



PART TWO

STATUS OF THE OFFICE OF FINANCIAL RESEARCH

Review of Mission

The Office principally supports the Financial Stability Oversight Council (Council) and its member agencies by supplying germane data, developing empirically supported research insights, analysis, and highlights, and advancing data products that can point to financial system vulnerabilities and help identify threats to financial stability. Identifying and assessing those vulnerabilities in FY 2022 was essential to adhering to and delivering on our Office’s statutory mandate. In addition, the OFR collects, maintains, and shares supervisory and commercial datasets with Council member agencies; the OFR fulfills its statutory mandate in part through its centrally cleared repo data collection. The Office leads the Council Data Committee and works with the Council Systemic Risk Committee to address data gaps. The Data Committee provides a forum for information-sharing among the Council’s Chief Data Officers and representatives, coordinates action on data-related topics, and oversees the annual update to the Interagency Data Inventory. The OFR and the FSOC Secretariat collaborate to ensure proposed research and data topics, projects, and publications are consistent with the OFR’s mission and the Council’s needs.

Addressing Top Priorities

In FY 2022, the OFR launched two significant pilot programs; the Non-centrally Cleared Bilateral Repo Pilot and the OFR-hosted Climate Data and

Analytics Hub Pilot. The largely opaque repo market was seen as a potentially significant data gap for regulators, leading the OFR to create a pilot data collection project. A proposed rule governing these repo transactions was published in early 2023.

Separately, the OFR worked with the Federal Reserve and the Federal Reserve Bank of New York (FRBNY) on the OFR-hosted Climate Data and Analytics Hub pilot. The pilot entailed collecting data from multiple public sources and providing a shared space for collaboration and analytics.

In other significant highlights, the OFR:

- Assumed the role of Secretariat for the Regulatory Oversight Committee (ROC), an international organization made up of over 50 countries that are responsible for overseeing the governance of multiple globally used financial data standards, including the Legal Entity Identifier (LEI), the Unique Product Identifier (UPI), Unique Transaction Identifier (UTI), and Critical Data Elements (CDE) for over-the-counter derivatives transaction reporting;
- Enhanced the Financial Instrument Reference Database by adding new data elements from the Financial Information eXchange (FIX) Protocol;
- Participated in several U.S. and international financial data standards development initiatives in collaboration with Council member agencies;
- Published numerous working papers, including on hedge funds, central bank digital currencies, and Treasury market stress;

- Made significant progress on the OFR's Workforce Plan 2020–2024 by addressing gaps related to retention, workforce development, training, and recruitment;
- Implemented multiple new layers of information security focused on technology infrastructure and data;
- Initiated hybrid workplace flexibilities that include telework and remote work following temporary workplace provisions during the COVID-19 pandemic; and
- Assisted the Defense Advanced Research Projects Agency (DARPA) in research to address disruptions to distributed financial ledgers.

The OFR's Non-centrally Cleared Bilateral Repurchase Agreement Pilot

The multitrillion-dollar market for repurchase agreements (repo) supports short-term liquidity and price discovery by allowing financial institutions to lend or borrow cash, usually overnight, with securities as collateral. While the OFR's centrally cleared repo collection was an important first step in providing financial regulators with greater visibility into this market, non-centrally cleared bilateral repo transactions still represent a major blind spot.

This lack of visibility was felt acutely following a September 2019 repo spike and March 2020 dislocations in the Treasury market, when substantial

portions of activity in these crucial funding markets could not be observed. In the wake of these episodes of stress, market participants and regulators—Treasury, Federal Reserve, and other Council officials—called for the availability of more data on non-centrally cleared bilateral repo and supported the OFR in a pilot to collect this data.

