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Financial Innovation And Statistical Methodology – Key Considerations

Joe Crowley, Marco Espinosa-Vega, Elizabeth Holmquist,
Ken Lamar, Emmanuel Manolikakis, James McAndrews, and
Holt Williamson

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Financial Innovation and Statistical Methodological Guidance—Key Considerations
Prepared by Joe Crowley, Marco Espinosa-Vega, Elizabeth Holmquist, Ken Lamar, Emmanuel Manolikakis, James McAndrews and Holt Williamson*

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ABSTRACT: Financial risks outside of the traditional banking sector can quickly spread throughout financial systems and lead to disruptions in the real economy. A lack of adequately detailed financial sector statistics can obscure buildups of risks from policymakers and hinder their ability to effectively respond once these risks materialize. In response, authorities worldwide, international organizations, including the IMF, and the Group of 20 (G-20), called for financial reforms and launched efforts to gather information on nonbank financial intermediary (NBFi) activities—including the Data Gaps Initiative (DGI) and enhanced Financial Stability Board (FSB) NBFi data collection. While these initiatives represent significant strides to strengthen NBFi’s data collection, there continue to be gaps in the conceptual and methodological guidance in the financial and macroeconomic statistics manuals on which the FSB, DGI, and national authorities rely; gaps that are increasing in light of increased globalization and the financial sector digitalization. This paper proposes conceptual guidance to help bridge existing and emerging gaps.

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WORKING PAPERS

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Prepared by Joe Crowley, Marco Espinosa-Vega, Elizabeth Holmquist,
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I. Introduction

As the Global Financial Crisis (GFC) made clear, financial risks outside of the traditional banking sector can quickly spread throughout financial systems and lead to disruptions in the real economy. Prior to the GFC, for example, rapid growth in credit intermediation via the so-called shadow banking system (e.g., securitization) received relatively little attention from regulators and policymakers. This neglect stemmed, in part, from a lack of adequately detailed statistics, including on the size and interconnectedness of emerging risk exposures.

In response, authorities worldwide, international organizations, including the IMF, and the Group of 20 (G-20), called for financial reforms and launched efforts to gather information on nonbank financial intermediaries' (NBFIs) activities. A well-known outcome was the G-20 Data Gaps Initiative (DGI-I) geared towards strengthening relevant data collection for financial stability analysis (Box 1).

In line with these efforts, the Financial Stability Board (FSB) initiated an annual global collection of macro data on NBFIs, which in its broadest measure includes all private, non-deposit-taking financial institutions.¹ Additionally, the FSB also tracks two subsets of NBFIs: Other Financial Intermediaries (OFIs) and a narrow measure of NBFIs, which encompasses “entities that may pose bank-like financial stability risks (i.e., credit intermediation that involves maturity/liquidity transformation, leverage transformation, leverage or imperfect credit risk transfer).”² Over the years, ambitions for this data collection’s coverage of NBFIs institutions, activities, and interconnections has continued to expand in granularity and scope—due at least in part to digital financial services innovations and the increasing demand by stakeholders for additional clarification of how this trend may impact the economy.

While these initiatives represent significant strides to strengthen NBFIs’ data collection, there continues to be gaps and, more broadly, a need for additional conceptual and methodological guidance in the financial and macroeconomic statistics manuals, on which the FSB and the DGI rely. This paper proposes guidance to help bridge these existing gaps.³

The paper starts with an overview of the current NBFIs taxonomy within the other financial corporations (OFC sector) as well as select financial instruments in the financial and macroeconomic statistics manuals (FMSMs).⁴ It identifies areas where the taxonomy would benefit from updates, clarification, streamlining, and consistency. Furthermore, it suggests expanded coverage of the NBFIs sector to capture potential financial stability risks. Finally, it compares the proposed new breakdowns with those planned in the context of the SNA and Balance of Payments Manual updates and proposes a common core taxonomy.

¹ Deposit taking institutions include mainly central banks and banks, though other deposit-taking institutions, such as credit unions or SACCOs are also included.

² [Non-Bank Financial Intermediation - Financial Stability Board \(fsb.org\)](https://www.fsb.org/non-bank-financial-intermediation/)

³ While the additional conceptual guidance and taxonomy proposed in this paper would aid the compilation of macro statistics that can be used for macro-financial surveillance, such data will also need to be complemented with additional, higher frequency, and more granular and timely data for financial stability analysis.

⁴ Money market funds are classified as ODCs in Monetary and Financial Statistics (MFS), but for the purposes of this paper, money market funds are excluded from deposit taking institutions and included in the NBFIs sector. FMSMs include the 2008 System of National Accounts, Balance of Payments Manual 6, Monetary and Financial Statistics Manual and Compilation Guide, Government Finance Statistics Manual. The 2019 Financial Soundness Indicators Compilation Guide and the 2015 Handbook on Securities Statistics are also included in the overview of current NBFIs taxonomy.

The paper proceeds to review recent developments in Fintech and illustrates how economic theory, funding sources, risks, and the scope of regulation need to be considered for their classification in official statistics. Finally, the paper proposes possible paths forward for conceptual guidance updates. This version of the paper refrains from a number of topics, including cross-border discussions—to be better addressed in a follow up version.

Box 1. The Data Gaps Initiative (DGI): Goals and Achievements

In the wake of the GFC, the G-20 Finance Ministers and Central Bank Governors Working Group on Reinforcing International Co-operation and Promoting Integrity in Financial Markets (G20WG) called on the IMF and FSB to identify data gaps—including those related to complex instruments, off-balance sheet entities, and cross border linkages of financial institutions that hindered policy responses during the GFC—and to recommend ways to strengthen relevant data collection for financial stability analysis. The DGI had two stages.

During the first stage (DGI-1), the G20WG made a list of 20 key recommendations covering three main areas relevant for financial sector surveillance.

- Monitoring risk in the financial sector including Financial Soundness Indicators (FSI) country coverage; standardized measures of tail and other distributional risks; system-wide macroprudential risk; credit default swaps (CDS) markets; disclosure requirements for complex products; and information on securities.
- Tracking international network connections including linkages across individual financial institutions with special attention paid to GSIBs; CPIS and IBS; identification of nonbank financial counterparts, perhaps including for nonresident exposures; IIP; cross border flows and exposures (financial and nonfinancial); and a standardized template for international exposures of large NBFIs.
- Expanding sectoral and other financial and economic datasets including balance sheets, flow of funds, and sectoral data; as well as nonfinancial sector information, including distributional data (i.e., income quartiles) Government Finance Statistics (GFS), public sector debt; and real estate prices.

At the completion of the DGI-1, in 2015, only a handful of the recommendations had been fully completed.

At the same time, the DGI-2 was launched to complete the DGI-1 recommendations and to implement new recommendations on derivatives and the Coordinated Direct Investment Survey (CDIS). When the DGI-2 was completed in 2022, about half of the recommendations had been fully completed and significant progress had been made on the rest.¹

The recommendations that had not been fully completed by the end of the DGI-2 include:

- Recommendation 5) Shadow banking. Most G-20 countries made limited progress on collecting and disseminating securities financing transaction data (loans securitized with securities, including repos).
- Recommendation 10) IIP. Gaps relate to other financial corporations (OFCs) and currency composition.
- Recommendation 11) IBS. Several countries do not report consolidated banking statistics, which measure banks' country risk exposures on a worldwide consolidated basis.
- Recommendation 14) Cross border NBFi data. Only thirteen G-20 countries reported NBFi data, and this is done via IMF's Standardized Report Forms for OFCs (SRF-4SR), ECB, and one other method, raising comparability questions.

¹ See closing See closing DGI-1 report <https://data.imf.org/api/document/download?key=60952980> and DGI-2 report <https://www.imf.org/-/media/Files/Research/imf-and-g20/2022/g20-data-gaps-initiative-dgi-2-closing-report.ashx>.

II. Non-Bank Financial Intermediation in Macro Statistics

International macroeconomic statistical standards are periodically revised to ensure they reflect the current structure of the economy and financial systems. The latest update process for the *BPM6* and *2008 SNA* was launched in 2020 with a target publication date of 2025. Some of the issues being addressed in the update of the manuals center on the treatment of NBFIs subsectors and instruments. Box 2 provides an overview of the main recommendations of these guidance notes.

Box 2. Guidance Notes Related to Non-Bank Financial Intermediation and Fintech Recording

The Joint Financial and Payments Systems Task Team (FITT) drafted a series of guidance notes concerning updates to the BPM6 and the 2008 SNA with recommendations, some of which have already been approved by both the IMF Committee on Balance of Payments Statistics, and the Advisory Expert Group on National Accounts. The notes' related to non-bank financial intermediation and the recording of fintech activities are summarized as follows

The guidance note on “Capturing Nonbank Financial Intermediation” and a follow up note on “More Disaggregated Institutional Sector and Financial Instrument Breakdowns” recommend additional sectoral and instrument breakdowns in SNA and BPM to better capture non-bank financial intermediation.

Additions to the SNA sectoral breakdowns would include dividing money market funds (MMFs) into constant and variable net asset values (NAV), separating insurance into life and non-life corporations, and separating pension funds into defined benefit and defined contributions plans (a third note addresses hybrid insurance and pension products). Furthermore, detailed subcategories would be added to non-MMF investment funds (12), OFIs (6), and captive financial institutions and money lenders (4). These additional categories are reflected in Appendix IV.

Additional subcategories for the BPM would include MMFs, non-MMF investment funds, insurance corporations, pension funds, OFIs (of which central clearing counterparties), and captive financial institutions and money lenders, and financial auxiliaries. Furthermore, “Loans” in the updated SNA and BPM would include an “of which” line for repos, and in external sector statistics (ESS), nonfinancial corporations would be separated from households and NPISHs.

The guidance note “The Recording of Crypto Assets in Macroeconomic Statistics” examines the classification of crypto assets / currencies. Key issues being reviewed include whether crypto assets without a corresponding liability should be classified as non-financial assets or as financial assets.

The guidance note on the “Impact of Fintech on Macroeconomic Statistics” finds that while the concept of “fintech” is not specifically referenced in the existing international statistical standards, they allow for the proper treatment and recording of fintech companies and fintech related activities in most cases without the need to introduce a new “fintech” sector. However, it proposes that an “of which fintech” category can be included within the existing activity and sector classifications for countries with significant fintech activities (not reflected in Appendix IV).

The guidance note on “Financial Derivatives” recommends key changes for classifying derivatives. The main change would be for derivatives to be broken down by market risk category (6), instrument (7), and trading venue and clearing status (3) (market risk and instrument breakdowns are included in Appendix IV). Other items include clarifications and reemphasis of existing guidance.

Box 2. Guidance Notes Related to Non-Bank Financial Intermediation (Concluded)

The guidance note on “Credit Default Swaps” (CDSs) recommends continuing to classify CDSs as options instead of forward contracts. The reasoning is that CDSs share several characteristics with other options, while the most notable characteristic shared with forward contracts is that its market value may switch from positive (asset position) to negative (liability position) or vice versa over the contract period. It also recommends breakdowns of financial derivatives by risk category so that credit derivatives can be separately identified.

The guidance note on “Reverse Transactions” (RTs) recommends maintaining the current recording of RTs in *BPM6* and *2008 SNA*. It also recommends several clarifications (recording of short RT positions, interest and dividends on borrowed securities, identify borrower counterparties, etc.) and discussing separate presentations of RTs in in the updated SNA and BPM.

These guidance notes provide important conceptual clarifications about the recording of NBFi and digital assets in the official accounts. This paper elaborates on the need for further updated guidance and argues that a common taxonomy should be incorporated across the FMSM. In doing so, it outlines the financial stability rationale for additional NBFi breakdowns, a broader analysis of digital financial intermediation, and additional recommendations to continue to strengthen FMSM guidance for the development of financial intermediation statistics to aid macro stability analysis.

The State of Play

Financial and macroeconomic statistical manuals play an important role in the conceptual and methodological guidance for the production of relevant NBFi statistics. For example, the FSB’s annual Global Monitoring Report on NBFi draws from sectoral balance sheet information provided by national authorities. Compilers are referred to *2008 SNA* and related manuals for guidance when completing the reporting template on non-bank financial intermediation.

However, the detail needed to move from a measure of other financial intermediaries to economic funds, as requested by the template, goes far beyond the nine financial corporation subsectors described in the *2008 SNA*, and thus reporters have found the existing SNA taxonomy insufficient.

This is not surprising considering how the financial sector has evolved since the drafting of the SNA. While many of the financial subsector details now being requested for financial stability monitoring by the FSB will be addressed by enhancements to the SNA that are planned for the upcoming 2025 update (for example, detail on equity, bond, and hedge funds), there will continue to be gaps—such as for the new FSB request for government MMFs statistics.

Additionally, in some places current FMSM guidance may be inconsistent or non-existent. For example, the classification of guidance for real estate investment trusts (REITs) and real estate funds—an important link

between the financial sector and the real economy—is complex and ambiguous.⁶ A compiler providing information to the FSB template that calls for a breakdown between REITS and real estate investment funds, and further—between equity and mortgage types as part of the financial corporations sector—will be left confused when they are told to rely on the national accounts for guidance. This lack of clarity could ultimately result in reduced international comparability for the FSB collection and measurement errors in key macroeconomic indicators such as saving, investment and equity in the sectoral accounts with potential misleading policy guidance by decision-makers.⁷

In this case, as in numerous others, there is a need to update and expand the guidance in the SNA and BPM manuals, as well as to ensure that the methodology is consistent across all official manuals. The aim should be to provide a common core taxonomy across all official manuals, augmented with additional domain specific material as deemed relevant.⁸

Currently, there exist differences in the way NBF activity is defined, classified and presented in the various FMSMs. The updating of the BPM and SNA and future update of the GFS and MFSM provide an excellent opportunity to improve the consistency with which NBF statistics are produced and presented to users. Given the importance of an up-to date conceptual guidance for the collection of relevant NBF data, Appendix I provides a side-by-side comparison of the current taxonomy across all the main NBF categories in STA's suite of manuals for institutional investors and asset managers; market intermediaries; and financial market infrastructure. This bird's eye view reveals overlaps and differences in taxonomy across STA's suite of manuals and aids with the identification of gaps and areas in need of update and/or streamlining—to improve analytical efficacy.

Figure 1 below provides an excerpt of the full color-coded authors' assessment where the current manuals' NBF taxonomy could be enhanced (the complete list can be found in Appendix II).

- Green cells indicate cases where all core elements of comprehensive taxonomy are there, although the text would benefit from updates (for example, the definition of open-end non-MMF investment funds in the 2008 SNA would benefit from streamlining).

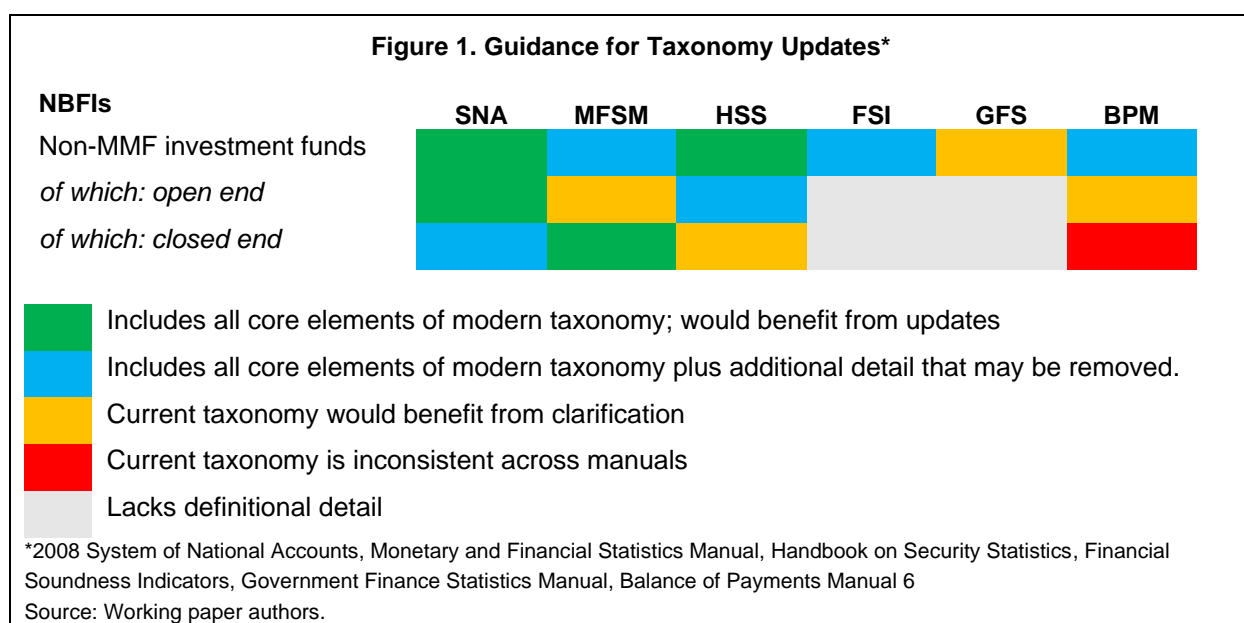
⁶ REITs can be legally incorporated entities or more generally, structured as trusts, where the units trade on stock exchanges. In the 2008 SNA, real estate activities by trusts or companies are classified under the non-financial corporate sector. Real estate funds are classified under the non-money market investment fund sector. More detail is provided in the 2015 Financial Production, Flows and Stocks SNA handbook, where a distinction is made between real estate funds, equity and mortgage REITs; however, equity and mortgage REITs are also described as types of real estate funds. Equity REITs, are economic entities that own, manage and operate commercial and retail properties and generate a surplus through real estate services. Mortgage REITs, on the other hand, are a type of real estate fund that typically invests in mortgages or mortgage-related assets like mortgage back securities (MBS). Real estate funds invest in debt and equity securities of companies/trusts that purchase real estate – equity REITS. Both real estate funds and Mortgage REITs are categorized separately within the non-MMF investment fund subsector, while equity REITs are to be classified as nonfinancial corporations. (Box 4.7) The guidance from the MFSMCG is like that of the Financial Production, Flows and Stocks handbook, where mortgage REITS are distinct from real estate funds. The only other manual that mentions REITs is the BPM6, which simply states that REITs are to be included in the investment fund subsector but makes no mention of the distinction between equity REITs and mortgage REITs nor other real estate funds (4.74).

