 15, 2020. https://www.investopedia.com/terms/l/loss-ratio.asp.

Hendler, Rom. “How To Defend Against Malicious LLM Cyberattacks.” Forbes, October 27, 2023. https://www.forbes.com/sites/forbestechcouncil/2023/10/27/how-to-defend-against-malicious-llm-cyberattacks/.

Hill, Kashmir. “Automakers Are Sharing Consumers’ Driving Behavior With Insurance Companies.” *New York Times*, March 11, 2024. https://www.nytimes.com/2024/03/11/technology/carmakers-driver-tracking-insurance.html.

Hines, Kieran. “Retail Banking Tech Spending Trends Reflect Multiple Challenges.” *ABA Banking Journal*, November 10, 2022. https://bankingjournal.aba.com/2022/11/retail-banking-tech-spending-trends-reflect-multiple-challenges/.

Hines, Kieran, and Gareth Lodge. “Retail Banking Technology Spending Forecasts 2022–27: Growing Out of the Pandemic.” Celent, August 25, 2022. https://www.celent.com/insights/631021434.

Huang, Kalley. “Why Did FTX Collapse? Here’s What to Know.” *New York Times*, November 10, 2022. https://www.nytimes.com/2022/11/10/technology/ftx-binance-crypto-explained.html.

Hughes, Jennifer. “Meme-Stock 2.0: Wall Street’s Retail Trading Boom Is Back.” *Financial Times*, February 17, 2023. https://www.ft.com/content/0ffaea2b-ba38-4dbc-bb52-499cdb0e1662.

Iacurci, Greg. “Robo-Advisors Are Growing in Popularity. Can They Really Replace a Human Financial Advisor?” CNBC, January 16, 2022. https://www.cnbc.com/2022/01/16/robo-advisors-are-gaining-popularity-can-they-replace-a-human-advisor.html.

IBISWorld. *Commercial Banking in the US*. Industry Report 52211, November 2023. https://www.ibisworld.com/united-states/market-research-reports/commercial-banking-industry/.

IBISWorld. *Global Commercial Banks*. Industry Report 52211-GL. September 2023. https://www.ibisworld.com/global/market-research-reports/global-commercial-banks-industry/.

Imeson, Michael. "Big Data Makes a Difference to Banks." The Banker. December 3, 2012. https://www.thebanker.com/Big-data-makes-a-big-difference-to-banks-1354525258.

Insinna, Valerie, and Zeba Siddiqui. "Boeing Says 'Cyber Incident' Hit Parts Business After Ransom Threat." Reuters, November 2, 2023. https://www.reuters.com/business/aerospace-defense/boeing-investigating-cyber-incident-affecting-parts-business-2023-11-01/.

International Business Machines Corporation (IBM). "Cost of a Data Breach Report 2023." July 2023. https://www.ibm.com/reports/data-breach?utm_content=SRCWW&p1=Search&p4=43700077724064006&p5=e&gad_source=1&gclid=Cj0KCQjwztOwBhD7ARIsAPDKnkBMc_Ch0qnZ2BH-OJ5nqnSxOl_3Gf4jUKL8S2oy356D_Fu83gurnGwaAr4oEALw_wcB&gclsrc=aw.ds

International Business Machines Corporation (IBM). "IBM Unveils Watsonx Generative AI Capabilities to Accelerate Mainframe Application Modernization." August 22, 2023. https://newsroom.ibm.com/2023-08-22-IBM-Unveils-watsonx-Generative-AI-Capabilities-to-Accelerate-Mainframe-Application-Modernization.

International Business Machines Corporation (IBM). "What Is Artificial Intelligence in Finance?," accessed March 7, 2024. https://www.ibm.com/topics/artificial-intelligence-finance#:~:text=Artificial%20intelligence%20(AI)%20in%20finance,in%20the%20financial%20services%20industry.

Investopedia Team. "What Do T+1, T+2, and T+3 Mean?" Investopedia, May 5, 2022. https://www.investopedia.com/ask/answers/what-do-t1-t2-and-t3-mean/.

Jacobs, Tom. *Profitability Concerns Drive September Swoon for Insurtechs*. S&P Global Market Intelligence, September 29, 2023. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/profitability-concerns-drive-september-swoon-for-insurtechs-77476917.

JPMorgan Chase. "How AI Will Make Payments More Efficient and Reduce Fraud." November 20, 2023. https://www.jpmorgan.com/insights/payments/payments-optimization/ai-payments-efficiency-fraud-reduction.

Kellermann, Tom. *Cyber Bank Heists: Threats to the Financial Sector*. Contrast Security, 2023. https://www.contrastsecurity.com/hubfs/Cyber%20Bank%20Heists%20Report%202023.pdf?hsLang=en.

Kissin, Ellesheva. "City Stalls UK Drive to Shorten Settlement Times for Trades." *Financial Times*, December 13, 2023. https://www.ft.com/content/d44e69bb-a878-4f83-bd07-b94a628ba0b3.

Krüger, Philipp S., and Jan-Philipp Brauchle. *The European Union, Cybersecurity, and the Financial Sector: A Primer*. Carnegie Endowment for International Peace, March 16, 2021. https://carnegieendowment.org/2021/03/16/european-union-cybersecurity-and-financial-sector-primer-pub-84055.

Lemonade. "Lemonade Insurance." Accessed December 20, 2023. https://www.lemonade.com/.

Leng, Cheng, Costas Mourselas, and Kate Duguid. "Cyber Attack Shines Light on Role of China's Largest Lender in Us Treasury Market." *Financial Times*, November 15, 2023. https://www.ft.com/content/877c9b22-a459-49b0-8745-0e941e93c272.

Locke, Taylor. "From Bitcoin Hitting $1 Trillion in Market Value to Elon Musk's Dogecoin Tweets: 12 Key Crypto Moments from 2021." CNBC, December 27, 2021. https://www.cnbc.com/2021/12/27/12-key-moments-that-fueled-cryptos-record-growth-in-2021.html.

Mackintosh, Phil. "Who Counts as a Retail Investor?" Nasdaq, December 17, 2020. https://www.nasdaq.com/articles/who-counts-as-a-retail-investor-2020-12-17.

Mägerle, Jürg, and David Maurer. *The Continuous Linked Settlement Foreign Exchange Settlement System (CLS)*. Swiss National Bank, November 2009. https://www.snb.ch/dam/jcr:92bb643e-a03e-4970-a8ce-0dadae60b130/continuous_linked_settlement.en.pdf.

Marous, Jim. *2024 Retail Banking Trends and Priorities*. Digital Banking Report, January 2024. https://www.digitalbankingreport.com/trends/2024-retail-banking-trends-and-priorities/.

Marr, Bernard. "A Short History of ChatGPT: How We Got to Where We Are Today." *Forbes*, May 9, 2023. https://www.forbes.com/sites/bernardmarr/2023/05/19/a-short-history-of-chatgpt-how-we-got-to-where-we-are-today/.

Martineau, Kim. "What Is Generative AI?" *IBM Research Blog*. April 20, 2023. https://research.ibm.com/blog/what-is-generative-AI.

Martínez, A., and David Gura. "FTX Founder Sam Bankman-Fried Is Found Guilty of All Charges Including Fraud." NPR, November 3, 2023. https://www.npr.org/2023/11/03/1210390433/ftx-founder-sam-bankman-fried-is-found-guilty-of-all-charges-including-fraud.

Maruccia, Alfonso. "IBM Assures AI-Powered Cobol Translator in Watsonx Will Not Replace Developers." TechSpot, December 11, 2023. https://www.techspot.com/news/101157-ai-based-cobol-translator-watsonx-not-replace-developers.html.

Mason, Thomas. "U.S. Insurtech Market Report: What to Cut?" *S&P Global Market Intelligence*, August 16, 2022. https://www.spglobal.com/marketintelligence/en/news-insights/research/us-insurtech-market-report-what-to-cut#:~:text=As%20insurtech%20startups%20shift%20focus,U.S.%20Insurance%20Technology%20Market%20Report.

Mason, Thomas. "Banks Still Plan to Increase Tech Spend in 2023." S&P Global Market Intelligence, May 4, 2023. https://www.spglobal.com/marketintelligence/en/news-insights/research/banks-still-plan-to-increase-tech-spend-in-2023-sp-survey.

Mastercard. *How IOT Will Shape the Future of Payments*. May 2021. https://www.mastercard.com/news/media/wddjfrhn/how-iot-will-shape-the-future-of-payments.pdf.

Mauritius Commercial Bank. *Annual Report 2023*. September 25, 2023. https://mcb.mu/docs/mcb/about-us/financial-reports/fy-2022-23/mcb-annual-report-2023.pdf?sfvrsn=50f9e946_10.

McKinsey & Company. "What Is Generative AI?" January 19, 2023. https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai.

McKnight, David R., and Timothy Tipton. "10 Risks and Cybersecurity Strategies for Banks in 2023." Crowe, March 23, 2023. https://www.crowe.com/insights/10-risks-and-cybersecurity-strategies-for-banks-in-2023.

Members of the U.S. Congress. "Final Letter to Biden in Support of USTR Digital Trade Work." United States Senate, November 6, 2023. https://www.warren.senate.gov/imo/media/doc/FINAL%20Letter%20to%20Biden%20in%20Support%20of%20USTR%20Digital%20Trade%20Work.pdf.

Members of the U.S. Congress. "Letter Supporting Ambassador Katherine Tai's Approach to Worker-Centered Trade Policy." February 12, 2024. https://delauro.house.gov/sites/evo-subsites/delauro.house.gov/files/evo-media-document/DeLauro%20Rosa%20-%20Letter%20Supporting%20Ambassador%20Katherine%20Tai's%20Approach%20to%20Worker-Centered%20Trade%20Policy.pdf.

Milken Institute. *Insurtech Market Overview*. Milken Institute, 2018. https://milkeninstitute.org/sites/default/files/2019-08/Insurtech-Market-Overview-Landscape-converted.pdf.

Monetary Authority of Singapore. "U.S. Treasury and Monetary Authority of Singapore Conduct Joint Exercise to Strengthen Cross-Border Cyber Incident Coordination and Crisis Management." May 2, 2023. https://www.mas.gov.sg/news/media-releases/2023/ust-and-mas-conduct-joint-exercise.

Monicken, Hannah. "Pagán: U.S. Pulled Back on WTO e-Commerce Proposals to 'Match' IPEF Stance." Inside Trade, November 1, 2023. https://insidetrade.com/daily-news/pag-n-us-pulled-back-wto-e-commerce-proposals-match-ipef-stance.

Moore, Ariana-Michele. *P2P Payment Methods: So Many Options, So Little Money?* Datos Insights, September 21, 2023. https://datos-insights.com/wp-content/uploads/2023/09/20230915_P2P-Payment-Methods_So-Many-Options-So-Little-Money_Summary.pdf.

Naik, Gautam. "Cyber 'Catastrophe Bonds' Move Step Closer to Hitting Public Debt Markets." *Insurance Journal*, November 13, 2023. https://www.insurancejournal.com/news/national/2023/11/13/747832.htm.

Naik, Gautam. "AXIS Capital Sponsors First Cyber-Catastrophe Bond Issued in Public Debt Markets." *Insurance Journal*, November 29, 2023. https://www.insurancejournal.com/news/international/2023/11/29/749877.htm.

National Association of Insurance Commissioners (NAIC). *State Licensing Handbook*. 2020. https://content.naic.org/state_licensing_handbook.htm.

Naydenov, Rossen, and Marianthi Theocharidou. *EU Cybersecurity Initiatives in the Finance Sector*. European Union Agency for Cybersecurity, March 2023. https://www.enisa.europa.eu/publications/EU_Cybersecurity_Initiatives_in_the_Finance_Sector.

O'Connor, Tara. "'AI Can Make Advice More Personal.'" *The Financial Times*, December 6, 2023. https://www.ftadviser.com/your-industry/2023/12/06/ai-can-make-advice-more-personal/.

O'Farrell, Seth. "Is Investment Promotion Ready for AI?" FDI Intelligence, October 16, 2023. https://www.fdiintelligence.com/content/feature/is-investment-promotion-ready-for-ai-83008?saveConsentPreferences=success.

Office of the U.S. Trade Representative (USTR). "USTR Statement on WTO E-Commerce Negotiations." October 24, 2023. https://ustr.gov/about-us/policy-offices/press-office/press-releases/2023/october/ustr-statement-wto-e-commerce-negotiations.

OneUnited Bank. "OneUnited Bank Introduces WiseOne Insights a Revolutionary AI-Driven Financial Wellness Companion." Press release, OneUnited Bank, October 26, 2023. https://www.oneunited.com/blog/oneunited-bank-introduces-wiseone-insights-a-revolutionary-ai-driven-financial-wellness-companion/.

Onyx by JPMorgan Chase. "Tokenized Collateral Network." 2023. https://jpmorgan.com/onyx/tokenized-collateral-network.htm.

Organisation for Economic Co-operation and Development (OECD). *Leveraging Technology in Insurance to Enhance Risk Assessment and Policyholder Risk Reduction*. Organisation for Economic Co-Operation and Development (OECD), December 13, 2023. https://www.oecd-ilibrary.org/docserver/2f5c18acen.pdf?expires=1707543590&id=id&accname=guest&checksum=8219D273573C571EC642E4C5170F101D.

Organisation for Economic Co-operation and Development (OECD). *Going Digital Guide to Data Governance Policy Making*. Paris: Organisation for Economic Co-operation and Development, December 14, 2022. https://www.oecd-ilibrary.org/science-and-technology/going-digital-guide-to-data-governance-policy-making_40d53904-en.

Organisation for Economic Cooperation and Development (OECD). *Artificial Intelligence, Machine Learning and Big Data in Finance*. Paris: OECD, August 11, 2021. https://www.oecd.org/finance/financial-markets/Artificial-intelligence-machine-learning-big-data-in-finance.pdf.

Oxford English Dictionary. "Insurtech." Oxford University Press, December 2023. https://www.oed.com/dictionary/insurtech_n.

Palmer, Doug. "Tai Says Digital Trade Move Avoided 'Policy Suicide.'" Politico, December 7, 2023. https://subscriber.politicopro.com/article/2023/12/tai-says-digital-trade-move-avoided-policy-suicide-00130635.

Pape, Carter. "Chico Bank Suffers Data Breach after February Cyber Attack." *American Banker*, March 23, 2023. https://www.americanbanker.com/news/chico-bank-suffers-its-second-cyberattack-of-the-year.

Pape, Carter. "Here's How the White House's Cyber Initiatives Could Affect Banks." *American Banker*, July 13, 2023. https://www.americanbanker.com/news/heres-how-the-white-houses-cyber-initiatives-could-affect-banks.

Pape, Carter. "Ransomware Attack on Chinese Bank Interrupts U.S. Treasury Trading." *American Banker*, November 10, 2023. https://www.americanbanker.com/news/ransomware-attack-on-chinese-bank-interrupts-u-s-treasury-trading.

Papillard, Camille, Mark Wootton, Emmanuelle Riess, and Gabriel Sampaio. "T+1 Settlement: Are You Ready?" BNP Paribas, June 8, 2023. https://securities.cib.bnpparibas/t1-settlement-ready/.

Parekh, Satyajit, Stephen Reddin, Kayvaun Rowshankish, Henning Soller, and Malin Strandell-Jansson. "Data Localization and New Competitive Opportunities." McKinsey & Company, June 30, 2022. https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/localization-of-data-privacy-regulations-creates-competitive-opportunities.

Pound, Jesse. "Bitcoin Hits $1 Trillion in Market Value as Cryptocurrency Surge Continues." CNBC, February 19, 2021. https://www.cnbc.com/2021/02/19/bitcoin-hits-1-trillion-in-market-value-as-cryptocurrency-surge-continues.html.

Precedence Research. "P2P Payment Market Size to Hit Over USD 11.62 Trillion by 2032." September 2023. https://www.precedenceresearch.com/p2p-payment-market.

Progressive. "What Is Subrogation?" Accessed February 9, 2024. https://www.progressive.com/answers/what-is-subrogation/.

PYMNTS. "Citi Says AI Will Personalize Treasury, Power Data-Readiness." July 5, 2023. https://www.pymnts.com/news/artificial-intelligence/2023/citi-says-ai-will-personalize-treasury-and-power-data-readiness-teams/, https://www.pymnts.com/news/artificial-intelligence/2023/citi-says-ai-will-personalize-treasury-and-power-data-readiness-teams/.

PYMNTS. "P2P Transaction Volume up 25% as Firms Rush to the Space." August 9, 2023. https://www.pymnts.com/news/payment-methods/2023/p2p-transaction-volume-up-25percent-as-firms-rush-to-the-space/, https://www.pymnts.com/news/payment-methods/2023/p2p-transaction-volume-up-25percent-as-firms-rush-to-the-space/.

Qazini. "From Threat to Solution: African Banks Embracing AI for Tailored Services." June 1, 2023. https://www.qazini.com.

Rangachari, Sairam. *The Open Banking Transformation*. J. P. Morgan Chase, 2018. https://www.jpmorgan.com/solutions/treasury-payments/insights/open-banking.

Ratnam, Gopal. "Small Banks Facing Greater Cyber Risks Urge Congress to Act." *Roll Call*, November 9, 2021. https://rollcall.com/2021/11/09/small-banks-facing-greater-cyber-risks-urge-congress-to-act/.

Robertson, Harry. "GameStop Day Traders Shook Markets and Hit Hedge Funds for Billions. What Has Wall Street Learned?" Markets Insider, January 30, 2021. https://markets.businessinsider.com/news/stocks/gamestop-saga-triggers-rethink-wall-street-short-seller-losses-2021-1-1030021995.

S&P Global. *Global Bank Country-by-Country Outlook 2023: Greater Divergence Ahead*. November 17, 2022.https://www.spglobal.com/_assets/documents/ratings/research/101569237.pdf.

Saeed, Saqib, Saha Altamimi, Nora Alkayyal, Ebtisam Alshehri, and Dina Alabbad. "Digital Transformation and Cybersecurity Challenges for Business Resilience: Issues and Recommendations." *Sensors*. July 25, 2023. https://www.mdpi.com/1424-8220/23/15/6666.

S&P Global. *Global Banks Country-By-Country Outlook 2024: Forewarned Is Forearmed*. S&P Global Ratings, 2024. https://www.spglobal.com/ratings/en/research/pdf-articles/231116-global-banks-country-by-country-outlook-2024-forewarned-is-forearmed-101589446.

Santenac, Isabelle, Philip Vermeulen, Anita Sun-Young Bong, Lorenzo Fattibene, Ed Majkowski, and Anna Hurynovich. *2024 Global Insurance Outlook*. Ernst & Young, November 29, 2023. https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/insurance/insurance-pdfs/ey-2024-global-insurance-outlook-report-v2.pdf.

Securities Industry and Financial Markets Association (SIFMA), Investment Company Institute (ICI), Depository Trust and Clearing Corporation (DTCC), and Deloitte. *Accelerating the U.S. Securities Settlement Cycle to T+1*. December 1, 2021. https://www.sifma.org/wp-content/uploads/2021/12/Accelerating-the-U.S.-Securities-Settlement-Cycle-to-T1-December-1-2021.pdf.

Seifert, Catherine, and Fateh Yahaya. *Industry Surveys: Property & Casualty Insurance*. Center for Financial Research and Analysis, July 2023. https://services.marketscope.com/micro-services/SP/msa/reports?reportURL=/IndustrySurveysAll/ipc_0723.pdf.

Self-Regulatory Organizations; National Securities Clearing Corporation; Order Instituting Proceedings To Determine Whether To Approve or Disapprove a Proposed Rule Change To Adopt Intraday Volatility Charge and Eliminate Intraday Backtesting Charge. 87 Fed. Reg. 63845. October 20, 2022. https://www.federalregister.gov/documents/2022/10/20/2022-22732/self-regulatory-organizations-national-securities-clearing-corporation-order-instituting-proceedings.

SentinelOne. "Cyber Attacks on Financial Institutions | Why Banks Are Caught in the Crosshairs." SentinelOne, August 22, 2023. https://www.sentinelone.com/blog/a-cyberwar-on-financial-institutions-why-banks-are-caught-in-the-crosshairs/.

Shabsigh, Ghiath, and El Bachir Boukherouaa. *Generative Artificial Intelligence in Finance: Risk Considerations*. *International Monetary Fund (IMF)* 2023, no. 6 (August 22, 2023): 1–24. https://doi.org/10.5089/9798400251092.063.

Shabsigh, Ghiath, and El Bachir Boukherouaa. *Generative Artificial Intelligence in Finance: Risk Considerations*. IMF Fintech Note 2023/006. International Monetary Fund, August 2023. https://www.imf.org/en/Publications/fintechnotes/Issues/2023/08/18/Generative-Artificial-Intelligence-in-Finance-Risk-Considerations-537570.

Shea, Sharon, and Alissa Irei. "What Is Ransomware? How It Works and How to Remove It." *TechTarget*. Accessed December 18, 2023. https://www.techtarget.com/searchsecurity/definition/ransomware#:~:text=Ransomware%20is%20a%20type%20of,attacker%20receives%20a%20ransom%20payment.

Shubber, Kadhim, and Joshua Oliver. "Inside Celsius: How One of Crypto's Biggest Lenders Ground to a Halt." *Financial Times*, July 13, 2022. https://www.ft.com/content/4fa06516-119b-4722-946b-944e38b02f45.

Shortening the Securities Transaction Settlement Cycle (Proposed Rule). 87 Fed. Reg. 10436. February 24, 2022. https://www.federalregister.gov/documents/2022/02/24/2022-03143/shortening-the-securities-transaction-settlement-cycle.

Shortening the Securities Transaction Settlement Cycle (Final Rule). 88 Fed. Reg. 13872. March 6, 2023. https://www.federalregister.gov/documents/2023/03/06/2023-03566/shortening-the-securities-transaction-settlement-cycle.

Simpson, Andrew G. "InsurTechs Take Note: Chubb's Digital Marketplace Serves 1,000 Agents a Day." Insurance Journal, February 13, 2019. https://www.carriermanagement.com/features/2019/01/23/188793.htm.

Singh, Medha. "Retail Traders Cash Out as Market Rallies on Bets of End to Rate Hikes." Reuters, November 16, 2023. https://www.reuters.com/markets/us/retail-traders-cash-out-market-rallies-bets-end-rate-hikes-2023-11-16/.

Smith, Ryan. "AIG Launches Refreshed Website." Insurance Business, May 7, 2023. https://www.insurancebusinessmag.com/us/news/technology/aig-launches-refreshed-website-438577.aspx.

Son, Hugh. "Morgan Stanley Is Testing an OpenAI-Powered Chatbot for Its 16,000 Financial Advisors." CNBC, March 14, 2023. https://www.cnbc.com/2023/03/14/morgan-stanley-testing-openai-powered-chatbot-for-its-financial-advisors.html.

Son, Hugh. "JPMorgan Is Developing a ChatGPT-Like A.I. Service That Gives Investment Advice." CNBC, May 25, 2023. https://www.cnbc.com/2023/05/25/jpmorgan-develops-ai-investment-advisor.html.

Spiegel, Jeff. "How Advisors Are Increasing Efficiency and Impact with Ai." BlackRock, August 30, 2023. https://www.blackrock.com/us/financial-professionals/insights/how-advisors-use-ai.

Stafford, Philip. "How Can Blockchain Be Used to Trade Bonds?" *Financial Times*, October 23, 2023. https://www.ft.com/content/fa673b94-7f7b-45a2-8754-6a83619ed6e1.

State Farm. "Create an Affordable Price, Just for You." Accessed February 13, 2024. https://www.statefarm.com/.

Statista. *Cyber Insurance*. December 2022. https://www.statista.com/study/27800/cyber-insurance-statista-dossier/.

Statista. "Digital Assets - Worldwide." April 2023. https://www.statista.com/outlook/dmo/fintech/digital-assets/worldwide.

Statista. "Global Banking & Securities IT Spending 2025." April 2021. https://www.statista.com/statistics/1154162/worldwide-banking-securities-spending-forecast/.

Statista. *Insurtech*. 2023. https://www.statista.com/study/46031/insurtech/.

Statista. "Monthly Number of Active Users Selected Leading Apps That Allow for Online Share Trading Worldwide from January 2017 to July 2021, by App (in 1,000s)." December 12, 2022. https://www.statista.com/statistics/1259822/global-etrading-app-monthly-active-users/.

Statista. "Robo-Advisors - Worldwide, United States." Accessed December 14, 2023. https://www.statista.com/outlook/dmo/fintech/digital-investment/robo-advisors/custom.

Stfalcon. "Application of the IoT Technology in Payment." June 7, 2023. https://stfalcon.com/en/blog/post/Application-of-the-IoT-technology-in-payment.

Swedroe, Larry. "What's Unique About Private Equity?" *Morningstar*, February 7, 2024. https://www.morningstar.com/alternative-investments/whats-unique-about-private-equity.

Swiss Re. "Looking Up During a Storm." December 19, 2022. https://www.swissre.com/reinsurance/property-and-casualty/solutions/property-solutions/rapid-damage-assessment/resilience-hurricane-ian.html.

Swiss Re. "What You Need to Know About the Cyber Insurance Market." August 28, 2023. https://www.swissre.com/risk-knowledge/advancing-societal-benefits-digitalisation/about-cyber-insurance-market.html.

Swiss Re. "Swiss Re Rapid Damage Assessment." Accessed December 18, 2023. https://www.swissre.com/reinsurance/property-and-casualty/solutions/property-solutions/rapid-damage-assessment.html.

Swiss Re. *The Economics of Digitalisation in Insurance: New Risks, New Solutions, New Efficiencies*. *Sigma*, 2023. https://www.swissre.com/institute/research/sigma-research/sigma-2023-05-digitalisation.html.

Tenenbaum, Alex, Jonathan Hatzor, and Milo Wilson. *Cyber Insurance: Coming of Age*. Howden, 2023. https://www.howdengroup.com/sites/g/files/mwfley566/files/2023-07/howden-cyber-report-coming-of-age-03072023-final_0.pdf.

U.S. Congress. House of Representatives. Financial Services Committee, Subcommittee on Consumer Protection and Financial Institutions. "Hybrid Hearing Entitled: Cyber Threats, Consumer Data, and the Financial System." November 3, 2021. https://financialservices.house.gov/calendar/eventsingle.aspx?EventID=408182.

U.S. Department of Commerce (USDOC). "Joint Statement of the Japan-U.S. Economic Policy Consultative Committee." November 15, 2023. https://www.commerce.gov/news/press-releases/2023/11/joint-statement-japan-us-economic-policy-consultative-committee.

U.S. International Trade Commission (USITC). *Recent Trends in U.S. Services Trade 2020 Annual Report*. 5094. July 2020. https://www.usitc.gov/sites/default/files/publications/332/pub5094.pdf.

U.S. Securities and Exchange Commission (SEC). *Concept Release on Equity Market Structure*. *Federal Register* Notice 17 C.F.R. Part 242. January 21, 2010. https://www.sec.gov/files/rules/concept/2010/34-61358fr.pdf.

U.S. Securities and Exchange Commission (SEC). "Order Approving Proposed Rule Change to Adopt Intraday Volatility Charge and Eliminate Intraday Backtesting Charge." March 13, 2023. https://www.sec.gov/files/rules/sro/nscc/2023/34-97129.pdf.

U.S. Securities and Exchange Commission (SEC). *Staff Report on Algorithmic Trading in U.S. Capital Markets*. August 5, 2020. https://www.sec.gov/file/staff-report-algorithmic-trading-us-capital-markets.

Vazarkar, Santosh. "T+1 and Beyond: Seize the Opportunity." Broadridge. Accessed October 5, 2023. https://www.broadridge.com/article/capital-markets/t-plus-1-and-beyond-seize-the-opportunity.

Verisk. "Insurance Fraud Finds a New Enemy in Verisk's Advanced Image Forensics." June 14, 2023. https://www.verisk.com/newsroom/insurance-fraud-finds-a-new-enemy-in-verisks-advanced-image-forensics/.

Wade, Mike, Neil Tomlinson, and Val Srinivas. *2024 Banking and Capital Markets Outlook*. Deloitte, August 2023. https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-outlooks/banking-industry-outlook.html.

WalkMe. "The Impact of Digital Transformation in the Insurance Industry." *WalkMe Blog*. May 2, 2023. https://www.walkme.com/blog/digital-transformation-insurance/.

White House. "Office of the National Cyber Director." Accessed November 30, 2023. https://www.whitehouse.gov/oncd/.

Whittall, Christopher. "US Banks Reap Boom in Bond, Portfolio, and Algo Trading." *International Finance Review*, February 19, 2021. https://www.ifre.com:443/story/2742168/us-banks-reap-boom-in-bond-portfolio-and-algo-trading-dfxq32cqc8.

Wilhelm, Alex, and Anna Heim. "Despite Messy IPOs, There's Good Reason to Be Optimistic About Insurtech Startups." *TechCrunch*, May 19, 2019. https://techcrunch.com/2023/05/19/messy-ipos-insurtech-startups/.

Witkowski, Wallace. "Lemonade Logs Best U.S. IPO Debut of 2020 With More Than 140% Gain." *MarketWatch*, July 2, 2020. https://www.marketwatch.com/story/lemonade-logs-best-ipo-debut-of-2020-with-more-than-140-gain-2020-07-02#:~:text=Debut%20follows%20string%20of%20recent%20strong%20IPOs&text=Lemonade%20shares%2C%20which%20skyrocketed%20as,%2429%20a%20share%20late%20Wednesday.

Wu, Emily. Sovereignty and Data Localization. Harvard Kennedy School. Belfer Center for Science and International Affairs. July 2021. https://www.belfercenter.org/sites/default/files/2021-07/SovereigntyLocalization.pdf.

Wyman, Oliver. "Future of Securities Services." 2020. https://www.oliverwyman.com/our-expertise/insights/2020/nov/future-of-securities-services-industry.html.

Dimension Market Research. "Generative AI in Trading Market Is Expected To Reach a Revenue Of USD 1,705.1 Mn By 2033, at 26.3% CAGR." Dimension Market Research, April 16, 2024. https://finance.yahoo.com/news/generative-ai-trading-market-expected-185000362.html.

Yaffe-Bellany, David, and Erin Griffith. "How a Trash-Talking Crypto Founder Caused a $40 Billion Crash." *The New York Times*, May 18, 2022. https://www.nytimes.com/2022/05/18/technology/terra-luna-cryptocurrency-do-kwon.html.

Zec, Jelena, Avi Arnon, and Harris Chin. "How AI Is Transforming Wealth Management." Citi Ventures, August 23, 2023. https://www.citi.com/ventures/perspectives/opinion/ai-wealth-management.html.

Zewe, Adam. "Explained: Generative AI." MIT News | Massachusetts Institute of Technology, November 9, 2023. https://news.mit.edu/2023/explained-generative-ai-1109.

Zubenko, Valentyn. "How Big Data Changes the Scope of Modern Banking." Avenga. September 19, 2023. https://www.avenga.com/magazine/how-big-data-changes-banking/.

Chapter 4
Financial Services and Sustainability, Financial Inclusion, and Capital Market Development

This chapter highlights the recent trends in increased demand for new financial products and services that address issues related to sustainability and financial inclusion—and increased provision of a wide range of financial services in emerging markets. As in chapter 3, this chapter describes recent developments in each of the three major financial services sectors: banking, insurance, and securities services. It also highlights how financial services provision is being widened and deepened in the U.S. and global markets in response to customers' increased financing and risk-management demands related to the environmental effects of climate change, to broaden access to necessary financial services, and to support expansion of capital markets.

In recent years, concerns about sustainability and financial inclusion have affected demand conditions for global financial services firms, leading to various outcomes across the sector. These concerns have commonly been expressed under the umbrella term environmental, social, and governance (ESG). Industry and government stakeholders continue to expand efforts across a range of ESG issues, not least because many firms see this as financially beneficial. However, global firms and investment fund managers can find it challenging to balance the need to meet their announced ESG targets with a recent legislative push to diminish the role of ESG in investment decisions.[379]

Reportedly, over 160 proposals at the state level seek to ban companies and investors from considering ESG concerns when making decisions in the United States.[380] As a result, many companies have pivoted away from using the term ESG, although they may continue to pursue certain ESG-related targets even if not specifically referred to as ESG. Specifically, "green hushing" refers to firms that have chosen to avoid disclosing their environmental efforts, whether or not they are pursuing them. Reportedly, 155 S&P 500-listed companies mentioned ESG on earnings calls in the fourth quarter of 2021—but only 61 of these corporations did so in the second quarter of 2023.[381] Further, several of the goals captured under the term ESG are increasingly indistinct and interrelated but remain key components of global initiatives. For example, the United Nations (UN) has identified financial inclusion as a factor in its Sustainable Development Goals (SDGs) but does not overtly reference ESG.[382]

In the banking sector, sustainability has become a larger focus of international and domestic lending activities, among other operations. Most banks identify sustainability as a priority area, especially as it relates to climate change (mitigation and adaptation), gender equality, and financial inclusion. Various

[379] Grewal Levy Marketing News, "From Greenwashing to Green Hushing," February 20, 2024; Glazer, "The Latest Dirty Word in Corporate America," January 9, 2024, 1; Cort and Esty, "ESG Standards," July 28, 2020, 2–3.
[380] Marsh, "Climate Investors Warn the Right Is Winning the War on ESG," February 28, 2024.
[381] Glazer, "The Latest Dirty Word in Corporate America," January 9, 2024, 2.
[382] UNCDF, "Financial Inclusion and the SDGs," accessed March 5, 2024. For more information on financial inclusion and the SDGs see box 4.1.

sustainability-focused international alliances have been established, and sustainable finance has increased to meet demand.