In 2022, the OFR assembled a team of experts from across the Office to focus on closing this data gap. Senior researchers, data managers, technologists, and legal advisors conducted an outreach-and-collection pilot to shed light on this previously unobserved portion of the repo market. This team looked at market structure and size, industry data submission practices, and which institutions should be reporting these data. The OFR gained significant insight through multiple meetings with experts from several Council member agencies, the FRBNY, financial industry trade associations, and individual financial institutions, many of which are likely to be covered by a final rule. Nine firms volunteered to participate in the pilot collection, each submitting data from three days' reporting in June.

From our preliminary analysis of the pilot collection, we learned about several market practices, including the composition of collateral, the identity of counterparties, and the terms of repo agreements. Notably, we find that most non-centrally cleared bilateral repos are collateralized by U.S. Treasuries, despite much of the collateral being eligible for bilateral central clearing. In addition, relative to other repo market segments, a larger proportion of repo volumes are attributable to hedge funds or other asset

managers, and the length of terms of these repos are generally longer than other segments, with lower-quality collateral generally having longer terms.

The OFR initiated the rulemaking process to establish a permanent collection. In early 2023, the Office published a Notice of Proposed Rulemaking (NPRM) that requests public comment on data fields, formats, potential definitions for institutions that will be required to report data, and other pertinent information.

Interagency Data Inventory

The Council Interagency Data Inventory is a catalog of data collections by Council member agencies and other government organizations that started in 2011. The inventory does not contain data but rather *metadata*—data about data—on each collection. The inventory contains a brief description of each data collection and basic information, such as the collecting organization; the name and number of the form used to collect the data; and the type of collection, such as financial or supervisory. These metadata are publicly available but sometimes difficult to find. The Interagency Data Inventory is updated annually and can be used to search for data collections and analyze gaps and overlaps in collections. Each Council member agency determines which of its data collections to include in the inventory.

OFR-hosted Climate Data and Analytics Hub Pilot

In 2022, the OFR collaborated with the Federal Reserve and the FRBNY to develop the OFR-hosted Climate Data and Analytics Hub (Data and Analytics Hub) pilot, a new tool to help financial regulators assess risks to financial stability stemming from climate-related financial risk. The purpose of the pilot was twofold: to meet the Federal Reserve's request for a collaborative space with shared climate data, analytic tools, and computing power; and to enable the OFR to develop and test a scalable model for offering enhanced services to Council member agencies.

While the pilot was limited to publicly available climate data, future versions of the platform will include public, academic, and commercial data to enable research on other financial stability-related topics. The Data and Analytics Hub will provide the Council and its member agencies access to analysis-ready data, high-performance computing, and analytical and data visualization software in a secure and collaborative environment. While access to the pilot was limited to the Federal Reserve and the FRBNY, future versions of the Data and Analytics Hub aim to provide access to all Council member agencies.

Climate Data Assessment

The OFR identified and categorized over 30 climate-related data sources divided into three groups: commercial vendors, government agencies, and academia/international organizations. Climate-

related financial risk was subsequently divided into nine subcategories: agricultural production, landslides/land changes, inland flooding, temperature, hurricanes/wind, precipitation, coastal flooding/sea-level changes, water supply stress, and wildfires.

While some data are publicly available, others are restricted and require specific access agreements. A substantial proportion of the data requires specialized knowledge, and files can be significant in size. The data can also have missing information and time stamps, impacting usability.

Agency data collections are typically in raw form, but commercial vendors offer curated data. Vendors often digest and clean agency data, apply models, and develop risk-score assessments. None of the 17 surveyed commercial vendors currently provide data across the nine risk subcategories, although several of them are adding additional capabilities. In addition, the vendor models are variable in scope and mechanics, which necessitates the need to understand the differences in their outputs. A thorough review of the academic literature, policy analyses, and environmental statutes is vital for users to gain a better understanding of climate models and their underlying data.

We identified key data gaps to further evaluate the relationship between financial stability and climate-related financial risk. These included information on the properties of residential and commercial mortgage holders, as well as distribution, supply-chain, central resource, and transportation-related data for properties and infrastructure.