⁷ Appendix I lists the current taxonomy of all the main NBF categories—institutional investors and asset managers; market intermediaries; and financial market infrastructures—in official statistics, the Financial Soundness Indicators and the Handbook on Securities Statistics. These categories include relevant financial subsectors and financial instruments that will be detailed in the 2025 SNA and BPM update.

⁸ A common core taxonomy would use identical language across the manuals to minimize different interpretations of the same concept. However, beyond this common core, each manual may request additional granularity and provide examples and context appropriate to its domain.

- Blue cells indicate cases that are similar to green, however the taxonomy has detail in addition to the core elements that may be removed if not specifically domain-relevant (for instance, the Handbook on Security Statistics' (HSS) description of open-end funds includes the most popular types of these funds).
- Yellow cells refer to cases where the current taxonomy would benefit from clarification. For example, the MFSMCG says that the benefits received by participants in defined contribution (DC) pension plans are “based on the participant’s contributions to the pension fund and the investment performance of the fund” (3.200). However, this statement should clarify that employers may also contribute to a participant’s DC plan.
- Red cells indicate where there are inconsistencies across manuals. An example of such an inconsistency is in the BPM description of closed end funds, which indicates that they are also known as “exchange-traded funds” (ETFs). However, most ETFs are open-end funds.
- Gray cells indicate no existing definition. While it can be argued that not all manuals require such detailed definitions of each NBF1 subsector and instrument for the compilation of their domain’s statistics, as is the case of open end and closed end funds in the FSI and GFS manuals, maintaining common definitions across the suite of manuals may aid compilers understanding and data collection efforts.

For this review, we examined 31 different sector or instrument categories across the 6 manuals for a total of 186 elements (of which 24 green, 28 blue, 44, yellow, 7 red, and 83 missing).⁹ While inconsistencies are rare, these indicate likely priority areas for attention. These categories include the taxonomy of closed-end funds, exchange-traded funds, and REITs (previously discussed), as well as the difference between a foreign currency swap and a cross-currency interest-rate swap. The MFSMCG covered the most of our selected elements while the GFS covered the least.



⁹ Taxonomy from the 2008 SNA manual and the 2015 Financial Production, Flows and Stocks SNA handbook are grouped together in the SNA column. Seven additional NBF1 subsectors proposed in Appendix III are currently not covered in any of the manuals and have therefore been excluded from this review. These subsectors are constant net asset value (NAV) MMFs, variable NAV MMFs, government MMFs, prime MMFs, equity funds, fixed income funds, and principal trading firms.

The Need for Additional Granularity

To provide a clearer window into financial stability risks, we propose that enhancements to the existing taxonomy include additional granularity for institutional investors and asset managers, market intermediaries, and financial market infrastructures.

For example, in many parts of the world, MMFs have become a key part of the financial market plumbing when it comes to the intermediation of short-term sovereign securities and corporate debt—a liquidity transformation that exposes them to runs. Yet, current and the proposed SNA and BPM MMF breakdowns would not allow us to track detailed MMF developments.

Since the GFC there have been several episodes where NBFIs have been at the center of distress in financial markets, such as the March 2020 dash-for-cash (with large redemptions in prime MMFs). It is widely acknowledged today that NBFIs can be important sources of financial stability risk via several channels (e.g., leverage and funding reversals due to the procyclicality of credit). And the type of NBFIs that has been at the center of these episodes has included money market funds, hedge funds, broker-dealers, and even traditionally conservative institutional investors such as pension funds and life insurance companies.¹⁰ Measures to mitigate these runs (e.g., allowing stable NAVs only for MMF investing in government securities) introduced in the wake of the GFC have so far been inadequate. Several initiatives, including additional redemption gates, liquidity fees, and swing prices are under consideration.

The DGI and guidance notes in the context of the BPM and SNA updates have already recommended adding NBFIs subsectors to the existing main financial sectors listed in Appendix I, as well as some additional detail on particular financial instruments. For example, it is currently recommended to report constant net asset value (NAV) MMFs separately from variable NAV MMFs. This paper suggests compilers consider also capturing data on government and prime MMFs separately for both stable and variable NAV; detail that would have been helpful for the tracking of events such as the March 2020 dash-for-cash.

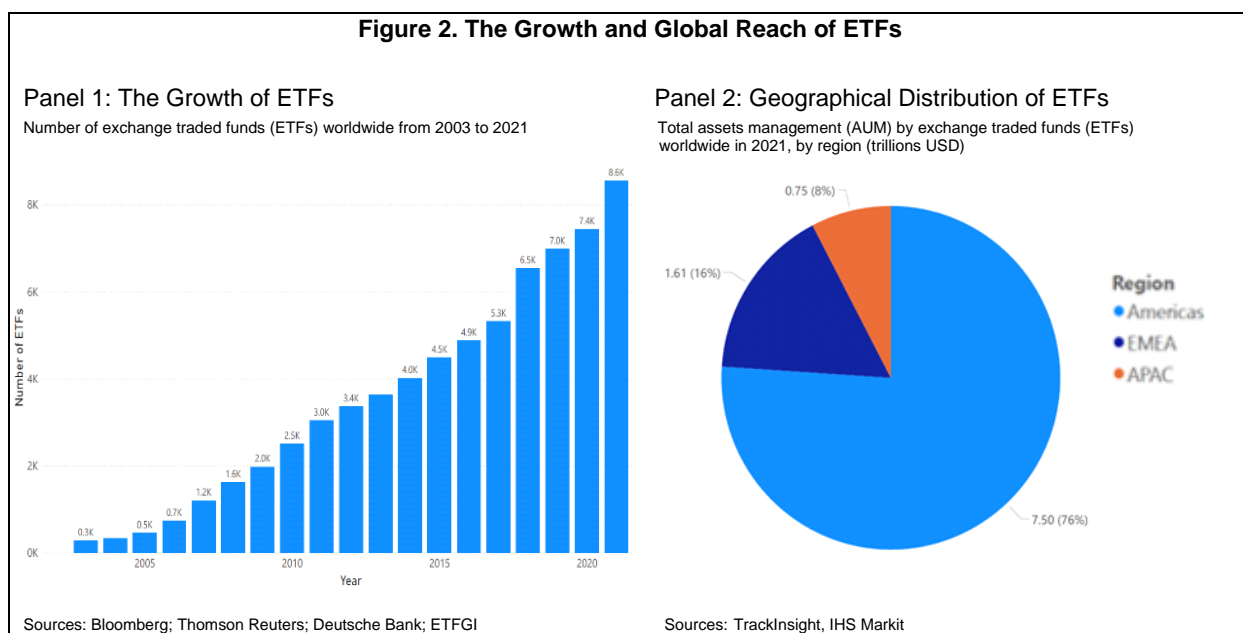
Recommendations for Taxonomy Updates and Additional Granularity

This paper recommends that the taxonomy related to NBFIs be reviewed and updated across the suite of manuals to enhance clarity and consistency. This will reduce confusion and ultimately improve the availability and quality of statistics. Similarly, the paper suggests additional granularity, even beyond the planned SNA and BPM update, in the conceptual guidance for the collection of NBFIs data for macro-financial surveillance. Such guidance will aid national compilers who face continuous demands for statistics with increased

¹⁰ As documented, for the U.S., by Herman et al. (2015), nonbank credit tends to be more procyclical than bank credit. As explained in, for example, Cunliffe (2020), highly leveraged NBFIs are exposed to “small price moves (leading) to large losses relative to the fund’s Net Asset Value, (with) ... growing margin requirements (reducing) the amount of funding to support trading. This combination of losses and liquidity demands can very quickly generate pressure on funds to de-lever, with corresponding reductions in market liquidity. As demonstrated in, for example, (Shin et al. 2011), an important source of funding risk in the banking sector is the reliance on non-core funding (e.g. wholesale deposits) because movements away from core funding hides sudden funding reversal risks. And due to the complexity and opacity in some of NBFIs funding linkages, funding reversal risks are more prominent in the NBFIs sector. Kayshap (2021), illustrates with a hypothetical example, funding reversal risks arising from funding interconnections among pension funds, money market funds broker-dealers and hedge funds. As he explains, these funding chains “can create contagion in liquidity demands” in times of stress times. Funding chains across these NBFIs create a cumulative need for liquidity that “can far exceed the liquidity needs of any one party in the chain”. Funds are recycled in the NBFIs system in that for “each link in the chain, one party’s perceived liquidity asset is another part’s runnable liability.” A real-life example of this hypothetical dash-for-cash was observed in March 2020, where non-government money market funds experienced significant redemptions.

granularity and scope – such as with the FSB collection on nonbank financial intermediation— but have little methodological guidance on which to rely.

As illustrated for the case of MMFs, where liquidity mismatches pose a potential systemic risk, the ultimate selection criteria for the proposed NBFI taxonomy and granularity updates would be the type of systemic risk posed by the sector/financial market. Another example is the case of exchange traded funds (ETFs) which have seen significant growth since their inception in the late 90s (Figure 2). ETFs issue shares that are designed to track an underlying passive investment (indexes) and are often promoted as a cost-effective way for investors to gain exposure to long term assets. ETFs hold portfolios of securities financed with the issuance of shares that can be traded continuously on centralized exchanges but can only be redeemed by Authorized Participants (APs)—buying or redeeming shares to arbitrage away any deviations in the ETF price relative to its NAV. ETFs have grown significantly since the turn of the century, holding close to \$ 10 trillion in assets.¹¹ These funds have become competitors to MMFs and have expanded beyond holding safe assets. The ETF model relies on authorized participants to act to keep the ETF price on its NAV. However, the liquidity of the underlying asset markets, and liquidity constraints faced by authorized participants has led to share prices deviating from fair market value of the underlying assets during stressful market conditions, which can be destabilizing for institutions that rely on ETFs for cash management.¹² Recent stress events include corporate bond ETFs trading at steep discounts to underlying asset values in March 2020.



Appendix III details the potential financial stability risk triggers associated with the suggested breakdown of NBFI subsectors. We seek to identify key financial subsectors whose business models make them susceptible to risks, such as maturity, liquidity, funding, exchange rate mismatches; excessive leverage, whereby a financial institution may have difficulty absorbing even moderate losses; and counterparty risks, such as credit risk.¹³ This appendix also presents suggested taxonomy for each of the proposed subsectors.

¹¹ See ETFGI reports the global ETFs industry gathered US \$105.88 billion of net inflows in February 2022

¹² For further discussion of the potential systemic risks posed by ETFs, see Bhattacharya and O'Hara (2020).

¹³ Additional NBFI subsectors and financial instruments that could be considered for coverage later include warehoused asset loans, insured versus uninsured deposits by investor, securitization funds, and interval investment funds.

Appendix IV summarizes the list of additional NBFI breakdowns proposed in this paper, relative to the new proposed financial sector breakdowns in the context of the SNA and BPM updates. These include additional breakdowns in MMFs, non-MMFs, REITs, hedge funds, and derivatives. While not all these NBFI breakdowns may be relevant to all jurisdictions, each is tied to specific risks.

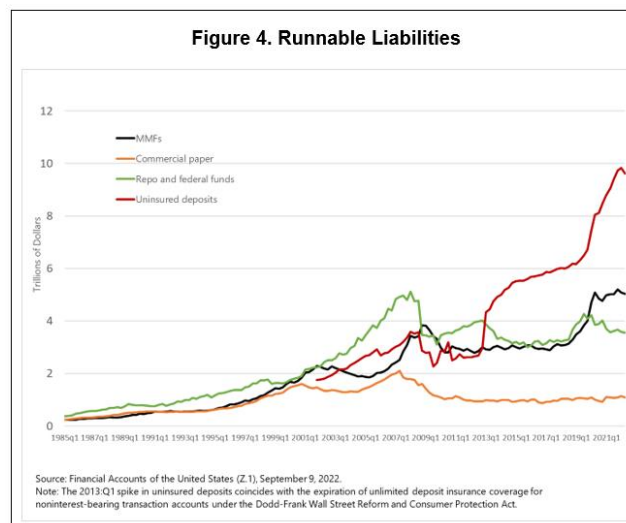
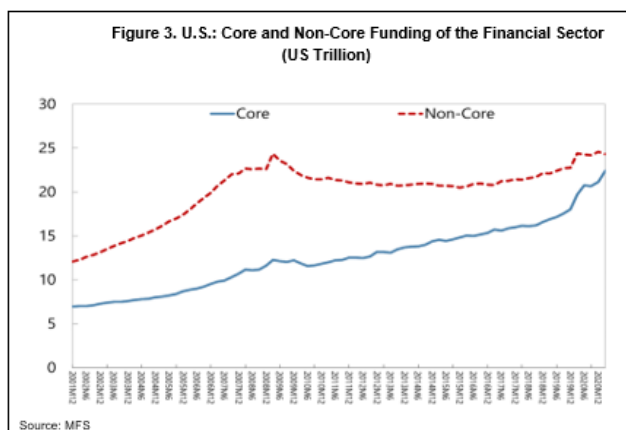
In most jurisdictions sponsorship of NBFIs continue to be the norm and the growth of NBFI activities has outpaced that of the traditional banking sector. Within the banking sector, reliance continues to shift to wholesale funding from retail deposits. Some of the suggested breakdowns in appendix would allow for better tracking of core and non-core funding in the banking system, as illustrated in Box 3.

Box 3. NBFI Data for Financial Stability: Two Examples

Figure 3 illustrates how existing monetary and financial sector data can usefully be deployed in tracking the composition of NBFI liabilities, which can provide insights into the stage of the financial cycle and the buildup of risk. The figure shows that prior to 2008, noncore funding of the financial sector increased at a much faster pace than core funding, and that it was the noncore funded part of the financial sector that suffered by far the greatest contraction when the crisis occurred.

Figure 4 provides a more granular look at specific elements of the NBFI sector. It shows that repos, federal funds, and to a lesser extent MMFs and uninsured deposits, increased sharply prior to 2008, representing a buildup of risk. These riskier markets also suffered greater contractions after the crisis in 2008. Repos were affected in part because of higher margin requirements. Financial intermediaries such as brokers and dealers that rely on the continuous rollover of repo for funding (including Lehman Brothers) were severely impacted. MMFs, normally viewed as safe investments because of their conservative asset portfolios, suffered runs because even small movements in safe assets caused their ability to honor their strict constant NAV obligations to come into question.

The additional breakdowns proposed in this paper would improve the collection of information on the size, composition, and maturity of funding of runnable liabilities. This additional granularity would enhance understanding of the increasingly important role NBFIs play in the financial sector and provide policymakers with a better view of emerging risks and developments to be addressed.



III. Fintech in Financial and Macroeconomic Statistics Manuals

Currently, guidance for the collection of information on fintech activities in official statistics is limited because the conceptual framework of the 2008 SNA and related official statistics was developed before the rapid growth of digital and financial innovation. This paper, along with the SNA and BPM update and the forthcoming new data gaps initiative (DGI) workplan, proposes steps to address this gap.

Fintech can be defined as technology-enabled innovation in financial services that could result in new business models, applications, processes, or products with an associated material effect on the provision of financial services.¹⁴ Fintech has disrupted payments, credit, wealth management and the transmission of monetary policy. Current fintech examples include payments and “peer-to-peer” lending facilitated by electronic platforms, robo-advisors, the creation of crypto assets, the organization of crypto exchanges, the emergence of stablecoins, loan origination, and many other banking-related services—notably those centered on payments.

To start, we will review fintech payment providers by focusing on nonbank providers of payment services, drawing from Ehrentaud et al. (2021) and McAndrews and Menand (2020).¹⁵

Non-bank payment service providers

Fintech payment providers, or Non-bank Payment Service Providers (NBPSPs) fall into several types, depending on the role they play in the payment landscape. The main distinction among NBPSPs for the purposes of potential data gaps for NBFIs statistics is whether the NBPSP 1) directly offers storage of value or 2) whether they rely on third parties for this storage.¹⁶

In the U.S., for example, many of these NBPSPs are regulated as Money Services Businesses (MSBs)—money transmitters. Those that provide storage of value act directly as payment providers and conduct business in a manner very similar to a depository institution. Classic-type MSBs, such as Western Union, issue only specific claims (for example, by depositing money with such a business, one receives a liability that can be redeemed only by a specific person and at specific place). Modern-type MSBs, such as mobile network operators (MNOs, e.g., Venmo, Alipay, M-Pesa) provide a more general-purpose liability that is quite similar to a demand deposit.