In the insurance sector, global property and casualty (P&C) insurers are addressing changing demand conditions related to extreme weather. Global insured losses, including in the United States, have risen sharply over the past 30 years for many reasons, including increased population and construction in coastal and other vulnerable areas, higher construction costs, and the increased insurable value of physical assets in those areas (larger houses with more amenities, more retail, etc.). Some industry observers have attributed some of the recent rise in these losses to an increase in the frequency and severity of weather events.[383] Global provision of P&C insurance for risks from weather and other natural disaster losses is characterized by protection gaps, higher insurance premiums, and the introduction of new insurance products.[384]

In the securities sector, the growth of capital markets in emerging market economies has created more opportunities for investors, savers, and individual and corporate borrowers—helping to fuel economic development in these economies and include more people in global capital markets. Increasing incomes and demand for securities and asset management services have led to deeper capital markets over the past several years, particularly in India and China.[385] Although U.S. securities firms have entered these markets to a degree, regulatory and structural trade barriers exist for U.S. and other foreign firms. Further, as India's and China's capital markets have deepened, Indian and Chinese securities firms' participation in the global securities market has grown, although it remains relatively limited.[386]

Banking Services: Banking and Sustainability

Sustainable finance is defined broadly by banks, governments, and multilateral institutions around the world as financing directed toward initiatives addressing climate change , environmental preservation, and inequality and economic inclusion.[387] Globally, most banks identify sustainability as a priority area of their business strategy; and they appear to be particularly focused on climate change (mitigation and adaption), gender equality, and financial inclusion.[388] Banks' environmental and social impacts are

[383] Banerjee et al., "Natural Catastrophes in 2023," March 26, 2024, 1, 4; Banerjee et al., Natural Catastrophes and Inflation in 2022, March 22, 2023, 5–6, 8, 18; Munich Re, "Record Thunderstorm Losses and Deadly Earthquakes," January 4, 2024; NASA, "Extreme Weather," accessed April 16, 2024; O'Malley, "Confirmed: Global Floods, Droughts Worsening with Warming," March 13, 2023.
[384] Verisk, Global Modeled Catastrophe Losses, September 8, 2023, 11; Allianz, "Risk Barometer 2024 - Natural Catastrophes," January 2024; Wells, "$100bn of Insured Catastrophe Losses Now Reached in 2023," November 8, 2023; *Economist*, "Parts of America Are Becoming Uninsurable," September 21, 2023; Foroohar, "What to Do When the US Becomes Uninsurable," June 12, 2023; Hazell et al., When and How Should Agricultural Insurance Be Subsidized?, July 14, 2017, 3; Kousky et al., "Can Parametric Microinsurance Improve the Financial Resilience of Low-Income Households in the United States?," July 30, 2021, 303–13; Harris, "Quantifying 'ESG,'" April 11, 2023; Tian et al., "Hedge Funds' Mega Returns Set Off Demand Spiral for Catastrophe Bonds," February 4, 2024.
[385] Goldman Sachs, "India's Affluent Population Is Likely to Hit 100 million by 2027," February 16, 2024; Banerjee et al., "WealthTech in Asia–Pacific," October 18, 2023, 5–6.
[386] LSEG, "Global Mergers and Acquisitions Review, Full Year 2023," 2024, 12; LSEG, *Emerging Markets M&A Review*, 2024, 6.
[387] UNEP FI, *Responsible Banking: Building Foundations*, October 2021, 32–33.
[388] UNEP FI, *Responsible Banking: Building Foundations*, October 2021, 34–36. Focus areas differ across geographical regions and between developed and developing countries.

indirect, however, as their primary role in achieving sustainability goals is in financing or facilitating such activities.[389]

International banking alliances focused on sustainability have grown in recent years, and banks have increased their volume of sustainable financing. A variety of factors appears to have prompted increased focus on sustainability issues. For example, such factors include a growing consumer awareness of, and value placed on, business practices related to climate and social issues.[390] A related factor is the recognition that sustainable financing can be a competitiveness or market "differentiating" characteristic, as banks have begun to earn more in fees from climate-focused loans and bonds in comparison with fossil-fuel related financing.[391] There is also growing recognition of the roles of both public and private entities and institutions, including banks, in national and international efforts to make progress toward achieving climate-related goals and greater economic inclusion.[392] For example, literature indicates that banks can play a positive role in financing the diffusion of cleaner, low-carbon technologies that are needed to meet net-zero goals.[393]

Sustainability-Focused International Alliances in the Banking Sector and Related Regulation

Alongside the growth in banks' sustainable financing activities, an increasing number of international standard-setting frameworks and related efforts across jurisdictions, including the United States, are focused on environmental and social issues. In 2019, the UN Environment Programme Finance Initiative launched the Principles for Responsible Banking (PRB). The objective of the PRB is to provide a framework for aligning signatory banks' business strategies with the UN SDGs, the Paris Agreement on climate change, and other relevant frameworks.[394]

PRB membership has grown globally from 130 banks in 2019 to 342 banks in 2024, representing 54 percent of global banking assets.[395] The Net Zero Banking Alliance (NZBA)—established under the umbrella of the PRB in April 2021—is a global alliance of 144 banks that have committed to transition to net-zero greenhouse gas (GHG) emissions by 2050 or sooner.[396] The NZBA includes nine U.S. banks: Amalgamated Bank, Areti Bank, Bank of America, Citibank (Citi), Climate First Bank, JPMorgan Chase, Morgan Stanley, Goldman Sachs, and Wells Fargo.

[389] UNEP FI, *Responsible Banking: Building Foundations*, October 2021, 16.
[390] Kuhl, *Green Banking for a Competitive Edge*, November 2021.
[391] Kuhl, *Green Banking for a Competitive Edge*, November 2021; Bloomberg News, "Banks' Green Fees Overtake Fossil-Fuel Fees for Second Year," October 19, 2023.
[392] See for example, JPMorgan Chase, "JPMorgan Chase Targets More Than $2.5 Trillion," accessed December 28, 2023; USDT, "Secretary of the Treasury Janet L. Yellen's Remarks to the Institute of International Finance," April 21, 2021.
[393] See De Haas, "Sustainable Banking," November 2023, 5–8.
[394] UNEP FI, *Responsible Banking: Building Foundations*, October 2021, 7.
[395] UNEP FI, "Signatories," accessed January 9, 2024.
[396] UNEP FI, "The Commitment: Net-Zero Banking Alliance," accessed December 26, 2023; For members and links to published targets, see "Our Members: Net-Zero Banking Alliance," accessed April 2, 2024.

Support and adoption of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) has also increased.[397] The TCFD was launched in 2015 with the aim of consistency across sectors. It provided voluntary recommendations to aid companies in disclosing climate-related risks and opportunities, with additional guidance specific to the banking sector.[398] As of May 2022, 257 banks across global regions (Asia Pacific, Europe, Latin America, North America, and the Middle East and Africa) (representing 60 percent of global banking assets) had endorsed the TCFD framework. In addition, 182 banks (representing 53 percent of global banking assets) had begun disclosing climate-related financial information in line with the TCFD recommendations.[399]

TCFD-aligned recommendations have been incorporated into international standards, such as by the International Sustainability Standards Board, or reflected in laws or regulations across many jurisdictions, including the United Kingdom (Sustainability Disclosure Requirements) and the European Union (Corporate Sustainability Reporting Directive or CSRD).[400] Specifically, the CSRD requires large and public-listed EU-based companies to disclose their risks related to social and environmental issues and the impact their activities have on people and the environment came into effect in 2023.[401] In the United States, the U.S. Securities and Exchange Commission (SEC) adopted a rule in 2024 requiring public companies to disclose certain climate-related risks and other information, as well as GHG emissions in certain cases.[402] In 2023, California enacted two laws which require disclosure of climate-related financial risks and GHG emissions for certain U.S. companies doing business in the state.[403] Both

[397] The Financial Stability Board (FSB) "is an international body that monitors and makes recommendations about the global financial system," including work to address climate-related financial risks. For more information, see Financial Stability Board, "About the FSB," November 16, 2020; Financial Stability Board, "Climate-Related Risks," October 12, 2023.

[398] TCFD, *Recommendations of the Task Force on Climate-Related Financial Disclosures*, June 2017, 14–15. In 2024, TCFD responsibilities will be transferred to the International Financial Reporting Standards Foundation, see IFRS, "IFRS Foundation Welcomes Culmination of TCFD Work," accessed March 7, 2024.

[399] Peter et al., *Task Force on Climate-Related Financial Disclosures (TCFD) Recommendations*, December 2022, 6, 78–86. For broader indications of sectoral and global support for TCFD recommendations, see The Task Force on Climate-related Financial Disclosures, *Task Force on Climate-Related Financial Disclosures: 2023 Status Report*, October 2023, 81. For an example of a bank TCFD report, see Forese, "Announcing Our TCFD Report," November 13, 2018.

[400] TCFD, *Task Force on Climate-Related Financial Disclosures: 2023 Status Report*, October 2023, 81–85 (see Table D1 "TCFD-Aligned Disclosure Requirements in Select Jurisdictions" and Figure D1 "TCFD Recommendations Support Alignment across Disclosure Regimes"); Beltran et al., "What Are Large Global Banks Doing About Climate Change?," January 5, 2023, 4–5; The International Financial Reporting Standards Foundation, "ISSB Issues Inaugural Global Sustainability Disclosure Standards," June 26, 2023.

[401] European Commission, "Corporate Sustainability Reporting," accessed December 13, 2023. The CSRD went into effect on January 5, 2023; and companies subject to the previous reporting directive (that the CSRD superseded) are required to report in line with the CSRD beginning with fiscal year 2024. Other large companies are required to report beginning with fiscal year (FY) 2025; small and medium-sized public companies are required to report beginning with FY 2026; and non-EU companies are required to report beginning with FY 2028. TCFD, Task Force on Climate-Related Financial Disclosures: 2023 Status Report, October 2023.

[402] SEC, "Fact Sheet: The Enhancement and Standardization of Climate-Related Disclosures: Final Rules," March 6, 2024. Disclosures include ". . . Scope 1 and/or Scope 2 greenhouse gas (GHG) emissions on a phased-in basis by certain larger registrants when those emissions are material. . . ."

[403] S.B. 253, 2023–24 Ca. State Senate, Reg. Sess. (2023), S.B. 261, 2023–24 Ca. State Senate, Reg. Sess. (2023).

the SEC rule and the California laws are facing legal challenges and the SEC has announced a pause in implementation of the rule during this period of litigation.[404]

Additionally, in 2023, the Board of Governors of the Federal Reserve System (Federal Reserve Board), the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency (OCC) collectively issued principles to support large financial institutions in assessing and managing climate-related financial risks.[405] The guidance indicated that vulnerabilities related to identifying and managing climate change risks could adversely impact the stability of financial institutions. It also recognized that climate change's negative impacts could disproportionately affect underserved consumers and communities.[406]

Other recent efforts specifically target consumer protection and financial inclusion. Taking effect in January 2026, the Federal Reserve Board, the Federal Deposit Insurance Corporation, and the OCC collectively issued a rule in October 2023 updating certain Community Reinvestment Act regulations to expand access to financial services in low- and moderate-income communities, among other goals.[407] In 2022, the Consumer Financial Protection Bureau (CFPB) announced that it was enhancing its efforts to combat discriminatory practices.[408] And in 2023, the CFPB issued a final rule related to small business lending and a proposed rule on open banking standards.[409]

Sustainable Finance

Growing demand for sustainable products and services is evidenced by increased bank financing of broadly defined green and social initiatives. In the first progress report of signatories to the PRB, member banks offering sustainable finance products dedicated $2.3 trillion to the financing of initiatives addressing climate change, environmental preservation, and inequality and economic inclusion (in fiscal year 2020).[410] The most recent progress report of PRB member banks indicated that nearly all members

[404] SEC, "In the Matter of the Enhancement and Standardization of Climate-Related Disclosures for Investors," April 4, 2024; Sidley, "California's New Climate Disclosure Laws Under Fire," February 1, 2024; Cleveland-Peck and Tokar, "U.S. Appeals Court Temporarily Halts SEC Climate-Disclosure Rules," March 18, 2024; Naishadham, "SEC climate rule prompts a rush to sue," March 20, 2024; Vanderford, "SEC Accepts Pause on Its Climate Rule," April 4, 2024.

[405] Principles for Climate-Related Financial Risk Management, 88 Fed. Reg. 74183, 7 (October 30, 2023).

[406] Also see Avtar, Ruchi et al., *Understanding the Linkages between Climate Change and Inequality in the United States*, November 2021.

[407] OCC, "Agencies Issue Final Rule to Strengthen and Modernize Community Reinvestment Act Regulations," October 24, 2023; O'Donnell, "Fed Moves to Close Massive Racial Homeownership Gap," October 24, 2023; ABA, "Community Reinvestment Act," accessed January 9, 2024.

[408] CFPB, "CFPB Targets Unfair Discrimination in Consumer Finance," March 16, 2022. For an article discussing a court ruling against the CFPB anti-discrimination policy, see Berry, "Texas Judge Rebukes CFPB over Anti-Discrimination Policy," September 10, 2023.

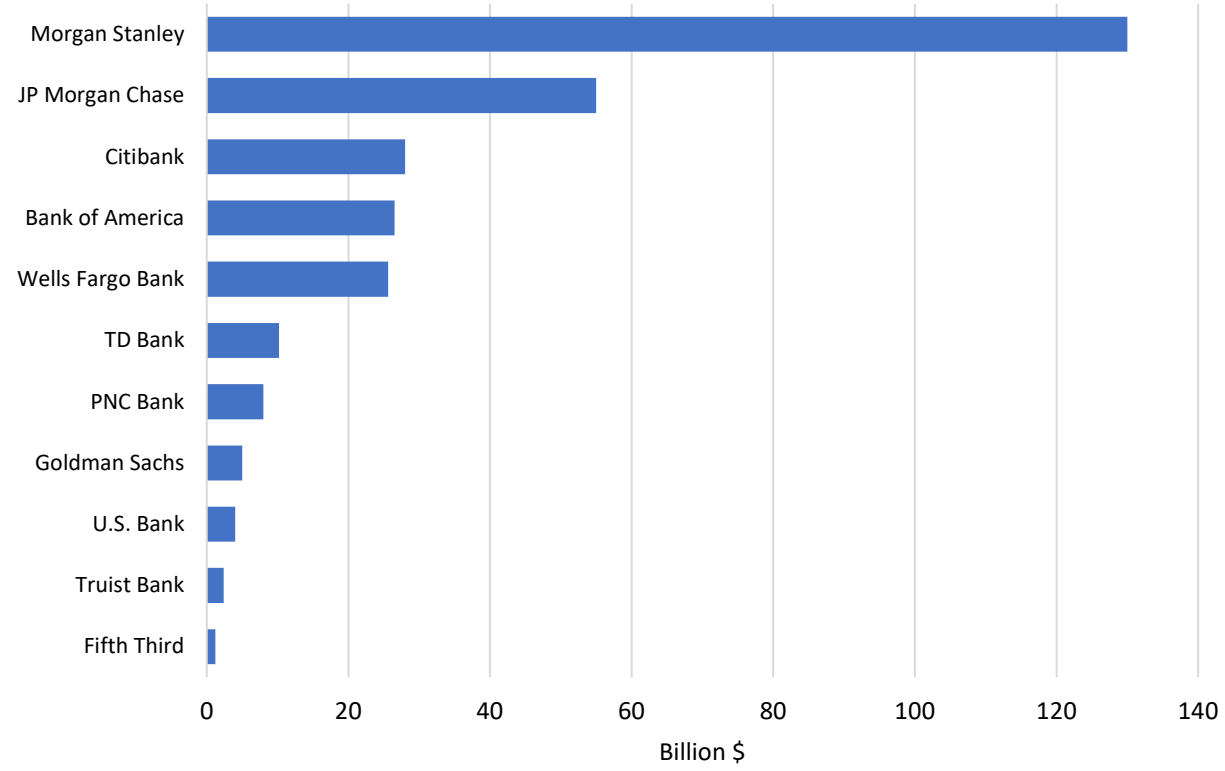
[409] The small business lending rule has been stayed pending ongoing litigation. CFPB, Small Business Lending under the Equal Credit Opportunity Act (Regulation B). March 30, 2023; CFPB, "Small Business Lending Rulemaking," n.d.; Chopra, "Laying the Foundation for Open Banking in the United States," June 12, 2023. For more discussion on open banking see chapter 3. [check if n.d. required]

[410] More specifically, the UNEP FI defines sustainable finance in its report "as the financial volume that contributes to sustainable development in the wider sense, more specifically to climate change mitigation and adaptation, the preservation of biodiversity, pollution prevention and circular economy, as well as considerations on inequality,

offered sustainable finance products, and the subset of members classified as global systemically important banks had earmarked $7 trillion in sustainable finance.[411] Across U.S. banks, the value of such financing in 2020 ranged from $1.2 billion to $130 billion, as shown in figure 4.1.

Figure 4.1 Value of sustainable financing across largest U.S. banks, 2020

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.33.



Source: Statista, "Value of green financing of the largest banks in the United States in 2020," February 1, 2022.
Note: Statista notes the selection of largest banks is by total assets and data collected from banks' environmental reporting; data are not available for some of the largest banks and thus are not included. TD Bank used a specified exchange rate for its calculation. These statistics appear to include environmental and social initiatives, as discussed in the main text.

More recently, large U.S. banks' sustainable finance targets through 2030—including JPMorgan Chase's $2.5 trillion and Citi's $1 trillion in commitments—appear to apply across a range of environmental and social initiatives. Main areas include: (1) environmentally focused finance or facilitation, including of renewable energy, clean and emerging technologies, sustainable transportation, and water conservation; (2) issuance of green and sustainable bonds; (3) international development finance; and (4) domestically focused investments and loans in support of economic inclusion, affordable housing, small businesses, and racial, ethnic, and gender equality.[412]

inclusiveness, labor relations, or human rights issues etc." UNEP FI, *Responsible Banking: Building Foundations*, October 2021, 33.

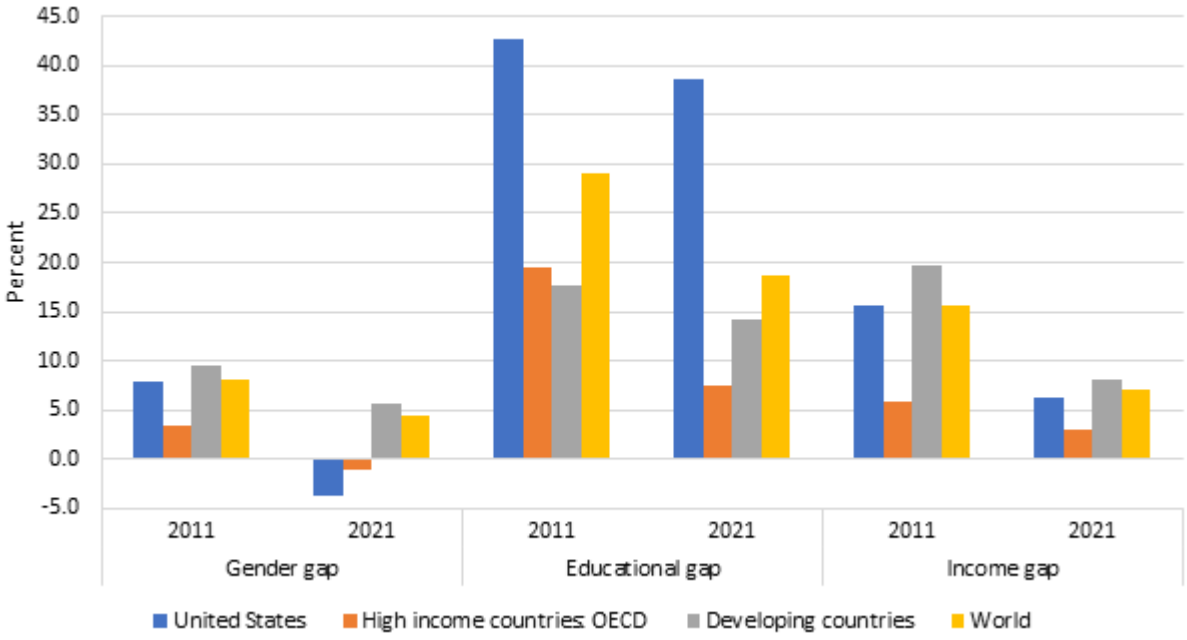
[411] UNEP FI, *Principles for Responsible Banking: Towards Real-World Impact*, September 2023, 26–27.

[412] JPMorgan Chase, "JPMorgan Chase Targets More Than $2.5 Trillion over 10 Years," accessed December 28, 2023; JPMorgan Chase, *Our Approach to Our Sustainable Development Target*, April 2023; Skyler, "Citi Commits $1 Trillion to Sustainable Finance by 2030," April 15, 2021. Also see Bank of America, *Approach to Zero*, April 2022.

Past and ongoing sustainable finance activities by large U.S. banks illustrate focus areas. For example, JPMorgan Chase's $55 billion in green financing included project financing for a wind farm developed by ALLETE Clean Energy, raising funds for Bloom Energy Corporation's development of efficient energy generators, and investing in a South Boston public housing project serving families at or below certain median income thresholds.[413] Citi's financing included loans for affordable housing development in Albuquerque, New Mexico; investments in women- and minority-owned companies; as well as the expansion of banking access to communities of color and provision of mortgage access to minority borrowers.[414] According to the World Bank Global Findex Database, access to financial services measured as bank account ownership has increased globally from 2011–21, although important gaps in remain, as shown in figure 4.2 below.[415] For a discussion on the positive effects of and recent trends in financial inclusion as measured by account ownership, see box 4.1.

Figure 4.2 Account ownership gap by gender, education, and income, 2011 and 2021

In percentage points. Underlying data for this figure can be found in appendix B, table B.34.



Source: World Bank, "The Global Findex Database 2021," accessed December 13, 2023.

[413] JPMorgan Chase, "JPMorgan Chase Targets More Than $2.5 Trillion over 10 Years," accessed December 28, 2023. JPMorgan Chase noted exceeding its 2020 sustainable finance target.
[414] Citigroup Inc., "Citi Recognized as an 11-Time Industry Leader in Affordable Housing," March 23, 2021; "Citi Launches More Than $1 Billion in Strategic Initiatives to Help Close the Racial Wealth Gap," September 23, 2020; Skyler, "Citi Commits $1 Trillion to Sustainable Finance by 2030," April 15, 2021.
[415] World Bank, "The Global Findex Database 2021," accessed December 13, 2023.

Box 4.1 Financial Inclusion

Growing empirical evidence demonstrates that financial inclusion—i.e., ensuring access to useful and affordable financial services for individuals and businesses—has a positive impact on sustainable development across countries.[a] These effects include the UN Sustainable Development Goals (SDGs) of ending hunger, reducing gender inequality, and promoting overall economic growth.[b] For example, financial inclusion may combat hunger by providing farmers access to the financial resources needed to undertake yield-increasing technology upgrades.[c] Financial inclusion may also promote gender equality by enabling greater female entrepreneurship.

Over the last decade, financial inclusion has expanded, though important gaps and variation across countries persist. According to the World Bank Global Findex Database, access to financial services measured as bank account ownership increased globally from 51 percentage points in 2011 to 76 percentage points in 2021.[d] In 2021, 78 percent of men globally reported having a bank account compared with 74 percent of women; this resulted in a global gender account ownership gap of 4 percentage points for the year, down from 8 percentage points in 2011, as shown in figure 4.2 above.[e]

Although account ownership by women varies considerably across regions and countries, the gender gap also declined on average within developing countries, from 10 percentage points in 2011 to 6 percentage points in 2021, as shown in figure 4.2.[f] Data show that, depending on factors such as mobile-phone access and digital literacy, the growth of mobile money accounts and the receipt of digital payments have expanded financial inclusion in certain developing economies.[g] As such, supporting access to technology and implementing government programs and policies to help overcome known barriers to opening an account (such as necessary documentation) have proven to support and may help expand financial inclusion further.[h]

Globally, across developing countries and the OECD and within the United States, gaps in account ownership by income and education levels also declined from 2011 to 2021, as shown in figure 4.2. However, certain gaps remain high. For example, 96 percent of those with a secondary education report having a bank account, compared with 58 percent of those with a primary education or less in the United States, resulting in an education gap of 39 percentage points in 2021.[i]

[a] Yap, Lee, and Liew, "The Role of Financial Inclusion in Achieving Finance-Related Sustainable Development Goals (SDGs)," June 2, 2023.
[b] Yap, Lee, and Liew define financial inclusion as financial availability, accessibility, and usage. Data on financial availability includes number of deposits, loans, accounts, and credit cards per 1,000 adults; data on accessibility includes number of ATMs per 100,000 adults; and data on usage includes outstanding loans and deposits as a percentage of GDP. See table 1 (page 8) for data on financial inclusion, table 4 (page 10) for estimates of the impact of financial inclusion on individual finance-related SDG goals, and table 6 (page 15) for the effects of financial inclusion on the aggregated finance-related SDG index.
[c] For a discussion of the (positive) role of credit markets in climate change adaptation within agriculture, see De Haas, "Sustainable Banking," November 2023, 20.
[d] Account ownership is defined as: "the percentage of respondents who report having an account (by themselves or together with someone else) at a bank or another type of financial institution … or report personally using a mobile money service in the past year ….," World Bank, "The Global Findex Database 2021," accessed December 13, 2023.
[e] The gender gap is measured as the difference between male and female account ownership. The U.S. and OECD gender gaps appear negative in 2021 since there was higher female relative to male account ownership in that year.
[f] Klapper, Singer, and Ansar, "Women and Financial Inclusion," 2021, 2.
[g] See Klapper, Singer, and Ansar, "Women and Financial Inclusion," 2021. For more information on digital payments see chapter 3.
[h] Klapper, "5 Approaches to Advance Financial Inclusion for Women," March 31, 2023.
[i] The education gap is measured as the difference in account ownership between respondents with secondary education or more and primary education or less; the income gap is measured as the difference in account ownership between the richest 60 percent and poorest 40 percent. For a discussion of data correlating financial exclusion and climate vulnerability, see Klapper, McConaghy, and Stein, "Climate Vulnerability and Financial Exclusion Go Hand in Hand—What Can Be Done?," May 15, 2023. For a discussion of financial exclusion and race in the United States, see McKinsey, "What Is Financial Inclusion?," August 7, 2023.

Smaller U.S. banks are also focusing on meeting demand for financial products related to the environment. For example, in 2022 a Florida bank launched a lending platform for local customers installing solar panels. Following a high volume of processed loans, the bank is expanding these operations nationally and developing a consumer application that measures environmental impacts from purchases.[416] In another example, some Ohio- and Alabama-based banks have a growing focus on financing renewable energy projects—such as solar and wind projects in rural areas—and have increased company investments in such energy sources.[417]

Green, Social, and Sustainability Bonds

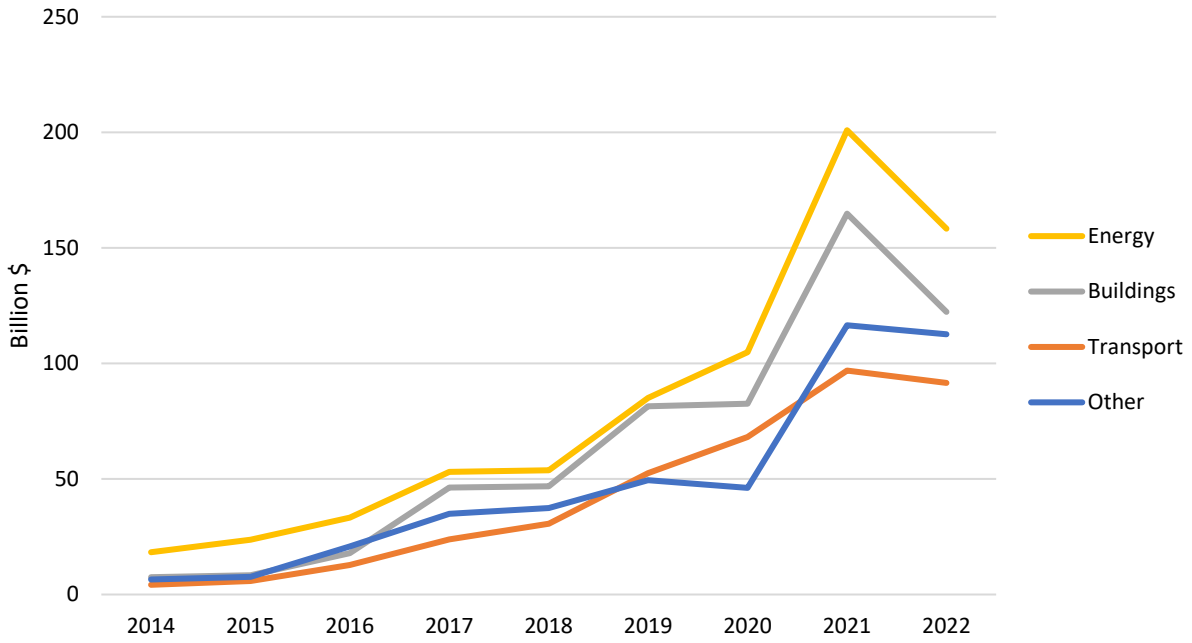
Although market valuations have fallen during the recent period of higher interest rates, rising demand for sustainable investments is evidenced by the growth in the market for green, social, and sustainability bonds over the past 10 years.[418] Green bonds are debt instruments earmarked for green projects, while social bonds focus on social outcomes such as education, gender equality, and affordable housing. Sustainability bonds cover both green and social uses.[419]

Green bonds were first issued in 2007. Global green bond issuance grew in value from $36.6 billion in 2014 to a period high of $582.4 in 2021 and declined to $487.1 billion in 2022, or at an average annual growth rate of 38.2 percent during from 2014 through 2022, as shown in figure 4.3.[420] During 2021 and 2022, there was a 16 percent decline in green bonds (the only yearly decline in the period shown below), attributed to inflation, as well as rising interest rates and energy costs associated with Russia's invasion of Ukraine in February 2022.[421] In 2022, about 47 percent of green bond volume originated from Europe, while at the country level, China (18 percent of the total), the United States (13 percent), and Germany (13 percent) produced the largest volume of green bonds.[422]

[416] Crosman, "Solar Loans, Tracking Carbon Footprints," August 23, 2023.
[417] Alix, "Where Banks Are Eyeing Profits in the Green Economy," June 2, 2021.
[418] For an overview of these bonds and information on other types of bonds, including transition and sustainability-linked, see Climate Bonds Initiative, "Sustainable Debt Global State of the Market 2022," accessed February 5, 2024.
[419] Climate Bonds Initiative, "Explaining Green Bonds," accessed December 27, 2023; *Social & Sustainability Bond Methodology*, August 2022, 3, 5.
[420] Climate Bonds Initiative, "Interactive Data Platform: Region," accessed December 27, 2023. Yearly totals may vary depending on how data is categorized; for example, the total for 2022 in figure 4.3, which reports subcategories for use of proceeds is less than total reported elsewhere ($484.4 bn vs $487.1 bn). The interactive data platform labels 2022 as "H1" but appears to report full year data.
[421] Climate Bonds Initiative, "Sustainable Debt Global State of the Market 2022," accessed February 5, 2024, 4–5, 7; "Interactive Data Platform," accessed February 5, 2024.
[422] Climate Bonds Initiative, "Interactive Data Platform: Region," accessed December 27, 2023.

Figure 4.3 Value of annual green bond issuance globally by use of proceeds, 2014–22

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.35.



Source: Climate Bonds Initiative, "Interactive Data Platform: Use of Proceeds," accessed December 27, 2023.
Note: Data refers to value of green bonds issued in each year.

From 2014 to 2022, energy, buildings, and transport were the three largest green bond categories by value (figure 4.3). To illustrate, green bonds used to finance manufacturing facilities in the solar, wind, geothermal, and bioenergy supply chains would be classified in the energy category, while green bonds used to finance public infrastructure for electric vehicles, walking, and cycling would be classified in the transport category.[423] Private-sector corporations were the largest issuers of green bonds in 2022, with financial (including banks) and nonfinancial corporate entities issuing more than half the value of green bonds globally.[424] The remaining issuers included government-backed and sovereign entities, development banks, and local governments.[425]

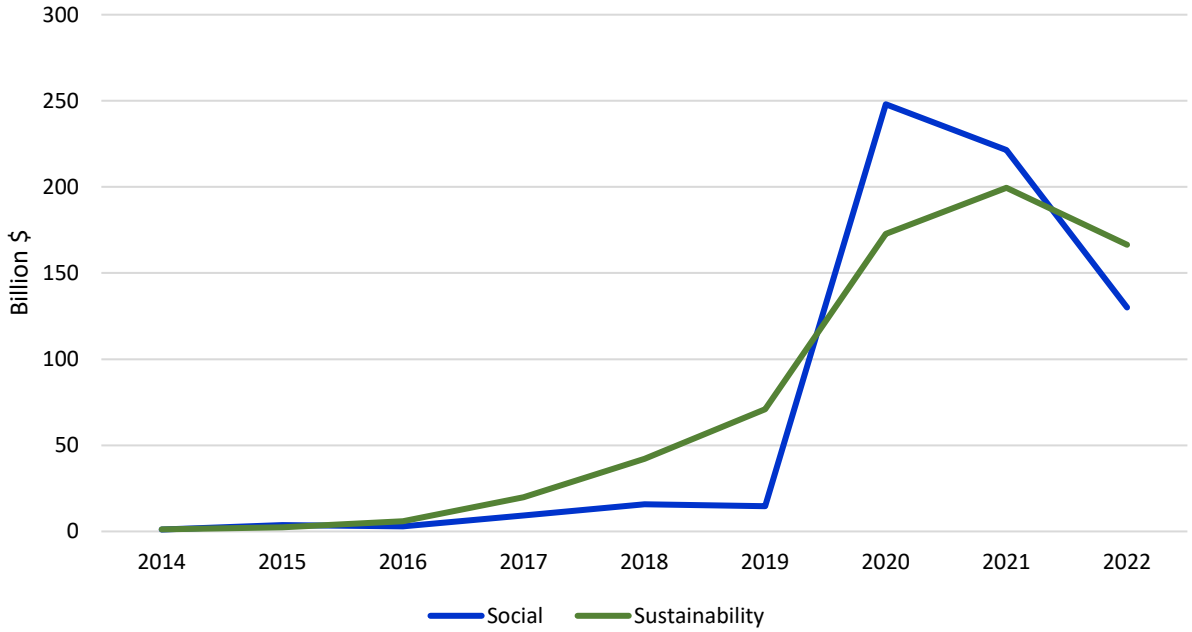
Though starting from a lower base, the market for global social and sustainability bonds has grown faster than the green bonds market in recent years. The global issuance of social bonds grew from $1.1 billion in 2014 to a period high of $248 billion in 2020 and slowed to $130.1 billion in 2022; sustainability bonds grew from $1.2 billion in 2014 to a period high of $199.5 billion in 2021 and totaled $166.4 billion in 2022 (figure 4.4).[426] Declining by 41 percent from 2021 to 2022, social bonds experienced a greater decline than green or sustainability bonds for the year. The factors discussed above which caused declines in the green bond market caused a decline in bond issuance across all categories, while the decline in social and sustainability bond issuance was driven by declines in bonds specifically earmarked

[423] Climate Bonds Initiative, "Interactive Data Platform: Use of Proceeds," accessed December 27, 2023. Underlying components of investments are eligible to be included or labeled as green or climate finance as detailed in the Climate Bonds Initiative Taxonomy, see Climate Bonds Initiative, "Climate Bonds Taxonomy," September 2021.
[424] "Interactive Data Platform: Issuer Type," accessed December 27, 2023.
[425] "Interactive Data Platform: Issuer Type," accessed December 27, 2023.
[426] Climate Bonds Initiative, "Interactive Data Platform: Region," accessed December 27, 2023.

for COVID-19-pandemic-related recovery.[427] Government-backed entities and development banks were the largest issuers of social bonds and sustainability bonds, respectively, while financial corporate entities issued 16.5 percent of social and 20.9 percent of sustainability bonds, in 2022.[428]

Figure 4.4 Value of annual social and sustainability bond issuance globally, 2014–22

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.36.