Data Standards

The OFR's statutory mission includes preparing and publishing financial data standards and formats that better allow both the private and public sectors to monitor risks in the financial system. To accomplish this mission, the OFR focuses on improving the quality and utility of financial data and facilitating the aggregation, integration, sharing, access, interoperability, and exchange of these data.

Since many financial institutions operate globally, the OFR's data standards efforts have an international focus, where possible. The OFR is a leader in promoting the development, adoption, and use of financial data standards in multiple financial data standards bodies, including the Regulatory Oversight Committee (ROC), the International Organization for Standardization (ISO), and the Accredited Standards Committee X9, Inc. (ASC X9).

The OFR engages in these activities with other Council member agencies, financial and standards-setting authorities from other jurisdictions, and leaders and experts from the public and private sectors.

Regulatory Oversight Committee

The OFR is a major contributor of subject matter expertise to the work of the ROC, the global body of authorities overseeing multiple ISO standards and data, including the Legal Entity Identifier (LEI), the Unique Product Identifier (UPI), the Unique Transaction Identifier (UTI), and Critical

Data Elements (CDE) for Over-the-Counter (OTC) derivatives reporting. The UPI, UTI, and CDE all support a consistent, high-quality standard for reporting and aggregating data regarding OTC derivatives transactions—a market that has traditionally been global and opaque in terms of financial risks.

The OFR continues as a member of the ROC's Plenary, Executive Committee, Committee on Evaluation and Standards (CES), and Committee on Derivatives Identifiers and Data Elements (CDIDE).

In 2022, in a major transition, the OFR also assumed the role of Secretariat for the ROC. In this role, the OFR staff provides administrative services and other support to the organization as it helps the U.S. and other government authorities oversee the development of these financial data standards and promote their use in their own markets.

Legal Entity Identifier

The OFR continued to promote the adoption and expanded use of the Legal Entity Identifier (LEI), an international data standard, ISO 17442, for identifying the legal entities participating in a financial transaction. The LEI, on which the Global LEI System is based, consists of a 20-digit alphanumeric code and an associated set of data elements uniquely identifying a legal entity.

The OFR is committed to ensuring the quality of LEI data is sufficiently high to make it useful for industry participants and regulators. For example, through its active participation in the ROC's Committee on Evaluation and Standards (CES), the OFR contributed to improving

the quality of data describing an entity's direct-accounting consolidating parent, its ultimate-accounting consolidating parent, and other LEI data elements.

During 2022, the OFR contributed to the ROC's efforts to evaluate the Global Legal Entity Identifier Foundation's (GLEIF's) Verifiable LEI (vLEI) as part of the ROC's oversight responsibilities. The vLEI is a digital credential that combines three concepts: (1) an organization's identity, represented by the LEI; (2) a person's identity, represented by their legal name; (3) and the role the person plays for the legal entity. In its evaluation, the ROC seeks to fully understand the vLEI and the opportunities to expand the use of the LEI and the Global LEI System.

The OFR is committed to ensuring that the adoption of the LEI continues to grow. As of September 2022, nearly 2.1 million LEIs have been issued worldwide. Approximately 29% of these were issued in the U.S., with about 12% issued to U.S. entities.

Financial Instrument Reference Database

The OFR continued to enhance the Financial Instrument Reference Database (FIRD), an existing data product that is required by OFR's statute, with the inclusion of new data elements from the Financial Information eXchange (FIX) Protocol. OFR is also leveraging the X9 Industry Forum for Financial Terms Harmonization to provide industry input for future development. This body is tasked with analyzing and mapping the terms and definitions across multiple industry standards, with the results available to the

public. This is an important feedback loop for the quality of FIRD content.

International Organization for Standardization

The OFR made contributions to multiple International Organization for Standardization (ISO) Technical Committee 68 (TC 68) projects. TC 68 is responsible for developing and maintaining standards for the global financial services industry. The OFR is an active member of Subcommittee 8 (Reference Data for Financial Services), Subcommittee 9 (Information Exchange for Financial Services), and other groups.