Firms such as WeChat pay, Alipay, Venmo, Revolut, M-Pesa, and others have grown rapidly in the last decade to provide online and mobile payments while also offering storage of value in accounts or on mobile devices.

¹⁴ Financial Stability Board, FinTech and market structure in financial services (February 2019)

¹⁵ In this section, we discuss fintechs that do not focus on crypto assets, but instead provide more conventional payment related services.

¹⁶ In Ehrentaud et al. (2021)'s words: “The NBPSP category comprises two nonoverlapping subcategories. They are (1) those offering storage of value in a payment account or on a device (for example, nonbank e-money institutions and post office Giro institutions) and (2) those not offering it themselves but relying on storage of value by others (e.g., merchant and ATM acquirers, payment initiation service providers and account information service providers).”

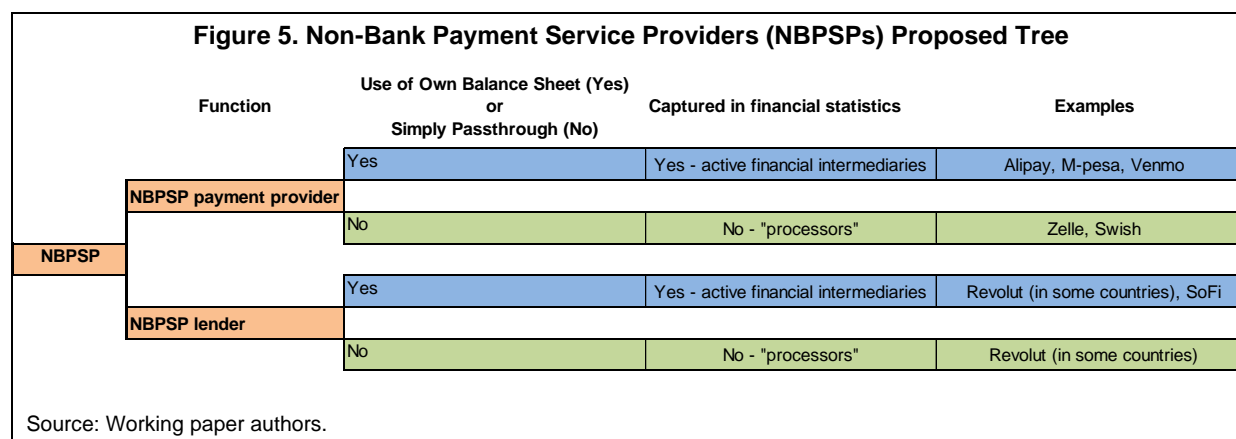
An important question is whether the assets of the NBPSPs that offer storage of value are captured in current monetary statistics collections. The answer will depend, in part, on whether regulation requires these NBPSPs to store their assets with depository corporations (e.g., central banks and commercial banks), and in part on the compiler's care in capturing electronic money balances as part of the monetary aggregates, as explained in Shirono et al. (2021).

For NBPSPs that offer storage of value in accounts or on devices, most (but not all) countries they operate in, require them to deposit their holdings at a regulated depository institution. They are therefore captured in the broad money aggregates. However, the capture of the payment transactions themselves varies by jurisdiction, and type of regulation (for an analysis of mobile money, see Shirono et al. (2021)).

In some countries, the collection of NBPSPs' data is complicated by the heterogeneous regulation to which they are subject. NBPSP liabilities are like demand deposits, but because NBPSPs are not regulated as banks they may hold assets outside the banking sector. This may lead to limited coverage or coverage being available only at the subnational level. In the U.S., for example, any statistics on the volume of services are only available at the state level, which provides inadequate statistical coverage for monetary aggregates.

A second set of concerns reflects financial stability. Nonbank regulation does not require non-banks, particularly NBPSPs, to continually keep a minimum stock of liquid assets on hand to redeem liabilities on demand. Maturity mismatches may therefore arise in the balance sheets of NBPSPs. Furthermore, the liabilities of MSBs and other NBPSPs are not insured. Consequently, they represent a risk of failure in the event of a run by their liability-holders. These concerns are greatly attenuated for NBPSPs that provide only front-end communication services and do not store value.

More generally, statistical manuals should create a basic taxonomy of NBPSPs based on their funding sources and the regulatory regimes to which they are subject. For example, for NBPSPs involved in payment processing, consideration will have to be given to whether the NBPSP stores value directly on its balance sheet to support its monetary liabilities or whether it provides access to the monetary liabilities of another financial institution. Regarding NBPSP lenders, attention will have to be paid to whether the NBPSP lends (at least in part) from its own balance sheet, through the issuance of asset-backed securities, or whether it acts as a passthrough, facilitating access to lending by third-party financial institutions. In the latter case, those NBPSPs would be considered "processors." Finally, NBPSPs that lend directly or issue monetary liabilities are active financial intermediaries whose activities should be captured in financial statistics. Figure 5 presents a type of hypothetical decision tree that would help with the classification of these entities



Technological challenges to incumbent banks

The increasing digitalization facilitated by technology, and its delivery through smart phones has led to potentially disruptive changes in finance and calls for rethinking of official statistics classifications. Many technology-centric firms have entered financial intermediation with the objective of competing with traditional banks. While there is no universally accepted nomenclature for these new entrants, they tend to be classified in two camps: challenger and neo banks. “Challenger banks,” are regulated banks that provide services through digital-only, branchless methods. “Neobanks” are non-regulated banks and innovate to find close substitutes to services provided by banks to compete for banking customers.

Challenger banks’ classification in official statistics is straightforward as they are subject to banking regulations and report their statistics in the same way that other banks do. Most challenger banks seek to attract large customer bases through their ease of use, low fees and competitive yields. Among the best known of these banks are Marcus, Discover Banks, and Varo Bank.

Neobanks are fintech firms that offer services that sometimes compete with banks and sometimes complement services provided by banks. They seek to be more user-friendly than incumbent banks, for example by working to assist depositors to avoid overdraft charges and by providing convenient apps. Because they often partner with banks, they may have their activity reported in the statistics of these banks, as is the case with Chime and Current, two U.S. examples that rely on partner banks to offer direct deposit and payment options utilizing debit cards. Revolut is an example in the U.K.

Neobanks in the embryonic stage may be classified as non-financial corporations but may require a change in classification as their activities mature. As a result, they require close attention by compilers of official statistics as they will likely be outside the scope of traditional financial data collections.

Mature neobanks may be difficult to classify depending on their funding sources and regulation. Those that are funded through securitization schemes and do not need to apply for a banking license will be difficult to classify in official statistics. Those that partner with incumbent banks or other service providers that help them to expand their reach and meet know-your-customer (KYC) and anti-money laundering (AML) regulations, would likely be captured in the regular reporting of depository institutions’ statistics.

Classification Criteria for Digital Money in Financial and Monetary Statistics Manuals (FMSMs)

Since 2008, the introduction of decentralized, peer-to-peer electronic assets resembling cash has ushered in a number of potentially far-reaching changes to the financial system. Policy makers have called for the classification of these new digital instruments as crypto assets—rather than crypto *currency* (because of its high price volatility and lack of widespread use as media of exchange).

Discussions in the statistics community have reached a consensus to classify these digital assets as financial assets provided there exists a corresponding liability. However, no consensus has been reached thus far, including in the context of the SNA and BPM update, on the treatment of crypto assets without a corresponding liability (CAWLs), even if suitable to use or even designed to act as a general medium of exchange, or designed to act as medium of exchange within a platform only.

According to the 2008 SNA and BPM6, financial assets, by definition, must have a corresponding liability—with gold bullion held as official reserves as the only exception to this rule.¹⁷ This dictum is paramount to ensure cross-sectoral and cross-country consistency of the consolidated financial accounts.

Naturally this dictum works perfectly well for what economists refer to as *inside money*, which by definition has a corresponding liability. Inside money disappears if there is sufficient consolidation across the balance sheets in an economy as amounts due-to one party cancel out amounts due-from another, netting to zero (e.g., Garratt and Wallace (2018)). Examples of inside money include checking accounts in commercial banks as well as e-money, such as Alipay or M-pesa.

Currencies classified as *outside money*, such as hard currency and central bank reserves, do not disappear when all private balance sheets are consolidated. These financial assets are what we call in this paper, **self-redeeming** (Appendix V).

Currency and central bank reserves, while widely described as backed, cannot be redeemed into anything other than central bank money.¹⁸ We suggest that currency and central bank reserves, as they are not redeemable into the assets described as backing them, is best described as self-redeeming. Such a category would also be useful for the categorization of CAWLs. Hence, we propose to classify CAWLs (for example, Bitcoin) and monetary and non-monetary gold used for financial purposes as self-redeeming. Issuers of outside assets, such as fiat money or Bitcoin, do not commit to redeem it for any other asset. It is self-redeeming. It does not disappear when all private balance sheets are consolidated.¹⁹ In Appendix V, we emphasize the fact that the novelty of crypto assets is its technology, not its economic characteristics. The technologies of crypto assets (e.g., cryptography, distributed ledger, validation consensus mechanism, etc.) are deployed to address problems such as double spending or unbounded issuance (printing money), allowing crypto assets (potentially crypto currencies) to fulfill the classic roles of money as a medium of exchange. Other than this technology, there is little that is novel about crypto assets.^{20,21} Figure 6 illustrates “the decision tree” emerging from the discussion in Appendix V.²²

In line with this reasoning, this paper—along with the ESCoE and ONS discussion paper (2021)—suggests creating a new “Valuables” category within the Financial Account and classifying self-redeeming assets, like CAWLs and financial gold within this new instrument (Appendix V).

¹⁷ Gold bullion held as part of monetary gold is the only current exception to this rule, in that it is a financial asset that no counter party sector recognizes as a corresponding liability (2008 SNA §17.244).

¹⁸ Kumhof, Michael et al. Central Bank Money: Liability, Asset, or Equity of the Nation? (November 14, 2020). Cornell Legal Studies Research Paper 20-46, Available at SSRN: <https://ssrn.com/abstract=3730608> or <http://dx.doi.org/10.2139/ssrn.3730608>.

¹⁹ Nor upon “failure” or “liquidation” of any institution involved is there a distribution of assets backing the money. This is in contrast to share-based, or equity, instruments, which have a claim on the assets of the enterprise upon liquidation. For a self-redeeming asset, no such claim either exists or would be honored.

²⁰ In practice, however, it can be argued that Bitcoin and other CAWLs are not yet acting as a widely accepted medium of exchange.

²¹ Some crypto assets, such as bitcoin, also have a novel economic characteristic in that they are not sponsored by an individual or corporation, nor are they mutually owned. Instead, they are managed as collectives with voting rules, or with coalitions of participants determining policies. While these are novel organization types, they don't strike us as related to the question of the statistical reporting of the volumes of these instruments.

²² For an alternative taxonomy contrasting traditional and digital money, see Adrian and Mancini-Griffoli (2021).

Figure 6. Hypothetical Financial Asset Decision Tree

	Medium of Exchange	Self-redeeming	Examples
Financial Asset	Yes	Yes	Currency, financial and monetary gold, CBDC
		No	Commercial bank deposits, B-Money, E-money, stablecoins
	No	Yes	None
		No	General accounts

Source: Espinosa-Vega and McAndrews.

A potential complication regarding our proposal may arise in cases where a CAWL, such as Bitcoin, is designated legal tender—as has been the recent case in a few countries. Would such designation affect the proposed classification of the CAWL as a self-redeemable financial asset? While, from a conceptual perspective, it could be argued that any asset held by the monetary authority as reserves for exchange rate management purposes (e.g., managing the exchange rate of Bitcoin vis-à-vis the US dollars) could be classified as international reserves, there are strict limits on what qualifies as international reserves. Because of those limits, it is not currently possible to classify crypto assets as international reserves. As a result, we propose that both public and private holdings of these assets should be classified in the new financial valuables category.

As the discussion about possible legal tender status indicates, the characteristic of self-redeemability does not exhaust the classification of all cyber assets—only some of which could potentially work as currencies. Further classifications may emerge, as future research sorts out several dimensions of crypto asset features. Specifically, whether a jurisdiction may deem a cryptocurrency to be legal tender; whether a cryptocurrency is programmable; whether the cryptocurrency is “native”—not tied to the use of a particular product or service, such as Bitcoin and Ethereum; whether the cryptocurrency builds on a native currency, such as decentralized applications (DApps) or non-fungible tokens (NFTs); or, like many initial coin offerings (ICOs) aimed at the funding products usually described, sometimes only loosely, in a “white paper.” Given the diverse and growing landscape of cryptocurrencies, this will be an important field of research. To give a flavor of the type of analysis that might take place in the future, we illustrate a potential taxonomy of a particular type of crypto asset—the fast-growing stablecoins.

Stablecoins

The emergence of crypto assets led to the rise of stablecoins, including custodial (tokens issued on a blockchain pledging to maintain a stable value with respect to an existing currency, commodity, or index) and algorithmic or undercollateralized coins. Specifically, algorithmic stablecoins automatically increase or decrease the supply of the coin depending on various conditions, such as a change in its price or in the backing assets that users provide to the system. Figure 7 depicts a bird's eye view classification of stablecoins. The focus of policy discussions, as the focus in this paper, has been on stablecoins issued by institutions of either the custodial or central bank digital currency (CBDC) type.

Figure 7. Types of Stablecoins

	Centralized	Decentralized
Collateralized	Custodial	Synthetics
Un(der)collateralized	CBDC	Undercollateralized

Source: Robinson and Konstantopoulos, Paradigm

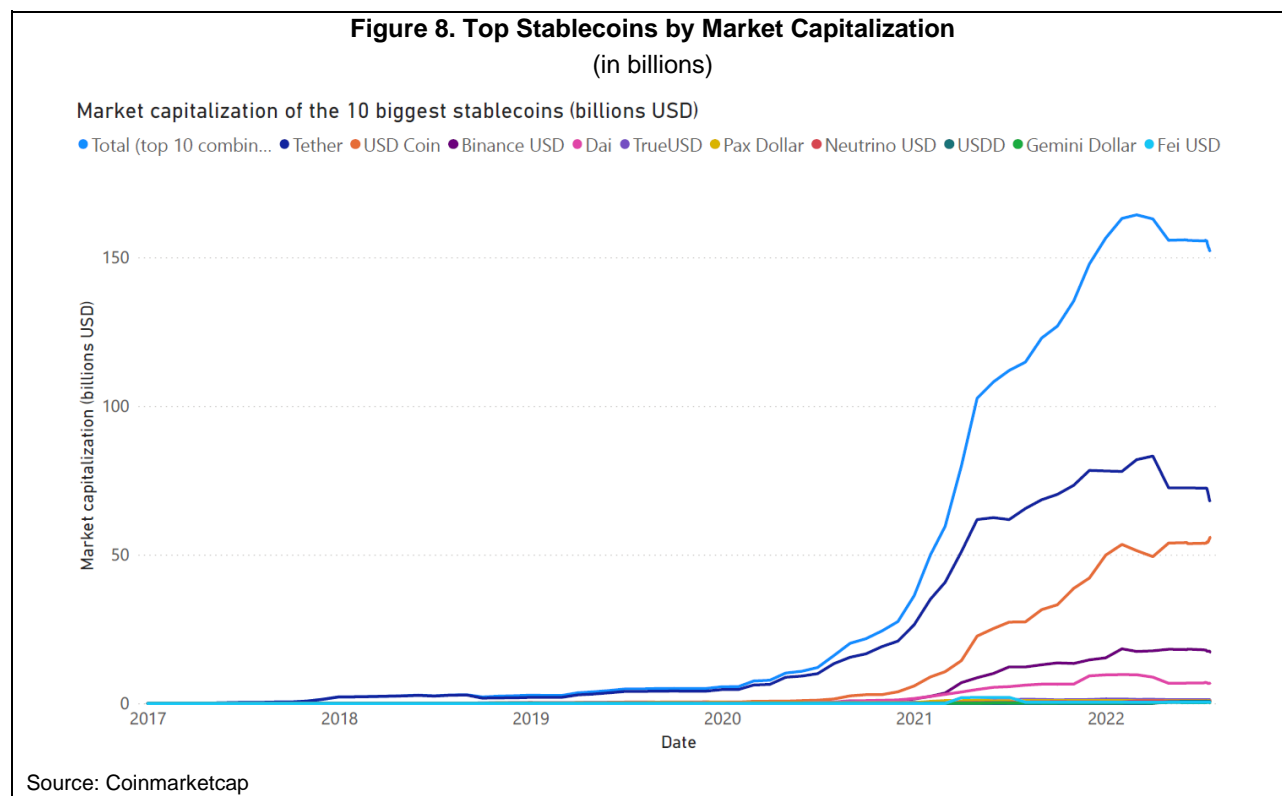
Custodial stablecoins have grown quickly (although with a recent slowdown in growth rates) as shown in Figure 8. While in the aggregate (e.g., Tether, Circle's USD, Paxos, etc.) they represent a small portion of the overall capital markets, their growth has attracted the attention of incumbent traditional intermediaries and policymakers.