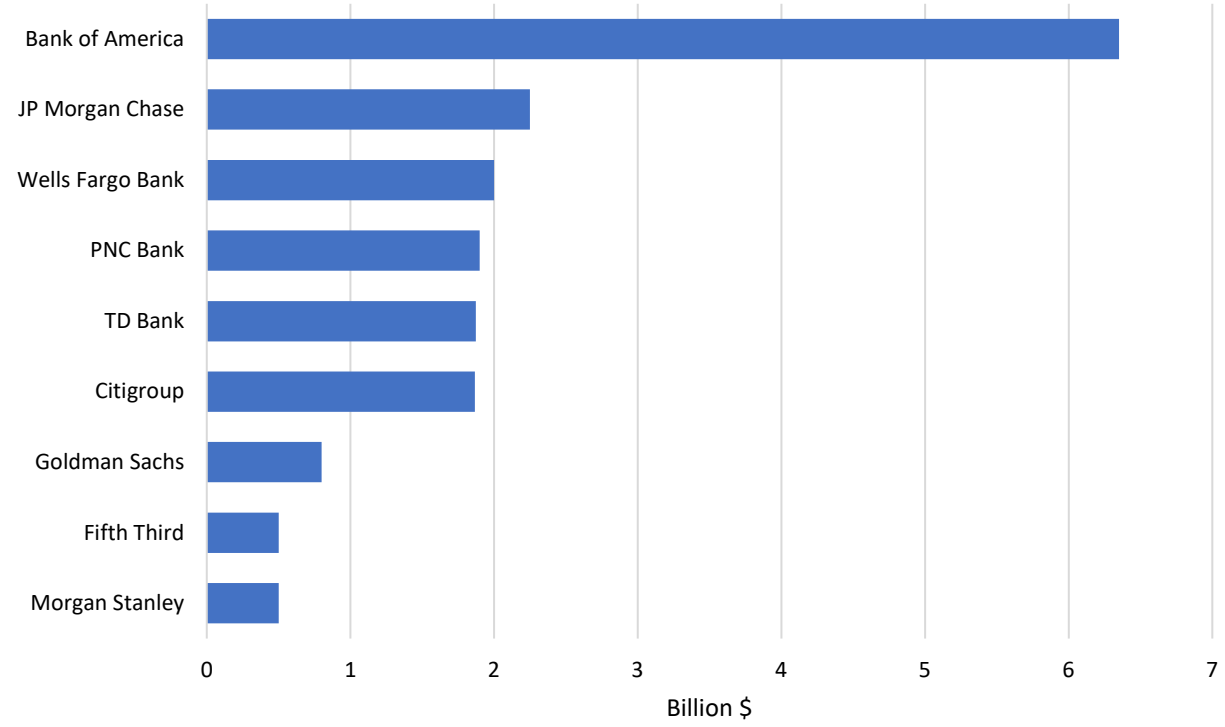
Source: Climate Bonds Initiative, "Interactive Data Platform: Region," accessed January 4, 2024.
Note: Data refer to the value of social or sustainability bonds issued in each year.

The total value of green, social, or sustainability bonds issued by the largest U.S. banks in 2022 was approximately $18 billion (figure 4.5). For example, Wells Fargo Bank announced in 2022 a $2 billion "Inclusive Communities and Climate Bond" dedicated to renewable energy, clean transportation, and inclusive social issues such as affordable housing and economic opportunity.[429] In 2021, the bond was allocated between renewable energy (49 percent), housing affordability (37 percent), and socioeconomic advancement and empowerment (14 percent) projects.[430] Examples of investments made by Wells Fargo include solar and wind energy projects across several U.S. states; equipment and inventory for a rural hospital in Waimea, Hawaii; and an affordable housing development with dedicated units for formerly homeless families in Brooklyn, New York.[431]

[427] Climate Bonds Initiative, "Sustainable Debt Global State of the Market 2022," accessed February 5, 2024, 4.
[428] "Interactive Data Platform: Issuer Type," accessed December 27, 2023.
[429] Wells Fargo, "Wells Fargo Issues $2 Billion Inclusive Communities and Climate Bond," August 15, 2022, 10.
[430] Wells Fargo, *Inclusive Communities and Climate Bond*, May 2022.
[431] Wells Fargo, *Inclusive Communities and Climate Bond*, May 2022, 14–15.

Figure 4.5 Value of green, social, or sustainability bonds issued by largest U.S. banks, 2022

In billions of dollars. Underlying data for this figure can be found in appendix B, table B.37.



Source: Statista, "Value of green bond issuance of the largest banks in the United States in 2022," accessed December 27, 2023.
Note: Statista notes the selection of largest banks is by total assets and banks not included above have not issued green bonds. Citigroup and PNC Bank have years other than 2022 and TD Bank has used a specified exchange rate. For some banks, bonds issued appear to include social or sustainable bonds and in years leading up to 2022.

Outlook

Reports analyzing banks' financing activity suggest that the aggregated allocation between low-carbon versus fossil-fuel financing has fallen short of requirements to meet climate change targets.[432] At the same time, a growing body of literature shows that banks have started to reduce lending to carbon-intensive firms, although there are limited climate impacts thus far from such shifts in supply of finance.[433] One report based on 2021 data for 1,142 banks from around the globe found that $842 billion was allocated toward low-carbon energy while $1.04 trillion was allocated toward fossil fuels.[434]

[432] Analyses indicate that that reaching global climate goals requires a ratio of 4:1 investment in low-carbon to fossil-fuel supply by 2030. For more information, see Lubis et al., *Investment Requirements of a Low-Carbon World*, October 6, 2022.
[433] For a review of the relevant banking literature, see De Haas, "Sustainable Banking," November 2023, 9–13, 21. Also see pages 13–20 for a review of literature on bank lending activity in response to natural disasters.
[434] Quinson, "Banks Need Even Bigger Low-Carbon Pivot to Avert Climate Crisis," February 28, 2023; White et al., "Financing the Transition: Energy Supply Investment and Bank Financing Activity," February 28, 2023, 4. See White et al. pages 6–9 for information on methodology (e.g., related to sectoral coverage and financing activity included) and page 22 for a summary of similar analyses. Another report, based on data for 60 banks from around the globe

In addition, the analysis showed that European banks had a higher ratio of financing toward low-carbon energy projects relative to fossil fuel financing compared to banks headquartered in North America or China, and there was considerable variation across individual banks.[435] Going forward, three North American banks have indicated they would regularly and publicly disclose their clean energy financing ratios.[436]

Banks appear to continue to pursue sustainability, although they note that inconsistent disclosure of climate data by companies that would receive financing is a challenge in meeting their climate-related goals. On the basis of a 2021 U.S. survey related to green and sustainable finance, insufficient disclosure was identified as the biggest challenge for investors who identified obstacles toward such investing, and most U.S. companies (including banks) and investors surveyed indicated a desire for greater regulation around the disclosure of companies' environmental activities.[437] A more recent survey of the finance industry also pointed to continued commitments to sustainable investment practices and challenges related to climate data.[438]

Banks have pointed to regulations and supportive public policies which they expect will facilitate their efforts to meet climate-related and sustainable investment goals. For example, U.S. banks reportedly anticipate that the passage of the 2022 Inflation Reduction Act—which allocated federal spending and tax incentives toward decarbonization—will lead to an increase in low-carbon projects that can attract financing.[439] Relatedly, individual banks have indicated that the introduction of regulatory requirements for climate-related disclosure would help overcome data challenges.[440]

Continued growth is expected in the green, social, and sustainability bond markets, though many investors and credit strategists indicate that levels will remain below 2021 record highs. Future growth depends on multiple factors, including interest rates, as well as time and costs associated with issuing green bonds (such as verification that they meet sustainability criteria). Green bonds are likely to continue as the largest category of bonds in this area, though some expect interest in new areas of specialty bonds—for example, bonds focused on gender equality.[441]

found that $2.3 trillion was allocated/related to the production of fossil fuel energy while $178 billion was for clean energy activities during January 2016–July 2022, see Sierra Club, *Background Briefing: Just 7% of Global Banks' Energy Financing Goes to Renewables, New Data Shows*, February 2023, 2–3.

[435] Quinson, "Banks Need Even Bigger Low-Carbon Pivot to Avert Climate Crisis," February 28, 2023; White et al., "Financing the Transition: Energy Supply Investment and Bank Financing Activity," February 28, 2023, 15.

[436] As part of complying with requirements under EU directives, European banks have made similar disclosures and additional U.S. banks may begin public disclosures. For more information, see Segal, "JPMorgan, Citi, RBC Reach Deals," April 4, 2024; Temple–West, "New York's Green Troublemaker," March 20, 2024.

[437] HSBC, *Sustainable Financing and Investing Survey 2021: US Report*, September 19, 2021, 9–10. See figures 13–15, there was less consensus on required disclosure of social effects though both sets of disclosures were seen as helpful in certain aspects. See page 11 for survey methodology, including type of investors and companies surveyed.

[438] Marsh and Pham, "Bankers Hate Saying 'ESG' But Are Hardwiring it into Their Work," August 14, 2023.

[439] Quinson, "Banks Need Even Bigger Low-Carbon Pivot to Avert Climate Crisis," February 28, 2023; "Big Bank Citi Talks Net-Zero Goals, Scope 3 Emissions, Climate Disclosure," November 3, 2023.

[440] "Big Bank Citi Talks Net-Zero Goals, Scope 3 Emissions, Climate Disclosure," November 3, 2023.

[441] Mutua and Ritchie, "Global ESG Debt Set for Tepid Growth as High Rates Inhibit Sales," December 28, 2023.

Insurance Services: Global Property and Casualty Insurance and Changing Demand Conditions Related to Extreme Weather

Over the last 30 years, a significant increase in the frequency and severity of extreme weather events has contributed to a marked rise in the demand for insurance products that address these risks, and in the value of insured losses. Factors such as growing population density and asset accumulation in vulnerable areas, inflation, and increased construction costs have contributed to the increasing value of these losses. The growing incidence and value of weather-related losses have impacted the provision of traditional property and casualty (P&C) insurance globally, for example, by discouraging the supply of insurance in disaster-prone areas.[442] Resulting insurance gaps have reportedly led global P&C insurers and reinsurers to introduce new products and risk diversification tools, such as parametric insurance policies and microinsurance. There has also been increased demand for liability insurance related to compliance with net-zero targets.

Recent Trends in Insured Losses

Weather-related global P&C insured losses have been increasing for at least three decades, averaging 3.4 percent annual growth since Hurricane Andrew in 1992 (figure 4.6).[443] According to a large reinsurance broker, such insured losses have crossed the $100 billion threshold every year since 2017, except for 2019.[444] Losses reached $123 billion in 2023, although there was not a major "primary" event (e.g., Hurricanes Katrina or Ian) driving these losses.[445] Most 2023 losses (81 percent) were a result of "secondary" perils.[446]

---

[442] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 14; Property and casualty (P&C) insurance is often called nonlife insurance outside of the United States (with the major distinction being that nonlife insurance includes health insurance, while in the United States, private health insurance is a separate category). In 2022, global premiums totaled $4.0 trillion and $2.8 trillion, respectively, in the P&C and life insurance segments. Within P&C, property refers to physical assets (e.g., buildings, ships, and cars) while casualty refers to liability which is often related to negligence or omissions (e.g., worker's compensation, professional liability, and general liability). P&C insurance is generally split into personal (households and individuals) and commercial insurance. Some examples of P&C insurance include personal auto, homeowner's, inland marine, crop, fire, flood, and farm owners, among others. Data on insured losses by hazard and by type of insurance are scarce and this section will discuss the P&C insurance market in total. Rudden, "Life and Non-Life Insurance Premiums Globally 2022," December 6, 2023; AM Best, *Best's Guide to Understanding the Insurance Industry*, June 2023, 24–25.

[443] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 5.

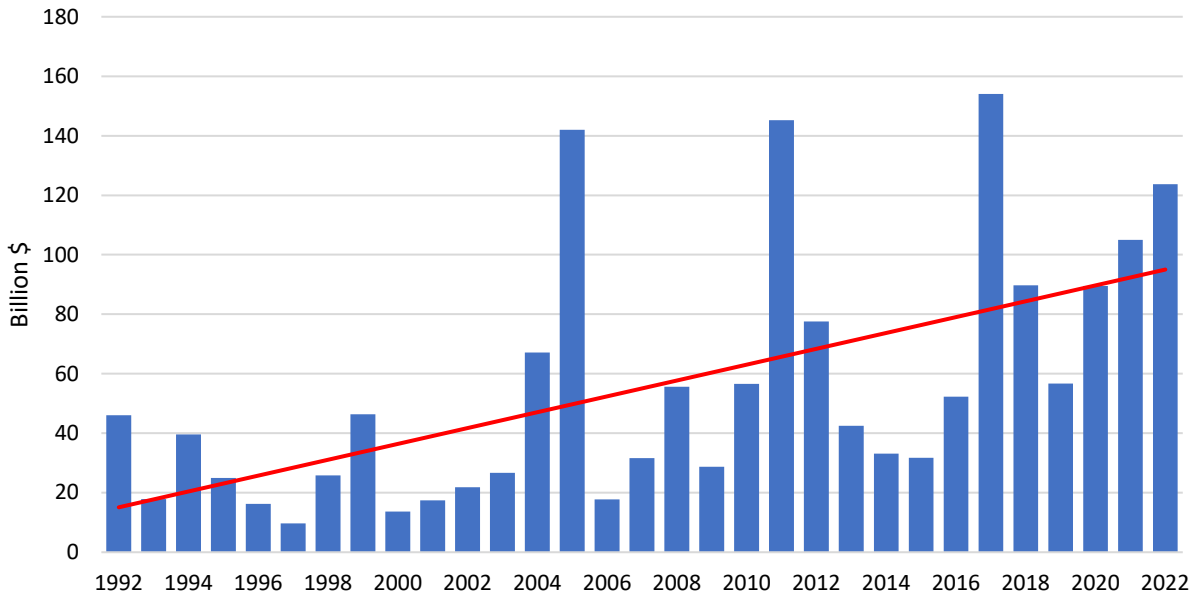
[444] The $100 billion threshold is often cited in industry press as indicative of a particularly destructive year—usually caused by a major weather event. The first years with insured losses of $100 billion dollars or more were 2005 (Hurricane Katrina) and 2011 (Tohuku earthquake and tsunami). The new normal appears to be insured losses averaging at least $100 billion. Wells, "$100bn of Insured Catastrophe Losses Now Reached in 2023," November 8, 2023.

[445] Bowen et al., *Natural Catastrophe and Climate Report: 2023*, January 2024, 6, 8.

[446] Secondary perils usually refer to the smaller perils that typically follow a primary event (i.e., a tropical cyclone or earthquake) such as flooding, wildfires, tornadoes, hailstorms, and tsunamis. Stevenson, "Earnings Perils," August 23, 2023.

Figure 4.6 Global insured weather-related losses, 1992–2022

In billions of inflation-adjusted 2022 dollars. Underlying data for this figure can be found in appendix B, table B.38.



Source: Statista, "Insured losses caused by natural disasters worldwide from 1970 to 2021," May 2, 2023.
Note: Industry-wide data for 2022 were calculated from Swiss Re Institute using 45 percent of $275 billion in economic losses that were covered by insurance. Swiss Re, a large global reinsurer, collects global insurance data through its *sigma* study. This study includes data that "originates primarily" from national supervisory authorities (but also industry associations) and cover 147 countries, "Sigma on World Insurance: Methodology and Data," 2019.

Population Shifts and Asset Accumulation

Globally, the number of people living in the near-coastal zone (land within 100 km of the coast at an elevation of 100 m or fewer) grew from 1.2 billion in 1990 to 2.2 billion in 2020, and the population living in the low-elevation coastal zone (or LECZ, refers to land at elevation of 10 m and below with a hydrological connection to the sea) increased from 634 million to 898 million from 2000 to 2020.[447] Additionally, about 40 percent of cities with at least 1 million residents are located in the near-coastal zone, and two-thirds of all cities with at least 8 million residents are in the LECZ. Various estimates forecast continued growth in coastal populations.[448]

Population and asset accumulation in coastal areas has a direct effect on insured losses. For hurricanes and typhoons, the location of landfall, as opposed to number of storms, is usually the main driver of insured losses for a given year.[449] For example, the 2022 North Atlantic hurricane season was average in terms of the number of named storms and major hurricanes.[450] However, it registered the third-highest

[447] Reimann et al., "Population Development as a Driver of Coastal Risk," January 31, 2023, 3–4.
[448] Reimann et al., "Population Development as a Driver of Coastal Risk," January 31, 2023, 3–4.
[449] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 4.
[450] Tropical storms are named when they sustain winds of at least 39 miles per hour (mph) while the term "major hurricane" refers to storms that maintain winds of at least 111 mph. Moore, "NOAA Forecasters Increase Atlantic Hurricane Season Prediction to 'above Normal,'" August 10, 2023.

insured losses on record, likely because Hurricane Ian (accounting for $50–65 billion of around $125 billion total) made landfall in a populated area with a large accumulation of physical assets.[451]

From 1970 to 2020, the Cape Coral-Fort Myers metropolitan area—where Hurricane Ian landed—posted a 608 percent population increase while all of Florida posted a 217 percent increase, both substantially higher than overall growth in the United States (63 percent). Population growth in other high-risk states like Texas (160 percent) and California (98 percent) also outpaced U.S. population growth during the period.[452] Similarly, urbanization in Australia contributed to high insured losses from the flooding in February–March 2022. The share of Australians that live in urban areas is among the highest in the world, and the practice of soil sealing is reportedly the main contributor to increased expected losses from flood damage.[453]

Growing population density in areas affected by wildfires in recent years is also contributing to the rise in insured losses. Globally, 3.5 billion people live in the wildland-urban interface (WUI), defined as the area of transition between unoccupied land and human development. In this zone, structures and other human development are mixed with undeveloped wildland or vegetative fuel, making it easier for fires to spread.[454] The WUI accounts for 4.7 percent of total global land area (about twice the size of India) with several regions at significant risk, including the Pacific coast of North America; eastern North America and the Caribbean; the Brazilian coast; across Europe; West, South, and East Africa; Southeast Asia, and Australia.[455] In the United States, WUI area increased 31 percent from 1990 to 2020, and the number of homes in the WUI increased 47 percent over the same period.[456] U.S population in the WUI area doubled to 21 million people between 1990 and 2010, while the U.S. population in areas with the highest wildfire risk level grew by 160 percent.[457]

Increased Construction Costs and Inflation

In recent years, construction costs in the United States and other major markets have increased because of aging infrastructure, inflationary pressures, and supply chain bottlenecks that arose during the COVID-19 pandemic.[458] At the end of 2022, U.S. and European construction costs were up 40 percent

[451] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 5, 12.
[452] USITC staff calculations based on data from the U.S. Census Bureau and the Florida Regional Economic Analysis Project. Florida Regional Economic Analysis Project, "Cape Coral-Fort Myers MSA vs. Florida," accessed January 17, 2024; Census, "2020 Population and Housing State Data," August 12, 2021; Census "Historical Population Change Data (1910-2020)," April 26, 2021.
[453] Soil sealing refers to the process associated with urbanization where development covers natural surfaces with impermeable layers of housing, roads, or other developments. Soil sealing speeds water runoff and makes flash flooding more likely. Léger, "Insurers Need to Step up to Close the Flood Protection Gap," March 30, 2022; Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 14.
[454] U.S. Fire Administration (USFA), "What Is the WUI?," June 8, 2022.
[455] Schug et al., "The Global Wildland–Urban Interface," September 2023, 94–95.
[456] Mockrin et al., "Understanding the Wildland Urban Interface (1990-2020)," November 20, 2023.
[457] *Economist*, "Parts of America Are Becoming Uninsurable," September 21, 2023, 1–2; The researchers categorized wildfire risk within the WUI into low (+107 percent), medium (+95 percent), and high. Rao et al., "Everyone Is Moving to the Places in the U.S. with the Greatest Wildfire Risk," February 9, 2022.
[458] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 10. For more information on recent inflation see chapter 2.

and 20 percent, respectively, since the beginning of 2020.[459] From 2019 to 2022, replacement costs in the United States increased approximately 40 percent—significantly higher than the 20 percent increase in nominal GDP during the period.[460] In Australia, the cost to rebuild after the February–March 2022 floods was higher than anticipated partially because of replacement cost increases of over 20 percent during 2022 and skilled labor shortages.[461]

The higher insurable value of buildings and other physical assets—a product of factors such as proximity to schools, home renovations, and features such as pools or home security systems—has contributed to increases in insured losses.[462] Inflation has also affected the value of these losses.[463] One executive at a U.S. P&C industry association indicated that home values in the United States have increased 50 percent over the last five years.[464] Globally, nominal housing prices in advanced and emerging economies have increased 46.4 percent and 46.3 percent from the third quarter of 2018 to the third quarter of 2023, respectively.[465]

Extreme Weather

According to industry sources, the increased severity and frequency of extreme weather, such as heat, drought, and flooding, in recent years may also have had an impact on insured losses.[466] A recent report from a large reinsurer found that although 2023 was the hottest year on record, climate change effects contributed one-eighth of the increased in insured losses in 2023.[467] The Intergovernmental Panel on Climate Change (IPCC) stated that, globally, the frequency of extreme heat and heavy precipitation has increased since the 1950s. The IPCC added that global land monsoon precipitation and the proportion of major tropical cyclones (Categories 3–5) have increased since the 1980s.[468]

In the summer of 2022, drought and other weather variabilities had a global impact (particularly on crop insurance) in many locations around the world, including Europe, Morocco, Brazil, and China.[469] In the United States, the number of discrete weather and climate events that resulted in at least $1 billion in insured losses has steadily increased from three in 1980 to 28 in 2023, setting the record.[470] According to a report from a large reinsurer, the United States is significantly exposed to economic losses from

[459] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 22.
[460] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 22.
[461] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 14.
[462] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 4.
[463] Howard and McGinley, "11 Factors That Affect Homeowners Insurance Premiums," October 20, 2023.
[464] Bellano, "Insurers Look Ahead to 2024 and Key Issues: Catastrophes, Inflation, Layoffs, AI and More," December 5, 2023, 37.
[465] USITC staff calculations based on Bank for International Settlements (BIS) data. BIS, "Selected Residential Property Prices," accessed February 28, 2024.
[466] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 5–6, 8, 18; Munich Re, "Record Thunderstorm Losses and Deadly Earthquakes," January 4, 2024.
[467] Banerjee et al., "Natural Catastrophes in 2023," March 26, 2024, 1, 4.
[468] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021: The Physical Science Basis - Summary for Policymakers*, August 9, 2021, 8–9.
[469] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 6–7.
[470] These losses are inflation-adjusted. NOAA National Centers for Environmental Information (NCEI), "U.S. Billion-Dollar Weather and Climate Disasters," January 9, 2024.

floods, tropical storms, and severe convective storms[471]—losing 0.4 percent of GDP annually.[472] Additionally, several regions saw record natural catastrophe claims in 2022. For example, flooding in Australia during February–March 2022 led to $4.3 billion in insured losses—the largest ever recorded in Australia—while the Durban flooding in South Africa resulted in a record $1.5 billion in insured losses.[473]

Protection Gaps and Higher Premiums for Natural Catastrophe and Weather-Related Coverage

Partially because of the demand (e.g., more demand for insurance in risky areas due to population shifts and asset accumulation) and supply (e.g., increased replacement costs due to inflationary pressure and supply chain bottlenecks) reasons, insurers typically do not cover every risk. This can result in protection gaps.[474] The extent of protection gaps varies around the world. For example, in 2023, the percentage of economic losses that were insured was estimated at 12 percent in Asia, 51 percent in North America, and 32 percent globally.[475] A large reinsurance company estimates that losses from natural catastrophes were $260 billion in 2023, about $100 billion of which were insured, implying a protection gap of $160 billion.[476] Growing losses have affected global supply and demand for P&C insurance,[477] widening protection gaps in many markets.[478] Specifically, some insurance companies have limited or eliminated their offerings in vulnerable areas, which has affected the affordability and availability of coverage for P&C risks in these places.

In the United States, some large insurers have begun to leave certain higher risk areas and raise rates because of the higher likelihood of incurring losses. For example, Allstate and State Farm (among others) have announced that they will stop offering new home insurance policies in California.[479] The California Department of Insurance approved State Farm's (which remains California's largest home insurer) plan

[471] Severe convective storms are atmospheric phenomena that can develop after warm moisture rises into the air and may result in varied weather events, including, thunderstorms, lightning, hail, straight-line winds, and tornadoes, among others. III, "Severe Convective Storms," October 2023.
[472] The study found that the United States ranked second out of 36 economies (behind the Philippines at 3.0 percent of GDP) for total economic losses as a percent of GDP. For more information, see Banerjee et al., "Economic Losses Set to Increase Due to Climate Change," February 28, 2024.
[473] Banerjee et al., *Natural Catastrophes and Inflation in 2022*, March 22, 2023, 6.
[474] A protection gap often refers to the uninsured portion of economic losses after a natural disaster. It can be measured as a percentage or as the absolute value of the difference between the total economic losses and the insured losses following an event — or series of events (e.g., insured losses for a given year).
[475] Verisk, *Global Modeled Catastrophe Losses*, September 8, 2023, 11.
[476] Allianz, "Risk Barometer 2024 - Natural Catastrophes," January 2024; Wells, "$100bn of Insured Catastrophe Losses Now Reached in 2023," November 8, 2023.
[477] Although this section will focus on primary insurance, growth in insured losses, as well as regulatory requirements, can also increase the price and limit the availability of reinsurance (see chapter 2). Reduced reinsurance capacity can limit the ability of primary insurers to underwrite more risks. Regulatory requirements impacting the availability of reinsurance include minimum local retention thresholds and mandatory cessions to local reinsurers, among others. Messina, Mazzouli, and Prowse, "European Insurers More Exposed to Weather Losses as Reinsurers Retreat," accessed December 8, 2023.
[478] IAIS, *A Call to Actions*, November 2023, 6.
[479] Other states that are reportedly hard to insure and where residents are having the most difficulty finding adequate and affordable insurance include Florida, Texas, Colorado, Louisiana, and New York. Freedman and Bomey, "Uninsurable America," June 6, 2023.

to increase home insurance premiums by an average of 20 percent in 2024.[480] In 2023, the price of home insurance policies in Florida increased at an annual rate of 42 percent to about $6,000 per year (more three times the national average). At least 15 insurers have reduced their provision of homeowner's insurance in Florida, and seven other insurers in the Florida market have been declared insolvent.[481] In Texas, home insurance premiums increased 22 percent in 2023—double the national average.[482]

A large global reinsurer has indicated that similar developments can be seen around the world, including in Mediterranean coastal countries in Europe and in parts of Australia.[483] For example, in 2023, median home insurance premiums in Australia increased 28 percent, while those in flood or bushfire-prone areas saw increases of 50 percent.[484] The head of the Insurance Council of Australia has indicated that more than 1 million households (10 percent) on the continent face home insurance affordability stress.[485] Similarly, customers of South Africa's largest insurer, Old Mutual, may see increases of 10 percent in 2024 partially because its reinsurance rates for catastrophic events has increased as much as 30 percent after remaining mostly flat from 2010 to 2020.[486]

Some insurers are also excluding specific perils from homeowners' policies. In some cases, insurers are offering a baseline policy to clients in disaster-prone areas without protections for secondary perils that may be caused by a disaster.[487] These coverage exclusions are often based on the type of disaster risk in a particular area (for example, excluding wind and hail damage protection from policies in hurricane-prone geographic areas or excluding wildfire and smoke protection in wildfire country).[488] While an individual insurer's decision to stop underwriting certain risks may be sound from the firm's solvency perspective, there may be macroprudential and consumer protection risks associated with multiple insurers limiting insurance provision in certain locations or for certain perils.[489]

Protection gaps can have a negative impact on the value of insured assets, such as homes and cars, which may disproportionately harm the financial position of lower-income households. For example, if flood insurance were unavailable because properties were considered to be in a flood-prone area, affected homeowners would have to cover the expense of flood-related repairs. Home prices in that locality might decline because of homeowners' inability to insure property. Mortgages often require

[480] Truong, "California's Largest Insurer Raises Home and Auto Rates by 20%," January 9, 2024. State Farm has also announced that it intends to decline the renewals of 30,000 homeowner and 42,000 commercial apartment properties. Kaenel, "State Farm to Drop Thousands of Calif. Policies despite Pending Reforms," March 22, 2024.
[481] *Economist*, "Parts of America Are Becoming Uninsurable," September 21, 2023, 3.
[482] Douglas, "Climate Change, Natural Disasters Sent Texas Homeowners Insurance Rates Skyrocketing in 2023," December 1, 2023.
[483] Foroohar, "What to Do When the US Becomes Uninsurable," June 12, 2023.
[484] Huang, "Affordable Home Insurance," October 22, 2023.
[485] Westcott, "Many Australians Abandon Insurance as Premiums Surge on Climate Costs," November 27, 2023; IBISWorld, "Australia - Number of Households," November 27, 2023.
[486] Changole, "Climate Change Risks Raising South Africa Premiums, Insurer Says," January 29, 2024.
[487] Bogage, "Home Insurers Cut Natural Disasters from Policies as Climate Risks Grow," September 5, 2023.
[488] Bogage, "Home Insurers Cut Natural Disasters from Policies as Climate Risks Grow," September 5, 2023.
[489] For example, insurance can play a role in helping localities to recover and reconstruct after natural disasters. Insurance can also incentivize adaptation, risk mitigation, and preparedness for a disaster—and can serve as a shock absorber for the larger macroeconomy. IAIS, *A Call to Action*, November 2023, 5.

insurance, and unaffordable or unavailable insurance can make selling houses more difficult, potentially depressing house prices.[490]

Both shocks are particularly onerous for lower-income populations. The International Association of Insurance Supervisors (IAIS) asserts that protection gaps disproportionately affect vulnerable segments of society and are felt more severely in emerging markets and developing economies.[491] Between 2010 and 2020, economic losses (insured losses and uninsured losses) represented a higher portion of GDP in low- and lower-middle-income countries than in upper-middle- and high-income countries. These impacts on GDP were particularly pronounced in Africa, Asia, and the Pacific.[492] According to a White House assessment, in the United States, climate impacts disproportionately affect low-income communities and communities of color.[493] In addition, some academic studies have reported that, in particular, the compounding effects of historical redlining in the United States may have made U.S. Black populations especially vulnerable to physical hazards.[494]

Throughout the United States, various government insurers of last resort have increased premiums during the past few years. When private insurers start to leave a geography or exclude common perils in a risk-prone region, state insurers of last resort frequently step in to provide insurance, typically with higher premiums and reduced coverage compared to the lost policy.[495] The number of policyholders in some of these plans has increased. For example California's Fair Plan doubled its number of policyholders from 2018 to 2022, and Citizens Property Insurance Corporation (Citizens), Florida's largest property insurer, grew from 450,000 policyholders in 2020 to 1.2 million in 2023.[496] Several insurers of last resort increased prices in 2023, including Citizens and Louisiana Citizens Property Insurance Corporation (Louisiana Citizens), which raised prices 12.3 percent and 63 percent, respectively.[497] These insurers of last resort are, in turn, seeing increased reinsurance prices. For

[490] Mahdawi, "For Some US Residents, It Is Now Impossible to Get Home Insurance," May 31, 2023.
[491] IAIS, *A Call to Action*, November 2023, 5.
[492] IAIS, *A Call to Action*, November 2023, 18.
[493] White House, Office of Science and Technology Policy (OSTP), "Fifth National Climate Assessment," November 9, 2023.
[494] Bruick et al., "Climate Change and Race: The Impact on Black Lives," November 30, 2023. Redlining refers to the systematic and discriminatory labeling of neighborhoods as dangerous or hazardous for investment and mortgage lending. These practices were formalized in the U.S. housing programs of the 1930s-era New Deal and resulted in less investment and limited availability of services in neighborhoods with large Black populations. The practice was often related to the provision of (public and private) credit and insurance, but also likely restricted the availability of healthcare services and diverse grocery options in these historically segregated neighborhoods. Redlining most often refers to neighborhoods with historically large Black populations, but the practice has affected other minorities and poor communities. Cornell Law School, "Redlining," April 2022; Fernandez et al., "The Ghosts of Housing Discrimination Reach Beyond Redlining," March 15, 2023.
[495] First Street Foundation, *9th National Risk Assessment: The Insurance Issue*, September 20, 2023, 4.
[496] Also, UK Flood Re grew from 150,000 policyholders in 2018 to 260,000 in 2023. Smith, Mooney, and Williams, "The Uninsurable World," February 13, 2024; Reportedly, California's FIAR plan grew a further 22 percent to reach 370,000 policyholders in 2023. Kaenel, "California's Wildfire Insurance Problems Are Getting Worse," March 14, 2024.
[497] Temple, "Louisiana Department of Insurance Approves Citizens Rate Increase," October 10, 2022; Citizens Property Insurance Corporation, "2024: A Look Ahead for Citizens Policyholders," December 4, 2023.

example, the Texas Windstorm Insurance Association—the Texas insurer of last resort—paid 63 percent more for reinsurance in 2023 than in 2022.[498]

Various regulators and U.S. government entities have begun to investigate these growing protection gaps. The U.S. Senate has opened an inquiry into Citizens, Florida's state-backed insurer of last resort, to assess its solvency.[499] The National Association of Insurance Commissioners will collect data at the zip code level to understand trends in insurance premiums and availability—and it has agreed to transmit data to the U.S. Treasury.[500]

In addition, the National Flood Insurance Program (NFIP) introduced Risk Rating 2.0, a new risk rating formula to better account for flood risk by calculating flood insurance premiums on individual property basis as opposed to geographic zones. This update reflects the NFIP's attempt to use industry best practices and technology.[501] However, 10 U.S. states—led by the Louisiana attorney general, who argues that the new rates will damage Louisiana's economy—have sued to stop the implementation of Risk Rating 2.0.[502]

New Insurance Products that Address Natural Catastrophe, Weather, and Liability Risks

Parametric Insurance

Parametric insurance, also known as index-based insurance, is a product innovation that has allowed the insurance industry to cover more threats, exposures, and perils. Parametric insurance products pay out a pre-agreed amount when an objectively measurable triggering event—such as an earthquake with a minimum seismic magnitude or a hurricane with a minimum wind speed—occurs. Because payouts are not based on the amount of damage the insured property sustains, loss adjustment is not necessary, and claims resolution is faster than for traditional indemnity insurance. Parametric insurance policies are usually employed to complement and fill gaps left by traditional insurance coverage.[503]

Modern parametric insurance was pioneered in the 1990s, mostly as crop insurance, particularly in developing nations in Asia. Since 2008, parametric insurance has grown, especially in the United States, India, and China.[504] A large global reinsurer has estimated that parametric product sales increased 40

[498] Douglas, "Climate Change, Natural Disasters Sent Texas Homeowners Insurance Rates Skyrocketing in 2023," December 1, 2023.
[499] U.S. Senate, Committee on the Budget, "White House Launches Investigation into Citizens Property Insurance," November 30, 2023; Nilsen, "Senate Committee Investigating Florida's State-Backed Home Insurance Company," November 30, 2023.
[500] Frank, "Treasury Halts Plan to Seek Property Insurers' Climate Data," March 8, 2024.
[501] FEMA, "NFIP's Pricing Approach," November 28, 2023. For more information on technological advances in insurance services, see chapter 3.
[502] Campisi, "10 States Sue FEMA Over Costly New Insurance Pricing," October 9, 2023; Florida, Idaho, Kentucky, Mississippi, Montana, North Dakota, South Carolina, Texas, and Virginia. Frank, "New Flood Insurance Rates are Damaging," February 20, 2024.
[503] Swiss Re, "What Is Parametric Insurance?," July 7, 2023.
[504] Hazell et al., *When and How Should Agricultural Insurance Be Subsidized?*, July 14, 2017, 3.

percent from August 2021 to August 2022.[505] U.S. firms that provide parametric insurance for natural catastrophe-related risk include California firm Jumpstart (earthquakes) and Florida firm StormPeace (wind), among many others.[506]

According to industry reports, global provision of parametric insurance is expected to grow at a compound annual growth rate of 9.2 percent from 2023 to 2032.[507] Parametric insurance is most often used in agriculture and construction. For example, the World Bank's Global Index Insurance Facility has issued $2 billion in parametric insurance, covering production at over 65 million farms.[508] Major (re)insurers—including Allianz, AXA, Berkshire Hathaway, Chubb, Munich Re, and Swiss Re, among others—have developed parametric products.[509] These index-based insurance products can be found throughout the world, but in 2021, North American (re)insurers had the highest share of parametric revenue.[510]

Some parametric insurance products insure pools of policyholders. For example, in the Americas, the Caribbean Catastrophe Risk Insurance Facility was launched in 2007 as the first multi-country risk pool; it includes insurance coverage in both parametric and traditional formats.[511] In addition, the United Nations Capital Development Fund (UNCDF) has coordinated with the Pacific Insurance and Climate Adaptation Program (PICAP) to develop parametric insurance for small Pacific Island states.[512] Another example is the African Risk Capacity Group, which provides parametric insurance policies to African Union members to protect against the impact of diseases such as Ebola, Marburg, and meningitis.[513]

Parametric insurance policies have also been used to address micro protection gaps.[514] For example, in Sri Lanka, a global insurance advisory firm developed a parametric insurance product to help rebuild vacated shrimp farms. This product is the first in Asia to cover earthquakes, typhoons, excess rainfall, and heat stress under a single policy, and includes index-based triggers for weather events that are not covered by traditional insurance.[515] Separately, in Togo, the AXA Group's climate and parametric risk transfer unit AXA Climate (co-financed with Howden) has introduced a parametric flood policy that is expected to insure properties in three Togolese cities.[516]

[505] Martin et al., "Parametric Insurance—a Long History, a Bright Future," September 16, 2022.
[506] United Policyholders, "A New Option for Disaster Insurance," 2023.
[507] Parametric insurance also has applications in aerospace and defense, mining, manufacturing, and energy and utilities. DataHorizzon Research, "Parametric Insurance Market to Reach USD 29.1 Billion By 2032," November 17, 2023.
[508] GIIF, "Overview," accessed March 29, 2024.
[509] DataHorizzon Research, "Parametric Insurance Market to Reach USD 29.1 Billion By 2032," November 17, 2023.
[510] Research and Markets, "Global Parametric Insurance Market Size," August 2022.
[511] CCRIF, "Home | CCRIF SPC," accessed December 13, 2023.
[512] UNCDF, "Pacific Insurance and Climate Adaptation Programme," accessed February 28, 2024; This program also helps the Pacific Island economies to improve regulatory and policy frameworks and sustainable climate and natural disaster risk financing mechanisms. IAIS, *A Call to Action*, November 2023, 20.
[513] African Risk Capacity Group, "The African Risk Capacity Launches," December 8, 2022.
[514] Micro protection gaps often refer to the lack of insurance at the individual level — usually among low-income individuals in developing economies. IDF, *Technology and Innovation*, August 2020, 3–4, 9–12, 51, 59.
[515] de Combles de Nayves et al., *Global Insurance Report 2023*, November 3, 2023, 11.
[516] Evans, "AXA Climate and Howden Design," December 5, 2023.