ISO TC 68/Subcommittee 9 (SC 9) Working Group 1 (WG 1): Semantic Models

The ISO 20022 standard describes a common platform to develop messages for financial services and is used for a diverse number of financial data standards initiatives. All information within the model is used by TC 68/SC 9/WG 1 as a basis for the semantic transformation of data into the Web Ontology Language (OWL). The OFR contributes subject matter expertise in technical discussions and demonstrates ontology best practices and development, knowledge graphs, and platforms used in semantic technology.

ISO 24366: Natural Person Identifier (NPI)

The OFR actively participated in developing ISO 24366 Natural Person Identifier (NPI) — a data standard that uniquely identifies the natural persons

relevant to any financial transaction. This standard was published in October 2021.¹⁷⁸ Following this event, ISO TC 68 began developing a complementary standard, ISO 2466-2, to describe the requirements for: (1) the identification of natural persons, (2) the verification of their identity documentation and data, and (3) the issuance, use, and management of the lifecycle of the identifier.¹⁷⁹ ISO 24366-2 aims to guide and help enable implementation of ISO 24366. In the development of the NPI, the OFR made key contributions, drawing on its leadership and experience in developing and implementing ISO 17442 Legal Entity Identifier (LEI).

ISO TC 68 Advisory Group 5 (AG 5): Digital Currencies

The OFR contributed to the development of the TC 68 advisory group (AG5) report on central bank digital currencies (CBDC) and non-fiat digital currencies. A key aim of this report was to identify use cases for these currencies and provide recommendations to the ISO TC 68 Plenary covering data standards that support these use cases. The OFR ensured that U.S. expertise was brought to bear in preparing this report by providing close coordination with the leadership of ASC X9.

ISO TC 68/Advisory Group 3 (AG 3): Standards Best Practices

The OFR contributed to the work of ISO TC 68 Advisory Group 3 (AG3) Standards Best Practices. AG3 is charged with identifying and documenting practices that should apply when: (1) revising existing

TC 68 standards or developing new standards, (2) monitoring and evaluating the performance of ISO Registration Authorities, and (3) maintaining, publishing, and accessing code sets. To this work, the OFR contributed subject matter expertise, as well as analytical, drafting, and editing skills. The results of this work are set to be presented in two reports in 2023: “Standards Best Practices for ISO TC 68” and “Results of Discussions of ISO TC 68/AG 3 Regarding ISO Registration Authorities–Issues.”

ISO TC 68 Study Group 4 (SG 4): Communications

The OFR is the convener of TC 68’s Communications Group (SG4) which is responsible for facilitating the sharing of news and articles relevant to the work of TC 68’s subcommittees and subgroups. This leadership role allows the OFR to stay closely abreast of the large number of activities and events across TC 68.

Accredited Standards Committee X9, Inc.

The Accredited Standards Committee X9, Inc (ASC X9) is accredited by the American National Standards Institute (ANSI) to develop and maintain voluntary consensus data standards for the U.S. financial services industry. ASC X9 is the U.S. voting body for ISO. The OFR is a board and executive committee member and holds leadership positions on multiple subcommittees.

In its role as chair of the X9D Subcommittee, which is responsible for developing standards for financial instruments, the OFR leads X9’s Industry

Forum for Financial Terms Harmonization. This body is developing a common data dictionary, using open data standards to align terms and definitions widely used in the financial sector.

The OFR is the vice chair of the X9A Subcommittee, responsible for developing standards for retail card and mobile-based payments and contributing to international work in these areas. The OFR was also elected to chair the X9A1 Blockchain working group to address gaps in the security, integrity, and accessibility of blockchain and distributed ledger technology for emerging payments and financial services. The OFR led the development of a proposal for a Risk Assessment Framework for Bank Provided Crypto Asset Payment Custodial and Payment Services. This was presented to X9's Real-Time Payments Study Group for additional support and partnership.