Despite the strong interest in stablecoins, the technical risk they pose may not be fully understood. As explained by Narula (2021),²³ most centralized stablecoins operate as software running on decentralized blockchains. And the software and the underlying blockchain platforms they run on, are subject to technical and operational risk—a fact that may not be fully appreciated by their users and regulators.²⁴ The recent failure of Bean, a stablecoin associated with Beanstalk, an ethereum protocol, is a cautionary tale for so-called

²³ Neha Narula, "The Technology Underlying Stablecoins," 23 September, 2021, <https://nehanarula.org/2021/09/23/stablecoins.html>.

²⁴ Stablecoins run as smart contracts on blockchains. In many cases what we call one stablecoin (for example, Tether or USDC) runs on multiple different blockchains, as entirely separate tokens sharing a single backing. Users can choose which token on which blockchain to obtain, but some might be easier to obtain or use than others, as the tokens are accepted in smart contracts or as payment individually. Each blockchain is used as an accounting of who currently controls a stablecoin token. For example, USDC runs on five different chains: Ethereum (27.5B USDC), Algorand (345M USDC), Solana (2.9B USDC), Stellar (161M USDC), and Tron (206M USDC), with the intention of adding ten more. There is no "universal" USDC token—each USDC token is specific to one of these chains. This is often a point of confusion; for example, CoinMarketcap mistakenly says that "All of the USDCs in circulation are actually ERC-20 tokens, which can be found on the Ethereum blockchain." This could be because Coinbase, one of the largest US cryptocurrency exchanges, currently only sells USDC issued on the Ethereum blockchain. However, Centre's own website says that "USD Coin is an ERC-20 stablecoin," which is not true of USDC issued on other chains.

algorithmic stablecoins. More recently, the failure of Terra, an algorithmic stablecoin provided yet another illustration of their instability.²⁵



Abstracting from these risks, classification of stablecoins in terms of their backing and liquidity is evolving making their classification for official statistics purposes difficult. In Lipton et al.'s (2020) words, “We ought to ask ourselves: are stablecoins ... simply old wine in new bottles?”²⁶ The challenge is to identify when stablecoins are “old wine” (i.e., a new iteration of well-established institutions such as depository institution or money market funds) in digital form and when they are truly new type of assets (e.g., Bitcoin or Ethereum).

Key factors that determine the classification of stablecoins in official statistics include the type of assets they are backed with and the conditions for withdrawal or redemption of the stablecoins.²⁷ “To maintain a stable value relative to fiat currency, many stablecoins offer a promise or expectation that the coin can be redeemed at par upon request. These stablecoins are often advertised as being supported or backed by a variety of “reserve assets.” However, as indicated in PWG, page 4:

“Stablecoin redemption rights can also vary considerably, in terms of both who may present a stablecoin to an issuer for redemption and whether there are any limits on the quantity of coins that may be redeemed.

²⁵ See Sam Kessler, “Attacker drains \$182 million from Beanstalk Stablecoin Protocol,” Coindesk, April 17, 2022. <https://www.coindesk.com/tech/2022/04/17/attacker-drains-182m-from-beanstalk-stablecoin-protocol/>.

²⁶ Alexander Lipton, Aetienne Sardon, Professor Dr. Fabian Schär, and Christian Schüpbach, “Stablecoins, Digital Currency, and the Future of Money, 2020, available at <https://arxiv.org/pdf/2005.12949.pdf>.

²⁷ President’s Working Group (PWG) on Financial Markets, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency, “Report on Stablecoins,” November 2021. https://home.treasury.gov/system/files/136/StableCoinReport_Nov1_508.pdf.

Some issuers are permitted under the terms of the arrangement to postpone redemption payments for seven days, or even to suspend redemptions at any time, giving rise to considerable uncertainty about the timing of redemptions. As a further point of variation, stablecoins also differ in the nature of the claim provided to the user, with some providing a claim on the issuer and others providing no direct redemption rights to users”

Depending on these factors stablecoins may or may not resemble depository institutions. Stablecoins that offer rights to immediate redemption of the backing assets should probably be classified as depository institutions. Stablecoins that are not redeemable may more closely resemble ETFs, particularly if there are procedures in place to increase or decrease the amount of tokens through purchases or sales by the sponsor or authorized participants with the intention of maintaining a stable value.²⁸ However, because in most cases it may be unclear both what the backing assets are and the conditions under which tokens may be redeemed, stablecoins may not necessarily resemble either of these types of financial institutions.

Classification of custodial stablecoins in official statistics would depend on their reserves and the rights to redemption. If, for example, a stablecoin was associated with a central bank account, *all* proceeds were invested in central bank reserves, and tokens were immediately redeemable into a bank transfer, then the stablecoin issuer could be classified as a depository institution with a narrow asset base, i.e., a narrow bank. If the stablecoin held reserves at regulated deposit taking institutions that were immediately redeemable, it could be classified as a depository institution. If a stablecoin did not allow redemption of its tokens, it could be classified as a (potentially constant) NAV MMF or ETF. Figure 9 features an illustration of the type of decision tree that needs to be endorsed by official accounts methodologists for the classification of stablecoins.

Figure 9. Hypothetical Classification of Stablecoins

	Access to CB Account	Portfolio	Immediate Redeemability	Classify as
Custodial Stablecoins	Yes	100 percent in bank reserves	Yes	DTn*
	No	Account at DTs	Yes	DTs
		Cash and cash-equivalent	No	MMF
		Securities to track specific index	No	ETF

* Where DTn stands for narrow bank.

Source: IMF Staff

²⁸ See Paul Kupiec, “Should stablecoins be regulated like banks, exchange-traded funds, or both?” December 7, 2021, The Hill, <https://thehill.com/opinion/finance/584499-should-stablecoins-be-regulated-like-banks-exchange-traded-funds-or-both?rl=1>.

Central Bank Digital Currency

While the taxonomy of CBDCs is still evolving, the BIS defines CBDCs as a form of digital money, denominated in the national unit of account, and representing a direct liability of the central bank (BIS 2021). So far, two variants are widely recognized: wholesale CBDCs (restricted to use by financial intermediaries for interbank transfers and wholesale transactions); and retail CBDCs (for day-to-day payments and transfers by the wider economy). Wholesale CBDC could be more flexible than more conventional settlement systems, for example by allowing settlement outside of current hours of operation or from participants outside the jurisdiction of the settlement system. Retail CBDCs, currently being tested and studied by central banks, would offer a widely available central bank liability in a more convenient form than paper currency. CBDCs can be account-based or token-based depending on the design choices that authorities make.²⁹ A key difference between CBDCs and stablecoins is that CBDCs are issued by a monetary authority, not the private sector. In general, narrow banks, which would offer accounts backed fully by central bank reserves, are not considered CBDCs by all analysts because the liability held by the retail customer is a liability of a private bank, and not the central bank.³⁰ Such narrow bank deposits are sometimes referred to as “synthetic CBDCs.”

Various authors have suggested that CBDCs can have benefits including improved financial inclusion, improved competition in the banking system, enabling of better tools for the implementation of monetary policy, and faster and more secure finality of payment settlement. One question is whether ongoing reforms to the current retail payments system will be enough to achieve faster and more secure finality of payment settlement—making the adoption of CBDC less urgent. Box 4 reports on two recent reforms to improve current retail payment systems drawing on commercial bank accounts—CODI in Mexico and PIX in Brazil.

²⁹ See Morten Bech and Rod Garratt, “Central Bank Cryptocurrencies,” BIS Quarterly Review, September 2017, and Markets Committee, Committee on Payment and Settlement Systems, BIS, “Central Bank Digital Currencies,” March 2018, for descriptions and discussion of these types of CBDCs.

³⁰ See Adrian, T., Mancini-Griffoli, T. (2019). The Rise of Digital Money, FINTECH NOTES, 19/01, 2019, p. 1–15 for a discussion of this option, called synthetic CBDCs.

Box 4. Central Bank Retail Payment Systems

An important touted benefit of CBDC has been a potential faster, cheaper and more secure retail payment settlement system. The question is whether ongoing reforms to the current system would suffice to achieve this goal, potentially making CBDC redundant. Below, we compare two such recent reforms, CODI and PIX.

In September 2019, Mexico introduced Codi, a payment system with many similarities to Brazil's Pix. Both systems are available to virtually all transaction account holders for sending payments. A critical difference, however, is that Pix takes several key steps to promote universal access, including mandating that large financial institutions participate and that all participating PSPs provide their customers with all the functionalities needed for initiating and receiving instant payments in their mobile applications. Also, Codi data are stored at each financial institution, while Pix data are stored at the central bank. Compared to Pix, Codi was slower to introduce the capacity to make transfers to and from the government and participation in Codi is more restrictive; allowing participation only by financial institutions that are members of SPEI, the Bank of Mexico's real-time gross settlement (RTGS) system.

Codi is less widely used in Mexico than Pix is in Brazil, with monthly transactions numbering in the hundreds of thousands and volume of transactions amounting to around 150 million Mexican pesos as of April 2021. Usage of Pix, on the other hand, has soared since its launch. By end-February 2022 (15 months after launch), 114 million individuals, or 67 percent of the Brazilian adult population, had either made or received a Pix transaction. Moreover, 9.1 million companies have signed up – fully 60 percent of firms with a relationship in the national financial system. The volume of transactions, initially around R\$ 30 billion, was over R\$ 600 billion by February 2022 (about twice the amount of currency in circulation). Over three quarters of transactions are between two individuals, but business to business transactions account for about a third of the total volume of transactions. Transactions with the government are possible, but the number and volume are negligible. Pix is used by people of all ages, with only a somewhat larger though gradually declining share of younger users. A 2021 article in Bloomberg reports anecdotes of Pix being used by very small businesses and even panhandlers. Source: BCB

Pix allows for near instantaneous (within a few seconds) transfers of cash at any time of day—including when offline—at zero cost for individuals (other than in a small set of circumstances) and low cost for businesses. Transactions can take place using only cellphones, though other avenues of transacting are possible, including at bank branches and ATMs. Security mechanisms are in place to detect fraud and to quickly reverse transactions when it is detected, and transactions occur over a protected network. There is no minimum transaction size limit, but participants may establish upper limits per payee, day, or month. Participants may join Pix with usernames that don't reveal personal information, but that are linked to accounts that are not anonymous, albeit not revealed to every counterparty to a transaction.

Pix transactions are made to and from “transactional accounts”, which include demand deposit, savings, or prepayment accounts operated by a bank or other financial institution. Pix can also be used to obtain cash, including at ATMs. Pix participants do not extend credit, and there are no balances associated with a Pix account; only with the accounts that Pix is linked to.

Pix has resulted in substantial reductions in costs for users. Pix costs an average of 0.22 percent of a transaction's value for merchants, whereas debit cards in Brazil cost slightly above 1 percent and credit cards reach 2.2 percent. Pix is also more competitive than credit cards, with fees of 1.7 percent in the United States, 1.5 percent in Canada and 0.3 percent in the European Union (BIS 2022).

Ongoing reforms to the current retail payments system, such as PIX, CODI, and the upcoming FedNow are aimed at addressing the speed and finality of payments. These reforms are ongoing and limited to specific countries. At the same time, a number of countries are actively studying the adoption of retail CBDCs. Thus, guidance for the classification of CBDC is needed.

Classifying CBDC in Official Statistics

A CBDC would presumably be classified as a liability of the central bank or monetary authority in the same manner as traditional currency (the likelihood that it is nonredeemable notwithstanding) making it straightforward to classify in official statistics.

Alternatively, were central banks to issue synthetic CBDCs, a two-tier system whereby commercial banks would be involved in the issuance of CBDC, banks would act as intermediaries issuing CBDC that would represent a claim on the central bank. In that case, it could also be that the synthetic CBDC could represent a claim on the issuing commercial banks, backed by deposits at the central bank. In this latter case, CBDC could be classified like a demand deposit, as “inside” money. Either classification would be a relatively straightforward application of current statistical methodology.

What Next?

The analysis so far illustrates data gaps arising from innovations in financial instruments that have been facilitated by technology and the need for additional methodological guidance to close these gaps—to assist in the early detection of financial vulnerabilities. Additional enhancements to both national accounts, financial sectors and instrument, and basic research in these areas should contribute to better monitoring of financial developments and inform economic policy making. To that end we list some recommendations.

IV. Main Recommendations

- Update the international statistical standards’ classification systems. Provide cross-manual, common, and updated core definitions for each NBF1 subsector, starting with the proposed taxonomy shown in Appendix III. The review of NBF1 subsectors and selected financial instruments, assembled in Appendix I and illustrated in Appendix II, reveal both overlaps and inconsistencies in definitions across the STA manuals. A set of streamlined, common core definitions will aid statisticians in the assembly of necessary counterparty data and help ensure cross-domain compatibility. These core definitions should be supplemented with content appropriate to the domain.
- Expand the FMSM classification systems to include NBF1 financial institutions and activities currently not covered. As shown by the red text Appendix IV, there are several NBF1 subsectors relevant to financial surveillance that are not discussed in the current suite of FMSMs nor in the proposed updated standards. Providing methodological guidance on these—their definitions, primary activities, and links to financial

stability risks—will aid compilers in gaining support and traction for the collection of such data in jurisdictions where they are relevant, and support international comparability when data are published³¹

- Incorporate additional discussion of NBFIs's connections to financial risks in SNA and MFS manuals. For example, NBFIs that allow immediate and at constant NAV withdrawals, such as by the authorized participants of exchange-traded funds, face higher funding risk—even when their liabilities are backed by short term assets, such as government fixed income securities of short maturity. Annex III outlines how this paper's recommended NBFIs breakdowns are associated with funding risk, excessive leverage, and credit risk. While there is a robust discussion of financial risks, particularly relating to depository corporations, in the *Financial Soundness Indicators 2019* manual, compilers in other domains would also benefit from a better understanding of data needs for monitoring NBFIs subsectors.
- The international statistical community needs to take a more agile approach in the update of statistical manuals to ensure methodological guidance keeps pace with financial innovation. They will need to be able to quickly establish and adopt new international methodological guidance to keep pace with developments in NBFIs and Fintech.
- Continue to inventory the coverage of relevant NBFIs instruments, particularly those associated with sectorization, valuation, cross-border risks (not fully assessed in this paper) and those suggested through reader feedback. Identified instruments should be considered and documented in order to provide a more comprehensive view of potential risk exposures.
- Statistical frameworks and Statistical Business Registers must seek to capture non-traditional providers that compete with traditional banks and report on them in a timely manner. The increasing digitalization of technology has not only broadened access to financial services but has allowed some of these non-traditional providers to operate without banking supervision and regulation, potentially leading to systemic risks to the financial system.
- Decentralized, peer-to-peer crypto assets need to be monitored to the extent possible. They are rapidly evolving, are becoming entrenched in the financial system, and a lack of information will complicate the work of policymakers, investors, and other stakeholders.
- Reporting guidance for crypto assets and stablecoins needs to be established. Self-redeeming private crypto assets are intended to act as financial assets and should be classified as such while recognizing their novel characteristics. The paper suggests the creation of a new Valuables category within the Financial Account to include self-redeeming assets, like Bitcoin and financial gold. The wide variety of rapidly growing stablecoins pose conceptual challenges to statisticians that should be addressed by the international statistical community under the aegis of Advisory Expert Group on National Accounts (AEG) and the IMF's Balance of Payments Committee (BOPCOM).

³¹ An example of a link to a financial stability risk that should be included in the core definition is the frequency and parity at which the NBFIs allows investor withdrawals.

- The activity of fintech payment providers should be reported and monitored for purposes of both micro- and macro- financial stability. In cases where they store value within their organization, their assets should be reported and monitored on a national basis, consistent with the reporting required of banks.
- Similarly, lending by fintechs should be reported and monitored in the same way as lending by banks. Fintech lending is an important category of loan origination in many markets, and, in some jurisdictions, the dominant sector for some loan types, such as for home mortgages in the U.S.
- Funding structures for fintech lenders should be monitored for both leverage and funding risks. The risk of sudden decreases in funding availability is a key micro-prudential risk and may be associated with broader systemic risks.

V. Concluding Remarks and Next Steps

“Financial stability ... is more about the tail of the probability distribution than the central probability” wrote Cunliffe (2017). And while tail events are infrequent, their consequences can be severe. We need granular enough data to recognize the buildup of potential vulnerabilities through time.

This paper seeks to update the guidance for the collection of NBF1 and financial innovation data. Current official statistical guidance needs to be updated to reflect the rapid restructuring and innovation in the financial sector. The rapid growth of the NBF1 and more broadly shadow banking and Fintech activities have many potential benefits, but also can create systemic risk—including from liquidity and deleveraging risks in the financial sector.

The paper reviews the current coverage of NBF1 activities in official statistics (all statistical manuals), then proceeds with recommendations to enhance its clarity, consistency, and granularity. NBF1 subsectors and instruments covered in Appendix III were selected to allow for meaningful assessments of potential systemic vulnerabilities with regards to financial risks. Not all the suggested NBF1 granularity will apply to every economy, and national authorities must prioritize collection efforts around areas of greatest risk. Likewise, if any NBF1 subsectors are particularly large, statistical compilers may want granularity even beyond that proposed in Appendix III to get a more nuanced view of a particular risks. It is worth emphasizing that sectorization, valuation, cross-border, and other relevant risk topics have been deferred for future versions of the paper.