Microinsurance

The development of parametric insurance has been boosted by the growth of microinsurance—small scale insurance products typically offered in developing countries to cover weather and crop risks.[517] These microinsurance policies are tailored to low-income individuals and households and are offered in small amounts with simplified terms and conditions. Many microinsurance policies are index-based, and there is evidence that microinsurance can improve the financial resilience of low-income households.

Parametric microinsurance is already widely offered in the developing world but may soon grow in importance in the United States. Although there may be issues with profitability, regulatory requirements, and demand in the United States, the insurance commissioner for Puerto Rico in July 2020 became the first in the United States to approve regulations permitting parametric microinsurance and at least one global firm is positioned to offer a parametric microinsurance product in that market. These products differ from the U.S. examples above (Jumpstart and StormPeace) because they are parametric products designed for low-income families and individuals.[518]

Liability Insurance for Climate-Related Risk

Actions aimed at holding governments and corporations accountable for GHG emissions and other climate-related concerns have increased in recent years. Globally, the total number of climate litigation cases grew 2.5 times between 2017 and 2022, with 69.8 percent of lawsuits in 2022 filed in the United States[519] and 17.2 percent of cases being brought in the global south.[520] As of July 2023, U.S. cities and states have filed 21 cases against fossil fuel companies since 2017. Plaintiffs have brought claims related to nuisance, negligence, liability, and consumer protection, and many cases have centered around

[517] NAIC, "Parametric Disaster Insurance," June 1, 2023.
[518] For example, most U.S. state insurance regulations require "proof-of-loss" for a parametric insurance product to be considered insurance and not a derivative. This may undermine quicker claims resolution that is a key feature of parametric products. Kousky et al., "Can Parametric Microinsurance Improve Financial Resilience . . . in United States?," July 30, 2021, 303–13.
[519] The report defines climate change litigation as "cases that raise material issues of law or fact relating to climate change mitigation, adaptation, or the science of climate change." The report excludes lawsuits where climate change is mentioned incidentally (only in passing and not critical to the legal argument) and those whose goals may be climate related but whose "resolution does not depend on the climate change dimension of those goals" (e.g., lawsuits brought to protect human health from pollution that may force a reduction in emissions are excluded). The report includes cases brought by "plaintiffs, petitioners, applicants, complainants, and communicants (referred throughout as plaintiffs), through a variety of legal strategies in a wide range of national and international jurisdictions." The report also includes plaintiffs that seek to reduce and reverse the implementation of policies related to climate change mitigation, adaptation, or the science of climate change. Burger and Tigre, "Global Climate Litigation Report," July 27, 2023, 3, 7, 13–14.
[520] The report defines the global south as regions of Latin America and the Caribbean, Asia, Africa, and Oceania, and denotes regions that are mostly low-income and often politically or culturally marginalized. However, it must be noted that the Global South is not a homogeneous group of countries, and that legal development and legal capacity vary by country. Burger and Tigre, "Global Climate Litigation Report," July 27, 2023, 21.

whether federal or state courts have jurisdiction over particular matters.[521] Financial institutions are also facing lawsuits related to their climate responsibility, including in Australia, Belgium, and Brazil.[522]

Multinational executives are concerned about risks related to varying ESG issues. Increasing cross-border differences in regulation can be challenging for multinational companies and may be a barrier to international trade for small and medium-sized enterprises (SMEs).[523] According to a study from a large global insurer, 28 percent of global executives do not feel prepared for reputational threats in general, and over a third plan to explore insurance services to manage these risks.[524]

Amid growing climate disclosure and audit requirements and potential regulatory enforcement actions, three-quarters of global companies in a recent survey report that they do not feel prepared to comply with the EU's Corporate Sustainability Reporting Directive.[525] Reportedly, more than 5,000 laws around the world are related to climate change.[526]

Growing climate litigation and regulatory developments have increased the importance of director's and officer's (D&O) insurance as a tool to mitigate these risks.[527] D&O insurance has traditionally insured corporations and their management against litigation, but specific language may be necessary to ensure coverage of climate-oriented and inclusivity regulations.[528] Insurers are increasingly interested in covering these risks under D&O plans, which often require the insured to provide detailed information on their compliance efforts, such as supply chain assessments, modern slavery controls, oversight of company sustainability targets, and awareness of relevant climate-related legislation.[529]

Catastrophe Bonds

Insurance companies often transfer risks to other entities to reduce their overall risk level and improve their ability to underwrite additional risks. This is traditionally accomplished when an insurance company cedes a portion of its risk to a reinsurer (see chapter 2). However, since the 1990s, limited reinsurance capacity has made alternative risk transfer arrangements increasingly popular. One way to execute alternative risk transfer is to securitize insured risks and sell them to investors as insurance-

[521] Plaintiffs have also brought cases against governments related to the scope, implementation, non-execution, and relaxation of existing climate regulation. In April 2024, the European Court of Human Rights ruled that Switzerland had violated the right to "respect for private and family life and failed to comply with its duties under the convention regarding climate change." This unappealable ruling is the first by an international court determining that a country has taken inadequate action on climate change, and the decision is expected to have ramifications beyond Switzerland's borders. Burger and Tigre, "Global Climate Litigation Report," July 27, 2023, 4, 28, 42–43, 53; Meredith, "A Landmark Ruling in Europe's Top Rights Court," April 9, 2024.
[522] Burger and Tigre, "Global Climate Litigation Report," July 27, 2023, 54.
[523] Haddad et al., "Trading in a New Climate," February 13, 2024.
[524] Laman, "Business Execs Report Growing Employer, ESG Risk Concerns," December 1, 2023.
[525] Reuters, "Three-Quarters of Firms Globally Are Not Ready for New ESG Rules, KPMG Finds," September 26, 2023.
[526] Climate-Laws.com, "Climate Change Laws of the World," accessed April 25, 2024.
[527] Director's and officer's insurance is a type of professional liability insurance that protects company executives and board members when they are sued for misrepresentation, mismanagement, or other breaches of duty or regulations. Cussen, "Directors and Officers (D&O) Liability Insurance," August 21, 2023.
[528] Levine, Masters, and Pappas, "D&O Insurance," November 28, 2023.
[529] Harris, "Quantifying 'ESG,'" April 11, 2023.

linked securities (ILS).[530] In these arrangements, investors essentially speculate on the likelihood that an insurable event will occur. ILS are an attractive investment tool because their returns are relatively uncorrelated with financial market movements. However, their performance has been mixed since 2017, partially because of the increased frequency of extreme weather events.[531]

Catastrophe (cat) bonds are a type of ILS that is often linked to natural disasters.[532] Typically, a cat bond agreement occurs when a (re)insurer sells securitized portions of its risk profile to investors. In this arrangement the investor receives some investment and premium payments through the duration of the contract as long as a triggering "catastrophic" event doesn't happen.[533] A record $15 billion in new cat bonds were issued globally in 2023, with the total value of outstanding cat bonds reaching about $41 billion.[534] Cat bonds have become more popular as their returns exceeded those on most other (non-ILS) fixed income investments. For example, cat bonds were critical in the highest-earning hedge fund strategy in 2023, easily outpacing gains from other high-risk fixed-income products—gaining 20 percent compared to 13 percent for high-yield U.S. corporate bonds (U.S. treasuries increased 4 percent).[535] Cat bonds also provide a mechanism for global investors to inject capital to cover risks in vulnerable countries.[536] For example, Mexico is likely to see approximately $62.5 million from a cat bond after Hurricane Otis struck its Pacific coast in October 2023.[537]

In the United States, most cat bonds are available only to large institutional investors and face fewer disclosure requirements than traditional registered bonds.[538] Several jurisdictions have established regulatory frameworks that make it easier to issue cat bonds, including Bermuda and Hong Kong.[539] Bermuda dominates in issuing cat bonds—and ILS in general—likely because of its favorable regulatory regime.[540] As of mid-2023, securities listed on the Bermuda Stock Exchange totaled $38.4 billion in outstanding capital, composing 92 percent of the market share in global ILS.[541]

Various types of entities have entered the global cat bond market as a means of managing risk. Large reinsurers have started to increase their use of cat bonds, and Alphabet (the parent company that owns

[530] Artemis, "What Is Alternative Risk Transfer?," accessed December 13, 2023.
[531] Returns on ILS ranged between -6 percent in 2017 and +11 percent in 2023. Boldan et al., "Insurance Investors: Priorities and Opportunities," October 30, 2023.
[532] This section focuses on natural catastrophe bonds. For a discussion of the nascent cyber catastrophe bond industry see chapter 3.
[533] FINRA, "Insurance-Linked Securities," July 9, 2021.
[534] Holzheu and Lechner, "Surge in Catastrophe Bond Issuance," December 14, 2023.
[535] Tian et al., "Hedge Funds' Mega Returns Set Off Demand Spiral for Catastrophe Bonds," February 4, 2024.
[536] Parodi et al., "Insurance, Cat Bonds Can Help Boost Poorer Countries' Resilience to Climate Risks," December 1, 2023.
[537] Parodi et al., "Insurance, Cat Bonds Can Help Boost Poorer Countries' Resilience to Climate Risks," December 1, 2023.
[538] FINRA, "Insurance-Linked Securities," July 9, 2021.
[539] International Association of Insurance Supervisors (IAIS), *The Role of Insurance Supervisors in Addressing Natural Catastrophe Protection Gaps*, November 2023, 19.
[540] One important feature of the Bermuda regulatory regime is the Special Purpose Insurer. In 2009, Bermuda introduced this new class of insurer that faces reduced minimal capital requirements, no restrictions on return of capital, the ability to waive auditing requirements, eliminated investment restrictions (subject to disclosure), and low licensing fees. These entities are often required to fully funded and "sufficiently sophisticated." Conyers, *Special Purpose Insurers*, October 2016, 4.
[541] Evans, "Bermuda Remains World-Leader for Cat Bonds, ILS and Convergence," October 12, 2023.

Google) issued their own cat bonds to protect against a potential earthquake.[542] The World Bank is a large issuer of cat bonds and expects to increase its $1 billion in current outstanding to $5 billion in the next five years. The World Bank also plans to expand the types of disasters covered by its cat bonds beyond hurricanes, pandemics, and earthquakes to include flood and drought.[543]

U.S. firms and public sector insurers are also active in the cat bond market. For example, Florida insurer of last resort, Citizens, is turning to cat bonds to address solvency issues. In 2023, the state-backed insurer sought to transfer $5.5 billion worth of risk, of which $2.4 billion were cat bonds and $2.98 billion were traditional reinsurance arrangements.[544] Although 20 percent gains are unlikely to be matched in 2024, institutional investors are increasing their presence in the cat bond market, including Schroders Plc, GAM Holding AG, and Crédit Agricole SA, because they still forecast gains.[545]

Outlook

Global insured losses reached $100 billion for the fourth consecutive year in 2023, and a large global reinsurer has said that this may be the new normal.[546] Although insured losses (and usually protection gaps) are measured after events, this reinsurer expects flood risk to increase globally. It also anticipates that the main driver of weather-related economic losses in the United States and in East and Southeast Asia will be tropical cyclones.[547]

Globally, nonlife insurance premiums are projected to grow at a faster rate in 2024–25 than in 2023, with relatively rapid growth anticipated in the Asia-Pacific region and China.[548] Profitability is anticipated to improve in 2024 as insurers charge higher premiums, high interest rates improve investment return, and inflation rates fall, reducing relative claims costs.[549] In the United States, the property and casualty (P&C) industry may benefit from these conditions with nominal premium growth anticipated to grow 7 percent and 4.5 percent in 2024 and 2025, respectively.[550] These premium increases in the United States may see homeowner's insurance premiums increase 6 percent in 2024, potentially making insurance unaffordable in risky areas.[551]

Addressing natural catastrophe protection gaps will continue to be a key priority for the International Association of Insurance Supervisors (IAIS).[552] The IAIS is also calling for increased data collection and

[542] Naik, "Catastrophe Bond Market Headed for Major Surge in Issuance," October 25, 2023; Evans, "Alphabet's (Google's) First Catastrophe Bond Priced on-Target at $237.5m," November 26, 2020.
[543] Naik, "Catastrophe Bond Market Headed for Major Surge in Issuance," October 25, 2023.
[544] Gallin, "Florida Citizens Could Purchase as Much as $5.5bn of Reinsurance for 2024," December 5, 2023.
[545] Tian et al., "Hedge Funds' Mega Returns Set Off Demand Spiral for Catastrophe Bonds," February 4, 2024.
[546] Howard, "Global Insured Losses for Nat Cats Keep Breaking Records," March 26, 2024; Banerjee et al., "Economic Losses Set to Increase Due to Climate Change," February 28, 2024.
[547] Howard, "Global Insured Losses for Nat Cats Keep Breaking Records," March 26, 2024; Banerjee et al., "Economic Losses Set to Increase Due to Climate Change," February 28, 2024.
[548] "Global Outlook," November 21, 2023.
[549] Hersch et al., "2024 Insurance Outlook," July 27, 2023, 6.
[550] Holzheu and Finucane, "U.S. Property & Casualty Outlook," January 9, 2024.
[551] Ellfeldt, "Insurance Prices Skyrocket in Disaster-Prone States," April 2, 2024.
[552] The IAIS plans to work internally and with various international bodies to harmonize insurance supervision across jurisdictions, improve natural catastrophe risk modeling, and support building supervisory capacity in emerging market and developing economies, among other plans. IAIS, *A Call to Action*, November 2023, 23–24.

sharing among supervisors, standardized implementation of stress testing and scenario analysis, and improved communication with and education of consumers.[553]

Securities Services: Growth in Emerging Markets

Revenues of securities services firms in a given country are directly related to the size of its economy, as well as the level of development of its financial markets. Securities markets in advanced economies, especially the United States, therefore, represent the lion's share of global securities services provision. However, securities services are already well developed in China and are growing quickly in other major emerging markets, notably in India, leading to deeper global capital markets and expanding market access for new investors in these economies. This section briefly describes developments in global securities markets and the competitive position of global securities firms in these markets, comparing the major emerging markets to advanced markets, including the United States, China, and India. It also describes recent developments in India and China, which are the largest and most important emerging markets in terms of the size of their economies and the volumes traded in their securities markets.

Depth and Development of Securities Services in Advanced and Emerging Markets

Growth in stock market capitalization, funds' assets, transaction volumes on international exchanges, and other measures of the depth of a country's capital markets are not necessarily correlated, but they can indicate some of the trends in demand for securities services. Securities services that facilitate access to capital markets are provided by investment banks/broker-dealers, as well as the online market-making platforms.[554]

Investment banks provide market-making and brokerage services, assist firms to raise capital, locate investors, and arrange mergers and acquisitions (M&A) and other corporate finance transactions. In 2023, global M&A totaled $2.9 trillion and 55,200 deals, reflecting a sharp drop from $3.5 trillion and 59,000 deals in 2022.[555] (However, this drop reversed in early 2024 because of increases in U.S. M&A, especially in energy, technology, and financial sectors.)[556] The M&A transactions of a given country also reflect the size of its economy. For instance, in 2023, U.S.-based targets (i.e., acquired or merged firms) accounted for $1.4 trillion in announced M&A transactions; in comparison, China-based targets had $272.4 billion and India-based targets had $76.4 billion.[557] [558]

[553] IAIS, *The Role of Insurance Supervisors in Addressing Natural Catastrophe Protection Gaps*, November 2023, 11–14.
[554] For a detailed categorization of securities services, see table 2.2.
[555] LSEG, "Global Mergers and Acquisitions Review, Full Year 2023," 2024, 1.
[556] Zhuo, "FirstFT," March 28, 2024.
[557] Notably, though, India had one of the largest M&A transactions in 2023, as Jio Financial Services (a subsidiary of Reliance Industries) went public at an estimated value of $18.4 billion. LSEG, "Global Mergers and Acquisitions Review, Full Year 2023," 2024, 2.
[558] LSEG, "Global Mergers and Acquisitions Review, Full Year 2023," 2024, 3.

The other major types of securities services are related to asset management, assisting investors, pension funds, sovereign wealth funds, and other providers of capital. Firms providing these services include institutional asset managers, wealth management advisors, mutual fund and hedge fund managers, and private equity firms. Most of the world's largest asset managers invest and operate in North America, Europe, and Japan. In 2023, the largest global asset managers were U.S. firms BlackRock, with $8.6 trillion in total assets under management; Vanguard Group, with $7.3 trillion; and Fidelity Investments, with $3.7 trillion. In emerging economies, China's largest asset manager, Postal Savings Bank of China, was ranked 38th, with $716.0 billion in total assets, and India's largest asset manager, State Bank of India, was ranked 193rd, with $86.7 billion in total assets.[559]

Securities services enable investments in public company shares traded on stock exchanges and securities firms' revenues from equity sales and trading are closely related to the size of the equity markets where they operate. In 2022, the total values of traded stocks were an estimated $44.3 trillion for the United States, $32.5 trillion for China, and $1.9 trillion for India.[560] Also, at the end of 2022, the largest domestic stock market capitalizations (i.e., the total number of shares issued by domestic companies multiplied by their respective prices) were the New York Stock Exchange (NYSE) and the Nasdaq (table 4.1).[561] Stock markets around the world grew steadily from 2018 to 2021, though each of the major exchanges (with the exception of the NYSE) posted substantial declines in 2022.[562] Stock exchanges in some advanced economies have been surpassed by exchanges located in emerging markets. The London Stock Exchange Group was in seventh place in 2018 but fell to ninth place in 2022 because of growth in China's and India's equity markets.

Table 4.1: Total equity market capitalization by exchange, 2018–22

In billions of dollars. Euronext includes Belgium, France, Ireland, Italy, Norway, Portugal, and the Netherlands.

Exchange	2018	2019	2020	2021	2022
NYSE	20,679	21,084	22,509	23,991	24,060
Nasdaq	9,757	13,002	19,060	24,557	16,238
Shanghai Stock Exchange	3,919	5,106	6,976	8,155	6,724
Euronext	3,730	4,702	5,444	7,334	6,064
Japan Exchange Group	5,297	6,191	6,718	6,544	5,380
Shenzhen Stock Exchange	2,405	3,410	5,238	6,220	4,701
Hong Kong Exchanges and Clearing	3,819	4,899	6,130	5,434	4,567
National Stock Exchange of India	2,056	2,163	2,552	3,548	3,387

Source: WFE, "Statistics Portal," accessed December 29, 2023; World Bank, "World Development Indicators: DataBank," accessed November 29, 2023.

[559] Thinking Ahead Institute, *The World's Largest 500 Asset Managers*, October 2023, 45–48.

[560] In comparison, these values were an estimated $49.1 trillion, $13.1 trillion, and $1.3 trillion respectively in 2018. The United States has had the largest share of the global equity market. This may be partly due to more liquidity and exposure to growing industries in the United States compared to other countries. World Bank, "World Development Indicators" (accessed April 12, 2024); Goldman Sachs, "How to Diversify as Global Stock Markets Grow More Concentrated," March 28, 2024.

[561] Domestic market capitalization includes both shares of listed domestic companies and shares of foreign companies not listed on other exchanges. It excludes collective investment funds, options and futures, and other factors. WFE, "2022 Annual Statistics Guide," May 11, 2023; WFE, "WFE Statistics Definitions Manual," February 2022, 9.

[562] WFE, "2022 Annual Statistics Guide," May 11, 2023.

Cross-border portfolio investments are another indicator of the depth of national securities markets. Through its Coordinated Portfolio Investment Survey, the IMF provides estimates of portfolio investments from abroad, defined as cross-border transactions and positions that involve debt or equity securities, for each national market. As of December 2022, in the United States, foreign-owned portfolio investment assets totaled $14 trillion, representing 20 percent of total foreign-owned portfolio investment assets globally, up from $11.3 trillion in December 2018.[563] In comparison, foreign-owned portfolio investment assets in China totaled $1 trillion (up from $498 billion), and corresponding assets in India totaled $14 billion (up from $6 billion).[564] The United States, with portfolio investments abroad valued at $14 trillion as of December 2022, or 20 percent of the global total, is also the world's largest source by far of cross-border portfolio investment.[565] The United States' top investment destinations were the Cayman Islands ($2.6 trillion), the UK ($1.4 trillion), and Canada ($1.3 trillion); its investments in India ranked 11th at $290 billion, and its investments in China ranked 12th at $247 billion.[566]

Additionally, the IMF also ranks countries based on the depth, access, and efficiency of their financial institutions and markets. It estimated that the United States had an overall financial development index in 2021 of 0.92, while China had 0.63 and India had 0.53 (table 4.2).[567] The index levels for the United States and China in 2021 were similar to those in 2017. India's index, however, increased over the period from 0.46 in 2017, reflecting improvements in the country's stock market turnover ratio that indicated greater market efficiency.[568]

Table 4.2: Financial development indictor, by type and country/market, 2021

Country/market	Financial development	Financial institutions access	Financial institutions depth	Financial institutions efficiency
China (mainland)	0.63	0.46	0.49	0.73
India	0.53	0.27	0.39	0.67
United States	0.92	0.83	0.80	0.70
Advanced Markets[569]	0.62	0.55	0.66	0.62
Emerging Markets[570]	0.33	0.40	0.26	0.61

Source: IMF, Financial Development Index Database, accessed March 8, 2024. Mainland China excludes Hong Kong and Macau.

[563] IMF, "CPIS," accessed February 1, 2024.
[564] IMF, "CPIS," accessed February 1, 2024.
[565] IMF, "CPIS," accessed February 1, 2024.
[566] Low tax rates in jurisdictions like the Cayman Islands, Ireland, and Luxembourg attract international investments. Bertaut, Bressler, and Curcuru, "Globalisation and the Reach of Multinationals," December 1, 2019, 2.
[567] IMF, "Financial Development Index Database," accessed November 30, 2023.
[568] This is specifically the "financial markets efficiency index" in IMF, "Financial Development Index Database," accessed November 30, 2023.
[569] Advanced market countries include Andorra, Australia, Austria, Belgium, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, South Korea, Latvia, Lithuania, Luxembourg, Macao, Malta, The Netherlands, New Zealand, Norway, Portugal, Puerto Rico, San Marino, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan, the United Kingdom, and the United States.
[570] Emerging market countries include Afghanistan, Albania, Algeria, Angola, Antigua and, Barbuda, Argentina, Armenia, Aruba, Azerbaijan, The Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Central African, Republic, Chad, Chile, China (mainland), Colombia, Comoros, Democratic

The U.S. securities markets are the largest and most developed in the world. Compared to the notable emerging economies of China and India, equity market capitalization in the United States was over 3.5 times that of China and over 11 times that of India in 2022;[571] U.S. inward portfolio investments were more than 10 times greater than China's and more than 1,000 times greater than India's. The number of securities services employees in all three countries has increased in the short term, with notable growth in India. In the United States, the U.S. Bureau of Labor Statistics estimates that about 443,220 securities, commodities, and financial services sales agents were employed in May 2022, up from 389,610 in May 2017.[572] China reported that the number of registered employees in its securities services industry was 359,841 in 2021, up from 342,827 in 2017.[573] Specific data on employment in India's securities industry are unavailable, but reports of broader employment in India's financial services sector suggest growth: it stood at 7.8 million in FY 2023, up from 5.5 million in 2018.[574]

Recent Developments in India's Securities Markets

As described above, although China's banks and securities firms have a greater presence in the global banking and capital markets, India's financial sector is growing in size, complexity, and sophistication; this section summarizes recent trends in the provision of securities services in India. India's securities services are largely domestic (its services exports are primarily computer services), but its participation in global securities markets is beginning to grow, albeit from a small base.

The expansion of India's securities services sector is demonstrated by a number of economic indicators. By one estimate, the total value of India's managed investments grew from 41 percent of India's GDP in 2017 to 57 percent in 2022.[575] In 2022, India's largest asset management companies were SBI Funds Management, with an estimated $82.3 billion under management; ICICI Prudential Mutual Fund, with $59.6 billion; and HDFC Mutual Fund with $55 billion.[576] India's exports of financial intermediation

---

Republic of the Congo, Republic of Congo, Costa Rica, Côte d'Ivoire, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Fiji, Gabon, The Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Iran, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kosovo, Kuwait, Kyrgyz Republic, Lao, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Nicaragua, Niger, Nigeria, North Macedonia, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Qatar, Romania, Russia, Rwanda, Samoa, São Tomé and Príncipe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Solomon Islands, Somalia, South Africa, South Sudan, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Syria, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago ,Tunisia, Türkiye, Turkmenistan, Tuvalu, Uganda, Ukraine, United Arab, Emirates, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, West Bank and Gaza, Yemen, Zambia, and Zimbabwe.

[571] 2022 figures in current U.S. dollars. World Bank, "Market Capitalization of Listed Domestic Companies," accessed March 8, 2024; WFE, "Statistics Portal," accessed December 29, 2023.

[572] USDOL, BLS, "Occupational Employment and Wages," April 25, 2023; USDOL, BLS, "Occupational Employment and Wages," March 30, 2018; USDOL, BLS, "Data," accessed November 29, 2023.

[573] Slotta, "China," January 2, 2023.

[574] Statista, "India," 2023.

[575] These investments include mutual funds, hedge funds, and portfolio services. Mukherjee, "India and China," December 28, 2022.

[576] Based on an average 2022 exchange rate of $1 USD to 78.6 INR. Statista Research Department, "India," November 20, 2023.

services indirectly measured (FISIM, see box 2.1) also increased, from $405 million in 2018 to $444 million in 2022. The U.S. Bureau of Economic Analysis (BEA) estimates that the United States imported $17 million of India's FISIM in 2022, an increase from $5 million in 2017.

India's government has also implemented domestic policy measures to support its financial securities sector. In response to COVID-19 pandemic-related financial shocks, for instance, India's government started providing additional support for its nonbanking financial companies (NBFCs), including full guarantees of investment-grade debt securities and partial guarantees of lower-grade debt securities.[577] It also allowed them to classify loans as "standard" if they were successfully restructured before December 31, 2020.[578]

India's stock market has also become an effective avenue for channeling domestic savings toward investments in Indian businesses. At the end of 2022, the domestic market capitalization of India's National Stock Exchange, at $3.4 trillion, surpassed both the Taiwan Stock Exchange ($1.4 trillion) and the Korea Exchange ($1.6 trillion) combined.[579] At the same time, both of the Indian stock market's weighted indices—Sensex (which tracks the 30 largest Indian companies on the Bombay Stock Exchange) and Nifty (which tracks the 50 largest Indian companies on the National Stock Exchange)—rose about 4 percent in 2022.[580] India's private fundraising and initial public offerings (IPOs) slowed in 2022, but the total value of new stock listings grew throughout the period. For example, the Life Insurance Corporation of India raised $2.7 billion in 2022.[581] By one estimate, the pre-tax income of India's largest firms rose from $102.3 billion in 2018 to $165.4 billion in 2022.[582]

India's securities markets have been adversely affected by some recent high-profile defaults on loan obligations. One significant event was the September 2018 series of defaults on debt obligations of India's financial company Infrastructure Leasing and Financial Services Limited, which had negative credit effects on both commercial banks and NBFCs.[583] The company's subsequent requirements to cut lending and limit cash outflows reduced credit access for firms like real estate developers.[584] Another firm, Dewan Housing and Finance Corporation, defaulted in 2019. These liquidity crunches reduced access to funding through mutual funds (except for a few large well-established NBFCs), and the percentage of long-term market debt in borrowings fell from 49.1 percent at the end of March 2017 to 40.8 percent at the end of December 2019.[585]

According to economic analysts, the recent rapid growth in India's capital markets may also be partly attributed to regulatory favors from the government for very large firms and individuals.[586] By one estimate, half of the total recent gains in India's currency value are due to market actions by firms

[577] Ahmed et al., "Banking Sector and Nonbanking Financial Companies," July 6, 2023, 56.
[578] Ahmed et al., "Banking Sector and Nonbanking Financial Companies," July 6, 2023, 56.
[579] WFE, "2022 Annual Statistics Guide," May 11, 2023.
[580] USDOS, "2023 Investment Climate Statements: India," 2023. Sensex is also called the "sensitive index" and Nifty is called the "national stock exchange fifty."
[581] USDOS, "2023 Investment Climate Statements: India," 2023.
[582] Mukherjee, "India and China," December 28, 2022. These INR-USD exchange rate estimates by year are from IRS, "Yearly Average Currency Exchange Rates," accessed November 29, 2023.
[583] Sengupta, Song, and Vardhan, *A Study of Nonbanking Financial Companies in India*, November 1, 2021, 1.
[584] Ahmed et al., "Banking Sector and Nonbanking Financial Companies," July 6, 2023, 64.
[585] Ahmed et al., "Banking Sector and Nonbanking Financial Companies," July 6, 2023, 64.
[586] Findlay and Lockett, "'Modi's Rockefeller,'" November 13, 2020; Acharya, "India @75," March 30, 2023.

controlled by two of India's wealthiest businessmen, Gautam Adani and Mukesh Ambani.[587] By another estimate, 80 percent of the 2022 increase in India's stock market capitalization was from the Adani Group.[588] In contrast, India's small and medium-sized enterprises have reportedly encountered limited access to capital, compliance burdens, and changing policies that limit their revenue.[589]

The Participation of Foreign Securities Firms in India

India retains structural barriers that limit the participation of foreign securities services firms. For example, there are equity limits on foreign investment in India's financial services.[590]

Currently, India does not allow foreign individuals to participate directly in its stock market, though some participate through subaccounts of registered foreign institutional investors.[591] Foreign venture capital investors must register with SEBI to invest in India's companies, and investors who do register can raise capital in India through the issuance of Indian Depository Receipts (IDRs), which enable foreign companies to list on India's markets. A 2023 report found, however, that the UK's Standard Chartered Bank was the only foreign company to get listed on India's markets, and it terminated its IDR program in June 2020.[592] This may be related to IDR's entry barriers and the lack of clarity on taxes and conversion to overseas shares.[593]

Additionally, some foreign securities investors consider that Indian companies' stock valuations have higher price-to-earnings ratios compared to other emerging markets.[594] India had significant financial inflows in the third quarter of 2023, but in the fourth quarter, global investors sharply reduced their holdings of India's stocks, citing weaker-than-expected earnings by some information technology companies and rising crude oil prices (India imports 80 percent of its oil) after Hamas's October 7, 2023 attack on Israel.[595] Foreign direct investment (FDI) flows to India peaked at about $40 billion in 2021 but fell to $13 billion in 2023.[596]

Foreign investment in India's financial technology (or fintech) startups also trailed off recently as their valuations have declined: investments in India's fintech startups by venture capital and private equity firms grew rapidly from $2.1 billion in FY 2021 to $9.6 billion in FY 2022, but then fell to $3.9 billion in FY

[587] Mukherjee, "India and China," December 28, 2022.
[588] A January 2023 report said that the Adani Group engaged in stock price manipulation and accounting fraud and cooperated in creating offshore shell companies with forged documents worth about $4.5 billion, but the Adani Group said it has always been in compliance with the law. Subramanian and Felman, "Why India Can't Replace China," December 9, 2022; Hindenburg Research, "Adani Group," January 24, 2023; Rajvanshi, "Gautam Adani Accused of 'Largest Con in Corporate History,'" January 29, 2023.
[589] Shivakumar, "Where's the Middle?," October 10, 2022; Ananthapadmanabhan, "SAP BrandVoice," June 29, 2022. Others suggest India's financial sector needs to improve its data security and privacy and reduce its attrition rates. Badrinarayanan et al., "Indian Banks," August 2, 2023, 3.
[590] Data Privacy Framework Program, "India," accessed February 7, 2024.
[591] Singh, "Indian Stock Market," July 24, 2023.
[592] USDOS, "2023 Investment Climate Statements," 2023.
[593] USDOS, "2023 Investment Climate Statements," 2023.
[594] In 2023 companies in India's Sensex traded at an average of 21.4 times their earnings in 2022, but companies in the broader MSCI Emerging Market index traded at an average of only 11.9 times their earnings. Johnson, "Investors Ask If the Price Is Right for Buying into India's Growth Story," December 5, 2023.
[595] Cornish and Lockett, "Foreign Investors Sell Indian Stocks at Fastest Daily Pace in a Year," October 31, 2023.
[596] Travelli, "India Is Chasing China's Economy," January 2, 2024.