Tools for Risk Measurement and Monitoring

Short-term Funding Monitor

The OFR began publishing the Short-term Funding Monitor (STFM) in September 2020. During FY 2021, the STFM became one of the OFR's most heavily used financial stability monitoring tools. The data application programming interface for the STFM is often accessed more than 1,000 times per day. In Q3 FY 2021, the OFR expanded the STFM with a new set of time series designated the final vintage (or

version). This set of time series reflected all errors corrected from the preliminary vintage published daily. These series make the STFM an even-more-valued resource for academic researchers seeking a greater understanding of short-term markets.

There were two significant, though less visible, changes in 2022. First, the OFR's Data Operations team adapted to changing market practices in the form of the new sponsored general collateral financing product from FICC. Second, the volume of the new product is too low to affect published aggregates at this time, but with assistance from FICC, the OFR prepared the new data source and captured data from the beginning of trading.

The Data Operations staff also streamlined operational procedures to reduce the need for manual oversight of the daily data feed. This will allow the OFR to handle larger feeds in the future with fewer staff resources.

Financial Stress Index

The Financial Stress Index (FSI) is a daily index that monitors stress in the financial system. It is constructed from 33 financial market indicators—such as yield spreads, valuation measures, and interest rates—that represent the five categories of credit, equity valuation, funding, safe assets, and volatility. The FSI shows the financial stress contributions of several categories (credit, equity valuation, funding, safe assets, and volatility) as well as three regions (the U.S., other advanced economies, and emerging markets). During periods when financial stress is above average, the FSI is positive, and when stress is below average, the FSI is negative.

In FY 2022, the FSI was negative from October to February, then was marked by repeated periods of financial stress peaking in March, May, and July, continuing into FY 2023. This stress was driven mostly by the volatility and equity valuation categories across the FSI regions of the United States, other advanced economies, and emerging markets.

U.S. Money Market Fund Monitor

The OFR's U.S. Money Market Fund Monitor (MMFM) tracks the investment portfolios of money market funds. The MMFM converts data from the SEC's Form N-MFP2 data into a user-friendly format that allows users to chart fund characteristics, such as the types of assets held, investments by country, and counterparties involved. After surging in FY 2020, a record of 30%, money market fund total flows began a steady decline through the end of FY 2022. While remaining well above pre-COVID crisis levels during FY 2022, flows have oscillated during the year. Since the middle of FY 2021, fund participation in the Federal Reserve's reverse repurchase agreement (RRP) facility has gained significantly. As a result, activity in mid-FY 2022 peaked at around \$2 trillion.

Bank Systemic Risk Monitor

The OFR's Bank Systemic Risk Monitor (BSRM) is a collection of key indicators for monitoring systemic risks posed by the largest banks. The BSRM allows users to easily assess a bank's systemic risk capital surcharge, total assets, leverage, and

reliance on short-term wholesale funding. Features include systemic importance scores for U.S. and international banks and the OFR's Contagion Index, which reflects the financial system's exposure to these banks' activities and results. Components of the score focus on the size of a bank and its broader impact on the financial system based on:

1. The extent of the bank's network of obligations within the financial system,
2. The unique proposition of its offerings and services not replaced easily by others,
3. The complexity of the bank's operations as it pertains to the various assets classes in which it is involved, and
4. The coverage it provides across international borders.

Users have access to data tabs, customizable charts, and the OFR's Contagion Index, which considers size, leverage, and relationships with other financial institutions to reveal a potential loss that could spill over into the rest of the financial system if a given bank were to default.

Research and Analysis Center

The Research and Analysis Center (RAC) conducts applied and long-term research and analysis to support the stability of the U.S. financial system. The Center produces financial stability monitors, research, evaluation of financial stability policies, and briefings for the Council and other stakeholders. RAC makes certain results of

its work available to the public to promote transparency and engagement.