The paper then focuses on selected Fintech developments and guidance. Drawing from economic principles and regulation, it illustrates how official statistics could provide guidance to classify selected Fintech activities. Going forward, because of difficulties in identifying what sets different Fintech products apart, the decentralized nature of many of them and the evolving and sometimes fragmented regulatory perimeter, classifying these emerging activities may not be so straightforward.

This paper contributes to ongoing work across the globe to address the need for timely, relevant statistics in an environment of rapid change. It compliments ongoing international consultations regarding the update of

the SNA and BPM as well as work associated with the G-20 DGI. As these initiatives develop, their outcomes will likely influence aspects of this paper's recommendations.³²

This paper focuses on the methodological guidance needed for compilation of statistics suitable for monitoring the build-up of risks in NBFIs and fintech activities. However, we acknowledge that competing statistical priorities, heterogeneity across countries, and even the changing nature of risks challenge this work. In addition to the risk topics such as sectorization, and valuation that are deferred for now, another area for future work is to elaborate on the financial stability risks posed by climate change and biodiversity loss. As this field is rapidly evolving, there is a strong appetite for statistical guidance on data and indicators that could inform policy makers on climate-related financial stability risks. Anticipated work coming out of the new DGI will likely help usher along these efforts.

Because a clear and up-to-date taxonomy is a key pillar for NBFIs and Fintech data collection, Annex III needs to enjoy significant consensus—even as it is recognized that not all countries will need or be able to gather these data in the short run. Readers are also encouraged to share their views about the level of degree of granularity proposed in Annex III. Is this the appropriate level of granularity or are broader aggregates enough for financial stability analysis? Are their suggested enhancements to the common taxonomy recommendations?

Once there is some agreement on the NBFIs subsectors, further deliberation must consider the necessary instrument detail needed to best monitor their financial risks. For example, ideally, all NBFIs should provide information on the degree of their investors' leverage or the presence of leveraged investors to monitor the possibility of funding and market liquidity spirals on levered NBFIs. What degree of balance sheet detail would be needed for these financial subsectors? While some amount of from-whom-to-whom detail is necessary for assessments of cross-sector exposures, what degree of instrument aggregation is appropriate? Developing Table examples, such as those in the FSI Guide, would be a useful tool to encourage the collection of the agreed data.

³² For example, financial vehicle corporations engaged in securitization transactions will likely be considered in future versions of the paper for their role in dispersing credit risk.

Appendix I. Current NBF Taxonomy in Official Statistics

Institutional Investors and Asset Managers

Investment Funds

•Money market funds (S123)

SNA	Money market funds (MMFs) are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested primarily in money market instruments, MMF shares or units, transferable debt instruments with a residual maturity of not more than one year, bank deposits and instruments that pursue a rate of return that approaches the interest rates of money market instruments. MMF shares can be transferred by cheque or other means of direct third-party payment. Because of the nature of the instruments the schemes invest in, their shares or units may be regarded as close substitutes for deposits. (4.107)
MFS	MMFs are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested primarily in money market instruments, money market fund (MMF) shares or units, transferable debt instruments with a residual maturity of not more than one year, bank deposits, and instruments that pursue a rate of return that approaches the interest rates of money market instruments. For an investment fund to be recognized as an MMF, there needs to be: (1) a certain degree of capital certainty (store of nominal value); and (2) the possibility to withdraw funds immediately or on short notice. If the preceding conditions are not met, the institution is not classified as an MMF but as a non-MMF investment fund. Some MMFs offer the facility to withdraw funds from shareholder accounts through checks payable to third parties or other means of direct payments to third parties. These payments to third parties may be limited with respect to minimum amount or maximum number of checks that can be written in a specified period. (3.144-145)
HSS	Money market funds (MMF) are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested mainly in money market instruments, other MMF shares or units, transferable debt instruments with a residual maturity of not more than one year, bank deposits, and instruments that provide a rate of return close to the interest rates of money market instruments. MMF shares or units are often transferable by check or other means of direct third-party payment. Because of the nature of the instruments in which the schemes invest, their shares or units may be regarded as close substitutes for deposits (2008 SNA, paragraph 4.107). (4.20)
FSI	Money market funds (MMFs) are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested primarily in money market instruments, MMF shares or units, bank deposits, tradable debt instruments with a residual maturity of not more than one year, and instruments that pursue a rate of return that approaches the interest rates of money market instruments. For an investment fund to be recognized as an MMF, there needs to be (1) a certain degree of capital certainty (reliable store of value); and (2) the possibility to withdraw funds immediately or on short notice. If the conditions above are not met, the institution is not classified as an MMF but as a non-MMF investment fund. (2.45)
GFS	MMFs are investment funds that invest only or primarily in short-term money market securities such as treasury bills, certificates of deposit, and commercial paper. MMF shares and units sometimes are functionally close to transferable deposits, for example, accounts with unrestricted check-writing privileges. If MMF shares are included in broad money in the reporting economy, they should be recorded as a separate item to allow reconciliation with monetary statistics. (7.175)

BPM MMFs are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested primarily in money market instruments, MMF shares and units, transferable debt instruments with a residual maturity of less than one year, bank deposits, and instruments that pursue a rate of return that approaches the interest rates of money market instruments. MMF shares can be transferred by check or other means of direct third-party payment. Because of the nature of the instruments that MMFs invest in, their shares or units may be regarded as close substitutes for deposits. When MMFs are included in monetary aggregates, showing MMFs as an extra subsector will assist comparability. (4.73)

•**Non-money market investment funds (S124)**

SNA Non-MMF investment funds are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested predominantly in financial assets, other than short-term assets, and in nonfinancial assets (usually real estate). Investment fund shares or units are generally not close substitutes for deposits. They are not transferable by means of cheque or direct third-party payments. (4.108)

MFS Non-MMF investment funds are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested predominantly in long-term financial assets, such as equity shares, bonds, and mortgage loans, and nonfinancial assets, such as real estate. Non-MMF investment funds may also invest a small percentage of their total assets in highly liquid short-term financial instruments to ensure that requests to redeem shares or units are met without delay. They can be run under several denominations, such as mutual funds, investment pools, investment trusts, unit trusts, or institutions for collective investment. Shares or units issued by non-MMF investment funds are not close substitutes for deposits because of the following reasons: (1) they are not transferable by means of checks or other means of third-party payments; and (2) their price can fluctuate according to market conditions and so they are not a reliable store of nominal value. Consequently, shares or units issued by non-MMF investment funds do not meet the definition of broad money and are not included therein. (3.149)

HSS Non-MMF investment funds are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested primarily in financial assets, other than short-term assets, or in non-financial assets, such as real estate (or both). Non-MMF investment fund shares or units are generally not close substitutes for deposits. (2008 SNA, paragraph 4.108). (4.21)

FSI Non-MMF investment funds are collective investment schemes that raise funds by issuing shares or units to the public excluding MMFs. The proceeds are invested predominantly in long-term financial assets, such as equity shares, bonds, and mortgage loans, and nonfinancial assets, such as real estate. Non-MMF investment funds may also invest a small percentage of their total assets in highly liquid short-term financial instruments to ensure that requests to redeem shares or units are met without delay. They can be run under several denominations, such as mutual funds, investment pools, investment trusts, unit trusts, and institutions, for collective investment. (2.46)

GFS Investment funds are collective investment undertakings through which investors pool funds for investment in financial or nonfinancial assets. These funds issue shares (if a corporate structure is used) or units (if a trust structure is used). (7.174) Investment funds invest in a range of assets, such as debt securities, equity, commodity-linked investments, real estate, shares in other investment funds, and structured assets. (7.176)

BPM Non-MMF investment funds are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested predominantly in long-term financial assets and nonfinancial assets (usually real estate). Investment fund shares or units are generally not close substitutes for deposits. They are not transferable by means of check or third party payments. Some funds may be limited to certain investors only, whereas others are available to the public generally. Investment funds can be open or closed ended. . . Investment funds may be constituted as follows: (a) under the law of contract (as common funds managed by management companies), (b) under trust law (as unit trusts), (c) under a statute (as investment companies), or (d) otherwise with similar effect. . . Pension funds are excluded; they are part of the insurance companies and pension funds subsector. (4.74)

of which: open end

SNA Open-ended investment funds can issue and redeem shares on a continuous basis, or at certain defined (short-term) time intervals. An open-ended investment fund is equitably divided into shares or units, which vary in price in direct proportion to the variation of the fund's net asset value (NAV). Each time a new investment is made, new shares or units are created to match the prevailing share price. Each time, shares or units are

redeemed, the assets sold match the prevailing share price. In this way, there is no supply or demand created for shares or units and they remain a direct reflection of the underlying assets. (FPFS 2014, 4.256-257)

MFS	Open-ended investment funds issue and redeem shares on a continuous basis: each time a new investment is made by an investor, new shares or units are created; when shares are redeemed, an investment must be sold to match such redemption. (3.150)
HSS	Open-ended investment funds can issue and redeem shares on a continuous basis or at certain predefined (short-term) intervals. The most popular types of open-ended investment fund are index funds and money market funds (MMFs). . . . MMFs invest in short-term, low-risk financial instruments. An open-ended investment fund is divided equally into shares or units, which vary in price in direct proportion to the variation in the fund's net asset value (NAV). ⁶ (3.58) The classification of financial instruments (CFI) standard defines open-ended funds as those that "permanently sell new units to the public and redeem outstanding units on demand, resulting in an increase or decrease of outstanding capital." (footnote 6)
FSI	
GFS	
BPM	Open-ended funds or open funds are those whose shares or units are, at the request of the holders, repurchased or redeemed directly or indirectly out of the undertaking's assets. (4.74)

of which: closed end

SNA	Closed-ended funds are open for subscription only during a specified period when the scheme is launched. Investors can invest in the scheme at the time of the initial public issue. Thereafter, investors can acquire shares in a closed-ended fund by buying shares on a secondary market from a broker, market maker or other investors, as opposed to an open-ended fund, where all transactions eventually involve the fund issuing or redeeming shares or units (in exchange for cash or securities). Some closed-ended funds provide the option of selling the shares or units back to the investment fund through periodic repurchases at NAV-related prices. (FPFS 2014, 4.262)
MFS	Closed-ended investment funds are open for subscription only during a specified period at the launch of the scheme; thereafter, investors can acquire shares only by buying them on a secondary market from other investors. (3.150)
HSS	Closed-ended investment funds issue a limited number of shares or units. These sometimes have a specified maturity, such as five to seven years. New shares or units are rarely issued once the fund has been launched, and shares or units are not usually redeemable until the fund is liquidated. (3.58)
FSI	
GFS	
BPM	Closed-ended, closed, or exchange-traded funds are those with a fixed share capital, where investors entering or leaving the fund must buy or sell existing shares. (4.74)

Index funds

SNA	
MFS	Index-tracking funds that mirror the performance of a specific group of shares. (3.151)
HSS	Index funds track the performance of particular stock or bond indices. (3.58)
FSI	

GFS

BPM

Fund of funds

SNA	Funds of funds are investment funds investing in other funds. Their strategy consists of holding a portfolio of other investment fund shares or units, rather than investing directly in shares, bonds or other securities. There are different types of funds of funds, e.g. mutual, hedge, private equity or investment trust funds of funds. (FPFS 2014, Box 4.7)
MFS	Funds of funds . . . hold a portfolio of other investment funds shares rather than investing directly. (3.151)
HSS	
FSI	
GFS	
BPM	. . . investment funds [that] invest in other funds (“funds of funds”). (4.74)

Hedge funds

SNA	Hedge funds are unconstrained investment funds that participate in a range of assets typically involving high minimum investments, light regulation and a wide variety of investment strategies. Hedge funds are distinct from “traditional” investment funds in various ways: (a) Hedge funds usually engage in a wider range of investment and trading activities than traditional investment funds and invest in a broader range of assets, including securities, commodities and real estate; (b) Hedge funds speculate on future movements of the underlying assets by taking long or short positions; (c) Most hedge fund investment strategies aim to secure a positive return on investment, regardless of overall market performance; (d) Hedge fund managers typically invest their own money in the fund they manage, which serves to align their interests with investors in the fund; (e) Investors in hedge funds typically pay a management fee that goes towards the operational costs of the fund, and a fee based on the fund’s performance; (f) Hedge funds are usually open for investment to a limited number of accredited or qualified investors who meet criteria set by regulators; (g) Hedge funds may also invest, in full or in part, in other hedge funds, provided that they otherwise meet the definition. In order to identify a hedge fund, these criteria must be assessed against the fund’s public prospectus as well as its rules, articles of association, the subscription documents or investment contracts, and any marketing documents or similar statements. Obtaining data on hedge funds can be rather difficult as they are not regulated like traditional mutual funds. (FPFS 2014, Box 4.7)
MFS	Hedge funds Involving high minimum investments and light regulation, which invest in financial derivatives, take long and short positions in securities, and may sell over-the-counter derivative contracts. (3.151)
HSS	
FSI	
GFS	
BPM	Hedge funds are a kind of investment fund. Hedge fund is a term that covers a heterogeneous range of collective investment schemes, typically involving high minimum investments, light regulation, and a wide range of investment strategies. (4.75)

Private equity funds

SNA	Private equity funds are closed-end funds. Private equity funds are used for making investments in equity securities. They are typically limited partnerships with a fixed term of ten years (often with annual extensions). At inception, institutional investors make an unfunded commitment to the limited partnership, which is then drawn over the term of the fund. (FPFS 2014, 4.262, 7.42)
MFS	Private equity funds (PEFs) are collective investment schemes that invest in unlisted equity. They are usually constituted as closed-ended investment funds or as limited partnerships. Investments into PEFs are made mainly by institutional investors, such as ICPFs or large financial groups. . . .PEFs are included within non-MMF investment funds. (3.152)
HSS	
FSI	
GFS	
BPM	

of which: venture capital funds

SNA	A venture capital fund refers to an investment fund that primarily invests the financial capital of third-party investors in corporations that are too risky for the standard capital markets or banks. Most venture capital funds have a fixed life of 10 years, with the possibility of a few years' extension. The investors have a fixed commitment to the fund that is initially unfunded and subsequently "called down" by the venture capital fund over time as the fund makes its investments. When all of the money has been raised, the fund is said to be closed and the 10-year lifetime begins. (FPFS 2014, Box 4.7)
MFS	Venture capital funds are a subcategory of private equity funds that invest in start-up companies. (3.152)
HSS	
FSI	
GFS	
BPM	

Exchange-traded funds

SNA	Exchange-traded funds (ETFs) are types of index-tracking funds – they are usually actively managed to accurately mirror the performance of an index. ETFs may be based on small-cap companies, individual industries and any combination of countries and regions. ETFs can be linked to government, corporate and high-yield debt securities and paper of varying maturities. Some ETFs are based on commodity indices and property markets; others focus on the interests of particular types of individuals or groups, e.g. the environmentally conscious or religious communities. There are leveraged ETFs, which offer a geared return on a given index, inverse ETFs, which aim to go down when a benchmark goes up (and vice versa) and, inevitably, leveraged inverse ETFs. In contrast to closed-ended fund shares or units, the market price of an ETF trades in a narrow range very close to its NAV. This is because the structure of ETFs allows major market participants to redeem ETF shares for a "basket" of the fund's underlying assets. This feature could lead to potential arbitrage profits if the market price of the ETF were to diverge substantially from its NAV. The market price of closed-end fund shares or units is often 10 to 20 per cent higher or lower than their NAVs, while the market price of an ETF is typically within 1 per cent of its NAV (FPFS 2014, Box 4.7)
MFS	A subset of index funds that are priced continuously throughout the trading day, and therefore trade like a stock. (3.151)
HSS	Exchange-traded funds are a subset of index funds that can be traded on an exchange during the day, just like common stocks. (3.58, footnote 5)
FSI	

GFS

BPM

Closed-ended, closed, or exchange-traded funds are those with a fixed share capital, where investors entering or leaving the fund must buy or sell existing shares. (4.74)

Real estate investment trusts (REITs)

SNA

Most real estate funds are closed-ended funds. Real estate funds often use the legal form of a limited partnership, or of a private or a public limited corporation. Specific legal structures exist for real estate funds. One example is a real estate investment trust (REIT). A REIT is a corporation that owns and, in most cases, operates real estate. Among other things, REITs invest in shopping centers, office buildings, apartment blocks, warehouses and hotels. Some REITs also engage in financing real estate. Their shares are often traded on stock exchanges. To qualify as a REIT, a corporation must have most of its assets and income tied to real estate investment and must distribute a major amount of its taxable income to shareholders in the form of dividends. There are two main types of REITs: equity REITs, which invest in and own properties, and mortgage REITs, which invest in mortgages. Holders can invest in REITs either by purchasing their shares directly on an open exchange or by investing in an investment fund that specializes in real estate. Many REITs are accompanied by dividend reinvestment plans. These are ways for shareholders to reinvest variable amounts in a corporation. Investors can reinvest their dividends by purchasing additional shares or fractions of shares from the corporation on the dividend payment date. In various countries REITs are not considered to be funds and they do not always fall within the regulatory framework applying to investment funds. (FPFS 2014, Box 4.7)