2023.[597] The trading prices for internet-based Paytm's parent company One97 Communications and the financial marketplace PB Fintech have both fallen below their 2021 IPOs.[598] In mid-2023, the Australian asset manager Macquarie Group downgraded investment in India's Paytm because of risks of regulation and competition.[599] Additionally, BNP Paribas removed some Indian stocks from its portfolio to reduce its investment in software exporters, saying its caution was motivated by India's high relative valuations, concern that the government's budget could increase volatility, and the potential of reallocating funds to North Asia.[600]

However, many foreign securities services firms are looking to increase their presence in the Indian market. Examples of foreign hedge funds and securities brokers expanding in India include Singapore-based firms Dymon Asia Capital and Gao Capital. Dymon, which manages about $2 billion in assets, applied for an investment advisory license and is opening an office in Mumbai. Gao Capital, which manages about $100 million, is opening an office in Bangalore to trade derivatives (i.e., financial contracts based on underlying assets, commodities, or indices) in India.[601] Some cite India's stable environment as attractive for managing international equities.[602] Another example of bullish investment is U.S.-based Blackstone's Private Equity Group, the global leader in private equity investing.[603] In 2023, its portfolio in India had a market value of about $60 billion; it suggested that it is now easier for investors to exit India through dividend recaps, IPOs, and secondary sales.[604]

India also attracts foreign securities services firms through its Gujarat International Finance Tec-City (GIFT City) and its Global Capability Centers (GCCs). GIFT City is an international financial services hub on the banks of the Sabarmati River that offers an exemption from some taxes. For example, it provides a 100 percent tax exemption for 10 years to businesses that operate within the hub's international financial services center.[605] In 2022, GIFT City occupied 886 acres and managed about $33 billion in financial assets.[606] JPMorgan Chase and Deutsche Bank recently started operating in GIFT City: JPMorgan Chase offers clients foreign exchange derivatives, and Deutsche Bank works with companies that rely on cross-border financial services.[607]

GCCs are offshore units of multinational firms that primarily operate in Bengaluru and Hyderabad. GCCs provide increasingly complicated financial services, as well as cybersecurity, data science, accounting,

[597] Bose, "India's Fintech Partygoers Nurse a Needed Hangover," September 10, 2023.
[598] Bose, "India's Fintech Partygoers Nurse a Needed Hangover," September 10, 2023. Currently India has one fintech firm worth at least $10 billion: PhonePe.
[599] Joshi, "Surging India Internet Stocks Trounce China Peers, Widening Gap," June 27, 2023.
[600] Mukherjee, "India and China," December 28, 2022.
[601] As of October 2023, both offices are still in the process of being opened. Yu and Zhen, "Global Hedge Funds Are Boosting Their Presence," October 27, 2023.
[602] Yu and Zhen, "Global Hedge Funds Are Boosting Their Presence," October 27, 2023.
[603] Bezek, "The Top 10 Largest Private Equity Firms in the World," February 22, 2024.
[604] Pandit, "Amit Dixit on Blackstone in India," March 7, 2023.
[605] GIFT City, "India's First International Financial Services Centre," accessed February 28, 2024.
[606] Rodrigues and Sircar, "India's Free-Market Oasis Aims to Take on Singapore and Dubai," November 28, 2022.
[607] India also wants to encourage Indian companies to lease ships and aircraft through GIFT City instead of foreign zones; allow qualified jewelers to directly import gold India with fewer restrictions; and permit foreign universities to bypass regulations and open local campuses. Rodrigues and Sircar, "India's Free-Market Oasis Aims to Take on Singapore and Dubai," November 28, 2022.

and human resources, and by one estimate they have grown by 11 percent annually since 2015.[608] India's 1,800 GCCs currently employ more than 1.3 million people.[609] JPMorgan Chase opened a GCC in 2002 with 75 people and now employs about 50,000 in five cities.[610]

Recent Developments in China's Securities Markets

As in India, China's securities markets reflect asset valuations and growth trends in the domestic economy. This section describes developments in China's securities services since 2020, briefly updating the fuller description in the U.S. International Trade Commission's (Commission or USITC) 2020 *Recent Trends in U.S. Services Trade* report.[611] In the past few years, China's securities services have encountered some headwinds. China's asset managers have especially been affected by overinvestment in China's real estate.

In 2022, the total debt held by China's local government financing vehicles, which are largely involved in China's property market, increased to 50 percent of the country's GDP.[612] In 2021, China's major banks were notified by the Ministry of Housing and Urban-Rural Development that large real estate developer Evergrande could not meet repayments of loan interest,[613] and similarly China's developer Country Garden missed payments on bonds and lost $7.6 billion in early 2023.[614] As a result, net foreign investment in China-listed shares declined by an estimated 87 percent in 2023.[615]

Recently, a number of economic measures indicate that growth in China's securities services has stalled relative to India and other emerging economies. In global stock markets, China's share of Morgan Stanley Capital International (MSCI) Emerging Market index, which tracks large- and mid-cap markets in 24 countries and is used to measure the economic performance of emerging market companies, decreased from 35 percent in 2021 to 28 percent in 2022 (while India's share rose from 10 percent to 15 percent).[616] China's net FDI, calculated as inflows minus outflows, fell sharply to an estimated $15 billion in the first nine months of 2023, from $180 billion in 2022.[617] China's CSI 300 (covering Shanghai's and Shenzhen's largest companies) had fallen by 11.4 percent from 2022 to 2023.[618] Furthermore, in 2019, 19.3 percent of China's new A-share listings (securities incorporated in mainland China and traded on the Shanghai and Shenzhen stock exchanges) involved foreign banks, but fell to 3.1 percent in 2022.[619]

[608] Cornish, "India's Back-Office Boom Sparks 'War' for IT Service Workers," November 19, 2023.
[609] Das et al., "GCC Guide 2023," August 1, 2023.
[610] Cornish, "India's Back-Office Boom Sparks 'War' for IT Service Workers," November 19, 2023.
[611] USITC, *Recent Trends 2020*, July 2020.
[612] IMF, "Global Financial Stability Report, April 2023," April 2023, xiv–xv.
[613] Jim, "China Evergrande's Liquidity Crisis Deepens, Report Flags Interest," September 15, 2021.
[614] Goodman, "China's Economy Battles Debt," August 11, 2023.
[615] "Net foreign investment" is payments to the rest of the world minus receipts from the rest of the world. USDOC, BEA, "Glossary," accessed April 3, 2024; Lockett and Leng, "Foreign Investors Unwind $33bn Bet on China Growth Rebound," December 28, 2023.
[616] Mukherjee, "India and China," December 28, 2022.
[617] Lardy, "Foreign Direct Investment Is Exiting China, New Data Show," November 17, 2023.
[618] Jie, "Investors Are Bullish on Asia in 2024," January 2, 2024.
[619] Hale et al., "Foreign Banks Left out of Initial Public Offerings in China," June 11, 2023.

No U.S. securities services firms were involved in China's stock market IPOs during the first half of 2023 (though other foreign firms such as Credit Suisse and Deutsche Bank were involved).[620] Eight exchange-traded funds and investment trusts started using "ex-China" in their names to indicate demand for emerging market investments other than China, and the MSCI Emerging Markets index overall gained 9 percent since the end of 2022, while the ex-China version gained 14 percent.[621]

Despite its stock market issues, total revenue of China's securities services industry increased from $49.4 billion in 2016 to $77.9 billion in 2021.[622] The BEA estimates that the United States imported $385 million in financial intermediation services indirectly measured (FISIM) from China in 2022, a significant increase from $43 million in 2017.[623] JPMorgan Chase, Manulife Financial, and Morgan Stanley now own some fund management joint ventures in China.[624] China has also made financial adjustments in response to slowing growth: its five largest state-run banks lowered their deposit rates in December 2023 to reduce their interest payment costs.[625]

China still has mature capital markets managing transactions and deals relative to other emerging economies. Though Moody's government credit ratings moved China from "stable" to "negative" in December 2023, citing debt-burdened local governments, property downsizing, and low economic growth, the country still has a high rating of A1 compared to India's rating of Baa3.[626]

Outlook

Recent growth in securities markets in emerging economies suggests that global investors continue to look to emerging markets for investment opportunities, and the funneling of global capital toward these markets will encourage further expansion of their securities services sectors. Economic analysts estimate strong growth in India's securities markets in particular.

According to one recent poll, India's stock market capitalization is expected to rise over 10 percent by the end of 2024.[627] JPMorgan Chase recently announced that India will now be included in the global Government Bond Index-Emerging Markets series, and one expectation is that this addition could facilitate about $25 billion inflows into India's fixed income market by 2025.[628] Bloomberg Index Services also plans to include India's government bonds in its Emerging Market Local Currency Government Index

[620] Hale et al., "Foreign Banks Left out of Initial Public Offerings in China," June 11, 2023.
[621] Imahori and Kawakami, "Global Investors Pivot from Flagging China to India, Vietnam," August 1, 2023.
[622] Based on a USD-CNY exchange rate of 6.64 in 2016 and 6.45 in 2021. Slotta, "China," March 11, 2022.
[623] USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type of Service," July 6, 2023.
[624] Bloomberg News, "Vanguard Takes Final Step to Exit China," November 1, 2023.
[625] Hale and Leng, "Chinese State Banks Cut Deposit Rates," December 22, 2023.
[626] The United States has Moody's highest rating at AAA. But in November 2023 that ratings outlook was lowered from stable to negative, citing the government's potential debt ceiling defaults and government shutdowns. In August 2023, Fitch Ratings downgraded the U.S. credit rating from AAA to AA+, and in 2011 Standard and Poor's had lowered its score from AAA to AA+; both cited repeated U.S. debt ceiling crises. Amond, "U.S. Credit Rating Outlook Lowered to 'Negative' by Moody's," November 16, 2023; Reuters, "Moody's Affirms India's Sovereign Ratings, Retains Stable Outlook," August 18, 2023; Moody's, "Moody's Affirms China's A1 Rating," December 5, 2023.
[627] Sathyan and Shrivastava, "India Stocks Set to Hit New Highs," November 22, 2023.
[628] Dann, "India's Expanding Securities Market," January 30, 2024.

starting in January 2025.[629]Finally, foreign investors held less than 1 percent of government bonds in India in 2022. One prediction is that if foreign investors increased their participation in India's government bonds to 10 percent in 2030, funds available for India's corporate debt issuers could almost triple.[630]

Economic forecasts for China's securities markets are mixed. Some suggest that the value of the MSCI China Index could fall by as much as 36 percent, while others see a rise of as much as 23 percent by the end of 2024.[631] The wide range of predictions that for China's securities markets illustrates the high degree of uncertainty regarding China's security market growth prospects. Domestic and foreign investors are concerned about being exposed to further corrections in China's real estate values and whether they would be able to depend on a government bailout fund.[632]

[629] Sanyal, "Indian Bonds Are Set to Be Added to Global Indexes," March 26, 2024.
[630] Perez-Gorozpe et al., "Unlocking India's Capital Markets Potential," August 3, 2023.
[631] Galani, "Chinese Equities Are Ready for Long March Upwards," December 14, 2023.
[632] *Economist*, "China's Stockmarket Nightmare Is Nowhere Near Over," February 7, 2024.

Bibliography

Acharya, Viral, "India @75: Replete with Contradictions, Brimming with Opportunities, Saddled with Challenges." Panel at Spring 2023 Brookings Papers on Economic Activity, March 30, 2023. https://www.brookings.edu/wp-content/uploads/2023/02/3a_Acharya-BEPA-presentation-March-30-2023-v2.pdf.

African Risk Capacity Group. "The African Risk Capacity Launches Its First Parametric Insurance Product against High-Impact Epidemic Risks." December 8, 2022. https://www.arc.int/news/loombe-risk-capacity-launches-its-first-parametric-insurance-product-against-high-impact.

Ahmed, Faisal, Marco Casiraghi, and Sumiko Ogawa. "Banking Sector and Nonbanking Financial Companies." In *India's Financial System*. International Monetary Fund (IMF), July 6, 2023. https://www.elibrary.imf.org/display/book/9798400223525/CH003.xml.

Alix, Laura. "Where Banks are Eyeing Profits in the Green Economy." *American Banker*. June 2, 2021. https://www.americanbanker.com/list/where-banks-are-eyeing-profits-in-the-green-economy.

AM Best. *Best's Guide to Understanding the Insurance Industry*. June 2023. https://bestsreview.ambest.com/edition/2023/supplements/guidetounderstanding/.

American Bankers Association (ABA). "Community Reinvestment Act." n.d. https://www.aba.com/banking-topics/compliance/acts/community-reinvestment-act.

Amond, Ryley. "U.S. Credit Rating Outlook Lowered to 'Negative' by Moody's." CNBC, November 16, 2023. https://www.cnbc.com/select/moodys-lowers-us-credit-outlook-to-negative/.

Ananthapadmanabhan, Subramanian. "How India's Midmarket Businesses Can Eliminate The 'Missing Middle.'" Forbes, June 29, 2022. https://www.forbes.com/sites/sap/2022/06/29/how-indias-midmarket-businesses-can-eliminate-the-missing-middle/.

Artemis. "What Is Alternative Risk Transfer?" Accessed December 13, 2023. https://www.artemis.bm/library/what-is-alternative-risk-transfer/.

Avtar, Ruchi, Kristian Blickle, Rajashri Chakrabarti, Janavi Janakiraman, and Maxim Pinkovskiy. *Understanding the Linkages between Climate Change and Inequality in the United States*. Federal Reserve Bank of New York Staff Reports, No. 991. November 2021. https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr991.pdf?sc_lang=en

Badrinarayanan, Ranganathan, Ashwaryaa Bhatia, Peeyush Dalmia, Satviek Goel, Siddhartha Gupta, Piyushi Jain, Siddhartha Jogidasani, Madhur Maheshwari, and Renny Thomas. "Indian Banks: Building Resilient Leadership." McKinsey, August 2, 2023. https://www.mckinsey.com/featured-insights/india/indian-banks-building-resilient-leadership.

Banerjee, Anutosh, Sarina Deuble, Vishal Kaushik, Bernhard Kotanko, and Joydeep Sengupta. "WealthTech in Asia-Pacific: Financial Innovation." McKinsey & Company, October 18, 2023. https://www.mckinsey.com/industries/financial-services/our-insights/wealthtech-in-asia-pacific-the-next-frontier-in-financial-innovation#/.

Banerjee, Chandan, Lucia Bevere, Hendre Garbers, Balz Grollimund, Roman Lechner, and Andreas Weigel. "Sigma 1/2024: Natural Catastrophes in 2023." Swiss Re, March 26, 2024. https://www.swissre.com/institute/research/sigma-research/sigma-2024-01.html.

Banerjee, Chandan, Lucia Bevere, Hendre Garbers, and Patrick Saner. "Economic Losses Set to Increase Due to Climate Change, with US and Philippines the Hardest Hit, Swiss Re Institute Finds." Swiss Re, February 28, 2024. https://www.swissre.com/press-release/Economic-losses-set-to-increase-due-to-climate-change-with-US-and-Philippines-the-hardest-hit-Swiss-Re-Institute-finds/3051a9b0-e379-4bcb-990f-3cc8236d55a1.

Banerjee, Chandan, Lucia Bevere, Thierry Corti, James Finucane, and Roman Lechner. *Natural Catastrophes and Inflation in 2022: A Perfect Storm*. 1/2023. Swiss Re, March 22, 2023. https://www.swissre.com/dam/jcr:1d793484-9b96-4e54-91c3-09f8fc841bde/sigma-1-2023.pdf.

Bank for International Settlements (BIS). "Selected Residential Property Prices, Nominal, Index, 2010 = 100." Accessed February 28, 2024. https://data.bis.org/topics/RPP/BIS%2CWS_SPP%2C1.0/Q.5R.N.628?additional_ts=BIS%2CWS_SPP%2C1.0%5EQ.5R.R.628%7CBIS%2CWS_SPP%2C1.0%5EQ.4T.N.628%7CBIS%2CWS_SPP%2C1.0%5EQ.4T.R.628&view=chart.

Bank of America. "Approach to Zero." April 13, 2022. https://about.bankofamerica.com/en/making-an-impact/our-net-zero-strategy-and-targets-to-reduce-emissions.

Bellano, Anthony. "Insurers Look Ahead to 2024 and Key Issues: Catastrophes, Inflation, Layoffs, AI and More." *AM Best* December 2023 (December 5, 2023): 36–41. https://bestsreview.ambest.com/edition/2023/december/Insurers-Look-Ahead-2024-Key-Issues-and-Climate-Risk.html?altsrc=2.

Beltran, Daniel O., Hannah Bensen, Amy Kvien, Erin McDevitt, Monica V. Sanz, and Pinar Uysal. "What Are Large Global Banks Doing About Climate Change?" Board of Governors of the Federal Reserve System, January 5, 2023. https://www.federalreserve.gov/econres/ifdp/what-are-large-global-banks-doing-about-climate-change.htm.

Berry, Kate. "Texas Judge Rebukes CFPB over Anti-Discrimination Policy." *American Banker*, September 10, 2023. https://www.americanbanker.com/news/loom-judge-rebukes-cfpb-over-anti-discrimination-policy.

Bertaut, Carol, Beau Bressler, and Stephanie Curcuru. "Globalisation and the Reach of Multinationals: Implications for Portfolio Exposures, Capital Flows, and Home Bias." Irving Fisher Committee on Central Banking Statistics, December 1, 2019. https://www.bis.org/ifc/publ/ifcb52_25.pdf.

Bezek, Ian. "The Top 10 Largest Private Equity Firms in the World." *US News & World Report*, February 22, 2024. https://money.usnews.com/investing/articles/largest-private-equity-firms.

Bloomberg News. "Banks' Green Fees Overtake Fossil-Fuel Fees for Second Year." *InvestmentNews*, October 19, 2023. https://www.investmentnews.com/industry-news/news/banks-green-fees-overtake-fossil-fuel-fees-for-second-year-244738.

Bloomberg News. "Vanguard Takes Final Step to Exit China, Dismantling Last Team." November 1, 2023. https://www.bloomberg.com/news/articles/2023-11-02/vanguard-takes-final-step-to-exit-china-dismantling-last-team.

Bogage, Jacob. "Home Insurers Cut Natural Disasters from Policies as Climate Risks Grow." *Washington Post*, September 5, 2023. https://www.washingtonpost.com/business/2023/09/03/natural-disaster-climate-insurance/.

Boldan, Cristian, Andrew Reich, Matthew Scally, Corey Bourbonais, Grier Tumas Dienstag, and Doug McElhaney. "Insurance Investors: Priorities and Opportunities." McKinsey & Company, October 30, 2023. https://www.mckinsey.com/industries/financial-services/our-insights/insurance-investors-priorities-and-opportunities.

Bose, Shritama. "India's Fintech Partygoers Nurse a Needed Hangover." Reuters, September 10, 2023. https://www.reuters.com/breakingviews/indias-fintech-partygoers-nurse-needed-hangover-2023-09-11/.

Bowen, Steve, Brian Kerschner, and Jin Zheng Ng. *Natural Catastrophe and Climate Report: 2023*. Gallagher Re, January 2024. https://www.ajg.com/gallagherre/-/media/files/loomberg/gallagherre/news-and-insights/2024/loombe/natural-catastrophe-and-climate-report-2023.pdf.

Bruick, Zach, Daniel Muvezwa, Kirtiman Pathak, Daniel Stephens, Shelley Stewart, and Alexis Trittipo. "Climate Change and Race: The Impact on Black Lives." McKinsey & Company, November 30, 2023. https://www.mckinsey.com/bem/our-insights/impacts-of-climate-change-on-black-populations-in-the-united-states.

Burger, Michael, and Maria Tigre. *Global Climate Litigation Report: 2023 Status Review*. Columbia Law School, Sabin Center for Climate Change Law, July 27, 2023. https://scholarship.law.columbia.edu/sabin_climate_change/202.

Campisi, Natalie. "10 States Sue FEMA Over Costly New Insurance Pricing." Forbes, October 9, 2023. https://www.forbes.com/advisor/insurance/states-sue-fema-flood-insurance/.

Caribbean Catastrophe Risk Insurance Facility (CCRIF). "Home | CCRIF SPC." Our Vision. Accessed December 13, 2023. https://www.ccrif.org/.

Changole, Adelaide. "Climate Change Risks Raising South Africa Premiums, Insurer Says." Bloomberg, January 29, 2024. https://www.bloomberg.com/news/articles/2024-01-29/climate-change-risks-raising-south-africa-premiums-insurer-says.

Chopra, Rohit. "Laying the Foundation for Open Banking in the United States." June 12, 2023. https://www.consumerfinance.gov/about-us/blog/laying-the-foundation-for-open-banking-in-the-united-states/.

Citigroup Inc. "Citi Launches More Than $1 Billion in Strategic Initiatives to Help Close the Racial Wealth Gap." September 23, 2020. https://www.citigroup.com/global/news/press-release/2020/citi-launches-more-than-1-billion-in-strategic-initiatives-to-help-close-the-racial-wealth-gap.

Citigroup Inc. "Citi Recognized as an 11-Time Industry Leader in Affordable Housing." March 23, 2021. https://www.citigroup.com/global/news/press-release/2021/citi-recognied-as-an-11-time-industry-leader-in-affordable-housing.

Citizens Property Insurance Corporation. "2024: A Look Ahead for Citizens Policyholders." December 4, 2023. https://www.citizensfla.com/-/a-year-of-change-rates-legislative-changes-private-options.

Cleveland-Peck, Perry, and Dylan Tokar. "U.S. Appeals Court Temporarily Halts SEC Climate-Disclosure Rules." Wall Street Journal, March 18, 2024. https://www.wsj.com/articles/u-s-appeals-court-temporarily-halts-sec-climate-disclosure-rules-456f2f4c.

Climate Bonds Initiative. "Climate Bonds Taxonomy." September 2021. https://www.climatebonds.net/files/files/Taxonomy/CBI_Taxonomy_Tables-08A%20%281%29.pdf.

Climate Bonds Initiative. *Social & Sustainability Bond Methodology*. August 2022. https://www.climatebonds.net/files/files/CBI-Social-and-Sustainability-Bond-Methodology-14092022.pdf.

Climate Bonds Initiative. "Explaining Green Bonds." Accessed December 27, 2023. https://www.climatebonds.net/market/explaining-green-bonds.

Climate Bonds Initiative. "Interactive Data Platform." Climate Bonds Initiative. Accessed February 5, 2024. https://www.climatebonds.net/market/data.

Climate Bonds Initiative. "Interactive Data Platform: Issuer Type." Climate Bonds Initiative. Accessed December 27, 2023. https://www.climatebonds.net/market/data.

Climate Bonds Initiative. "Interactive Data Platform: Region." Accessed December 27, 2023. https://www.climatebonds.net/market/data/.

Climate Bonds Initiative. "Interactive Data Platform: Use of Proceeds." Accessed December 27, 2023. https://www.climatebonds.net/market/data/.

Climate Bonds Initiative. "Sustainable Debt Global State of the Market 2022." Accessed February 5, 2024. https://www.climatebonds.net/files/reports/cbi_sotm_2022_03e.pdf.

Climate Corporate Data Accountability Act, S.B. 253, 2023–2024 California State Senate, Regular Session. 2023. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240SB253.

Climate-Laws.com. "Climate Change Laws of the World." Climate Change Laws of the World. Accessed April 25, 2024. https://climate-laws.org/.

Consumer Financial Protection Bureau (CFPB). "CFPB Targets Unfair Discrimination in Consumer Finance." March 16, 2022. https://www.consumerfinance.gov/about-us/newsroom/cfpb-targets-unfair-discrimination-in-consumer-finance/.

Consumer Financial Protection Bureau (CFPB). Small Business Lending under the Equal Credit Opportunity Act (Regulation B). March 30, 2023. https://www.consumerfinance.gov/rules-policy/final-rules/small-business-lending-under-the-equal-credit-opportunity-act-regulation-b/.

Consumer Financial Protection Bureau. "Small Business Lending Rulemaking." n.d. https://www.consumerfinance.gov/1071-rule/.

Conyers. *Special Purpose Insurers*. October 2016. https://www.conyers.com/wp-content/uploads/2016/10/Special_Purpose_Insurers-BDA-1.pdf.

Cornell Law School. "Redlining." Legal Information Institute, April 2022. https://www.law.cornell.edu/wex/redlining.

Cornish, Chloe. "India's Back-Office Boom Sparks 'War' for IT Service Workers." *Financial Times*, November 19, 2023. https://www.ft.com/content/13f32219-483c-4030-b252-a0a76c625576.

Cornish, Chloe, and Hudson Lockett. "Foreign Investors Sell Indian Stocks at Fastest Daily Pace in a Year." *Financial Times*, October 31, 2023. https://www.ft.com/content/16145c3f-3b67-4315-9388-895ad80e2e83.

Cort, Todd, and Daniel Esty. "ESG Standards: Looming Challenges and Pathways Forward." *Organization & Environment* 33 (July 28, 2020). https://doi.org/10.1177/1086026620945342.

Crosman, Penny. "Solar Loans, Tracking Carbon Footprints: Ken LaRoe Pursues Green Goals." *American Banker*, August 23, 2023. https://www.americanbanker.com/news/solar-loans-tracking-carbon-footprints-ken-laroe-pursues-green-goals.

Cussen, Mark. "Directors and Officers (D&O) Liability Insurance." *US News & World Report*, August 21, 2023. https://www.usnews.com/insurance/glossary/directors-officers-liability-insurance.

Cutter, Chip, and Emily Glazer. "The Latest Dirty Word in Corporate America: ESG." *Wall Street Journal*, January 9, 2024. https://www.wsj.com/business/the-latest-dirty-word-in-corporate-america-esg-9c776003.

Dann, Clarissa. "India's Expanding Securities Market." Deutsche Bank, January 30, 2024. https://flow.db.com/securities-services/india-s-expanding-securities-market?language_id=1.

Das, Samantak, Rohan Sharma, and Anita Subramanian. "GCC Guide 2023." JLL, August 1, 2023. https://www.jll.co.in/en/trends-and-insights/research/the-rise-of-global-capabilities-centres-in-india.

Das, Ujjal. "Huge Reworking of Fund Expenses Starts?" May 19, 2023. https://www.valueresearchonline.com/stories/52647/huge-reworking-of-fund-expenses-starts/.

Data Privacy Framework Program. "India: Trade Barriers." Accessed February 7, 2024. https://www.privacyshield.gov/ps/article?id=India-Trade-Barriers.

DataHorizzon Research. "Parametric Insurance Market to Reach USD 29.1 Billion By 2032 Report by DataHorizzon Research." Yahoo Finance. November 17, 2023. https://finance.yahoo.com/news/parametric-insurance-market-reach-usd-114000341.html.

de Combles de Nayves, Henri, Bernhard Kotanko, Angat Sandhu, and Kazuaki Takemura. *Global Insurance Report 2023: The Future of Asia P&C Insurance*. McKinsey & Company, November 3, 2023. https://www.mckinsey.com/industries/financial-services/our-insights/global-insurance-report-2023-reimagining-life-insurance#/.

De Haas, Ralph. "Sustainable Banking." European Bank for Reconstruction and Development Working Paper, No. 282, November 2023. https://doi.org/10.2139/ssrn.4620166.

Douglas, Erin. "Climate Change, Natural Disasters Sent Texas Homeowners Insurance Rates Skyrocketing in 2023." *Insurance Journal*, December 1, 2023. https://www.insurancejournal.com/news/southcentral/2023/12/01/750400.htm.

Dugal, Ira. "Explainer: What India's Decision to Scrap Its 2000-Rupee Note Means for Its Economy." Reuters, May 21, 2023. https://www.reuters.com/business/finance/what-indias-decision-scrap-its-2000-rupee-note-means-its-economy-2023-05-20/.

Economic Times. "Government Lost Rs 1 Lakh Crore in Taxes in FY'21 Due to Corporate Tax Cut, Says MoS Finance." August 8, 2023. https://economictimes.indiatimes.com/news/economy/finance/government-lost-rs-1-lakh-crore-in-taxes-in-fy21-due-to-corporate-tax-cut-says-mos-finance/articleshow/102544590.cms?from=mdr.

Economist. "China's Stockmarket Nightmare Is Nowhere near over." February 7, 2024. https://www.economist.com/finance-and-economics/2024/02/07/chinas-stockmarket-nightmare-is-nowhere-near-over.

Economist. "Parts of America Are Becoming Uninsurable." September 21, 2023. https://www.economist.com/united-states/2023/09/21/parts-of-america-are-becoming-uninsurable.

Ellfeldt, Avery. "Insurance Prices Skyrocket in Disaster-Prone States." E&E News, April 2, 2024. https://www.eenews.net/articles/insurance-prices-skyrocket-in-disaster-prone-states/.

Evans, Steve. "Bermuda Remains World-Leader for Cat Bonds, ILS and Convergence." Artemis, October 12, 2023. https://www.artemis.bm/news/loombe-remains-world-leader-for-cat-bonds-ils-and-convergence/.

Evans, Steve. "Alphabet's (Google's) First Catastrophe Bond Priced on-Target at $237.5m." Artemis, November 26, 2020. https://www.artemis.bm/news/alphabets-googles-first-catastrophe-bond-priced-on-target-at-237-5m/.

Evans, Steve. "AXA Climate and Howden Design Parametric Flood Insurance for Togo." Artemis, December 5, 2023. https://www.artemis.bm/news/axa-climate-and-howden-design-parametric-flood-insurance-for-togo/.

Federal Emergency Management Agency (FEMA). "NFIP's Pricing Approach." November 28, 2023. https://www.fema.gov/flood-insurance/risk-rating.

Fernandez, Emma, Katie Fallon, Brendan Chen, Samantha Batko, and Emily Peiffer. "The Ghosts of Housing Discrimination Reach Beyond Redlining." Urban Institute, March 15, 2023. https://www.urban.org/features/ghosts-housing-discrimination-reach-beyond-redlining.

Findlay, Stephanie, and Hudson Lockett. "'Modi's Rockefeller': Gautam Adani and the Concentration of Power in India." *Financial Times*, November 13, 2020. https://www.ft.com/content/474706d6-1243-4f1e-b365-891d4c5d528b.

Financial Industry Regulatory Authority (FINRA). "Insurance-Linked Securities." July 9, 2021. https://www.finra.org/investors/insights/insurance-linked-securities.

First Street Foundation. *9th National Risk Assessment: The Insurance Issue*. September 20, 2023. https://report.firststreet.org/9th-National-Risk-Assessment-The-Insurance-Issue.pdf.

Forese, Jamie. "Announcing Our TCFD Report: Finance for a Climate-Resilient Future." Citi, November 13, 2018. https://www.citigroup.com/global/news/perspective/2018/announcing-our-tcfd-report-finance-for-a-climate-resilient-future.

Florida Regional Economic Analysis Project (FL-REAP). Cape Coral-Fort Myers MSA vs. Florida Comparative Trends Report: Population, 1969–2022. Accessed January 17, 2024. https://florida.reaproject.org/analysis/comparative-trends-analysis/population/reports/74250000/120000/#page_10.

Foroohar, Rana. "What to Do When the US Becomes Uninsurable." *Financial Times*, June 12, 2023. https://www.ft.com/content/a801a8e0-c977-449a-af26-a19500820007.

Frank, Thomas. "New Flood Insurance Rates Are Damaging Louisiana Economy, Officials Say." E&E News, February 20, 2024. https://subscriber.politicopro.com/article/eenews/2024/02/20/new-flood-insurance-rates-are-damaging-louisiana-economy-officials-say-00142090.

Frank, Thomas. "Treasury Halts Plan to Seek Property Insurers' Climate Data." E&E News, March 8, 2024. https://www.eenews.net/articles/treasury-halts-plan-to-seek-property-insurers-climate-data/.

Freedman, Andrew, and Nathan Bomey. "Uninsurable America: Climate Change Hits the Insurance Industry." Axios, June 6, 2023. https://www.axios.com/2023/06/06/climate-change-homeowners-insurance-state-farm-california-florida.

Galani, Una. "Chinese Equities Are Ready for Long March Upwards." Reuters, December 14, 2023. https://www.reuters.com/breakingviews/loombe-equities-are-ready-long-march-upwards-2023-12-14/.

Gallin, Luke. "Florida Citizens Could Purchase as Much as $5.5bn of Reinsurance for 2024." Reinsurance News, December 5, 2023. https://www.reinsurancene.ws/florida-citizens-could-purchase-as-much-as-5-5bn-of-reinsurance-for-2024/.

GIFT City. "India's First International Financial Services Centre." Accessed February 28, 2024. https://www.giftgujarat.in/business/ifsc.

Global Index Insurance Facility (GIIF). "Overview." Global Index Insurance Facility. Accessed March 29, 2024. https://www.indexinsuranceforum.org/overview.

Goldman Sachs. "How to Diversify as Global Stock Markets Grow More Concentrated." March 28, 2024. https://www.goldmansachs.com/intelligence/pages/how-to-diversify-as-stock-markets-concentrated.html.

Goldman Sachs. "India's Affluent Population Is Likely to Hit 100 Million by 2027." February 16, 2024. https://www.goldmansachs.com/intelligence/pages/indias-affluent-population-is-likely-to-hit-100-million-by-2027.html.

Goodman, Peter. "China's Economy Battles Debt, Slowing Trade and Specter of Deflation." *New York Times*, August 11, 2023. https://www.nytimes.com/2023/08/11/business/china-economy-trade-deflation.html.

Greenhouse Gases; Climate-Related Financial Risk, S.B. 261, 2023–2024 California State Senate, Regular Session. 2023. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240SB261.

Grewal Levy Marketing News. "From Greenwashing to Green Hushing: Strategic Approaches to Communicating About Sustainability Efforts." February 20, 2024. https://grewallevymarketing.com/2024/02/20/from-greenwashing-to-green-hushing-strategic-approaches-to-communicating-about-sustainability-efforts/.