Working papers allow members of the OFR staff to disseminate preliminary research findings in a format intended to generate discussion and comments among an expert audience.¹⁸⁰ Titles published¹⁸¹ in 2022 included:

- Hedge Funds and Treasury Market Price Impact: Evidence from Direct Exposures
- Central Bank Digital Currency: Stability and Information
- Cash-Hedged Stock Returns
- Aggregate Risk in the Term Structure of Corporate Credit
- Financial Intermediary Funding Constraints and Segmented Markets

Briefs by OFR staff appeal to a broad audience.¹⁸² These papers analyze the stability implications of financial and regulatory policy, as well as recent developments in the financial system. Titles published¹⁸³ in 2022 included:

- U.S. Commercial Real Estate Has Proven Resilient, but Emerging Risks Could Generate Losses for Lenders
- Treasury Market Stress: Lessons from 1958 and Today
- Negative Rates in Bilateral Repo Markets

RAC broadened the OFR blog to highlight topical issues that may interest a wider audience.¹⁸⁴ Topics covered by blog posts¹⁸⁵ in 2022 included:

- Non-centrally Cleared Bilateral Repo

- Rising Interest Rates Help Insurers, but Market Volatility Poses Risk to Some
- OFR Finds Large Cash Holdings Can Lead to Mismeasuring Risk

RAC regularly collaborates with outside researchers to identify and better understand threats to financial stability and ways to mitigate them. During 2022, RAC hosted or co-hosted research events, including:

- a one-day virtual symposium on November 4, 2021, for Ph.D. students to present cutting-edge research discussing important financial stability issues;
- “Financial Stability: Planning for Surprises, Learning from Crises,” which was co-hosted by the Federal Reserve Bank of Cleveland and held virtually November 17-19, 2021; and
- a one-day virtual conference on climate risk and financial stability, which was held September 9, 2022, in which experts presented research and held panel discussions on asset valuations, credit markets, stress testing, financial system externalities, and other topics.

OFR researchers presented their analyses and findings at various conferences, including:

- The Arizona State University Sonoran Winter Finance Conference;
- The Office of the Comptroller of the Currency (OCC) Research Symposium on Systemic Risk and Stress Testing in Banking;
- The Young Scholar Finance Consortium;

- The Eastern Finance Association’s annual meeting;
- The Federal Reserve Short-Term Funding Markets Conference with the University of Maryland;
- The SFS Cavalcade Conference;
- The Canadian Economics Association’s annual meeting; and
- The Society for Computational Economics’ 28th International Conference on Computing in Economics and Finance.

DARPA Cooperation

In 2022, the OFR provided subject matter expertise for the Department of Defense’s Defense Advanced Research Projects Agency (DARPA) EcoSystemic program, to address disruptions to distributed financial ledgers.

Integrated Planning

The OFR’s integrated-planning framework increases the line of sight between what we do and why we do it, ensuring strategic alignment and helping to make the Office a great place to work. The framework includes a cycle of leadership conversations about the OFR’s strategy, enterprise risk, tactical planning, resources, performance, and trade-offs. These conversations resulted in a data-driven map of the OFR’s priorities tied to its strategic objectives, the work required to advance the mission, the resources needed to move forward, and increased clarity about progress toward strategic goals.

This integrated map organizes and guides the work of the OFR, enabling a better

understanding of high-priority areas, improved monitoring, and reporting on financial stability risks—including those that originate outside the financial system. The plan is responsive to the emerging priorities of the Council and the Administration: short-term funding, asset management (hedge funds), digital assets (crypto assets), climate-related financial risks, and cybersecurity.

In 2022, the OFR revisited its *Strategic Plan 2020–2024* to ensure the discussion of strategic goals accurately reflects current work. The OFR made minor adjustments to its objectives to incorporate and demonstrate the accomplishments made in the OFR’s organizational culture and operations.