MFS

Real estate investment funds invest in debt and equity securities of companies that purchase real estate. Mortgage real estate investment trusts (mortgage REITs) . . . provide dividends to shareholders by investing in real estate mortgages or mortgage-backed securities.¹⁸ (3.151) Equity REITs are not considered financial intermediaries as they specialize in owning and managing real estate. Thus, they are not part of the FCs sector. (Footnote 18)

HSS

FSI

GFS

BPM

Real estate investment trusts are included [in non-MMF investment funds]. (4.74)

Insurance Corporations (S128)

SNA

Insurance corporations consist of incorporated, mutual and other entities whose principal function is to provide life, accident, sickness, fire or other forms of insurance to individual institutional units or groups of units or reinsurance services to other insurance corporations. Captive insurance is included, that is, an insurance company that serves only its owners. Deposit insurers, issuers of deposit guarantees and other issuers of standardized guarantees that are separate entities and act like insurers by charging premiums and have reserves, are classified as insurance corporations. (4.115)

MFS	Insurance corporations consist of incorporated, mutual, and other entities whose principal function is to provide life, accident, sickness, fire, or other forms of coverage to individual institutional units or groups of units, or reinsurance services to other insurance corporations. Captive insurances, which are insurance companies that serve only their owners, and reinsurance corporations are also included in this subsector. Insurance corporations may also operate pension plans. Life insurance corporations invest premiums to build up portfolios of financial assets to be used to meet future claims of policyholders, spreading risks of the policyholders over time. Non-life insurance corporations provide financial benefits to policyholders in the event of accidents, fire, property loss, health-related expenses, etc., spreading current risk or expenses among clients. Some individual insurance corporations sell both life and non-life insurance, in which case they are called composite insurance companies. Some corporations create captive insurance subsidiaries to handle their insurance needs. Captives are units separate from their parents and are included in this subsector. Captives collect premiums from their parent corporation, then reinsure themselves, or invest their assets to build up reserves against future claims of the parent corporation. Reinsurance corporations insure the insurance policies written by other insurance corporations in exchange for insurance premiums. Insurance corporations purchase reinsurance to offset policy risk, thereby capping the net loss incurred if the insured event occurs. (3.190-193)
HSS	Insurance corporations consist of incorporated, mutual, and other entities whose principal function is to provide life, accident, sickness, fire, or other forms of insurance to individual institutional units or groups of units, or reinsurance services to other insurance corporations. Captive insurance, that is, an insurance corporation that serves only its owners, is included in this subsector. Also included are deposit insurers, issuers of deposit guarantees, and other issuers of standardized guarantees. (2008 SNA, paragraph 4.115). (4.29)
FSI	Insurance corporations provide financial benefits to policyholders through risk-sharing and risk-transfer contracts. Main types of insurance include life or long-term insurance; non-life or property and casualty, or general insurance; and reinsurance. Also included in this subsector are captive insurance companies, which serve only their owners; deposit insurers; issuers of deposit guarantees; and other issuers of standardized guarantees that are separate institutional units and function like insurers by constituting reserves and charging premiums proportional to the cost of the service provided. Insurance corporations may also operate pension plans, as indicated in the next subsection. Life insurance corporations invest premiums to build up portfolios of financial assets to be used to meet future claims of policy holders, spreading risks of the policy holders over time. Life insurance corporations offer products that are purely insurance as well as products with a savings component. “Term insurance” provides a guaranteed death benefit for a specified time period. Non-unit linked insurance (or traditional insurance) is a contract that provides life insurance with a fixed payment in case of death or at maturity. Unit-linked insurance is an insurance contract, which provides a combination of (traditional) life insurance and an investment component with the investment risk being entirely borne by the policyholder. Returns on the investment component depend on market performance. Non-life insurance corporations provide financial benefits to policy holders in the event of accidents, fire, property loss, health-related expenses, and so on, spreading current risk or expenses among clients. Some individual insurance corporations sell both life and non-life insurance, in which case they are called composite insurance companies. Reinsurance corporations ensure the insurance policies written by other insurance corporations in exchange for insurance premiums. Insurance corporations purchase reinsurance to offset policy risk, thereby capping the net loss incurred if the insured event occurs. (2.47-2.50)
GFS	Life insurance is an activity whereby a policyholder makes regular payments to an insurer in return for which the insurer guarantees to provide the policyholder (or in some cases another nominated person) with an agreed sum, or an annuity, at a given date or earlier if the policyholder dies beforehand. Nonlife insurance is an activity similar to life insurance except that it covers all other risks, accidents, sickness, fire, etc. (A4.69-70)
BPM	Insurance corporations consist of incorporated, mutual, and other entities whose principal function is to provide life, accident, health, fire, or other forms of insurance to individual institutional units or groups of units or reinsurance services to other insurance corporations. Captive insurance is included, that is, an insurance company that serves only its owners. Deposit insurers, issuers of deposit guarantees, deposit protection schemes, and other issuers of standardized guarantees that are separate entities and act like insurers by charging premiums and have reserves are classified as insurance corporations. (4.88)

Pension Funds (S129)

SNA	Employers (or unions in collaboration with employers) set up pension schemes to provide retirement benefits for specific groups of employees (and self-employed persons). Governments sometimes organize pension schemes for their employees that are independent of the social security system. The pension fund subsector consists of only those social insurance pension schemes that are institutional units separate from the units that create them. Excluded from this subsector are non-autonomous pension schemes managed by employers, government-sponsored pension schemes funded through wage taxes (pay-as-you-go schemes), social security funds and arrangements organized by non-government employers, when the reserves of the fund are simply included among the employer's own reserves or invested in securities issued by that employer. (FPFS 2014, 2.38)
MFS	The pension funds subsector consists of autonomous pension funds that are established to provide retirement benefits for specific groups of individuals. These pension funds have their own separate sets of pension-fund assets and liabilities, with specific obligations to their contributors. Pension schemes can be established on a voluntary basis, or they can be compulsory with mandated contributions from the employee, employer, or both. Pension schemes may be administered by a separately constituted pension fund, or a fund that is operated by the employer. Governments also sometimes organize pension schemes for their employees, which are independent of the social security system. (3.196)
HSS	Pension funds are set up to provide retirement benefits for specific groups of employees and self-employed persons. Governments sometimes organize pension schemes for their employees that are independent of the social security system. The pension fund subsector consists of only those social insurance pension schemes that are institutional units separate from the units that create them. Excluded from this subsector are nonautonomous pension schemes managed by employers, government-sponsored pension schemes funded through wage taxes (pay-as-you-go schemes), and arrangements organized by nongovernment employers where the fund reserves are simply included in the employer's own reserves or are invested in securities issued by the employer. (BPM6, paragraph 4.90). (4.30)
FSI	The pension funds subsector consists of autonomous pension funds that are established to provide retirement benefits for specific groups of individuals. These pension funds have their own separate sets of pension-fund assets and liabilities, with specific obligations to their contributors. Pension schemes can be established on a voluntary basis, or they can be compulsory with mandated contributions from the employee, employer, or both. Pension schemes may be administered by a separately constituted pension fund, or a fund that is operated by the employer. Governments also sometimes organize pension schemes for their employees, which are independent of the social security system. (2.51)
GFS	If there is an autonomous employment-related pension fund (i.e., a separate institutional unit) to provide government employee pensions, this fund should be excluded from social security funds and be classified as a public financial corporation if under control of government, or otherwise as a private financial corporation. Autonomous employment-related pension schemes can be organized as a defined-benefit pension scheme or a defined-contribution pension scheme. (see paragraphs A2.47–A2.53)
BPM	Pension liabilities arise when members of households participate in a social insurance scheme that will provide income in retirement (and often benefits for death or disability). Such schemes may be organized by employers or by government; they also may be organized by insurance corporations on behalf of employees; or separate institutional units may be established to hold and manage the assets to be used to meet the pension obligations and to distribute the pensions. Pension schemes may be operated by a separately constituted pension fund or a fund that is part of the employer, or they may be unfunded. The pension fund subsector consists of only those social insurance pension funds that are institutional units separate from the units that create them. (4.89)

of which: Defined benefit

SNA	A defined benefit scheme is one where the benefits payable to an employee on retirement are determined by the use of a formula, either alone or as a minimum amount payable. In this case the risk of the scheme to provide an adequate income in retirement is borne either by the employer or is shared between the employer and employee. In certain cases, the employer's risk may be borne by the multiemployer scheme that operates the defined benefit pension scheme on behalf of the employer. A scheme that may be defined in terms similar to a defined contribution scheme but with a guaranteed minimum, say, or other such hybrid schemes, are grouped with defined benefit pension schemes in the SNA. (FPFS 2014, 3.352)
MFS	Future retirement benefits are determined by an actuarial formula related to participants' length of service and salaries, expected retirement ages, mortality rates, etc. (3.200)

HSS

FSI Under a defined benefit plan, the future retirement benefits are determined by specific factors such as the participants' length of service and salaries and age at retirement. (2.54)

GFS A defined-benefit pension scheme is one where the benefits payable to an employee on retirement are determined by the use of a formula, either alone or as a minimum amount payable. The level of benefits promised to participating employees is determined by a formula embodied in the terms of the social insurance scheme. These terms are usually based on factors such as the participants' length of service and salary. (A2.54)

BPM

of which: Defined contribution

SNA A defined contribution scheme is one where the benefits payable to an employee on retirement are defined exclusively in terms of the level of the fund built up from the contributions made over the employee's working life and the increases in value that result from the investment of these funds by the manager of the scheme. The entire risk of the scheme to provide an adequate income in retirement is thus borne by the employee. (FPFS 2014, 3.352)

MFS Benefits to be received by a participant are based on the participant's contributions to the pension fund and the investment performance of the fund. (3.200)

HSS

FSI Under a defined contribution plan, the benefits to be received by a participant are based on contributions to the pension fund and the investment performance of the fund. Hybrid schemes are a combination of a defined benefit plan and a defined contribution plan, where the risk of the scheme to provide an adequate income in retirement is shared by the employer and the employee. (2.54)

GFS A defined-contribution pension scheme is one where the benefits payable to an employee on retirement are defined exclusively in terms of the level of the funds built up from the contributions made over the employee's working life and the increases in value that result from the investment of these funds by the manager of the scheme. The risk of the scheme to provide an adequate retirement income is thus borne by the employee, and the benefits that will be payable depend on the assets of the fund. For a defined contribution pension scheme, a pension fund is always deemed to exist. (A2.55)

BPM

Sovereign Wealth Funds (part of S127)

SNA

MFS Sovereign wealth funds (SWFs) are created and owned by the general government to hold, manage, or administer assets to achieve financial objectives. They employ a set of investment strategies, which include investing in foreign financial assets. The funds are commonly established out of balance of payments surpluses, official foreign currency operations, privatization proceeds, fiscal surpluses, and/or receipts resulting from natural resources or commodity exports. (3.187)

HSS

FSI

GFS

BPM	Some governments create special purpose government funds, usually called sovereign wealth funds (SWFs). Created and owned by the general government for macroeconomic purposes, SWFs hold, manage, or administer assets to achieve financial objectives, and employ a set of investment strategies which include investing in foreign financial assets. The funds are commonly established out of balance of payments surpluses, official foreign currency operations, the proceeds of privatizations, fiscal surpluses, and/or receipts resulting from commodity exports. (6.93)
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Market Intermediaries

•Security and derivative dealers (part of S125)

SNA	When debt securities are marketed by issuers through underwriters or other intermediaries and then sold at higher prices to final investors, the financial assets and liabilities are to be recorded at the values paid by the investors. The differences between the amounts paid by the investors and those received by the issuers should be treated as service payments paid by the issuers to the underwriters. (FPFS 2014, 5.97)
MFS	Underwriters and dealers specialize in securities market activities, operating through public exchanges, over-the-counter markets, and privately negotiated deals. They assist firms in issuing securities through the underwriting and market placement of new securities issues and may trade in new or outstanding securities on their own account. Only underwriters and dealers that act as financial intermediaries are classified in this category. Securities brokers and other units that arrange trades between securities buyers and sellers but do not purchase and hold securities on their own account are classified as financial auxiliaries. (3.159)
HSS	
FSI	
GFS	
BPM	

•Central clearing counterparties (part of S125)

SNA	These organizations provide clearing and settlement transactions in securities and derivatives. Clearing relates to identifying the obligations of both parties to the transaction, while settlement is the exchange of the securities or derivatives and the corresponding payment. The central clearing counterparties involve themselves in the transaction and mitigate counterparty risk. (FPFS 2014, 2.27)
MFS	Central clearing counterparties (CCPs) provide clearing and settlement of market transactions in securities and derivatives. This can include tri-party repos. Clearing refers to the process of offsetting obligations and entitlements vis-à-vis counterparties to transactions so that settlement—which involves the actual exchange of securities, derivatives, and funds—can occur more efficiently on a net basis. The CCPs take the financial risk of the transaction between the counterparties onto their own account and so mitigate counterparty risk to the other parties involved. CCPs are FCs, but not money issuers as the margin deposits they collect to mitigate the financial risks they assume are restricted and held as collateral, and so are not included in broad money. CCPs should, therefore, be classified as other financial intermediaries except ICPFs. (3.157)
HSS	
FSI	
GFS	

BPM . . . provide clearing and settlement of market transactions in securities and derivatives. Clearing refers to the process of offsetting obligations and entitlements vis-à-vis counterparties to transactions so that settlement—which involves the actual exchange of securities, derivatives, and funds—can occur more efficiently on a net basis. The central clearing counterparties involve themselves in the transaction and mitigate counterparty risk. (4.77)

Financial Market Infrastructures

•Securities markets, exchanges and electronic platforms (part of S126)

SNA

MFS

Public exchanges, securities markets, and clearing houses provide facilities in which commodities, debt and equity securities, and financial derivatives are transacted and/or settled. An exchange is often responsible for ensuring the qualifications of its members, guaranteeing the completion of transactions, clearing and netting transactions, arranging payments, resolving disputes, and guarding against fraud. Exchanges are identified as such if they (1) are legally determined to be exchanges by regulators or courts; (2) maintain insurance or capital reserves; (3) exercise control over the trading of exchange members; or (4) operate a margining system or collect collateral. Provided they do not act as a principal to the transactions being conducted, the subsector includes the exchange and a number of entities such as securities depository companies, accounting and clearing offices, other specialized providers of securities trading services, and entities (private and government-controlled) that regulate or supervise exchanges and securities markets. (3.167)

HSS

FSI

GFS

BPM

Financial Instruments

•Repurchase agreements, securities lending with cash collateral, and margin lending (part of F.4)

SNA

Securities lending is the temporary transfer of securities by the lender (the seller of the securities or cash receiver) to the borrower. The securities borrower may be required to provide assets as collateral to the securities lender in the form of cash or securities. Legal title passes on both sides of the transaction so that the borrowed securities and collateral can be sold or lent. A securities repurchase agreement is an arrangement involving the provision of securities like debt securities or shares in exchange for cash or other means of payment, with a commitment to repurchase the same or similar securities at a fixed price. The commitment to repurchase may be either on a specified future date or an “open” maturity. Buy/sell-backs are synthetic repurchase agreements involving a combination of a spot transaction and a forward transaction. Securities lending with cash collateral, repurchase agreements (repos) and buy/sell-backs are different terms for arrangements having the same economic effects: namely those of a secured loan, as they involve the provision of securities as collateral for a loan or a deposit, where a deposit-taking corporation sells the securities under such an arrangement. Where securities are provided under securities lending, repurchase agreements and buy/sell-backs, no change in economic ownership occurs because the lender is still the beneficiary of the income yielded by the security (by means of the coupon and dividend pass-on mechanism, the so-called “manufactured dividend”) and is subject to the risks or benefits of any change in the price of the security. If a securities lending does not involve the supply of cash, that is, if there is an exchange of one security for another, or if one party supplies a security without collateral, there is no transaction in loans, deposits or securities. Margin calls in cash under a repo are classified as loans. (FPFS 2014, Box 4.4)