Haddad, Mona, Birgit Hansl, and Anouk Pechevy. "Trading in a New Climate: How Mitigation Policies Are Reshaping Global Trade Dynamics." World Bank, February 13, 2024. https://blogs.worldbank.org/en/developmenttalk/trading-new-climate-how-mitigation-policies-are-reshaping-global-trade-dynamics.

Hale, Thomas, and Cheng Leng. "Chinese State Banks Cut Deposit Rates in Bid to Stimulate Growth." *Financial Times*, December 22, 2023. https://www.ft.com/content/ae25c26e-9fba-4795-87b5-76ebbaa5d82e.

Hale, Thomas, Kaye Wiggins, and Hudson Lockett. "Foreign Banks Left out of Initial Public Offerings in China." *Financial Times*, June 11, 2023. https://www.ft.com/content/07a3cfba-33ef-4268-a880-6241e1f791af.

Harris, Lizzie. "Quantifying 'ESG': The Consequences for D&O Insurance." Lockton, April 11, 2023. https://global.lockton.com/gb/en/news-insights/quantifying-esg-the-consequences-for-d-and-o-insurance.

Hazell, Peter B., Rachel Sberro-Kessler, and Panos Varangis. *When and How Should Agricultural Insurance Be Subsidized? Issues and Good Practices*. World Bank, July 14, 2017. https://documents.worldbank.org/pt/publication/documents-reports/documentdetail/477891500024532370/When-and-how-should-agricultural-insurance-be-subsidized-Issues-and-good-practices.

Heller, Daniel, Andreas Reiter, Sebastian Schöbl, and Henning Soller. "ESG Data Governance: A Growing Imperative for Banks." February 8, 2023. https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/tech-forward/esg-data-governance-a-growing-imperative-for-banks.

Hersch, Karl, James Colaço, and Michelle Canaan. "2024 Insurance Outlook." Deloitte, July 27, 2023. https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-outlooks/insurance-industry-outlook.html.

Hindenburg Research. "Adani Group: How The World's 3rd Richest Man Is Pulling The Largest Con In Corporate History." January 24, 2023. https://hindenburgresearch.com/adani/.

Holzheu, Thomas, and James Finucane. "U.S. Property & Casualty Outlook: Strong Momentum into 2024." Swiss Re, January 9, 2024. https://www.swissre.com/institute/research/sigma-research/Insurance-Monitoring/us-property-casualty-outlook-january-2024.html.

Holzheu, Thomas, and Roman Lechner. "Surge in Catastrophe Bond Issuance." Swiss Re, December 14, 2023. https://www.swissre.com/institute/research/sigma-research/Economic-Insights/catastrophe-bond-issuance.html.

Howard, L. S. "The New Norm? Global Insured Losses for Nat Cats Keep Breaking Records: Swiss Re." *Insurance Journal*, March 26, 2024. https://www.insurancejournal.com/news/international/2024/03/26/766556.htm.

Howard, Pat, and Kara McGinley. "11 Factors That Affect Homeowners Insurance Premiums." Policygenius, October 20, 2023. https://www.policygenius.com/homeowners-insurance/factors-affecting-home-insurance-premiums/.

HSBC. *Sustainable Financing and Investing Survey 2021: US Report*. September 19, 2021. https://www.gbm.hsbc.com/en-gb/feed/sustainability/sfi-survey-us-report.

Huang, Fei. "Home Insurance Is on the Rise. Is There an Affordable Solution?" Business Think, October 22, 2023. https://www.businessthink.unsw.edu.au/articles/affordability-home-insurance-solution.

IBISWorld. "Number of Households—Australia." November 27, 2023. https://www.ibisworld.com/default.aspx.

Imahori, Yoshikazu, and Yuka Kawakami. "Global Investors Pivot from Flagging China to India, Vietnam." Nikkei Asia, August 1, 2023. https://asia.nikkei.com/Business/Markets/Global-investors-pivot-from-flagging-China-to-India-Vietnam.

Insurance Development Forum (IDF). *Technology and Innovation: Tools to Help Close the Protection Gap in Microinsurance Markets*. August 2020. https://www.insdevforum.org/wp-content/uploads/2020/11/Technology-and-Innovation_-Tools-to-help-close-the-Protection-Gap-in-Microinsurance-Markets.pdf.

Insurance Information Institute (III). "Severe Convective Storms: State of the Risk." Triple-I Issues Brief, October 2023. https://www.iii.org/sites/default/files/docs/pdf/triple-i_state_of_the_risk_convective_storms_10232023.pdf.

Intergovernmental Panel On Climate Change (IPCC). *Climate Change 2021: The Physical Science Basis – Summary for Policymakers*. Cambridge University Press, August 9, 2021. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf.

Internal Revenue Service (IRS). "Yearly Average Currency Exchange Rates." Accessed November 29, 2023. https://www.irs.gov/individuals/international-taxpayers/yearly-average-currency-exchange-rates.

International Association of Insurance Supervisors (IAIS). *A Call to Action: The Role of Insurance Supervisors in Addressing Natural Catastrophe Protection Gaps*. November 2023. https://www.iaisweb.org/uploads/2023/11/IAIS-Report-A-call-to-action-the-role-of-insurance-supervisors-in-addressing-natural-catastrophe-protection-gaps.pdf.

International Association of Insurance Supervisors (IAIS). *Global Insurance Market Report (GIMAR)*. December 6, 2023. https://www.iaisweb.org/uploads/2023/12/Global-Insurance-Market-Report2023.pdf?utm_source=International+Association+of+Insurance+Supervisors+%28IAIS%29&utm_campaign=988ad1cab2EMAIL_CAMPAIGN_2023_12_05_05_42&utm_medium=email&utm_term=0_-988ad1cab2-%5BLIST_EMAIL_ID%5D.

International Financial Reporting Standards Foundation (IFRS). "ISSB Issues Inaugural Global Sustainability Disclosure Standards." June 26, 2023. https://www.ifrs.org/news-and-events/news/2023/06/issb-issues-ifrs-s1-ifrs-s2/.

International Financial Reporting Standards Foundation (IFRS). "IFRS Foundation Welcomes Culmination of TCFD Work and Transfer of TCFD Monitoring Responsibilities to ISSB from 2024." 2024. https://www.ifrs.org/news-and-events/news/2023/07/foundation-welcomes-tcfd-responsibilities-from-2024/.

International Monetary Fund (IMF). "Global Financial Stability Report, April 2023." April 2023. https://www.imf.org/en/Publications/GFSR/Issues/2023/04/11/global-financial-stability-report-april-2023.

International Monetary Fund (IMF). "Coordinated Portfolio Investment Survey (CPIS)." Accessed February 1, 2024. https://data.imf.org/?sk=b981b4e3-4e58-467e-9b90-9de0c3367363&sid=1481577756129.

International Monetary Fund (IMF). "Financial Development Index Database." Accessed November 30, 2023. https://data.imf.org/?sk=f8032e80-b36c-43b1-ac26-493c5b1cd33b&sid=1480712464593.

Jie, Lim Hui. "Investors Are Bullish on Asia in 2024. Here's What to Look out For." CNBC, January 2, 2024. https://www.cnbc.com/2024/01/02/investors-are-bullish-on-asia-in-2024-heres-what-to-look-out-for.html.

Jim, Clare. "China Evergrande's Liquidity Crisis Deepens, Report Flags Interest Payment Miss." Reuters, September 15, 2021. https://www.reuters.com/business/fitch-says-possible-china-evergrande-default-may-have-broader-effects-2021-09-15/.

Johnson, Steve. "Investors Ask If the Price Is Right for Buying into India's Growth Story." *Financial Times*, December 5, 2023. https://www.ft.com/content/2563da99-a170-482a-825d-1f14efabd8ac.

Joshi, Ashutosh. "Surging India Internet Stocks Trounce China Peers, Widening Gap." Yahoo Finance, June 27, 2023. https://finance.yahoo.com/news/surging-india-internet-stocks-trounce-022340213.html.

JPMorgan Chase. *Our Approach to Our Sustainable Development Target*. April 2023. https://www.jpmorganchase.com/content/dam/jpmc/jpmorgan-chase-and-co/documents/jpmc-sdt-approach-2023.pdf.

JPMorgan Chase. "JPMorgan Chase Targets More Than $2.5 Trillion over 10 Years to Advance Climate Action and Sustainable Development." Accessed December 28, 2023. https://www.jpmorganchase.com/news-stories/jpmc-to-advance-climate-action-and-sustainable-dev-goals.

Klapper, Leora. "5 Approaches to Advance Financial Inclusion for Women." Gallup, March 31, 2023. https://news.gallup.com/opinion/gallup/473087/approaches-advance-financial-inclusion-women.aspx.

Klapper, Leora, Peter McConaghy, and Peter Stein. "Climate Vulnerability and Financial Exclusion Go Hand in Hand—What Can Be Done?" Center for Financial Inclusion, May 15, 2023. https://www.centerforfinancialinclusion.org/climate-vulnerability-and-financial-exclusion-go-hand-in-hand-what-can-be-done.

Klapper, Leora, Dorothe Singer, and Saniya Ansar. "Women and Financial Inclusion." 2021. https://thedocs.worldbank.org/en/doc/0254f85d1cceceb6e72362a71eb600e4-0430062023/original/Findex2021-GenderBrief-030823.pdf.

Kousky, Carolyn, Helen Wiley, and Len Shabman. "Can Parametric Microinsurance Improve the Financial Resilience of Low-Income Households in the United States?" *Economics of Disasters and Climate Change* 5, no. 3 (July 30, 2021): 301–27. https://doi.org/10.1007/s41885-021-00088-1.

Kuhl, Stephen. *Green Banking for a Competitive Edge*. Executive Report. BAI Banking Strategies, November 2021. https://www.bai.org/banking-strategies/green-banking-for-a-competitive-edge/.

Lahiri, Amartya. "The Great Indian Demonetization." *Journal of Economic Perspectives* 34, no. 1 (February 2020): 55–74. https://doi.org/10.1257/jep.34.1.55.

Laman, Allen. "Business Execs Report Growing Employer, ESG Risk Concerns: Beazley." *Insurance Journal*, December 1, 2023. https://www.carriermanagement.com/news/2023/11/30/256198.htm.

Lardy, Nicholas R. "Foreign Direct Investment Is Exiting China, New Data Show." Peterson Institute for International Economics, November 17, 2023. https://www.piie.com/blogs/realtime-economics/foreign-direct-investment-exiting-china-new-data-show.

Léger, Thierry. "Insurers Need to Step up to Close the Flood Protection Gap." Swiss Re, March 30, 2022. https://www.swissre.com/risk-knowledge/risk-perspectives-blog/insurers-step-up-to-close-flood-protection-gap.html.

Levine, Michael S., Lorelie S. Masters, and Alex D. Pappas. "D&O Insurance: An Essential Tool in the Evolving ESG Landscape." Lexology. *Hunton Insurance Recovery Blog*. November 28, 2023. https://www.lexology.com/library/detail.aspx?g=f5d91196-17ec-4ae9-908c-229c88e45092.

Lockett, Hudson, and Cheng Leng. "Foreign Investors Unwind $33bn Bet on China Growth Rebound." *Financial Times*, December 28, 2023. https://www.ft.com/content/b71094b0-d974-47fb-83f2-652dd4c0d4c5.

London Stock Exchange Group (LSEG). *Emerging Markets M&A Review: Full Year 2023*. 2024. https://www.lseg.com/en/data-analytics/products/deals-intelligence/global-investment-banking.

London Stock Exchange Group (LSEG). "Global Mergers and Acquisitions Review, Full Year 2023." 2024. https://thesource.lseg.com/TheSource/getfile/download/c6c0244c-a37c-4031-bc68-ebe561a4902b.

Lubis, Claudio, David Doherty, and William Young. *Investment Requirements of a Low-Carbon World: Energy Supply Investment Ratios*. BloombergNEF, October 6, 2022. https://about.bnef.com/blog/investment-requirements-of-a-low-carbon-world-energy-supply-investment-ratios/.

Mahdawi, Arwa. "For Some U.S. Residents, It Is Now Impossible to Get Home Insurance—and All Because of the Climate Crisis." *The Guardian*, May 31, 2023. https://www.theguardian.com/commentisfree/2023/may/31/for-some-us-residents-it-is-now-impossible-to-get-home-insurance-and-all-because-of-the-climate-crisis.

Marsh, Alastair. "Climate Investors Warn the Right Is Winning the War on ESG." Bloomberg, February 28, 2024. https://www.bloomberg.com/news/articles/2024-02-28/climate-investors-warn-the-right-is-winning-the-war-on-esg.

Marsh, Alastair, and Lisa Pham. "Bankers Hate Saying 'ESG' But Are Hardwiring It Into Their Work." Bloomberg, August 14, 2023. https://www.bloomberg.com/news/articles/2023-08-14/bankers-hate-saying-esg-but-are-hardwiring-it-into-their-work.

Martin, Andre, Loredana Mazzoleni Neglén, Robert Nusslein, Martin Hotz, and Andrea Baer. "Parametric Insurance—a Long History, a Bright Future." Swiss Re, September 16, 2022. https://corporatesolutions.swissre.com/insights/knowledge/evolution-of-parametric-insurance.html.

McKinsey & Company. "What Is Financial Inclusion?" August 7, 2023. https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-financial-inclusion.

Meredith, Sam. "A Landmark Ruling in Europe's Top Rights Court Delivers a Watershed Moment for Climate Litigation." CNBC, April 9, 2024. https://www.cnbc.com/2024/04/09/swiss-women-win-historic-victory-at-europes-top-human-rights-court.html.

Messina, Alberto, Robert Mazzouli, and David Prowse. "European Insurers More Exposed to Weather Losses as Reinsurers Retreat." Fitch Ratings. Accessed December 8, 2023. https://www.fitchratings.com/insurance/loomber-insurers-more-exposed-to-weather-losses-as-reinsurers-retreat-17-11-2023.

Mockrin, Miranda H., Volker C. Radeloff, David P. Helmers, Todd Hawbaker, Sebastián Martinuzzi, and Susan I. Stewart. "Understanding the Wildland Urban Interface (1990-2020)." USDA Forest Service Northern Research Station, November 20, 2023. https://storymaps.arcgis.com/stories/6b2050a0ded0498c863ce30d73460c9e.

Moody's. "Moody's Affirms China's A1 Rating, Changes Outlook to Negative from Stable." December 5, 2023. https://ratings.moodys.com/ratings-news/412128.

Mukherjee, Andy. "India and China: A 2023 Tale of Two Markets." *Washington Post*, December 28, 2022. https://www.washingtonpost.com/business/energy/india-and-china-a-2023-tale-of-two-markets/2022/12/26/d7b81dee-8571-11ed-b5ac-411280b122ef_story.html.

Munich Re. "Record Thunderstorm Losses and Deadly Earthquakes: The Natural Disasters of 2023." January 4, 2024. https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2024/natural-disaster-figures-2023.html.

Mutua, Caleb, and Greg Ritchie. "Global ESG Debt Set for Tepid Growth as High Rates Inhibit Sales." *Bloomberg Law*, December 28, 2023. https://news.bloomberglaw.com/esg/global-esg-debt-set-for-tepid-growth-as-high-rates-inhibit-sales.

Naik, Gautam. "Catastrophe Bond Market Headed for Major Surge in Issuance." Insurance Journal, October 25, 2023. https://www.insurancejournal.com/news/international/2023/10/25/745554.htm.

Naishadham, Suman. "SEC climate rule prompts a rush to sue. Experts say companies are likely to prepare to comply anyway," March 20, 2024." Associated Press, March 20, 2024. https://apnews.com/article/sec-climate-disclosure-rule-climate-change-lawsuits-300e9452566e21495865d2ca13a59567.

National Aeronautics and Space Administration (NASA). "Extreme Weather." Accessed April 16, 2024. https://science.nasa.gov/climate-change/extreme-weather/.

National Association of Insurance Commissioners (NAIC). "Parametric Disaster Insurance." June 1, 2023. https://content.naic.org/cipr-topics/parametric-disaster-insurance.

National Association of Mutual Insurance Companies (NAMIC). Letter to U.S. Treasury Secretary Janet Yellen concerning the Federal Insurance Office's climate data call. February 15, 2024. https://subscriber.politicopro.com/f/?id=0000018d-c42c-d7fe-abbd-d6bfe70e0000.

Nilsen, Ella. "Senate Committee Investigating Florida's State-Backed Home Insurance Company as Private Insurers Flee." CNN, November 30, 2023. https://www.cnn.com/2023/11/30/business/florida-insurance-senate-investigation-climate/index.html.

NOAA National Centers for Environmental Information (NCEI). "U.S. Billion-Dollar Weather and Climate Disasters, 1980 – Present." January 9, 2024. https://doi.org/10.25921/STKW-7W73.

O'Donnell, Katy. "Fed Moves to Close Massive Racial Homeownership Gap." *POLITICO*, October 24, 2023. https://www.politico.com/news/2023/10/24/lending-discrimination-anti-redlining-rule-00123150.

Office of Science and Technology Policy (OSTP). "Fifth National Climate Assessment Details Impacts of Climate Change on Regions Across the United States." The White House, November 9, 2023. https://www.whitehouse.gov/ostp/news-updates/2023/11/09/fact-sheet-fifth-national-climate-assessment-details-impacts-of-climate-change-on-regions-across-the-united-states/.

Office of the Comptroller of the Currency (OCC). "Agencies Issue Final Rule to Strengthen and Modernize Community Reinvestment Act Regulations." News release, October 24, 2023. https://www.occ.gov/news-issuances/news-releases/2023/nr-ia-2023-117.html.

O'Malley, Isabella. "Confirmed: Global Floods, Droughts Worsening with Warming." AP News, March 13, 2023. https://apnews.com/article/drought-rainfall-climate-change-flooding-satellite-51ba64f58528e5db93e846765b2da9f3.

Pandit, Vivek. "Amit Dixit on Blackstone in India." McKinsey, March 7, 2023. https://www.mckinsey.com/featured-insights/asia-pacific/how-blackstone-is-helping-to-build-indias-next-generation-of-global-companies.

Parodi, Alessandro, Simon Jessop, and Libby George. "Insurance, Cat Bonds Can Help Boost Poorer Countries' Resilience to Climate Risks." *Insurance Journal*, December 1, 2023. https://www.insurancejournal.com/news/international/2023/12/01/750393.htm.

Perez-Gorozpe, Jose, Brian Lawson, Angus Lam, and Aries Poon. "Unlocking India's Capital Markets Potential." S&P Global, August 3, 2023. https://www.spglobal.com/en/research-insights/featured/special-editorial/look-forward/unlocking-india-s-capital-markets-potential.

Peter, Hanna, Fitzgerald, James, Robinson, Elena, Lloyd, Harriet, Iovino, Luca, Hikmet, Mehmet, Jennings, Paul, and Jiang, Yuli. *Task Force on Climate-Related Financial Disclosures (TCFD) Recommendations: Global Progress Report for the Banking Sector*. Accenture. December 2022. https://www.accenture.com/content/dam/loomberg/final/industry/banking/document/Accenture-Banking-TCFD-progress-report.pdf.

Principles for Climate-Related Financial Risk Management for Large Financial Institutions. 88 Fed. Reg. 74183. October 30, 2023. https://www.federalregister.gov/documents/2023/10/30/2023-23844/principles-for-climate-related-financial-risk-management-for-large-financial-institutions.

Quinson, Tim. "Banks Need Even Bigger Low-Carbon Pivot to Avert Climate Crisis." *Bloomberg.com*, February 28, 2023. https://www.bloomberg.com/news/articles/2023-02-28/banks-need-even-bigger-low-carbon-pivot-to-avert-climate-crisis.

Rajvanshi, Astha. "Gautam Adani Accused of 'Largest Con in Corporate History.'" Time, January 29, 2023. https://time.com/6250052/adani-hindenburg-fraud/.

Rao, Krishna, Alexandra Konings, Marta Yebra, Noah Diffenbaugh, and Park Williams. "Everyone Is Moving to the Places in the U.S. with the Greatest Wildfire Risk." Fast Company, February 9, 2022. https://www.fastcompany.com/90719861/everyone-is-moving-to-the-places-in-the-u-s-with-the-greatest-wildfire-risk.

Reimann, Lena, Athanasios T. Vafeidis, and Lars E. Honsel. "Population Development as a Driver of Coastal Risk: Current Trends and Future Pathways." *Cambridge Prisms: Coastal Futures* (January 31, 2023): 1–12. https://doi.org/10.1017/cft.2023.3.

Research and Markets. "Global Parametric Insurance Market Size, Share & Industry Trends Analysis Report by Type, By Vertical (Agriculture, Construction, Aerospace & Defense, Mining, Manufacturing, Energy & Utilities), By Regional Outlook and Forecast, 2022–2028." August 2022. https://www.researchandmarkets.com/reports/5658979/global-parametric-insurance-market-size-share-and.

Reuters. "India Hikes Securities Transaction Tax on Futures, Options Contract." March 24, 2023. https://www.reuters.com/world/india/india-hikes-securities-transaction-tax-futures-options-contract-source-2023-03-24/.

Reuters. "Moody's Affirms India's Sovereign Ratings, Retains Stable Outlook." August 18, 2023. https://www.reuters.com/world/india/moodys-affirms-indias-sovereign-ratings-retains-stable-outlook-2023-08-18/.

Reuters. "Three-Quarters of Firms Globally Are Not Ready for New ESG Rules, KPMG Finds." September 26, 2023. https://www.reuters.com/sustainability/three-quarters-firms-globally-are-not-ready-new-esg-rules-kpmg-finds-2023-09-26/.

Rodrigues, Jeanette, and Subhadip Sircar. "India's Free-Market Oasis Aims to Take On Singapore and Dubai." Bloomberg News, November 28, 2022. https://www.bloomberg.com/news/features/2022-11-29/which-city-will-be-next-singapore-or-dubai-new-india-finance-hub-has-big-plans.

Rudden, Jennifer. "Life and Non-Life Insurance Premiums Globally 2022." Statista, December 6, 2023. https://www.statista.com/statistics/217278/world-life-and-nonlife-insurance-premiums-written/.

Santenac, Isabelle, Philip Vermeulen, Anita Sun-Young Bong, Lorenzo Fattibene, Ed Majkowski, and Anna Hurynovich. *2024 Global Insurance Outlook*. Ernst & Young, November 29, 2023. https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/insurance/insurance-pdfs/ey-2024-global-insurance-outlook-report-v2.pdf.

Sanyal, Shreyashi. "Indian Bonds Are Set to Be Added to Global Indexes. Here's Why It Could Be a Gamechanger." CNBC, March 26, 2024. https://www.cnbc.com/2024/03/26/indian-bonds-are-to-be-included-in-global-indexes-is-this-a-gamechanger.html.

Sathyan, Devayani, and Shaloo Shrivastava. "India Stocks Set to Hit New Highs in 2024 as Economy Hums – Reuters Poll." *Reuters*, November 22, 2023. https://www.reuters.com/world/india/india-stocks-set-hit-new-highs-2024-economy-hums-2023-11-22/.

Schug, Franz, Avi Bar-Massada, Amanda R. Carlson, Heather Cox, Todd J. Hawbaker, David Helmers, Patrick Hostert, et al. "The Global Wildland–Urban Interface." *Nature* 621, no. 7977 (September 2023): 94–99. https://doi.org/10.1038/s41586-023-06320-0.

Securities and Exchange Commission (SEC). In the Matter of the Enhancement and Standardization of Climate-Related Disclosures for Investors: ORDER ISSUING STAY. April 4, 2024. https://www.sec.gov/files/rules/other/2024/33-11280.pdf.

Securities and Exchange Board of India (SEBI). "Consultation Paper on Review of Total Expense Ratio Charged by Asset Management Companies (AMCs) to Unitholders of Schemes of Mutual Funds to Facilitate Greater Transparency and Accrual of Benefits of Economies of Scale to Investors." May 18, 2023. https://www.sebi.gov.in/reports-and-statistics/reports/may-2023/consultation-paper-on-review-of-total-expense-ratio-charged-by-asset-management-companies-amcs-to-unitholders-of-schemes-of-mutual-funds-to-facilitate-greater-transparency-and-accrual-of-benefits-of-_71394.html.

Segal, Mark. "JPMorgan, Citi, RBC Reach Deals with NYC to Disclose New Climate Finance Metric." ESG Today, April 4, 2024. https://www.esgtoday.com/jpmorgan-citi-rbc-reach-deals-with-nyc-to-disclose-new-climate-finance-metric/.

Sengupta, Rajeswari, Lei Lei Song, and Harsh Vardhan. *A Study of Nonbanking Financial Companies in India*. Asian Development Bank, November 1, 2021. https://doi.org/10.22617/WPS210381-2.

Shivakumar, Ram. "Where's the Middle? India Needs More Midsize Companies for Economy to Grow." ThePrint, October 10, 2022. https://theprint.in/opinion/wheres-the-middle-india-needs-more-midsize-companies-for-economy-to-grow/1160868/.

Sidley. "California's New Climate Disclosure Laws Under Fire in New Lawsuit Against California Air Resources Board," February 1, 2024. https://www.sidley.com/en/insights/newsupdates/2024/02/californias-new-climate-disclosure-laws-under-fire.

Sierra Club. *Background Briefing: Just 7% of Global Banks' Energy Financing Goes to Renewables, New Data Shows*. February 2023. https://www.sierraclub.org/sites/www.sierraclub.org/files/2023-02/Background%20briefing%20renewables%20data.pdf.

Singh, Manoj. "Indian Stock Market: Exchanges and Indexes Explained." Investopedia, July 24, 2023. https://www.investopedia.com/articles/stocks/09/loomb-stock-market.asp.

Skyler, Ed. "Citi Commits $1 Trillion to Sustainable Finance by 2030." April 15, 2021. https://www.citigroup.com/global/news/perspective/2021/citi-commits-1-trillion-to-sustainable-finance-by-2030.

Slotta, Daniel. "Total Revenue of Securities Industry in China from 2015 to 2021." Statista, March 11, 2022. https://www.statista.com/statistics/972989/china-securities-industry-revenue/.

Slotta, Daniel. "China: Number of Registered Employees in Securities Industry from 2012 to 2021." Statista, January 2, 2023. https://www.statista.com/statistics/974064/china-employee-number-of-securities-industry/.

Slotta, Daniel. "Leading Chinese Asset Management Companies on the Fortune China 500 Ranking in 2023." Statista, August 7, 2023. https://www.statista.com/statistics/455070/china-fortune-500-leading-chinese-asset-management-companies/.

Smith, Ian, Attracta Mooney, and Aime Williams. "The Uninsurable World: What Climate Change Is Costing Homeowners." *Financial Times*, February 13, 2024. https://www.ft.com/content/ed3a1bb9-e329-4e18-89de-9db90eaadc0b.

S&P Global, ESG Insider. "Big Bank Citi Talks Net-Zero Goals, Scope 3 Emissions, Climate Disclosure." Accessed November 3, 2023. https://www.spglobal.com/esg/podcasts/big-bank-citi-talks-net-zero-goals-scope-3-emissions-climate-disclosure.

Statista. "Value of Green Financing of the Largest Banks in the United States in 2020." February 1, 2022. https://www.statista.com/statistics/1287924/green-financing-value-by-largest-banks-usa/.

Statista. "India: Service Sector Employment by Service Type 2023." Statista, 2023. https://www.statista.com/statistics/1284079/india-service-sector-employment-by-service-type/.

Statista. "Value of Green Bond Issuance of the Largest Banks in the United States in 2022." Statista. Accessed December 27, 2023. https://www.statista.com/statistics/733210/green-bond-issuance-value-of-largest-banks-usa/.

Statista. "Insured Losses from Natural Disasters 1970-2021." Statista, May 2, 2023. https://www.statista.com/statistics/281052/insured-losses-from-natural-disasters-worldwide/.

Statista. "Leading Asset Management Companies in India as of March 2022." Statista, November 20, 2023. https://www.statista.com/statistics/1248397/india-leading-asset-management-companies-by-aum/.

Stevenson. "Earnings Perils: Redefining the Risks That Matter." Moody's, August 23, 2023. https://www.rms.com/blog/2023/08/23/earnings-perils-redefining-the-risks-that-matter.

Subramanian, Arvind, and Josh Felman. "Why India Can't Replace China: The Barriers to New Delhi's Next Boom." *Foreign Affairs*, December 9, 2022. https://www.foreignaffairs.com/india/why-india-cant-replace-china.

Swiss Re. "Sigma on World Insurance: Methodology and Data." Swiss Re, 2019. https://www.swissre.com/dam/jcr:c1b98465-0e22-4c1a-b434-80c022f6ec62/Methodolgy_WIS.pdf.

Swiss Re. "What Is Parametric Insurance?" July 7, 2023. https://corporatesolutions.swissre.com/insights/knowledge/what_is_parametric_insurance.html.

Swiss Re. "Global Outlook: Insurance Industry Strengthens Resilience in Challenging Environment, Says Swiss Re Institute." Press release, November 21, 2023. https://www.swissre.com/press-release/Global-outlook-Insurance-industry-strengthens-resilience-in-challenging-environment-says-Swiss-Re-Institute/0c711f45-b647-4aa4-aa00-4dd704d4a4f0.

Task Force on Climate-Related Financial Disclosures (TCFD). *Recommendations of the Task Force on Climate-Related Financial Disclosures*. June 2017. https://www.fsb-tcfd.org/recommendations/.

Task Force on Climate-related Financial Disclosures (TCFD). *Task Force on Climate-related Financial Disclosures: 2023 Status Report*. October 2023. https://assets.bbhub.io/company/sites/60/2023/09/2023-Status-Report.pdf.

Temple, Timothy J. "Louisiana Department of Insurance Approves Citizens Rate Increase and Offers Tips for Policyholders." Louisiana Department of Insurance, October 10, 2022. https://ldi.la.gov/news/press-releases/10-10-22-ldi-approves-citizens-rate-increase-and-offers-tips-for-policyholders.

Temple-West, Patrick. "New York's Green Troublemaker." *Financial Times*, March 20, 2024. https://www.ft.com/content/a9380e72-d507-45aa-b352-ebcf95e22168.

Thinking Ahead Institute. *The World's Largest 500 Asset Managers*. October 2023. https://www.thinkingaheadinstitute.org/content/uploads/2023/10/PI-500-2023-1.pdf.

Thomas, Alastair, Isabelle Joumard, Tibor Hanappi, and Michelle Harding. *Taxation and Investment in India*. OECD Economics Department Working Papers 1397. June 23, 2017. https://doi.org/10.1787/4258e11a-en.

Tian, Sheryl, Tong Lee, and Gautam Naik. "Hedge Funds' Mega Returns Set Off Demand Spiral for Catastrophe Bonds." *Bloomberg*, February 4, 2024. https://www.bloomberg.com/news/articles/2024-02-04/hedge-funds-record-profits-entice-investors-to-catastrophe-bonds.

Trade Map. "List of Services Exported by India: Financial Services." Accessed February 6, 2024. https://www.trademap.org/Service_SelCountry_TS.aspx?nvpm=1%7c699%7c%7c%7c%7c%7cS07%7c2%7c3%7c1%7c2%7c2%7c1%7c5%7c1%7c1%7c1.

Travelli, Alex. "India Is Chasing China's Economy. But Something Is Holding It Back." *New York Times*, January 2, 2024. https://www.nytimes.com/2024/01/02/business/india-economy-foreign-direct-investment.html.

Truong, Kevin. "California's Largest Insurer Raises Home and Auto Rates by 20%." *San Francisco Standard*, January 9, 2024. https://sfstandard.com/2024/01/09/state-farm-allstate-homeowners-auto-insurance-increase/.

United Nations Capital Development Fund (UNCDF). "Financial Inclusion and the SDGs." Accessed March 5, 2024. https://www.uncdf.org/financial-inclusion-and-the-sdgs?ref=hackernoon.com.

United Nations Capital Development Fund (UNCDF). "Pacific Insurance and Climate Adaptation Programme." Accessed February 28, 2024. https://www.uncdf.org/pacific-insurance-and-climate-adaptation-programme.

United Nations Environment Programme Finance Initiative (UNEP FI). "Our Members: Net-Zero Banking Alliance." Accessed December 26, 2023. https://www.unepfi.org/net-zero-banking/members/.

United Nations Environment Programme Finance Initiative (UNEP FI). *Principles for Responsible Banking: Towards Real-World Impact*. September 2023. https://www.unepfi.org/industries/banking/prb-2nd-progress-report/.

United Nations Environment Programme Finance Initiative (UNEP-FI). *Responsible Banking: Building Foundations*. October 2021. https://www.unepfi.org/industries/banking/responsible-banking-building-foundations/.

United Nations Environment Programme Finance Initiative (UNEP FI). "Signatories." January 9, 2024. https://www.unepfi.org/banking/prbsignatories/.

United Nations Environment Programme Finance Initiative (UNEP FI). "The Commitment: Net-Zero Banking Alliance." Accessed December 26, 2023. https://www.unepfi.org/net-zero-banking/commitment/.

United Policyholders. "A New Option for Disaster Insurance: Parametric." 2023. https://uphelp.org/buying-tips/a-new-option-for-disaster-insurance-parametric/.

Upadhyay, Jayshree P. "India Market Regulator Proposes Standard Investor Fees for Mutual Funds." *Reuters*, May 19, 2023. https://www.reuters.com/world/india/india-market-regulator-proposes-uniform-expense-ratios-mutual-funds-2023-05-19/.

Upadhyay, Jayshree P. "India's Markets Regulator to Ease Proposals on Mutual-Fund Fee Structures." *Reuters*, August 2, 2023. https://www.reuters.com/world/india/indias-markets-regulator-ease-proposals-mutual-fund-fee-structures-sources-2023-08-02/.

U.S. Census Bureau (Census). "Historical Population Change Data (1910-2020)." Census.gov, April 26, 2021. https://www.census.gov/data/tables/time-series/dec/popchange-data-text.html.

U.S. Census Bureau (Census). "2020 Population and Housing State Data." Census.gov, August 12, 2021. https://www.census.gov/library/visualizations/interactive/2020-population-and-housing-state-data.html.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Glossary." Accessed April 3, 2024. https://www.bea.gov/help/glossary.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Table 2.1 U.S. Trade in Services, by Type of Service." July 6, 2023. https://apps.bea.gov/iTable/?reqid=62&step=6&isuri=1&tablelist=245&product=4.

U.S. Department of Commerce (USDOC). Bureau of Economic Analysis (BEA). "Table 2.2 U.S. Trade in Services, by Type of Service and by Country or Affiliation." July 6, 2023. https://apps.bea.gov/iTable/?reqid=62&step=6&isuri=1&tablelist=51#eyJhcHBpZCI6NjIsInN0ZXBzIjpbMSw5LDEwLDddLCJkYXRhIjpbWyJQcm9kdWN0IiwiNCJdLFsiVGFibGVMaXN0IiwiMzA1NjgiXSxbIlRhYmxlTGlzdFNlY29uZGFyeSIsIjMwNTc2Il1dfQ==.

U.S. Department of Commerce (USDOC). National Oceanic and Atmospheric Administration (NOAA). "NOAA Forecasters Increase Atlantic Hurricane Season Prediction to 'Above Normal.'" August 10, 2023. https://www.noaa.gov/news-release/noaa-forecasters-increase-atlantic-hurricane-season-prediction-to-above-normal.