The OFR continued to meet its mission requirements and monitor financial stability throughout the COVID-19 pandemic while also providing support to the FSOC Secretariat and Council member agencies. On March 14, 2022, the OFR began re-entry into the office with a transition period through May 20, 2022. The OFR implemented hybrid workplace flexibilities that included telework and remote work.

Investments

The OFR’s annual budget and workforce plan cascade from the Office’s integrated-planning activities. The OFR Director consults with the Council Chairperson to establish the OFR annual budget and workforce plan. The OFR is funded through semiannual Financial Research Fund assessments.

The OFR obligated \$78.5 million in FY 2022, 45% for labor and 55% for nonlabor expenses. This funding directly supported

the OFR's strategic priorities. A significant portion of the nonlabor expenses is the cost of the data needed to execute the OFR's unique research mission (\$10.3 million), which enables the OFR to achieve its statutory mandates.

The OFR leverages the Treasury's shared-services programs, spending roughly \$8.6 million per year for support services for the OFR's human capital (e.g., payroll, recruitment, benefits, and agency-wide systems for training), finance (i.e., budget and acquisition), security processing, and travel programs. In addition, the OFR is assessed by the Department of Treasury approximately \$4.4 million annually for the use of Treasury's IT circuits.

Committed to retaining and recruiting a diverse workforce, the Office made significant progress on its *Workforce Plan 2020–2024* by addressing retention, workforce development, training, and recruitment gaps. This effort included the development of an OFR-wide competency model and the completion of a competency assessment for all staff and leaders; investment in professional development in the areas of data science, contract management, agile project management, change management, human-centered design, and leadership; and deployment of additional communication channels to convey key leadership messages across the workforce.

Recruitment remains a top priority. In 2022, the OFR grew its team by 14%, reducing gaps in subject matter expertise. The OFR filled multiple critical leadership positions, including the Associate Director of Financial Institutions and a Supervisory Information Technology Specialist. The

Office also added considerable expertise and bench strength to its research, analysis, information technology, operations, and public affairs teams.

The OFR shared job opportunity announcements broadly—including through our diversity, equity, and inclusion (DEI) partners—and enlisted advertising space from trade journals to social science communities to expand awareness about employment opportunities with the OFR. In addition, the OFR encouraged flexibility in work locations, broadening the applicant pool nationally to attract the best talent.

The OFR's Technology Center implemented multiple new layers of security focused on the safeguarding of infrastructure and data. The OFR took a proactive approach to create a new security operations facility, allowing significant advances toward a zero-trust architecture, in line with the federal mandate that all agencies should be compliant with zero trust by 2024. The Technology Center completed its four-year migration from Treasury-hosted services, hardware, and equipment to a cloud environment. OFR now operates fully within a cloud-based environment.

Teams across the Technology Center reviewed (in association with the data and analytics hub pilot) new methodologies and strategies for managing the fast-growing use of data and refining the OFR's IT services. The focus on improving data management practices resulted in the successful implementation of new tools, processes, and procedures.

Figure 80. OFR Funds Obligated in Fiscal Years 2017-22 (\$ thousands)

	2017	2018	2019	2020	2021	2022
Compensation	37,379	31,991	18,095	19,205	23,271	25,612
Benefits	13,054	10,932	6,860	7,100	8,552	9,461
Benefits to former employees			292			
Labor total	50,433	42,923	25,247	26,305	31,823	35,073
Travel	447	147	156	75	6	37
Transportation			2			
Communication and utilities	179	131	68	116	125	135
Printing and reproduction	22	8	7	7	3	7
Other services	31,823	26,353	26,648	25,815	31,245	31,957
Supplies and materials	6,508	5,649	6,118	9,837	8,377	10,231
Equipment	3,459	679	309	519	632	1,065
Nonlabor total	42,438	32,967	33,308	32,785	40,388	43,432
TOTAL	92,872	75,890	58,555	59,497	72,211	78,505

Note: Other services include rent and administrative support for human resources, conferences and events, facilities, and procurement.

Source: Office of Financial Research