MFS	A securities repurchase agreement (repo) is an arrangement involving the sale of securities for cash, at a specified price, with a commitment to repurchase the same or similar securities at a fixed price either on a specified future date (often one or a few days hence, but also further in the future) or with an “open” maturity. A repo is viewed from the perspective of the provider of the securities (i.e., the cash taker). The agreement is called a reverse repo when viewed from the perspective of the securities taker (i.e., the cash provider). Repos convey the legal ownership of the securities to the cash provider, which entitles the cash provider to sell the securities to a third party (on-selling). Despite conveyance of the legal ownership to the cash provider, the economic ownership is retained by the cash taker (i.e., the securities provider), as the cash taker retains the market risk and ownership benefits, other than the right of sale, including holding gains or losses and interest income on the securities. Because of these features, a repo is similar to a loan that is collateralized by the securities underlying the agreement. (4.71-72)
HSS	A securities repurchase agreement is an arrangement involving the provision of securities in exchange for cash with a commitment to repurchase the same or similar securities at a fixed price either on a specified future date, or with an “open” maturity. Securities lending with cash collateral and sell/buybacks are terms for different arrangements having the same economic effect as a securities repurchase agreement. Economic ownership of the securities provided as collateral under such agreements is considered not to have been transferred because the cash recipient (the seller of the securities) remains subject to all market risks and continues to receive any benefits. Therefore, transactions involving securities repurchase agreements and securities lending do not entail a new issuance of debt securities, but rather the incurrence of collateralized loans. These transactions are therefore excluded from debt securities statistics. (3.40)
FSI	A securities repurchase agreement (repo) is an arrangement involving the provision of securities in exchange for cash with a commitment to repurchase the same or similar securities at a fixed price either on a specified future date or with an “open” maturity. Repos convey the legal ownership of the securities to the cash provider, which entitles the cash provider to sell the securities to a third party (on-selling). Despite conveyance of the legal ownership to the cash provider, the economic ownership is retained by the cash taker (i.e., the securities provider), as the cash taker retains the market risk and ownership benefits, other than the right of sale, including holding gains or losses and interest income on the securities. Because of these features, repurchase agreements should be recorded as loans collateralized by the securities underlying the agreement. The securities should remain on the balance sheet of the cash taker and a new financial asset (i.e., a loan) should be recorded as an asset of the cash provider offsetting the reduction in cash and a liability, offsetting the cash received, of the cash taker. Although repurchase agreements are usually classified as loans, those resembling a standard deposit, where the client of the DTs is the cash-provider, should be classified as deposits. If securities acquired under a repo or securities-lending arrangement are sold to third parties, the security taker should record on the balance sheet a liability equal to the current market value of the security that was sold (short position). (5.44)
GFS	A securities repurchase agreement (repo) is an arrangement involving the sale of securities for cash, at a specified price, with a commitment to repurchase the same or similar securities at a fixed price either on a specified future date (often one or a few days hence) or with an open maturity. The economic nature of the transaction is that of a collateralized loan (or a deposit) because the risks and rewards of ownership of the securities remain with the original owner (security provider). Thus, the funds advanced by the security taker (cash provider) to the security provider (cash taker) are treated as a loan and the underlying securities remain on the balance sheet of the security provider, despite the legal change in ownership. (7.159)
BPM	A securities repurchase agreement is an arrangement involving the provision of securities in exchange for cash with a commitment to repurchase the same or similar securities at a fixed price. The commitment to repurchase may be either on a specified future date (often one or a few days hence, but also further in the future) or an “open” maturity. Repos, securities lending with cash collateral, and sale-buybacks are different terms for arrangements with the same economic effect as a securities repurchase agreement—all involve the provision of securities as collateral for a loan or deposit. A repo is used as a term from the perspective of the security provider, while a reverse repo is used from the perspective of the security taker. Securities repurchase agreements are a subset of reverse transactions. (5.52)

Derivatives (F.7)

SNA	Financial derivatives are financial instruments that are linked to a specific financial instrument or indicator or commodity, through which specific financial risks can be traded in financial markets in their own right. The value of a financial derivative derives from the price of the underlying item: the reference price. The reference price may relate to a commodity, a financial asset, an interest rate, an exchange rate, another derivative or a
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spread between two prices. The derivative contract may also refer to an index or a basket of prices or other items like emissions trading or weather conditions. (FPFS 2014, 4.323)

MFS A financial derivatives contract is a financial instrument that is linked to another specific financial instrument, indicator, or commodity, and through which specific financial risks (e.g., interest rate risk, foreign exchange risk, equity and commodity price risk, credit risk) can be traded in their own right in financial markets. The value of a financial derivative derives from the price of an underlying item: the reference price. The reference price may relate to a commodity, a financial asset, an interest rate, an exchange rate, another derivative, or a spread between two prices. No principal amount is advanced that has to be repaid, and no investment income accrues. Financial derivatives are used for a number of purposes, including risk management, hedging, arbitrage between markets, and speculation. (4.156-157)

HSS Financial derivatives are not classified as securities even if they are negotiable financial instruments. No principal amount is advanced that has to be repaid and no investment income accrues (MFSM, paragraph 176). Financial derivatives are instruments linked to specific financial or nonfinancial assets or indices through which specific financial risks can be traded in their own right in financial markets. (2.7)

FSI Financial derivatives are financial instruments that are linked to another specific financial instrument, indicator, or commodity, and through which specific financial risks (e.g., interest rate risk, foreign exchange risk, equity and commodity price risk, and credit risk) can be traded in their own right in financial markets. The value of a financial derivative depends on the price of the underlying item: the reference price. The reference price may relate to a commodity, a financial asset, an interest rate, an exchange rate, another derivative, or a spread between two prices. The derivative contract may also refer to an index or a basket of prices. Unlike debt instruments, no principal amount is advanced that has to be repaid, and no investment income accrues. Financial derivatives are used for several purposes, including risk management, hedging, arbitrage between markets, and speculation. (5.55)

GFS A financial derivative contract is a financial instrument that is linked to another specific financial instrument, indicator, or commodity and through which specific financial risks (e.g., interest rate risk, foreign exchange risk, equity and commodity price risks, and credit risk) can be traded in their own right in financial markets. Transactions and positions in financial derivatives are treated separately from the values of any underlying items to which they are linked. Financial derivatives are valued at market prices prevailing on balance sheet recording dates. If market price data are unavailable, other fair value methods (e.g., option models or present values) may be used to value them. Compilers are generally constrained to use the parties' own accounts. (7.204)

BPM A financial derivative contract is a financial instrument that is linked to another specific financial instrument or indicator or commodity and through which specific financial risks (such as interest rate risk, foreign exchange risk, equity and commodity price risks, credit risk, and so on) can be traded in their own right in financial markets. Transactions and positions in financial derivatives are treated separately from the values of any underlying items to which they are linked. (5.80)

•Options

SNA Options are contracts that give the purchaser of the option the right, but not the obligation, to buy (a "call" option) or to sell (a "put" option) a particular financial instrument or commodity at a predetermined price (the "strike" price) within a given time span (American option) or on a given date (European option). (FPFS 2014, 4.327)

MFS In an option contract (option), the purchaser acquires from the seller a right to buy or sell, depending on whether the option is a call (buy) or a put (sell), a specified underlying item at a strike price on or before a specified date. The purchaser of an option pays a premium to the writer of the option. (4.176)

HSS

FSI In an option contract (option), the purchaser acquires from the seller a right to buy or sell, depending on whether the option is a call (a contract to buy) or a put (a contract to sell) a specified underlying item at a strike price on or before a specified date. The purchaser of an option pays a

premium to the writer of the option. Throughout the life of the contract, the writer of the option has a liability and the buyer an asset, although the option can expire worthless; the option will be exercised only if settling the contract is advantageous for the purchaser. (5.61)

GFS

BPM

In an option contract (option), the purchaser acquires from the seller a right to buy or sell (depending on whether the option is a call (buy) or a put (sell)) a specified underlying item at a strike price on or before a specified date. The purchaser of an option pays a premium to the writer of the option. In return, the buyer acquires the right but not the obligation to buy (call option) or sell (put option) a specified underlying item (real or financial) at an agreed-on contract price (the strike price) on or before a specified date. (On a derivatives exchange, the exchange itself may act as the counterparty to each contract.) (5.85)

•Forwards and related instruments (i.e. futures)

SNA

A forward contract is an unconditional financial contract that represents an obligation for settlement on a specified date. Futures and other forward contracts are typically, but not always, settled by the payment of cash or the provision of some other financial instrument rather than the actual delivery of the underlying item and therefore are valued and traded separately from the underlying item. (11.120)

MFS

A forward-type contract (forward) is an unconditional contract by which two counterparties agree to exchange a specified quantity of an underlying item (financial or real) at an agreed-upon contract price (the strike price) on a specified date. Forward-type contracts include forwards, futures, and swaps. Forward-type contract is used as a term because the forward is often used more narrowly in financial markets (often excluding swaps). Futures are forward-type contracts traded on organized exchanges, while forward contracts are bought and sold in OTC trading conducted through computer-linked networks of dealers, or by telephone between FCs or between an FC and a nonfinancial corporate client. Forward contracts are not standardized, whereas futures contracts have standard terms as specified by the futures exchanges. The exchanges facilitate trading by determining the standardized terms and conditions of the contract, acting as the counterparty to all trades, and requiring margins to be deposited and paid to mitigate against risk. (4.162-164)

HSS

FSI

A forward-type contract (forward) is an unconditional contract by which two parties agree to exchange a specific quantity of an underlying item (financial or real) at an agreed-upon contract price (the strike price) on a specified date. Forward-type contracts include forwards, futures, and swaps. Forward rate agreements and forward foreign exchange contracts are common types of forward-type contracts. . . Futures are forward-type contracts traded on organized exchanges, while forward contracts are bought and sold in over-the-counter (OTC) trading conducted directly between the parties, although clearing may occur through a central counterparty. For futures, the exchanges facilitate trading by determining the standardized terms and conditions of the contract, acting as the counterparty to all trades, and requiring margins to be deposited and paid to mitigate against risk. (5.57-58)

GFS

BPM

A forward-type contract (forward) is an unconditional contract by which two counterparties agree to exchange a specified quantity of an underlying item (real or financial) at an agreed-on contract price (the strike price) on a specified date. Forward-type contracts include futures and swaps. Forward-type contract is used as a term because the term "forward" is often used more narrowly in financial markets (often excluding swaps). Futures are forward-type contracts traded on organized exchanges. The exchange facilitates trading by determining the standardized terms and conditions of the contract, acting as the counterparty to all trades, and requiring margin to be deposited and paid to mitigate against risk. Forward rate agreements and forward foreign exchange contracts are common types of forward-type contracts. (5.88-89)

•Swaps

SNA

Common forward-type contracts include interest rate swaps, forward rate agreements (FRA), foreign exchange swaps, forward foreign exchange contracts and cross-currency interest rate swaps. (11.121)

MFS A swap contract involves the counterparties exchanging, in accordance with prearranged terms, cash flows based on the reference prices of the underlying items. Swap contracts classified as forward-type contracts include currency swaps, interest rate swaps, cross-currency interest rate swaps, and equity swaps. Under a swap contract, the obligations of each party may arise at different times, for example, an interest rate swap for which payments are quarterly for one party and annual for the other. In such cases, the quarterly amounts payable by one party prior to payment of the annual amount payable by the other party are recorded as transactions in the financial derivative contract. (4.169)

HSS

FSI A swap contract involves the counterparties exchanging, in accordance with prearranged terms, cash flows based on the reference prices of the underlying items. Swap contracts classified as forward-type contracts include currency swaps, interest rate swaps, cross-currency interest rate swaps, and equity swaps. (5.57)

GFS

BPM A swap contract involves the counterparties exchanging, in accordance with prearranged terms, cash flows based on the reference prices of the underlying items. Swap contracts classified as forward-type contracts include currency swaps, interest rate swaps, and cross-currency interest rate swaps. Under a swap contract, the obligations of each party may arise at different times, for example, an interest rate swap for which payments are quarterly for one party and annual for the other. In such cases, the quarterly amounts payable by one party prior to payment of the annual amount payable by the other party are recorded as transactions in the financial derivative contract. Other types of arrangements also called swaps but not meeting the definition above include gold swaps, central bank swap arrangements, and credit default swaps. (5.91)

of which: interest rate swap contract

SNA An interest rate swap contract involves an exchange of cash flows related to interest payments, or receipts, on a notional amount of principal, which is never exchanged, in one currency over a period of time. Settlements are often made through net cash payments by one counterparty to the other. (11.121)

MFS An interest rate swap contract involves an exchange of cash flows related to interest payments, or receipts, on a notional amount of principal, which is never exchanged, in one currency over a period of time. One party pays an interest rate based on variable rates and the other based on fixed rates. Settlements are often made through net cash payments by one counterparty to the other. (4.170)

HSS

FSI

GFS

BPM

of which: foreign currency swap

SNA A foreign exchange swap is a spot sale/purchase of currencies and a simultaneous forward purchase/sale of the same currencies. (11.121)

MFS	A foreign currency swap is a spot sale/purchase of currencies and a simultaneous forward purchase/sale of the same currencies. For foreign currency swaps, it is necessary to distinguish between the transactions in the underlying currencies and the transaction in a financial derivative contract. (4.171)
HSS	
FSI	
GFS	
BPM	For foreign currency financial derivative swap contracts, such as currency swaps, it is necessary to distinguish between a transaction in a financial derivative contract and transactions in the underlying currencies. At inception, the parties exchange the underlying financial instruments (usually classified under other investment). At the time of settlement, the difference in the values, as measured in the unit of account at the prevailing exchange rate, of the currencies swapped are allocated to a transaction in a financial derivative, with the values swapped recorded in the relevant other item (usually other investment). (5.92)

of which: cross-currency interest-rate swap

SNA	A cross-currency interest rate swap, sometimes known as a currency swap, involves an exchange of cash flows related to interest payments and an exchange of principal amounts at an agreed exchange rate at the end of the contract. (11.121)
MFS	A cross-currency interest rate swap, sometimes known as a currency swap, involves an exchange of cash flows related to interest payments and an exchange of principal amounts at an agreed exchange rate at the end of the contract. (4.172)
HSS	
FSI	
GFS	
BPM	

of which: equity swap

SNA	
MFS	An equity swap involves an exchange of cash flows based on the performance of a stock price or stock index for one party, and based on a fixed or floating rate, another stock price, or a stock index for the other party. (4.173)
HSS	
FSI	
GFS	
BPM	

of which: forward rate agreement (FRA)

SNA	A forward rate agreement (FRA) is an arrangement in which two parties, in order to protect themselves against interest rate changes, agree on an interest rate to be paid, at a specified settlement date, on a notional amount of principal that is never exchanged. FRAs are settled by net cash payments. The only payment that takes place is related to the difference between the agreed forward rate agreement rate and the prevailing market rate at the time of settlement. The buyer of the forward rate agreement receives payment from the seller if the prevailing rate exceeds the agreed rate; the seller receives payment if the prevailing rate is lower than the agreed rate. (11.121)
MFS	A forward rate agreement (FRA) is an arrangement in which two parties, in order to protect themselves against interest rate changes, agree on an interest rate to be paid, at a specified settlement date, on a notional amount of principal that is never exchanged. FRAs are settled by net cash payments. The only payment that takes place is related to the difference between the agreed forward rate and the prevailing market rate at the time of settlement times the notional principal underlying the contract. The buyer of the FRA receives payment from the seller if the prevailing rate exceeds the agreed rate; the seller receives payment if the prevailing rate is lower than the agreed rate. An FRA is equivalent to a swap agreement in which a pre-determined fixed-rate payment is swapped for a floating-rate payment. (4.167)
HSS	
FSI	
GFS	
BPM	

•Credit derivatives

SNA	Credit derivatives are financial derivatives whose primary purpose is to trade credit risk. They are designed for trading in loan and security default risk. Credit derivatives take the form of both forward-type and option-type contracts and like other financial derivatives, they are frequently drawn up under standard master legal agreements and involve collateral and margining procedures, which allow for a means to make a market valuation. (11.123)
MFS	Credit derivatives are financial derivatives whose primary purpose is to trade credit risk. They are designed for trading mainly in loan and security credit default risk. In contrast, the financial derivatives described in the previous paragraphs are related mainly to risk of changes in the market prices of securities, commodities, interest rates, and exchange rates. Credit derivatives take the form of both forward-type (total return swaps) and option-type contracts (CDSs). A total return swap transfers both the credit and market risk of an underlying asset, such as a loan or a bond. Under a total return swap agreement, one party makes payments based on a set rate (fee), either fixed or variable, while the other party makes payments based on the return of an underlying asset, which includes both the income it generates and any capital gains. In this way, total return swaps allow the party receiving the total return to gain exposure and benefit from an underlying asset without actually having to own it, and allow the other party (which retains the underlying asset on its balance sheet) to buy protection against loss in its value (see also paragraph 5.218). In a CDS, the buyer of the swap pays a periodic fee to the seller of the swap in return for a cash payment by the seller in the event of a default by the debtor of the underlying instrument. A CDS is also referred to as a credit derivative contract and is considered insurance against non-payment. A buyer of a CDS might be speculating on the possibility that the third party will indeed default. Similar to other financial derivatives, credit derivatives are frequently drawn up under standard master legal agreements and involve collateral and margining procedures that allow for a means to make a market valuation. (4.180-183)
HSS	
FSI	
GFS	

BPM

Credit derivatives are financial derivatives whose primary purpose is to trade credit risk. They are designed for trading in loan and security default risk. In contrast, the financial derivatives described in the previous paragraphs are mainly related to market risk, which pertains to changes in the market prices of securities, commodities, interest, and exchange rates. Credit derivatives take the form of both forward-type (total return swaps) and option-type contracts (credit default swaps). Under a credit default swap, premiums are paid in return for a cash payment in the event of a default by the debtor of the underlying instrument. Like other financial derivatives, credit derivatives are frequently drawn up under standard master legal agreements and involve collateral and margining procedures, which allow for a means to make a market valuation. (5.93)