U.S. Department of Labor (USDOL). Bureau of Labor Statistics (BLS). "Occupational Employment and Wages: May 2017." March 30, 2018. https://www.bls.gov/news.release/archives/ocwage_03302018.pdf.

U.S. Department of Labor (USDOL). Bureau of Labor Statistics (BLS). "Occupational Employment and Wages: May 2022." April 25, 2023. https://www.bls.gov/news.release/pdf/ocwage.pdf.

U.S. Department of Labor (USDOL). Bureau of Labor Statistics (BLS). "Data: Occupational Employment and Wage Statistics (OEWS)." Accessed November 29, 2023. https://www.bls.gov/data/home.htm.

U.S. Department of State (USDOS). "2023 Investment Climate Statements: India." 2023. https://www.state.gov/reports/2023-investment-climate-statements/india/.

U.S. Department of State (USDOS). "Custom Report Excerpts: Bermuda." Accessed April 29, 2024. https://www.state.gov/report/custom/e7431437e4/.

U.S. Department of the Treasury (Treasury). "Secretary of the Treasury Janet L. Yellen's Remarks to the Institute of International Finance." April 21, 2021. https://home.treasury.gov/news/press-releases/jy0139.

U.S. Fire Administration (USFA). "What Is the WUI?" June 8, 2022. https://www.usfa.fema.gov/wui/what-is-the-wui.html.

U.S. International Trade Commission (USITC). *Recent Trends in U.S. Services Trade 2020 Annual Report*. Publication No. 5094. Washington, DC, July 2020. https://www.usitc.gov/sites/default/files/publications/332/pub5094.pdf.

U.S. Securities and Exchange Commission (SEC). "Fact Sheet: The Enhancement and Standardization of Climate-Related Disclosures: Final Rules." March 6, 2024. https://www.sec.gov/files/33-11275-fact-sheet.pdf.

U.S. Senate. Committee on the Budget. "White House Launches Investigation into Citizens Property Insurance Amid Questions About Company's Long-Term Solvency." November 30, 2023. https://www.budget.senate.gov/chairman/newsroom/press/whitehouse-launches-investigation-into-citizens-property-insurance-amid-questions-about-companys-long-term-solvency.

Vanderford, Richard. "SEC Accepts Pause on Its Climate Rule." The Wall Street Journal, April 4, 2024. https://www.wsj.com/articles/sec-accepts-pause-on-its-climate-rule-b2afe8d9.

Verisk. *Global Modeled Catastrophe Losses*. September 8, 2023. https://www.air-worldwide.com/siteassets/Publications/White-Papers/documents/2023-global-modeled-catastrophe-losses.pdf.

von Kaenel, Camille. "California's Wildfire Insurance Problems Are Getting Worse." E&E News, March 14, 2024. https://www.eenews.net/articles/californias-wildfire-insurance-problems-are-getting-worse/.

von Kaenel, Camille. "State Farm to Drop Thousands of Calif. Policies despite Pending Reforms." E&E News, March 22, 2024. https://www.eenews.net/articles/state-farm-to-drop-thousands-of-calif-policies-despite-pending-reforms/.

Weiss, Colin R. "Financial Flows to the United States in 2022: Was There Fragmentation?" *Federal Reserve* (August 4, 2023). https://www.federalreserve.gov/econres/notes/feds-notes/financial-flows-to-the-united-states-in-2022-was-there-fragmentation-20230804.html.

Wells Fargo. "Wells Fargo Issues $2 Billion Inclusive Communities and Climate Bond." August 15, 2022. https://newsroom.wf.com/English/news-releases/news-release-details/2022/Wells-Fargo-Issues-2-Billion-Inclusive-Communities-and-Climate-Bond/default.aspx.

Wells Fargo. *Inclusive Communities and Climate Bond*. May 2022. https://www08.wellsfargomedia.com/assets/pdf/about/corporate-responsibility/inclusive-communities-climate-bond-report.pdf.

Wells, Kane. "$100bn of Insured Catastrophe Losses Now Reached in 2023: Gallagher Re." Reinsurance News, November 8, 2023. https://www.reinsurancene.ws/100bn-of-insured-catastrophe-losses-now-reached-in-2023-gallagher-re/.

Westcott, Ben. "Many Australians Abandon Insurance as Premiums Surge on Climate Costs: ICA Head." Insurance Journal, November 27, 2023. https://www.insurancejournal.com/news/international/2023/11/27/749547.htm.

White, Katrina, Ryan Loughead, Jak Linstaedt, Jonas Rooze, and William Young. "Financing the Transition: Energy Supply Investment and Bank Financing Activity." February 28, 2023. https://about.bnef.com/blog/financing-the-transition-energy-supply-investment-and-bank-financing-activity/.

World Bank. "Market Capitalization of Listed Domestic Companies (Current US$)." World Bank Open Data. Accessed March 8, 2024. https://data.worldbank.org.

World Bank. "World Development Indicators" (accessed April 12, 2024). https://databank.worldbank.org/source/world-development-indicators#.

World Federation of Exchanges (WFE). "Statistics Definitions and Examples." September 2013. https://www.world-exchanges.org/storage/app/media/work/statistics/WFE_Statistics_Definitions.pdf.

World Federation of Exchanges (WFE). "WFE Statistics Definitions Manual." February 2022. https://www.world-exchanges.org/storage/app/media/statistics/WFE%20Statistics%20Definitions%20Manual%202022%20Feb.pdf.

World Federation of Exchanges (WFE). "2022 Annual Statistics Guide." May 11, 2023. https://www.world-exchanges.org/our-work/articles/2022-annual-statistics-guide.

World Federation of Exchanges (WFE). "Statistics Portal." Accessed December 29, 2023. https://statistics.world-exchanges.org/ReportGenerator/Generator.

Yap, Shen, Hui Shan Lee, and Ping Xin Liew. "The Role of Financial Inclusion in Achieving Finance-Related Sustainable Development Goals (SDGs): A Cross-Country Analysis." *Economic Research-Ekonomska Istraživanja* 36, no. 3 (June 2, 2023): 1–11. https://doi.org/10.1080/1331677X.2023.2212028.

Yu, Xie, and Summer Zhen. "Global Hedge Funds Are Boosting Their Presence in the Long-Shunned Indian Market." *Reuters*, October 27, 2023. https://www.reuters.com/world/india/global-hedge-funds-are-boosting-their-presence-long-shunned-indian-market-2023-10-27/.

Zhuo, Tee. "FirstFT: Global M&A Drought Ends as Blockbuster Deals Double in First Quarter." *Financial Times*, March 28, 2024. https://www.ft.com/content/9f324c88-4f9a-4d07-be5f-b83b71c7e4f9.

Chapter 5
Roundtable Summary

On November 2, 2023, the Commission held its 17th Annual Services Roundtable, at which individuals from government, industry, and academia convened to discuss issues impacting global services trade. The roundtable is an off-the-record event that is designed to promote a full and candid discussion among participants. The roundtable focused on two themes: (1) infrastructure development and financing, and services trade and (2) building services trade capacity. Following Chairman David S. Johanson's introductory remarks, Commissioner Amy Karpel moderated the discussion of the first topic, and Commissioner Rhonda Schmidtlein moderated the second.

Infrastructure Development and Financing, and Services Trade

During the first half of the roundtable, the discussion focused on services firms' roles as users and developers of infrastructure. Participants outlined the characteristics of services trade and infrastructure investment, and the factors that affect infrastructure investment decisions. Participants also described the role that U.S. services firms play in infrastructure investment and clarified some features of the related trade data.

Services Firms as Users and Developers of Infrastructure

Several participants discussed how services firms use and develop physical and digital infrastructure. One participant stated that investments in infrastructure that support the digital economy—such as satellites and submarine cables—have drastically improved the ability to move data and support services trade. Participants noted, though, that services firms themselves have participated in the development of infrastructure, citing services firms' investments in technical infrastructure, such as undersea cables, data centers, and servers.[633] Another participant suggested that new options, such as satellite communications, may eliminate some connectivity limitations and lessen the demand for certain types of physical infrastructure investments.

One participant described the leading role of U.S. financial institutions in the green transition and the development of renewable energy infrastructure. The participant identified financing mechanisms, including sustainability bonds and carbon markets, that support renewable energy. In addition, the participant discussed the leading role these financial institutions play in setting standards related to these sustainability products. Another participant noted that other services industries, particularly the financial, legal, and insurance industries, help facilitate investments in infrastructure abroad, particularly

[633] The participant cited the Equiano subsea cable and emphasized the role of marine cables in transcontinental digital communication. The Equiano cable system is owned by Google and connects Sesimbra, Portugal, to Cape Town, South Africa.

in developing secure and reliable investment contracts. One participant indicated that Chinese services firms play a larger role in on-the-ground infrastructure development in overseas markets than U.S. services firms, which are more likely to focus on financing and other support roles.

Separately, an insurance industry representative said that the insurance sector can be an important contributor to infrastructure investment. The representative explained that infrastructure projects are a natural investment vehicle for life insurers and reinsurers because, although they are asset-intensive in nature, infrastructure projects can provide a stable and long-term source of cash. The representative also cited a 2021 World Bank report, which found a strong correlation between infrastructure financing and insurance penetration.[634] According to the representative, the report also suggests that governments should clearly define what qualifies as infrastructure investment and calibrate capital rules to the long-term nature of many insurance investments.

Roundtable participants advocated for an expanded definition of infrastructure. They expressed concern about artificial intelligence (AI) and its impacts on U.S. firms working in sectors that use and develop digital infrastructure. Acknowledging AI as an emerging industry and an enabler across various sectors, one participant advocated for considering data as infrastructure itself. Another participant suggested that President Biden's executive order calling for a national AI resource highlights the importance of broad access to data and computing power for fostering a competitive AI environment.[635] One participant raised the issue of infrastructure services, noting the importance of robust services industries "behind the border" in emerging markets, particularly in the financial, information, communication, and distribution services industries.

Characteristics of Services Trade and Infrastructure Investment

Participants noted that empirical analysis of the varied data is important to understanding the relationship between services trade and infrastructure investment. One participant suggested that infrastructure investment may have made the trade of goods cheaper and easier. Another participant added that services contribute significant value to goods trade, and that these services are embedded in goods trade statistics. The participant said that, as such, data relating to goods trade flows can be helpful in understanding the relationship between services trade and infrastructure investment. This participant continued, saying that analyzing these data can help to disentangle the "reshoring" story, especially as Southeast Asia appears to be exporting more to the United States while importing more from China. The participant suggested that these shifting trading relationships may provide investment opportunities in the net-zero transition, including rare earth refining in Malaysia.

[634] Shindo and Stewart, "Developing Insurance Markets," June 2021.
[635] President Biden issued an executive order in October 2023 that sets standards for AI safety. Among other aims, the executive order requires that firms report risks of artificial intelligence systems and seeks to mitigate the danger of "deep fakes," or AI-generated media. White House, "President Biden Issues Executive Order on . . . Artificial Intelligence," October 30, 2023.

Factors that Impact Infrastructure Investment Decisions

Regulatory Factors

Data Localization Requirements

Roundtable participants discussed how regulatory factors, including data localization requirements and the open flow of data, among others, can impact infrastructure investment. One participant said that data localization requirements are increasing in prevalence, particularly in the Asia-Pacific region. However, a representative from an international organization expressed the view that the more recent trend is toward relaxing existing data localization requirements, including in countries with the strongest local data requirements. The trade organization representative said that many of these data localization regulations may have been "knee-jerk" reactions and that, as the policy challenges become clearer, there is room for these requirements to be reduced (e.g., narrowing their scope from all personal data to health and financial data).

One industry representative maintained that data localization requirements could break the global cloud model. Another participant said that with digitally enabled services, a significant amount of trade is reduced to data. This individual highlighted the importance of firms' ability to control, move, access, and store data, and to choose their own technologies. Another participant said that open data flows are a key driver of economic growth and productivity in the aviation, health, research, agriculture, and mining sectors, among others.

Another participant added that data do not need to be stored locally to be protected and that restrictions on the flow of data across borders may impact the inclusivity and distributional effects of trade. This particular participant expressed support for technological choice, standards, and other measures to protect consumers. Another participant expressed the view that there are legitimate regulatory concerns for regulating cross-border data flows related to data protection and privacy.

One participant said that efforts should be directed toward establishing multilateral agreements or systems to address the global trend of data localization. The participant cited Initiatives like the Data Free Flow with Trust Initiative led by Japan and frameworks from the Asia-Pacific Economic Cooperation forum and the Association of Southeast Asian Nations as models for addressing data localization concerns and regulatory requirements while ensuring services trade development.

Other Factors

Multilateral agreements and their impact on infrastructure investment decisions were also discussed more generally. One participant noted that mutual recognition agreements have facilitated the overseas operations of engineering services providers, enabling the United States to play a leading role in the global engineering market. This contrasts with other services sectors like architecture and construction, where there are fewer of these agreements and less trade. Another participant pointed to bilateral investment treaties and investor protections as a component of the enabling regulatory environment. More broadly, another participant said that market access agreements would help facilitate

infrastructure investment by allowing U.S. firms to do more business abroad and invest more—both domestically and internationally.

Participants also mentioned the local regulatory environment as a factor in investment decisions. One participant cited the importance of having a modern and stable legal system in the destination economy. The participant added that ensuring the protection of intellectual property, data, and due process and assuring fair treatment under local legal systems are critical in investment decisions. Another participant added that emerging market government procurement laws need to be modernized to embrace cloud services. One industry representative expressed the view that the differing interpretations of the Basel III capital requirements put U.S. financial firms at a disadvantage because the European Union interprets these requirements differently. This individual said that lowering capital requirements would allow U.S. financial services firms to invest more in infrastructure.

Participants noted another key local regulatory factor relates to foreign investment restrictions imposed by governments around the world, citing regulations in Europe and South Korea that could exclude U.S. firms unwilling to move their headquarters or divest to a local partner. One participant suggested that the threat of imposing duties on digital transmissions could impact investment decisions, particularly if the regulation requires a foreign commercial presence.

Availability of Financing

Roundtable participants also discussed the impact of the availability of financing on investment decisions, including recent developments in industrial policy and their impact on financing. One participant highlighted the Inflation Reduction Act, noting an increased focus on targeting infrastructure investments to expand the U.S. renewable energy market. This participant added that the private sector had announced more than $110 billion in new clean energy manufacturing since the law's passage, including in electric vehicle and solar manufacturing.

The Infrastructure Investment and Jobs Act (IIJA) was cited as another policy development that impacted the availability of financing. One participant said that this law will strengthen U.S. supply chains by investing in physical infrastructure, increasing competitiveness, expediting commerce, and reducing environmental impacts.

One participant noted that the Inflation Reduction Act and the Creating Helpful Incentives to Produce Semiconductors (CHIPS) Act have benefitted the United States. However, the participant cautioned that these investment policies will need to be buttressed by policy or trade agreements if they are to provide greater benefit to emerging economies. One participant also identified China's Belt and Road initiative as a policy development impacting global investment in infrastructure and indicated that it may raise strategic competition concerns for U.S. businesses.

A participant suggested that mitigating risk by leveraging multilateral development banks and development finance institutions may improve the flow of capital from private investors. This participant also expressed concern regarding the availability of financing to meet climate goals.

Participants discussed the relative importance of finance and project availability. One participant shared the view that a key issue for investment is not finance, but the lack of shovel-ready projects. Several participants concurred, pointing to the need for a pipeline of investment-ready projects, while one

participant noted the potential for the Partnership for Global Infrastructure and Investment to streamline the project pipeline. However, another participant said that foreign direct investment flows remain critical, particularly in Latin America.

Other Factors

Participants identified several other factors that impact infrastructure investment. One participant noted the importance of considering human capital availability, indicating that the development of port, logistics, and finance infrastructure requires specialized skills. Another participant cited the Russian invasion of Ukraine and the ongoing hostilities as a factor that has boosted climate-related infrastructure investment. Specifically, an industry representative cited alternative energy infrastructure investments in Europe that are intended to reduce reliance on Russia. One participant noted that there is untapped demand in the developing world for digital connectivity. Citing east Africa as an example, the participant suggested that this demand provides an opportunity for digital infrastructure investment.

Building Services Trade Capacity

The second half of the roundtable focused on building services trade capacity. Participants discussed characteristics of services trade capacity, factors impacting capacity, ways to encourage services trade, and ongoing initiatives to build capacity among small and medium-sized enterprises (SMEs).

Characteristics of Services Trade Capacity

Roundtable participants discussed differences in services capacity between and within countries and noted some features of the related data. One participant noted a recent Organisation for Economic Co-operation and Development (OECD) study and said that it shows the heterogeneity in services tradability around the world.[636] The participant said that the OECD study shows that the top quarter of advanced economies account for a large share of increased tradability, and that these information and communication technology (ICT) gains are accruing to the wealthiest and most digitally connected economies. The participant also said that the OECD study shows that a variation also exists within countries. The factors behind these variances are summarized in the next section.

Although some participants agreed that many developing countries are net importers of services trade, indicating a lack of competitiveness globally, they identified success stories for exporting services in specific sectors. Participants highlighted Bangladesh (software and back-office services), Burkina Faso (cultural services), Colombia (banking services), Ethiopia (air transport services), Nigeria (financial services), Senegal (business process outsourcing services), and Uganda (education services). One participant stated that African countries, along with other economies, are increasing their participation in global value chains and intermediate service exports. Another representative cited the tendency in

[636] OECD, "Shedding Light on the Drivers of Services Tradability," October 2022.

Latin American countries to under-trade in everything except commodities and indicated that there is potential to develop service sectors alongside manufacturing in these countries.[637]

Participants discussed the characteristics of international trade data and the context for their analysis. One participant noted that there may be too much emphasis on cross-border data flows, as affiliate transactions are significantly larger. The participant expressed the view that more attention needs to be paid to the investment accounts, as opposed to the trade accounts that emphasize travel and transportation, to better understand trade in services. Further, the participant said that these affiliate relationships can have an important impact on the development of digital infrastructure related to financial, information, communication, distribution, and transportation services within developing nations and enhance skills development.

Another participant pointed to input/output tables that show developing nations are purchasing low levels of business services, saying that business services contribute to productivity. The participant said that contract law is important to fostering an enabling environment for business services and, therefore, building contract law enforcement capacity can improve services productivity and trade in developing nations.

Factors Impacting Services Trade Capacity

Participants discussed the digitalization of services trade and the factors impacting services trade capacity and noted that services have become more tradable over the past two decades, driven by developments in ICT, air transport, and trade agreements. Regarding ICT connectivity and tradability, one participant noted that developing economies and rural areas within the United States lack agglomeration economies and are at a strategic disadvantage as the global economy and services trade digitalizes.[638] The participant cited research that indicates that agglomeration economies within the United States are more efficient in ICT adoption because of a subnational endowment of tradeable services. According to the research, differences in services tradability may help explain differing wage and skill premiums[639] patterns within the United States.[640]

Multiple participants agreed that rural areas in the United States face challenges participating in services trade, especially digitally enabled services, due to a lack of basic internet connectivity.[641] One participant noted that this can have differentiated effects, such as higher growth in and around urban areas relative to rural areas. In response to a follow-up question about ICT connectivity impacting services capacity in

[637] This participant suggested the idea of health tourism in Colombia and said that, in general, higher-end tourism could be a high-value sector when combined with health services.
[638] Agglomeration economies refer to locations where productivity is increased because many firms exist near each other. Common examples of agglomeration economies include the technology industry in Silicon Valley, the entertainment sectors in Hollywood and Mumbai, and the fashion district in Milan.
[639] A skill premium generally refers differences in wages between lower- and higher-skilled workers.
[640] This participant referenced: Eckert, "Growing Apart: Tradable Services," February 502019.
[641] The participant mentioned the Trade Partnership Worldwide database, which includes estimates of goods and services trade by U.S. States and Congressional Districts, as well as estimates of the jobs supported by exports. "Trade Partnership Worldwide," accessed February 5, 2024.

U.S. rural areas, this individual cited the Trade Partnership Worldwide Database that shows that North Dakota was the only state that experienced a decline in services exports from 2012 to 2019.[642]

One participant indicated that this trend varies by sector, and said that within technology services, geographic clusters of economic activity matter significantly. This participant noted that even after the onset of the COVID-19 pandemic, regional clusters still matter. The participant cited a news article that reported that 60 percent of all new generative AI job listings were in just 15 metro areas and that 43 of the top 50 AI companies in the United States—as ranked by Forbes—were in California, New York, Texas, and Massachusetts.[643] This participant also suggested that skills development is crucial for spreading human capital beyond major tech hubs.

More specifically, a representative from the insurance industry noted that economic development is the most indicative factor of the level of a country's insurance or reinsurance market development. The representative also said that underwriting expertise (skilled workers) and access to data modeling and technology (infrastructure) are critical to the continued development of insurance markets. This participant listed the strength of the regulatory regime, the rule of law and a predictable legal ecosystem for investment, and general ease of doing business as critical to developing insurance and reinsurance markets. The representative also expressed the view that state-owned enterprises tend to have a negative effect on the development of insurance markets because of potentially inaccurate risk pricing.

Ways to Encourage Services Trade

Participants suggested several ways to encourage services trade, including technical assistance and regional cooperation, among others. One participant pointed out that the International Trade Center in Geneva has collaborated with multilateral trade organizations, particularly in Africa, and has focused on promoting services exports in the last 15 years. Through technical assistance programs and public awareness initiatives, these multilateral organizations aim to mitigate the asymmetry and lack of knowledge that service providers may face. The participant said that these programs aim to bolster services providers' ability to identify trade opportunities and improve their capacity. Separately, one participant added that there is a technical skills gap in Latin America, and in response to a question on how to improve services capacity, the participant said that technical education, similar to that provided in U.S. community colleges, is missing in Latin America.

One participant also said that regional economic agreements can encourage services trade. The participant said that regional arrangements have proved successful in integrating services markets, including the East African Community and the Caribbean Community (CARICOM). Further, they said that integration through CARICOM, along with reform to laws regulating the cross-border movement of people, has been critical to improving services trade in the Caribbean.

Another participant suggested a different perspective, focusing on the untapped potential for tourism services trade in developing countries. The participant noted that improving infrastructure quality, including roads, electricity, and internet, can increase tourism exports. The participant then referred to differences in the Croatian and Albanian tourism industries, noting that Croatia is attracting more

[642] The participant also noted low services export growth in Wyoming, Oklahoma, West Virginia, and Hawaii.
[643] Heath, "AI Boom's Big Winners Are All in Four States," July 24, 2023; Cai, "The AI 50 2023," April 11, 2023.

tourists from higher-income countries. The participant said that Albania has warmer beaches, but Croatia may be benefitting from higher infrastructure quality. This participant added that many natural, cultural, and historical experiences around the world are not being monetized efficiently for the local economies.[644]

Initiatives to Aid SME Integration in the Global Services Market

Several participants identified government or public-private collaborations that aim to aid SMEs' integration in the global services market through enhancing market knowledge and providing regulatory, financial, and training support. One participant cited the Future of Business Survey, which found that the most important barrier to services trade, especially for SMEs, was difficulty finding and securing business partners.[645] This participant said that online platforms could play a vital role in helping SMEs identify and connect with potential partners on a global scale.[646] Similarly, another participant noted the importance of these networks and partnerships, particularly in the digital domain, which can facilitate knowledge exchange. The participant said that Latin America needs to develop local talent and capacities, including skills to manage long-term and large risks.

Participants said that regulatory challenges may also impede the ability of SMEs to compete in the global services market, and they noted that SMEs need help with these complexities. One participant discussed the role of regulatory "sandboxes."[647] The participant said that, especially for emerging economies, regulatory sandboxes create environments for innovative SMEs to collaborate with regulators in developing technologies.

This participant mentioned the UK's Information Commissioner's Office (ICO) and Singapore's Infocom Media and Development Authority (IMDA) as examples of such regulatory initiatives. One participant noted the valuable role that innovative SMEs can play when supported with public-private partnerships that combine regulatory sandboxes with research grants, investment from global companies, and entrepreneurial start-up programs.

Participants discussed various initiatives that focus on providing financial and training support to SMEs. One participant noted that the Small Business Innovation Research Grant offers nondilutive capital and

[644] This participant discussed the underutilization of tourism potential at the intersection of the Blue Nile and the White Nile in Sudan.
[645] This survey was a collaboration between Meta (the parent company that owns Facebook, Instagram, and WhatsApp), the OECD, and the World Bank. Facebook, OECD, and World Bank, "Future of Business Survey," accessed February 5, 2024.
[646] This participant mentioned a study by the InterAmerican Development Bank that focused on the online platform ConnectAmericas to estimate the impact of using such platforms on exports. Findings confirmed the cost-savings opportunities of online platforms through increasing consumer base and product volume. Carballo et al., "Information and Exports," June 22, 2020.
[647] Regulatory sandboxes often refer to a framework where a regulator allows businesses to explore and experiment with innovative products under regulatory supervision.

can aid in fostering technology commercialization.[648] Another participant noted that there may be a role for multilateral development banks and the Export-Import Bank to find creative ways to finance SME service exports.

One participant listed programs like Startup Chile, Startup Malaysia, and U.S. Department of State programs that connect entrepreneurs from the Pacific Islands.[649] The participant also noted Google's investment in small businesses, including time grants and cloud credits, which was cited as illustrating a commitment to supporting SMEs that use Google platforms for growth. Additionally, participants mentioned private sector initiatives, such as those of the UPS Foundation, Google, and Amazon Web Services, that provide training in digital skills, customs navigation, and export packaging. Participants also suggested that digital reskilling directed toward women is another element of support to small businesses.

[648] The Small Business Innovation Research program is self-described as a highly competitive program that encourages U.S. domestic small businesses to engage in federal research and development with the potential for commercialization. SBIR, "About," accessed February 28, 2024.
[649] "Our Impact," accessed February 8, 2024; "Our Story," accessed February 8, 2024; USDOS, "U.S. Department of State Launches First-Ever Academy for Women Entrepreneurs," accessed February 8, 2024.

Bibliography

Cai, Kenrisk. "The AI 50 2023." Forbes, April 11, 2023. https://www.forbes.com/lists/ai50/.

Carballo, Jerónimo, Marisol Rodríguez Chatruc, Carlos Salamanca Malagón, and Christian Volpe Martincus. "Information and Exports: Firm-Level Evidence from an Online Platform." *IDB Publications* (June 22, 2020). https://doi.org/10.18235/0002460.

Eckert, Fabian. "Growing Apart: Tradable Services and the Fragmentation of the U.S. Economy." PhD. Yale, February 502019. https://fpeckert.me/eckert_jmp_2018.pdf.

Facebook, Organisation for Economic Co-operation and Development (OECD), and World Bank. "Future of Business Survey." Accessed February 5, 2024. https://datacatalog.worldbank.org/search/dataset/0038106/Future-of-Business-Survey---Aggregated-Data.

Heath, Ryan. "AI Boom's Big Winners Are All in Four States." Axios, July 24, 2023. https://www.axios.com/2023/07/24/ai-goldrush-concentrated-4-states.

Organisation for Economic Co-operation and Development (OECD). "Shedding Light on the Drivers of Services Tradability Over Two Decades." October 2022. https://www.oecd.org/publications/shedding-light-on-the-drivers-of-services-tradability-over-two-decades-d5f3c149-en.htm.

Shindo, Tetsutaro, and Fiona Stewart. "Developing Insurance Markets: Insurance Companies and Infrastructure Investments." World Bank June 2021. http://hdl.handle.net/10986/36355.

Start-Up Chile. "Our Impact." Accessed February 8, 2024. https://startupchile.org/en/our-impact/.

Startup Malaysia. "Our Story." Accessed February 8, 2024. https://startupmalaysia.org/.

Small Business Innovation Research (SBIR). "About." Accessed February 28, 2024. https://www.sbir.gov/about.

"Trade Partnership Worldwide." Accessed February 5, 2024. https://tradepartnership.com/data/data-and-data-analysis/.

U.S. Department of State (USDOS). "U.S. Department of State Launches First-Ever Academy for Women Entrepreneurs Indo-Pacific Women-in-Tech Summit." Accessed February 8, 2024. https://www.state.gov/u-s-department-of-state-launches-first-ever-academy-for-women-entrepreneurs-indo-pacific-women-in-tech-summit/.

White House. "President Biden Issues Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence." The White House, October 30, 2023. https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/30/fact-sheet-president-biden-issues-executive-order-on-safe-secure-and-trustworthy-artificial-intelligence/.

World Trade Organization (WTO). “Bangladesh.” January 2022. https://www.wto.org/english/tratop_e/devel_e/bangladesh.pdf.

Appendix A
Selected Services-Related Commission Publications and Staff Research

This appendix provides summaries of and links to recent U.S. International Trade Commission publications—reports and shorter papers—that feature topics in services trade. Reports are prepared under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) in response to a request from the U.S. Trade Representative, the U.S. House of Representative Committee on Ways and Means, the U.S. Senate Committee on Finance, or either branch of Congress. The shorter papers are the results of research by the Commission's Services Division staff, sometimes in collaboration with staff members from other divisions of the Commission. These papers include articles in the Commission's Journal of International Commerce and Economics and working papers.

The shorter papers summarized in this appendix are solely meant to represent the opinions and professional research of their authors. They are not meant to represent in any way the views of the U.S. International Trade Commission, of any of its individual Commissioners, or of the U.S. government.

332 Investigations

U.S.-Pacific Islands Trade and Investment: Impediments and Opportunities

Investigation Number: 332-593

https://www.usitc.gov/publications/332/pub5463.pdf

Steven LeGrand (Office of Industry and Competitiveness Analysis, Agriculture and Fisheries Division), Robert Ireland (Office of Industry and Competitiveness Analysis, Natural Resources and Energy Division), and Anna Perry (Office of Industry and Competitiveness Analysis, Natural Resources and Energy Division)

This report provides an overview of the Pacific Island economies, descriptions of trends in goods and services exports to the United States and investment from the United States, and analysis on the use and utilization of the Generalized System of Preferences and the trade preferences provided to the U.S. territories and Freely Associated States. In addition, the report identifies and profiles several sectors as having potential for increased export to or investment from the United States. Several sections of the report consider the role of services trade, including:

Chapter 3: Pacific Island Services Exports

Chapter 7: Pacific Island Export and Investment Potential for Services: Tourism and Internet-Enabled Services Outsourcing

Working Papers

SMEs in Legal and Architecture Services

https://www.usitc.gov/publications/332/working_papers/final_compiled_environmental_services_u.s._market_and_trade_trends_20230511-compliant.pdf

Jennifer Powell and Tamar Khachaturian (Office of Industry and Competitiveness Analysis, Services Division), July 2023

This paper analyzes available data and outreach to representative firms to focus on small and medium-sized enterprises (SMEs) in two segments of the professional services sector: legal and architecture services. The paper discusses the definition of SMEs in each of these industry segments; SMEs' contribution to the number of U.S. establishments, employment, and exports; the types of services provided to overseas clients; and the channels through which these services are supplied. The analysis reveals meaningful distinctions between large and SME professional services firms, including differences in revenues, number of employees, the means of providing services to foreign clients (with larger firms tending to have establishments abroad), and the types of services provided (with small firms tending to provide niche services). Architecture services SMEs generally appear to be more reliant on overseas travel relative to SMEs in the legal services industry; however, different practices may exist across and within firms because of individual preferences and needs.

Environmental Services: U.S. Market and Trade Trends

https://www.usitc.gov/publications/332/working_papers/final_compiled_environmental_services_u.s._market_and_trade_trends_20230511-compliant.pdf

Jennifer Powell (Office of Industry and Competitiveness Analysis, Services Division), May 2023

This paper examines recent growth in the environmental services industry. The paper discusses how population growth, economic activity, and income levels, as well as recent shocks such as environmental disasters and new government regulations, have contributed to the slow but steady growth in most segments of this industry. The paper analyzes trade in environmental services and notes the increasing recognition of trade in providing access to the goods and services needed to address climate impacts and boost resilience; however, prospects for future liberalization of trade in environmental services remain uncertain.

Executive Briefings on Trade

Global Trade in Waste Treatment and De-Pollution Services

https://www.usitc.gov/publications/332/executive_briefings/ebot_global_trade_in_waste_treatment_and_de-pollution_services.pdf

Jennifer Powell (Office of Industry and Competitiveness Analysis, Services Division), March 2024

This brief examines recent trends in global waste treatment and de-pollution (WT&D) services trade. Available data suggest that global WT&D trade is small and has been relatively resilient, likely because of the essential nature of these services. Such trade is also characterized by substantial regional

concentration, as the nature of many WT&D services favors provision by geographically proximate firms and local affiliates.

Trends in U.S. Reinsurance Trade

https://www.usitc.gov/publications/332/executive_briefings/ebot_gray_trends_in_us_reinsurance_trade.pdf

Theron Gray (Office of Industry and Competitiveness Analysis, Services Division), January 2024

This brief explains recent regulatory, economic, and environmental shocks that have affected reinsurance trade. The brief discusses how large insured losses in 2022 likely fueled the large increase in property reinsurance rates during the January 2023 renewals. The brief then explores data on offshore reinsurance in the United States and explains how provisions in the Tax Cuts and Job Act of 2017 impacted trends in U.S. reinsurance trade, specifically affiliated offshore reinsurance for U.S. insurers.

New Maritime Decarbonization Regulations: Background & Market Effects (Part 2)

https://www.usitc.gov/publications/332/executive_briefings/ebot_maritime_decarbonization_ii.pdf

Rudy Telles Jr. (Office of Industry and Competitiveness Analysis, Services Division), November 2023

This brief discusses how the European Union's Emissions Trading System (EU ETS) will include maritime shipping in its carbon market beginning in 2024, placing a limit on the carbon emissions of ships above 5,000 gross tonnage that operate within the EU. The EU ETS will require shipping firms that exceed those limits to either purchase carbon credits in the EU ETS market or face penalties. The brief explains that although the new requirements are expected to have a small impact on global trade, industry analysts expect operational costs for shippers to increase and shippers to respond by modernizing their fleets and/or rerouting their ships to lessen their exposure to the EU ETS system.

U.S. Section 321 Imports Surge with Rising E-commerce Shipments From China

https://www.usitc.gov/publications/332/executive_briefings/ebot_serletis_u.s._section_321_imports_surge.pdf

George Serletis (Office of Industry and Competitiveness Analysis, Services Division), November 2023

This brief discusses U.S. imports under the de minimis threshold of $800. Imports under this threshold enter free of tariffs and taxes and with minimal customs inspection and processing. The majority of these imports, shipped by postal and express delivery services, are retail products purchased online. The brief explains that these Section 321 imports have been the key channel for Chinese business-to-consumer online retailers that ship direct from factories or distribution centers in China to U.S. consumers. The brief discusses that the large volume and fast growth of these imports from China since 2018 has led to increased congressional scrutiny and proposed legislation to modify what some have

called an outdated program not suited to the current trade environment of surging cross-border e-commerce.

New Maritime Decarbonization Regulations: Background & Market Effects (Part 1)

https://www.usitc.gov/publications/332/executive_briefings/ebot_maritime_decarbonization.pdf

Rudy Telles Jr. (Office of Industry and Competitiveness Analysis, Services Division), July 2023

This brief discusses new United Nations International Maritime Organization regulations that require existing maritime vessels to meet a minimum energy efficiency design standard, while also requiring that larger vessels be graded on their carbon intensity. The brief analyzes how, in response, ocean carriers are modifying their fleets, with compliance costs expected to increase total maritime logistics costs and alter freight rates and have a small but negative impact on total global trade and a minimal impact on gross domestic product. The brief is the first in a series that examines the market impacts of a new wave of global maritime decarbonization initiatives.

Gender, Preferential Trade Agreements, and Services

https://www.usitc.gov/publications/332/executive_briefings/ebot_gender_preferential_trade_service_agreements_and_services.pdf

Junie Joseph (Office of Industry and Competitiveness Analysis, Services Division), May 2023

This brief analyzes the underrepresentation of women in international trade and the increasing prevalence of U.S. and third-party preferential trade agreements (PTAs) that include explicit gender-related provisions. The brief presents new research that suggests that women may also benefit from broad trade and services trade liberalization measures in PTAs. The brief reviews gender-related provisions in U.S. PTAs, relevant research, and potential opportunities via services trade.

Digital Currencies and Cross-Border Payments: An Overview

https://www.usitc.gov/publications/332/executive_briefings/ebot_digital_currency.pdf

Junie Joseph (Office of Industry and Competitiveness Analysis, Services Division), April 2023

This brief discusses recent developments in digital currencies and one of the latest innovations to payment systems being explored by governments, institutions, firms, and households. It highlights how digital currencies promise faster, cheaper, and more transparent transactions, especially across borders, but there are concerns about effective implementation and the need for regulatory oversight. It contrasts the two main types of digital currencies, Central Bank Digital Currencies and cryptocurrencies (which are not backed by government central banks), and their cross-border usage.

Appendix B
Data Tables for Figures

Table B.1 Real value added by U.S. industry, 2018–22

In trillions of dollars. This table corresponds to figure 1.1.

Type of industry	2018	2019	2020	2021	2022
Private goods-producing industries	3.5	3.6	3.5	3.6	3.5
Private services-producing industries	14.2	14.6	14.3	15.3	15.8

Source: USDOC, BEA, "Real Value Added by Industry," September 28, 2023.
Note: Estimates are chained 2017 dollars. Private goods-producing industries include agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing. Private service-producing industries include utilities; wholesale trade; retail trade; transportation and warehousing; information; finance, insurance, real estate, rental, and leasing; professional and business services; educational services, health care, and social assistance; arts, entertainment, recreation, accommodation, and food services; and other services, except government.

Table B.2 Global services: Cross-border exports of commercial services, by country, 2022

In billions of dollars (billion $) and percentages (%). This table corresponds to figure 1.2.

Country	Billion $	Share of total (%)
United States	900	12.8
United Kingdom	492	7.0
China	422	6.0
Germany	406	5.8
Ireland	355	5.0
France	336	4.8
India	309	4.4
Singapore	291	4.1
Netherlands	270	3.8
Spain	167	2.4
All other countries	3,094	43.9
Total	7,043	100.0

Source: WTO, Statistics Database, Time Series on International Trade, "Trade in Commercial Services," July 2023.
Note: Exports of commercial services exclude public-sector transactions. Because of difficulty measuring and reporting services trade data, total services exports do not equal total services imports. Because of rounding, figures may not add to 100 percent.

Table B.3 Global services: Cross-border imports of commercial services, by country, 2022

In billions of dollars (billion $) and percentages (%). This table corresponds to figure 1.3.

Country	Billion $	Share of total (%)
United States	671	10.3
China	461	7.1
Germany	458	7.0
Ireland	373	5.7
United Kingdom	313	4.8
France	286	4.4
Netherlands	264	4.1
Singapore	258	4.0
India	249	3.8
Japan	207	3.2
All other countries	2,969	45.6
Total	6,509	100.0

Source: WTO, Statistics Database, Time Series on International Trade, "Trade in Commercial Services," July 2023.
Note: Imports of commercial services exclude public-sector transactions. Because of difficulty measuring and reporting services trade data, total services exports do not equal total services imports. Because of rounding, figures may not add to 100 percent.

Table B.4 U.S. services: Cross-border exports and imports, 2018–22

In millions of dollars. This table corresponds to figure 1.4.

Year	U.S. cross-border exports of private services	U.S. cross-border imports of private services
2018	843,418	542,420
2019	868,642	569,313
2020	704,320	441,748
2021	778,192	534,058
2022	900,001	671,387

Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.

Table B.5 U.S. services: Cross-border exports, by category, 2022

In millions of dollars (million $) and percentages (%). IP = Intellectual property. This table corresponds to figure 1.5.

Type of industry	Million $	Share of total (%)
Professional services	313,757	34.9
Financial services	190,394	21.2
Travel services	165,460	18.4
Digital and electronic services	127,785	14.2
Distribution services	64,502	7.2
Charges for the use of IP	25,951	2.9
All other services	12,152	1.4
Total	900,001	100.0

Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Professional services are underreported because of the suppression of data. The "All other services" category includes these suppressed data. Because of rounding, figures may not add to 100 percent.

Table B.6 U.S. services: Cross-border imports, by category, 2022

In millions of dollars (million $) and percentages (%). IP = Intellectual property. This table corresponds to figure 1.6.

Type of industry	Million $	Share of total (%)
Professional services	166,640	24.8
Travel services	161,941	24.1
Financial services	117,230	17.5
Distribution services	113,763	16.9
Digital and electronic services	96,179	14.3
Charges for the use of IP	6,824	1.0
All other services	8,810	1.3
Total	671,387	100.0

Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Professional services are underreported because of the suppression of data. The "All other services" category includes these suppressed data. Because of rounding, figures may not add to 100 percent.

Table B.7 U.S. services: Cross-border exports, by country, 2022

In millions of dollars (million $) and percentages (%). This table corresponds to figure 1.7.

Country	Million $	Share of total (%)
Ireland	84,269	9.4
United Kingdom	70,814	7.9
Canada	55,577	6.2
Switzerland	41,035	4.6
United Kingdom Islands, Caribbean	40,433	4.5
China	34,146	3.8
Germany	22,159	2.5
Japan	21,634	2.4
Mexico	21,265	2.4
All other countries	508,669	56.5
Total	900,001	100.0

Source: USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Notes: Data for government goods and services not included elsewhere for Mexico, Switzerland, India, Bermuda, and South Korea are suppressed. In this figure, data presented for those countries are total services trade, which is greater than their private services trade. The BEA category "United Kingdom Islands, Caribbean" includes the following U.K. overseas territories: the British Virgin Islands, the Cayman Islands, Montserrat, and the Turks and Caicos Islands. Because of rounding, figures may not add to 100 percent.

Table B.8 U.S. services: Cross-border imports, by country, 2022

In millions of dollars (million $) and percentages (%). This table corresponds to figure 1.8.

Country	Million $	Share of total (%)
United Kingdom	72,637	10.8
Canada	44,398	6.6
Germany	38,824	5.8
Mexico	38,331	5.7
Japan	35,774	5.3
Switzerland	34,102	5.1
India	33,247	5.0
Bermuda	32,023	4.8
China	26,488	3.9
All other countries	315,563	47.0
Total	671,387	100.0

Source: USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Data for government goods and services not included elsewhere for Mexico, Switzerland, India, Bermuda, and South Korea are suppressed. In this figure, data presented for those countries are total services trade, which is greater than their private services trade. Because of rounding, figures may not add to 100 percent.

Table B.9 U.S. services: Affiliate sales and purchases, 2017–21

In millions of dollars. This table corresponds to figure 1.9.

Year	Sales by U.S.-owned foreign affiliates	Purchases from foreign-owned U.S. affiliates
2017	1,549,858	1,123,825
2018	1,679,254	1,192,047
2019	1,731,363	1,236,728
2020	1,663,588	1,162,149
2021	1,951,710	1,322,252

Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs," October 5, 2023; and table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.
Note: MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates. Sales by U.S.-owned foreign affiliates include goods and services supplied by majority-owned foreign affiliates of U.S. parent firms. Purchases from foreign-owned U.S. affiliates includes goods and services supplied by majority-owned U.S. affiliates of foreign parent firms.

Table B.10 U.S. services: Affiliate sales by U.S.-owned foreign affiliates by industry, 2021

In billions of dollars (billion $) and percentage (%). This table corresponds to figure 1.10.

Type of industry	Billion $	Share of total (%)
Distribution services	575,465	29.5
Financial services	341,656	17.5
Digital and electronic services	313,373	16.1
Professional services	86,075	4.4
Manufacturing	36,030	1.8
Mining	33,208	1.7
All other services	565,903	29.0
Total	1,951,710	100.0

Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs Through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5, 2023.

Note: "Manufacturing" includes ancillary services provided by goods manufacturers. Other services include goods and services supplied by majority-owned foreign affiliates of U.S. parent firms. Digital & electronic services and professional services are underreported because of suppression of data. The "All other services" category includes suppressed data. MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates. Because of rounding, figures may not add to 100 percent.

Table B.11 U.S. services: Purchases from foreign-owned U.S. affiliates, 2021

In billions of dollars (billion $) and percentage (%). This table corresponds to figure 1.11.

Type of industry	Billion $	Share of total (%)
Distribution services	433,711	32.8
Financial services	223,118	16.9
Digital and electronic services	171,414	13.0
Professional services	141,866	10.7
Manufacturing	95,062	7.2
Mining	35,483	2.7
All other services	221,598	16.8
Total	1,322,252	100.0

Source: USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.

Notes: Digital and electronic services are underreported because of the suppression of data. The "All other services" category includes suppressed data. "Manufacturing" includes ancillary services provided by goods manufacturers. "Other" includes ancillary services provided in the mining, agriculture, and other sectors, as well as suppressed data. Beginning with the 2018 Recent Trends in U.S. Services Trade report, software publishing was reallocated from "Other Services" to "Digital and electronic services" to better reflect the industry composition. Therefore, Digital and electronic services data in this report cannot be directly compared with such data in USITC reports published before 2018. MNEs = multinational enterprises. Because of rounding, figures may not add to 100 percent.

Table B.12 Financial services: U.S. cross-border exports, by country, 2022
In millions of dollars (million $) and percentages (%). This table corresponds to figure 2.1.

Country	Million $	Share of total (%)
United Kingdom Islands, Caribbean	48,950	25.7
United Kingdom	27,250	14.3
Canada	11,984	6.3
Japan	8,632	4.5
Luxembourg	6,960	3.7
Ireland	6,165	3.2
Australia	5,670	3.0
Bermuda	5,623	3.0
Germany	4,575	2.4
China	4,514	2.4
All other countries	60,071	31.6
Total	190,394	100.0

Source: USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Financial services comprise two categories as defined by the Bureau of Economic Analysis (BEA): insurance services and financial services. The BEA category "United Kingdom Islands, Caribbean" includes the following U.K. overseas territories: the British Virgin Islands, the Cayman Islands, Montserrat, and the Turks and Caicos Islands. Because of rounding, figures may not add to 100 percent.

Table B.13 Financial services: U.S. cross-border imports, by country, 2022
In millions of dollars (million $) and percentages (%). This table corresponds to figure 2.2.

Country	Million $	Share of total (%)
Bermuda	31,016	26.5
United Kingdom	23,530	20.1
United Kingdom Islands, Caribbean	11,766	10.0
Switzerland	7,752	6.6
Canada	5,218	4.5
Germany	4,646	4.0
Japan	3,040	2.6
France	2,946	2.5
Australia	2,548	2.2
Hong Kong	2,409	2.1
All other countries	22,359	19.1
Total	117,230	100.0

Source: USDOC, BEA, table 2.2, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Financial services comprise two categories as defined by the Bureau of Economic Analysis (BEA): insurance services and financial services. The BEA category "United Kingdom Islands, Caribbean" includes the following U.K. overseas territories: the British Virgin Islands, the Cayman Islands, Montserrat, and the Turks and Caicos Islands. Because of rounding, figures may not add to 100 percent.

Table B.14 Financial services: U.S. cross-border exports, by industry, 2022
In millions of dollars (million $) and percentages (%). This table corresponds to figure 2.3.

Type of industry	Million $	Share of total (%)
Banking	126,512	66.4
Securities	41,214	21.6
Insurance	22,668	11.9
Total	190,394	100.0

Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Financial services comprise two categories as defined by the Bureau of Economic Analysis (BEA): insurance services and financial services. Because of rounding, figures may not add to 100 percent.

Table B.15 Financial services: U.S. cross-border imports, by industry, 2022

In millions of dollars (million $) and percentages (%). This table corresponds to figure 2.4.

Type of industry	Million $	Share of total (%)
Insurance	59,515	50.8
Banking	44,916	38.3
Securities	12,799	10.9
Total	117,230	100.0

Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.
Note: Financial services comprise two categories as defined by the Bureau of Economic Analysis (BEA): insurance services and financial services. Because of rounding, figures may not add to 100 percent.

Table B.16 Financial services: Sales by U.S.-owned foreign affiliates, by industry, 2021

In millions of dollars (million $) and percentages (%). This table corresponds to figure 2.5.

Type of industry	Million $	Share of total (%)
Securities	189,134	55.4
Insurance	68,118	19.9
Rental and leasing (except real estate)	45,794	13.4
Banking	38,610	11.3
Total	341,656	100.0

Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5, 2023.
Note: MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates. Because of rounding, figures may not add to 100 percent.

Table B.17 Financial services: Purchases from foreign-owned U.S. affiliates, 2021

In millions of dollars (million $) and percentages (%). This table corresponds to figure 2.6.

Type of industry	Million $	Share of total (%)
Insurance	83,928	37.6
Securities	83,513	37.4
Banking	38,840	17.4
Rental and leasing (except real estate)	16,837	7.5
Total	223,118	100.0

Source: USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs," October 5, 2023.
Note: MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates. Because of rounding, figures may not add to 100 percent.

Table B.18 Global banking revenues, 2018-23

In trillions of dollars. This table corresponds to figure 2.7.

Year	Exports
2018	2.7
2019	2.8
2020	2.7
2021	2.8
2022	2.8
2023	2.8

Source: Global Commercial Banks, September 2023.
Note: Totals include revenues for both retail and commercial banking services; revenues for 2023 are estimates.

Table B.19 Banking: U.S. cross-border exports and imports, 2018–22

In millions of dollars. This table corresponds to figure 2.8.

Year	U.S. cross-border exports	U.S. cross-border imports
2018	102,960	31,149
2019	108,973	33,622
2020	111,832	34,371
2021	126,403	39,362
2022	126,512	44,916

Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.

Table B.20 Banking: U.S. affiliate sales and purchases, 2017–21

In millions of dollars. This table corresponds to figure 2.9.

Year	Services supplied by U.S. firms' foreign affiliates	Services supplied by U.S. affiliates of foreign firms
2017	43,440	49,466
2018	41,301	48,718
2019	39,637	45,640
2020	35,156	41,382
2021	38,610	38,840

Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5, 2023 and USDOC, BEA, table 5.12, "Services Supplied to U.S. Persons by Foreign Multinational Enterprises through Their Majority Owned U.S. Affiliates, by Industry of Affiliate and by Country of Ultimate Beneficial Owner," October 5, 2023.
Note: MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates; MOUSAs = majority-owned U.S. affiliates; UBO = ultimate beneficial owner. Because of rounding, figures may not add to 100 percent.

Table B.21 Insurance: U.S. cross-border exports and imports, 2018–22

In millions of dollars. This table corresponds to figure 2.10.

Year	U.S. cross-border exports	U.S. cross-border imports
2018	19,118	43,797
2019	18,579	51,220
2020	20,022	57,743
2021	22,262	58,659
2022	22,668	59,515

Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 7, 2023.

Table B.22 Insurance: U.S. affiliate sales and purchases, 2017–21

In millions of dollars. This table corresponds to figure 2.11.

Year	Services supplied by U.S. firms' foreign affiliates	Services supplied by U.S. affiliates of foreign firms
2017	60,441	67,915
2018	60,919	89,201
2019	66,097	86,729
2020	69,961	66,466
2021	68,118	83,928

Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5, 2023 and USDOC, BEA, table 5.12, "Services Supplied to U.S. Persons by Foreign Multinational Enterprises through Their Majority Owned U.S. Affiliates, by Industry of Affiliate and by Country of Ultimate Beneficial Owner," October 5, 2023.
Note: MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates; MOUSAs = majority-owned U.S. affiliates; UBO = ultimate beneficial owner. because of rounding, figures may not add to 100 percent.

Table B.23 Securities: U.S. cross-border exports and imports, 2018–22

In millions of dollars. This table corresponds to figure 2.12.

Year	U.S. cross-border exports	U.S. cross-border imports
2018	33,312	10,186
2019	33,573	10,738
2020	39,006	11,326
2021	45,615	12,001
2022	41,214	12,799

Source: USDOC, BEA, table 2.1, "U.S. Trade in Services, by Type of Service," July 6, 2023.

Table B.24 Securities: U.S. affiliate sales and purchases, 2017–21

In millions of dollars. This table corresponds to figure 2.13.

Year	Services supplied by U.S. firms' foreign affiliates	Services supplied by U.S. affiliates of foreign firms
2017	140,655	60,831
2018	147,766	61,842
2019	156,150	71,328
2020	168,877	74,892
2021	189,134	83,513

Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5, 2023 and USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign Multinational Enterprises through Their Majority Owned U.S. Affiliates, by Industry of Affiliate and by Country of Ultimate Beneficial Owner," October 5, 2023.
Note: MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates; MOUSAs = majority-owned U.S. affiliates; UBO = ultimate beneficial owner. Because of rounding, figures may not add to 100 percent.

Table B.25 Rental and leasing (except real estate): U.S. affiliate sales and purchases, 2017–21

In millions of dollars. This table corresponds to figure 2.14.

Year	Services supplied by U.S. firms' foreign affiliates	Services supplied by U.S. affiliates of foreign firms
2017	57,195	11,380
2018	61,220	13,152
2019	55,328	16,037
2020	47,538	16,602
2021	45,794	16,837

Source: USDOC, BEA, table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs through Their MOFAs, by Industry of Affiliate and by Country of Affiliate," October 5, 2023, and USDOC, BEA, table 5.1, "Services Supplied to U.S. Persons by Foreign Multinational Enterprises through Their Majority Owned U.S. Affiliates, by Industry of Affiliate and by Country of Ultimate Beneficial Owner," October 5, 2023.
Note: MNEs = multinational enterprises; MOFAs = majority-owned foreign affiliates; MOUSAs = majority-owned U.S. affiliates; UBO = ultimate beneficial owner. Because of rounding, figures may not add to 100 percent.

Table B.26 Annual percentage change in average consumer prices, 2019–23

Consumer prices annual percentage change. This table corresponds to figure 2.15.

Date	European Union	United States	Large emerging markets
January 2019	1.4	1.6	2.6
February 2019	1.6	1.5	2.6
March 2019	1.6	1.9	3.0
April 2019	1.9	2.0	3.4
May 2019	1.5	1.8	3.5
June 2019	1.5	1.6	3.3
July 2019	1.3	1.8	2.9
August 2019	1.3	1.7	3.1
September 2019	1.1	1.7	3.2
October 2019	1.0	1.8	3.3
November 2019	1.3	2.1	3.7
December 2019	1.6	2.3	4.2
January 2020	1.7	2.5	4.1
February 2020	1.6	2.3	4.1
March 2020	1.1	1.5	3.6
April 2020	0.6	0.3	3.0
May 2020	0.5	0.1	2.4
June 2020	0.7	0.6	2.3
July 2020	0.8	1.0	3.5
August 2020	0.4	1.3	3.5
September 2020	0.2	1.4	3.4
October 2020	0.2	1.2	3.5
November 2020	0.2	1.2	3.3
December 2020	0.2	1.4	3.1
January 2021	1.2	1.4	3.0
February 2021	1.3	1.7	3.2
March 2021	1.7	2.6	3.6
April 2021	2.0	4.2	4.0
May 2021	2.3	5.0	4.5
June 2021	2.2	5.4	4.6
July 2021	2.5	5.4	3.7
August 2021	3.2	5.3	3.7
September 2021	3.6	5.4	3.8
October 2021	4.4	6.2	4.0
November 2021	5.2	6.8	4.4
December 2021	5.3	7.0	4.4
January 2022	5.6	7.5	4.4
February 2022	6.2	7.9	4.3
March 2022	7.8	8.5	4.8
April 2022	8.1	8.3	5.4
May 2022	8.8	8.6	5.5
June 2022	9.6	9.1	5.8
July 2022	9.8	8.5	5.7
August 2022	10.1	8.3	5.4
September 2022	10.9	8.2	5.5
October 2022	11.5	7.7	5.2
November 2022	11.1	7.1	4.8
December 2022	10.4	6.5	4.9

Date	European Union	United States	Large emerging markets
January 2023	10.0	6.4	5.0
February 2023	9.9	6.0	4.8
March 2023	8.3	5.0	4.4
April 2023	8.1	4.9	3.9
May 2023	7.1	4.0	3.7
June 2023	6.4	3.0	3.4
July 2023	6.1	3.2	3.6
August 2023	5.9	3.7	3.6
September 2023	4.9	3.7	3.2
October 2023	3.6	3.2	3.2
November 2023	3.1	3.1	3.2
December 2023	3.4	3.4	3.1

Source: OECD, "Consumer Prices," 2018, accessed February 28, 2024.
Notes: European Union excludes the United Kingdom for all years. Large emerging markets include Brazil, China, India, Indonesia, Saudi Arabia, and South Africa.

Table B.27 Central bank interest rates, January 2019–December 2023
In percentage. This table corresponds to figure 2.16.

Date	U.S. Federal Reserve, federal funds effective rate	European Central Bank, Marginal lending facility rate	Bank of England, Official bank rate
January 2019	2.4	0.3	0.8
February 2019	2.4	0.3	0.8
March 2019	2.4	0.3	0.8
April 2019	2.4	0.3	0.8
May 2019	2.4	0.3	0.8
June 2019	2.4	0.3	0.8
July 2019	2.4	0.3	0.8
August 2019	2.1	0.3	0.8
September 2019	2.0	0.3	0.8
October 2019	1.8	0.3	0.8
November 2019	1.6	0.3	0.8
December 2019	1.6	0.3	0.8
January 2020	1.6	0.3	0.8
February 2020	1.6	0.3	0.3
March 2020	0.7	0.3	0.1
April 2020	0.1	0.3	0.1
May 2020	0.1	0.3	0.1
June 2020	0.1	0.3	0.1
July 2020	0.1	0.3	0.1
August 2020	0.1	0.3	0.1
September 2020	0.1	0.3	0.1
October 2020	0.1	0.3	0.1
November 2020	0.1	0.3	0.1
December 2020	0.1	0.3	0.1
January 2021	0.1	0.3	0.1
February 2021	0.1	0.3	0.1
March 2021	0.1	0.3	0.1
April 2021	0.1	0.3	0.1
May 2021	0.1	0.3	0.1
June 2021	0.1	0.3	0.1
July 2021	0.1	0.3	0.1

Date	U.S. Federal Reserve, federal funds effective rate	European Central Bank, Marginal lending facility rate	Bank of England, Official bank rate
August 2021	0.1	0.3	0.1
September 2021	0.1	0.3	0.1
October 2021	0.1	0.3	0.1
November 2021	0.1	0.3	0.1
December 2021	0.1	0.3	0.3
January 2022	0.1	0.3	0.3
February 2022	0.1	0.3	0.5
March 2022	0.2	0.3	0.8
April 2022	0.3	0.3	0.8
May 2022	0.8	0.3	1.0
June 2022	1.2	0.3	1.3
July 2022	1.7	0.8	1.3
August 2022	2.3	0.8	1.8
September 2022	2.6	1.5	2.3
October 2022	3.1	1.5	2.3
November 2022	3.8	2.3	3.0
December 2022	4.1	2.8	3.5
January 2023	4.3	2.8	3.5
February 2023	4.6	3.3	4.0
March 2023	4.7	3.8	4.3
April 2023	4.8	3.8	4.3
May 2023	5.1	4.0	4.5
June 2023	5.1	4.3	5.0
July 2023	5.1	4.3	5.0
August 2023	5.3	4.5	5.3
September 2023	5.3	4.8	5.3
October 2023	5.3	4.8	5.3
November 2023	5.3	4.8	5.3
December 2023	5.3	4.8	5.3

Source: FRED, "Federal Funds Effective Rate," accessed January 8, 2024; BoE, "Interest Rates and Bank Rate," December 14, 2023; ECB, "Key ECB Interest Rates," December 13, 2023.

Table B.28 Global technology spending for banking and investment services, 2019–23

In billions of dollars. This table corresponds to figure 3.1.

Spending	2019	2020	2021	2022	2023
Banking and investment services	539	542	570	603	652

Source: "Global Banking & Securities IT Spending 2025," April 2021; Hines and Lodge, "Retail Banking Technology Spending Forecasts 2022-2027," August 25, 2022; "Gartner Forecasts Worldwide Banking and Investment Services IT Spending to Reach $652 Billion in 2023," July 21, 2023.

Table B.29 Global payments revenues by region, 2020–22

In trillions of dollars. This table corresponds to figure 3.2.

Region	2020	2021	2022
Asia-Pacific	0.9	1.0	1.0
North America	0.5	0.5	0.6
Europe, Middle East, and Africa	0.3	0.3	0.4
Latin America	0.1	0.1	0.2

Source: McKinsey Global Payments Report, September 18, 2023, 6.

Table B.30 Revenue from tokenized assets worldwide, 2017–22

In billions of dollars. This table corresponds to figure 3.3.

Asset	2017	2018	2019	2020	2021	2022
Cryptocurrencies	1.561	2.37	1.668	7.284	35.45	20.14
Other tokenized assets	0	0	0	0.026	7.02	6.36

Source: Statista, "Digital Assets - Worldwide," April 2023.

Table B.31 Global assets under management by robo-advisors, 2017–22

In billions of dollars. This table corresponds to figure 3.4.

Country	2017	2018	2019	2020	2021	2022
United States	0.06	0.84	9.51	64.54	281.70	671.60
Rest of the World	1.03	3.67	12.25	33.16	88.10	157.7

Source: Statista, “Robo-Advisors - Worldwide, United States,” accessed April 1, 2024.

Table B.32 Number of monthly active users selected leading apps, January 2019–July 2021

In thousands of users. This table corresponds to figure 3.5.

Date	Major securities services firms	New firms	Others
January 2019	1,757	1,734	185
February 2019	2,060	1,779	209
March 2019	2,536	1,703	230
April 2019	2,690	1,735	241
May 2019	2,517	1,871	243
June 2019	2,081	1,893	223
July 2019	2,141	1,952	254
August 2019	2,501	1,937	272
September 2019	2,437	1,988	244
October 2019	2,297	1,968	262
November 2019	2,647	2,128	248
December 2019	2,459	2,250	241
January 2020	2,400	2,576	263
February 2020	2,489	2,718	324
March 2020	3,072	3,221	400
April 2020	3,906	4,603	485
May 2020	3,511	5,279	465
June 2020	3,754	5,587	400
July 2020	3,552	5,464	549
August 2020	3,620	5,499	532
September 2020	3,829	5,484	491
October 2020	3,481	5,153	417
November 2020	3,487	5,306	384
December 2020	3,642	6,060	411
January 2021	3,825	7,550	460
February 2021	5,813	11,642	603
March 2021	5,094	11,623	622
April 2021	4,863	12,491	612
May 2021	4,344	13,850	528
June 2021	4,786	12,972	475
July 2021	4,541	11,025	476

Source: Statista, “Monthly Active Users Online Share Trading,” December 12, 2022.

Note: Data for Webull excludes Chinese users. Major securities services firms include TD AmeriTrade, Schwab Mobile, E*TRADE (Morgan Stanley), and Fidelity Investments. New firms include eToro, Webull and Robinhood. Others includes Merrill Edge, Interactive Brokers, and TradeStation.

Table B.33 Value of sustainable financing across the largest U.S. banks, 2020
In billions of dollars. This table corresponds to figure 4.1.

Bank	2020
Fifth Third	1.2
Truist Bank	2.4
U.S. Bank	4.0
Goldman Sachs	5.0
PNC Bank	8.0
TD Bank	10.2
Wells Fargo Bank	25.6
Bank of America	26.5
Citibank	28.0
JPMorgan Chase	55.0
Morgan Stanley	130.0

Source: Statista, "Value of green financing of the largest banks in the United States in 2020," February 1, 2022.
Note: Statista notes the selection of largest banks is by total assets and data collected from banks' environmental reporting; data are not available for some of the largest banks and this are not included. TD Bank used a specified exchange rate for its calculation.

Table B.34 Account ownership gap by gender, education, and income, 2011 and 2021
In percentage. This table corresponds to box figure 4.2.

Ownership	2011 Gender gap	2021 Gender gap	2011 Educational gap	2021 Educational gap	2011 Income gap	2021 Income gap
United States	7.9	-3.7	42.7	38.7	15.6	6.2
High income countries: OECD	3.4	-1.0	19.5	7.5	5.9	2.9
Developing countries	9.6	5.7	17.6	14.2	19.7	8.0
World	8.1	4.4	29.1	18.6	15.7	7.1

Source: The World Bank, "The Global Findex Database 2021," accessed December 13, 2023.

Table B.35 Value of annual green bonds issued globally by use of proceeds, 2014–22
In billions of dollars. This table corresponds to figure 4.3.

Green bond	2014	2015	2016	2017	2018	2019	2020	2021	2022
Energy	18.3	23.7	33.2	53.0	53.7	85.0	104.8	200.9	158.3
Buildings	7.5	8.3	17.9	46.3	46.9	81.4	82.6	164.8	122.3
Transport	4.2	5.9	12.7	23.9	30.7	52.5	68.2	96.9	91.6
Other	6.5	7.7	20.8	34.9	37.4	49.4	46.2	116.5	112.6

Source: Climate Bonds Initiative, "Interactive Data Platform: Region," accessed December 27, 2023.
Note: Data refers to value of green bonds issued in each year.

Table B.36 Value of annual social and sustainability bond issuance globally , 2014–22
In billions of dollars. This table corresponds to figure 4.4.

Bond	2014	2015	2016	2017	2018	2019	2020	2021	2022
Social	1.1	3.6	2.9	9.3	15.8	14.7	248.0	221.5	130.1
Sustainability	1.2	2.3	6.0	19.9	42.1	70.9	172.7	199.5	166.4

Source: Climate Bonds Initiative, "Interactive Data Platform: Region," accessed January 4, 2024.
Note: Data refer to the value of social or sustainability bonds issued in each year.

Table B.37 Value of green bonds issued across the largest U.S. banks, 2022

In billions of dollars. This table corresponds to figure 4.5.

Bank	2022
Morgan Stanley	0.50
Fifth Third	0.50
Goldman Sachs	0.80
Citigroup	1.87
TD Bank	1.87
PNC Bank	1.90
Wells Fargo Bank	2.00
JPMorgan Chase	2.25
Bank of America	6.35

Source: Statista, "Value of green bond issuance of the largest banks in the United States in 2022," accessed December 27, 2023.
Note: Statista notes the selection of largest banks is by total assets and banks not included above have not issued green bonds. Citigroup and PNC Bank have years other than 2022 and TD Bank has used a specified exchange rate. For some banks, bonds issued appear to include social or sustainable bonds and in years leading up to 2022.

Table B.38 Global insured weather-related losses, 1992–2022

In billions of dollars. This table corresponds to figure 4.6.

Year	Value
1992	46.00
1993	17.82
1994	39.63
1995	24.98
1996	16.28
1997	9.74
1998	25.84
1999	46.43
2000	13.69
2001	17.44
2002	21.88
2003	26.65
2004	67.12
2005	142.00
2006	17.72
2007	31.62
2008	55.61
2009	28.76
2010	56.59
2011	145.22
2012	77.62
2013	42.46
2014	33.11
2015	31.71
2016	52.34
2017	154.04
2018	89.74
2019	56.69
2020	89.54
2021	105.00
2022	123.75

Source: Statista, Insured losses caused by natural disasters worldwide from 1970 to 2021, May 2, 2023.
Note: Data for 2022 were calculated from Swiss Re using 45 percent of $275 billion in economic losses that were covered by insurance.

Appendix C
USITC Categories for U.S. Services Trade Data

Table C.1 USDOC, BEA industries in USITC services sector categories

BEA = Bureau of Economic Analysis. USITC = U.S. International Trade Commission

USITC services category	BEA industry
Distribution services	• Sea transport • Air transport (freight and port) • Other modes of transport • Trade-related services • Franchises and trademarks licensing fees
Digital and electronic services	• Audio-visual and related products • Telecommunications services • Computer services • Information services • Licenses for reproduction of AV and computer software
Financial services	• Insurance services • Financial services
Professional services	• Maintenance and repair services not included elsewhere • Research and development services • Licenses for the use of outcomes of research and development • Legal services • Accounting, auditing, and bookkeeping services • Business and management consulting and public relations services • Advertising • Architectural services • Engineering services • Scientific and other technical services • Health services • Education services • Other business services, not included elsewhere
Travel services	• Business • Personal • Passenger
All other services	• Construction • Waste treatment and de-pollution, agricultural, and mining services • Operating leasing services • Artistic-related services • Heritage and recreational services

Source: USITC staff compiled sectors using USDOC, BEA, categories presented in table 2.1, "U.S. Trade in Services, by Type of Service."

Table C.2 Affiliate services by sector/industry

BEA = Bureau of Economic Analysis. USITC = U.S. International Trade Commission

USITC sector categories	Affiliate services trade
Agriculture, forestry, fishing, and hunting services	• Agriculture, forestry, fishing, and hunting services
Distribution services	• Wholesale trade • Retail trade • Transportation and warehousing
Digital and electronic services	• Motion picture and sound recording industries • Telecommunications • Broadcasting • Data processing, hosting, and related services • Computer systems design and related services • Software publishing • Other information services
Financial services	• Finance and insurance • Rental and leasing (except real estate)
Manufacturing services	• Manufacturing services
Mining services	• Mining services
Professional services	• Architectural, engineering, and other technical services • Management, scientific and technical consulting • Legal services • Accounting, auditing, and bookkeeping services • Specialized design services • Scientific research and development services • Advertising and related services • Other professional, scientific, and technical • Management of companies and enterprises • Health care and social assistance • Educational services
All other services	• Newspaper, periodical, book, and database publishers • Utilities • Construction • Administrative and support services • Accommodations and food services • Arts, entertainment, and recreation • Other services (except public administration and private households) • Real estate • Waste management and remediation services

Source: USITC staff compiled sectors using USDOC, BEA, categories presented in table 4.1, "Services Supplied to Foreign Persons by U.S. MNEs through Their MOFAs, by industry and Affiliate and by Country of Affiliate" and table 5.1, "Services Supplied to U.S. Persons by Foreign MNEs through Their MOUSA, by Industry of Affiliate and by Country of UBO.