Appendix II. Guidance for Taxonomy Updates

	Includes all core elements of modern taxonomy; would benefit from updates					
	Includes all core elements of modern taxonomy plus additional detail that may be removed.					
	Current taxonomy would benefit from clarification					
	Current taxonomy is inconsistent across manuals					
	Lacks definitional detail					
	System of National Accounts 2008	MFS Manual and Compilation Guide 2016	Handbook on Security Statistics 2015	FSI Compilation Guide 2019	Government Financial Statistics Manual 2014	Balance of Payments Manual Sixth Edition
Non Bank Financial Intermediaries						
Institutional Investors and Asset Managers						
Investment Funds						
•Money market funds (S123)						
•Non-money market investment funds (S124)						
<i>of which: open end</i>						
<i>of which: closed end</i>						
Index funds						
Fund of funds						
Hedge funds						
Private equity funds						
<i>of which: venture capital funds</i>						
Exchange-traded funds						
Real estate investment trusts						
Insurance Corporations (S128)						
Pension Funds (S129)						
of which: Defined benefit						
of which: Defined contribution						
Sovereign Wealth Funds						
Market Intermediaries						
•Security and derivative dealers (part of S125)						
•Central clearing counterparties (part of S125)						
Financial Market Infrastructures						
•Securities markets, exchanges and electronic platforms (part of S126)						
Financial Instruments						
•repurchase agreements, securities lending with cash collateral, and margin lending (part of E.4)						
Derivatives (F.7)						
•Options						
•Forwards and related instruments (i.e. futures)						
•Swaps						
<i>of which: interest rate swap contract</i>						
<i>of which: foreign currency swap</i>						
<i>of which: cross-currency interest-rate swap</i>						
<i>of which: equity swap</i>						
<i>of which: forward rate agreement (FRA)</i>						
•Credit derivatives						

Appendix III. Recommended Taxonomy of NBF Subsectors, Including Potential Sources of Financial Stability Risk

Non-Bank Financial Intermediaries	Potential Source of Financial Stability Risks	Suggested Updates
•Money market funds		Money market funds (MMFs) are collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested primarily in money market instruments, MMF shares or units, transferable debt instruments with a residual maturity of not more than one year, bank deposits and instruments that pursue a rate of return that approaches the interest rates of money market instruments. MMF shares can be transferred by cheque or other means of direct third-party payment.
<i>constant NAV</i>	Maturity mismatch, collateral management, cliff and run effects if NAV falls below, or is expected to fall below, critical level. Counterparty, sector, concentration risk (as in Reserve Primary Fund with a large Lehman position). Foreign exchange rate risk.	MMFS that aim to maintain a stable share price (typically one unit of currency). Also referred to as "stable NAV MMFS," allow withdrawal at par value so long as NAV remains above critical level. The NAV is the value of a fund's assets less the value of its liabilities, including operating expenses.
<i>variable NAV</i>	Maturity mismatch, collateral management, excessive management of NAV if coarsely measured. Counterparty, sector, concentration.	MMFS that do not aim to maintain a stable share price (share prices fluctuate). Also referred to as "floating NAV MMFS." The definition must specify the digits to which the NAV is measured.
<i>government</i>	Maturity mismatch, collateral management. Counterparty risk in reverse repo positions.	Pooled investment funds that hold primarily government securities. These funds may invest in short-term securities, including Treasury securities, or reverse repos backed by Treasury securities or by Treasury-collateral.

Appendix III. Recommended Taxonomy of NBFISubsectors, Including Potential Sources of Financial Stability Risk

<i>prime</i>	Maturity mismatch, collateral management Counterparty, sector	Prime securities refer to high quality low risk investments with low yields. The Fund uses the proceeds to invest in certificates of deposit (CD) and high-grade commercial paper (CP).
•Non-money market investment funds		Collective investment schemes that raise funds by issuing shares or units to the public. The proceeds are invested predominantly in long-term financial assets and in nonfinancial assets (usually real estate). Non-MMF investment funds may also invest a small percentage of their total assets in highly liquid short-term financial instruments to ensure that requests to redeem shares or units are met without delay.
<i>of which: open end</i>	Model, price, ineffective hedges Maturity mismatch, collateral management, short positions Counterparty, sector	Open Ended Non-MMFS can issue new shares and redeem existing shares on a continuous basis. Therefore, the price of open-end fund shares varies in direct proportion to the variation of the fund's net asset value (NAV)-.
<i>of which: closed end</i>	Model, price, ineffective hedges Maturity mismatch, collateral management, short positions Counterparty, sector	Closed end non-MMFs raise a fixed share of capital, during an initial subscription period. Thereafter, investors entering or leaving the fund must buy or sell existing shares (i.e., private equity/venture capital, segregated funds).
Equity funds	Model, price, ineffective hedges Maturity mismatch, collateral management, short positions Counterparty, sector Foreign exchange rate risk	Non-MMFS that primarily invest in equity instruments.

Appendix III. Recommended Taxonomy of NBF Subsectors, Including Potential Sources of Financial Stability Risk

Fixed income funds	<p>Model, price, ineffective hedges</p> <p>Maturity mismatch, collateral management, short positions</p> <p>Counterparty, sector</p>	Non-MMFs that primarily invest in longer-term (original maturity more than one year) debt instruments such as government, municipal, and corporate bonds.
Index funds	<p>Model, price, ineffective hedges</p> <p>Liquidity of markets in which indexed securities trade.</p>	Index-tracking funds that mirror the performance of a specific group of shares.
Fund of funds	<p>Model, price, ineffective hedges</p> <p>Liquidity of markets in which indexed securities trade.</p>	Hold a portfolio of other investment funds shares rather than investing directly, in shares, bonds or other securities. There are different types of funds of funds, i.e., mutual, hedge, private equity or investment trust funds of funds.
•Hedge funds	<p>Leverage, maturity mismatch, short positions, collateral management</p> <p>Leverage lending, credit, sector, OTC contracts</p> <p>Price, model risk, ineffective hedges.</p> <p>Sovereign risk from positions.</p> <p>Foreign exchange rate risk.</p>	<p>Any private investment fund</p> <p>(a) with investment advisers that may be paid a performance fee or allocation, calculated by taking into account unrealized gains;</p> <p>(b) that may borrow an amount in excess of one-half of its net asset value (including any committed capital) or may have gross notional exposure in excess of twice its net asset value (including any committed capital); or (c) that may sell securities or other assets short or enter into similar transactions (other than for the purpose of hedging currency exposure or managing duration); (d) impose initial lock-up periods and general redemption notice periods, prior to specific redemption dates.</p>
Private equity funds	<p>Model, price, ineffective hedges</p> <p>Maturity mismatch if investors not subject to lock-up period</p> <p>Quality of investment</p>	See closed end non-MMFs

Appendix III. Recommended Taxonomy of NBF Subsectors, Including Potential Sources of Financial Stability Risk

Venture capital	Model, price, ineffective hedges	Venture capital fund refers to an investment fund that primarily invests the financial capital of third-party investors in early-stage corporations that are highly leveraged for the standard capital markets or banks.
Exchange-traded funds	Model, price, ineffective hedges Underlying market liquidity; credit or liquidity stresses in authorized participants.	Types of index-tracking funds that are traded intraday and are usually actively managed to accurately mirror the performance of an index. Because the structure of ETFs allows major market participants to redeem ETF shares for a “basket” of the fund’s underlying assets, the market price of an ETF trades in a narrow range very close to its NAV. Shares trade in secondary markets and are generally redeemed in-kind only by selected intermediaries.
Real estate investment trusts (REITs)	Counterparty and collateral value	Real Estate Investment Trusts (REITs) are of two types - equity REITs generate rental income through the owning and managing of real estate properties while mortgage REITs invest in financial assets backed by real estate, including mortgages and mortgage-backed securities. Both types are corporations that issue units, giving their investors access to the income generated by the trust’s portfolio.
Insurance Corporations	Model, price, ineffective hedges Counterparty, sector Leverage, maturity mismatch, short positions, collateral management	Insurance corporations consist of incorporated, mutual, and other entities whose principal function is to provide life, accident, sickness, fire, theft or other forms of insurance to individual institutional units or groups of units or reinsurance services to other insurance corporations. Insurance corporations may also provide investment funds to their policy holders and other retail investors.

Appendix III. Recommended Taxonomy of NBF Subsectors, Including Potential Sources of Financial Stability Risk

Pension Funds		The pension funds subsector consists of autonomous pension funds that are established to provide retirement benefits for specific groups of individuals. These pension funds have their own separate sets of pension-fund assets and liabilities, with specific obligations to their contributors. Pension schemes can be established on a voluntary basis, or they can be compulsory with mandated contributions from the employee, employer, or both. Pension fund contributions by participants are invested in a mix of public-market and private-market assets
of which: Defined benefits	<p>Leverage, maturity mismatch, short positions, collateral management</p> <p>Counterparty, sector, OTC contracts</p> <p>Model, price, ineffective hedges</p> <p>Sovereign risk from positions</p>	Future retirement benefits are determined by an actuarial formula related to participants' length of service and salaries, expected retirement ages, mortality rates, etc. Pension funds invests contributions in various securities to align returns with payouts.
of which: Defined contributions	<p>Leverage, maturity mismatch, short positions, collateral management</p> <p>Counterparty, sector, OTC contracts</p> <p>Model, price, ineffective hedges</p> <p>Sovereign risk from positions</p>	Benefits to be received by a participant are based on contributions to the pension fund and the investment performance of the fund, with no guarantee from the employer.

Appendix III. Recommended Taxonomy of NBF Subsectors, Including Potential Sources of Financial Stability Risk

Sovereign Wealth Funds	<p>Leverage, maturity mismatch, short positions, collateral management.</p> <p>Counterparty</p> <p>Model, price, ineffective hedges.</p> <p>Sovereign risk from positions.</p>	<p>Vehicles managed by state-affiliated entities, often focused on long-term illiquid assets.</p>
Market Intermediaries		
•Securities dealers	<p>Leverage, maturity mismatch, short positions, collateral management.</p> <p>Counterparty, leverage lending, sector, OTC contracts.</p> <p>Model, price, ineffective hedges.</p> <p>Sovereign risk from positions.</p>	<p>Securities dealers use client relationships or own inventory to facilitate client trades. They often enable leverage for their clients.</p>
•Principal trading firms	<p>Leverage, maturity mismatch, short positions, collateral management.</p> <p>Counterparty, leverage lending, sector, OTC contracts.</p> <p>Model, price, ineffective hedges.</p> <p>Sovereign risk from positions.</p>	<p>High-frequency (trading using extraordinarily high speed and sophisticated programs for generating, routing, and executing orders) buyers and sellers in electronic markets, holding minimal end-of-day inventories.</p>
•Central clearing counterparties	<p>Settlement risk, model risk bearing on margin requirements.</p>	<p>They act as counterparties to holders of certain financial contracts, netting and managing counterparty risk. Provide clearing and settlement transactions in securities and</p>

Appendix III. Recommended Taxonomy of NBF Subsectors, Including Potential Sources of Financial Stability Risk

	Counterparty, settlement risk.	derivatives, taking the financial risk of the transaction between counterparties on their own account, and becoming the counterparty of the original buyer and seller.
Financial Market Infrastructures		
•Securities markets, exchanges and electronic platforms	Settlement risk Counterparty	Marketplaces for trading securities and/or financial contracts like derivatives.
Financial Instruments		
Secured financing transactions	Settlement risk, including risk of failure to deliver security in a timely manner, Counterparty risk, model risk.	Transactions such as repurchase agreements, reverse repurchase agreements, security lending and borrowing, and margin lending transactions, where the value of the transactions depends on market valuations of the security sold and the transactions are often subject to margin agreements.
Derivatives	Counterparty, leverage lending, sector, Model, price, ineffective hedges	Financial derivatives are financial instruments that are linked to a specific financial instrument, indicator, or commodity, through which specific financial risks (e.g., interest rate risk, foreign exchange risk, equity and commodity price risk, and credit risk) can be traded in their own right in financial markets. The value of a financial derivative depends on the price of the underlying item: the reference price. The reference price may relate to a commodity, a financial asset, an interest rate, an exchange rate, another derivative, or a spread between two prices. The derivative contract may also refer to an index or a basket of prices.
•Options	Counterparty, leverage lending, sector, Model, price, ineffective hedges	Options are contracts that give the purchaser of the option the right, but not the obligation, to buy (a “call” option) or to sell (a “put” option) a particular financial instrument or commodity at a predetermined price (the “strike” price) within a given time span (American option) or on a given date (European option).
•Forwards and related instruments (i.e., futures)	Counterparty, leverage lending, sector, Model, price, ineffective hedges	A forward contract is an unconditional financial contract that represents an obligation for settlement on a specified date. Futures and other forward contracts are typically, but not

Appendix III. Recommended Taxonomy of NBF Subsectors, Including Potential Sources of Financial Stability Risk

		always, settled by the payment of cash or the provision of some other financial instrument rather than the actual delivery of the underlying item and therefore are valued and traded separately from the underlying item.
•Swaps	Counterparty, leverage lending, sector, Model, price, ineffective hedges	A swap contract involves the counterparties exchanging, in accordance with prearranged terms, cash flows based on the reference prices of the underlying items. Swap contracts classified as forward-type contracts include currency swaps, interest rate swaps, cross-currency interest rate swaps, and equity swaps. Under a swap contract, the obligations of each party may arise at different times
of which: interest rate swap contract	Counterparty, leverage lending, sector, Model, price, ineffective hedges	Fixed-rate payments swapped for floating-rate payments.
of which: foreign currency swap	Counterparty, leverage lending, sector, Model, price, ineffective hedges	Payments in one currency swapped for payments in another currency.
of which: cross-currency interest-rate swap	Counterparty, leverage lending, sector, Model, price, ineffective hedges	Fixed-rate payments in one currency swapped for floating-rate payments in another currency.
of which: equity swap	Counterparty, leverage lending, sector, Model, price, ineffective hedges	One party's swapped payment is based on the performance of a stock price or stock index. The other party's swapped payment can be based on a fixed or floating rate, another stock price, or a stock index.
of which: forward rate agreement (FRA)	Counterparty, leverage lending, sector, Model, price, ineffective hedges	An over-the-counter obligation that applies a predetermined interest rate to a notional principal amount over a specified future time period.
•Credit derivatives	Counterparty, leverage lending, sector, Model, price, ineffective hedges	Credit derivatives are financial derivatives whose primary purpose is to trade credit risk

Appendix IV. Proposed NBFI Breakdown

Financial subsectors and instruments listed in **black** correspond to breakdowns proposed via international consultation ahead of the update of the SNA and BP manual updates.¹ Breakdowns in **red** correspond to this paper's suggested additional breakdowns for a forward-looking picture of financial sector vulnerabilities. Highlighted rows correspond to those NBFI subsectors and financial instruments in Appendix III.

Non-Bank Financial Subsectors
Money Market Funds (MMFs) (S123)
Constant Net Asset Value MMFs
Variable Net Asset Value MMFs
Of which: Government
Of which: Prime
Non-Money Market Funds (non-MMFs) (S124)
Open end funds (S124a)
Real estate funds
Of which: Mortgage REITs
Equity REITs ²
Equity funds
Bond (fixed income) funds
Mixed or balanced funds
Hedge funds
Other open-end funds
Index funds
Fund of funds
Private equity funds
Of which: Venture capital
Exchange-traded funds
Closed end funds (S124b)
Real estate funds
Of which: Mortgage REITs
Equity REITs ²
Equity funds
Bond (fixed income) funds
Mixed or balanced funds
Hedge funds
Other closed-end funds
Funds of funds
Private equity funds
Of which: Venture capital
Other Financial Intermediaries (OFIs) (S125)
Financial vehicle corporations engaged in securitization transactions
Financial corporations engaged in lending (FCLs)
Security and derivative dealers

¹ See FITT Guidance Notes F.1 "More Disaggregated Institutional Sector and Financial Instrument Breakdowns" for further details.

² Although equity REITs are part of the nonfinancial corporate sector and therefore not included in the non-MMF investment fund aggregates, a holistic view of the potential inter-connectedness between real estate activities and financial intermediaries is important for policy makers to consider. Thus we include equity REITs in this context.

Specialized financial corporations
Of which: Principal trading firms
Other OFIs
Of which: Central clearing counterparties
Financial auxiliaries (S126)
Of which: Securities markets, exchanges and electronic platforms
Captive financial institutions and money lenders (S127)
Trusts, estate, and agency accounts
Corporate groups' captive financial entities
Of which: Foreign owned SPE-type captives
Other captive finance companies and money lenders
Of which: Sovereign wealth funds
Insurance corporations (S128)
Non-life insurance corporations
Life insurance corporations
Pension funds (S129)
Defined benefit pension funds
Defined contribution pension funds

Selected Financial Instruments	
Loans (F.4)	
Of which: Repurchase agreements, securities lending with cash collateral, and margin lending	
Derivatives and employee stock options (F.7)	
<i>(By market risk category)</i>	
Foreign exchange	
Single-currency interest rate	
Equity	
Commodity	
Credit	
Other	
<i>(By instrument)</i>	
Options	
Forwards and related instruments	
Futures	
Swaps	
Of which: interest rate swap contracts	
Of which: foreign currency swaps	
Of which: cross-currency interest-rate swaps	
Of which: equity swaps	
Of which: forward rate agreement (FRA)	
Credit derivatives	
Marketable employee stock options	
Other	
<i>(By trading venue and clearing status)</i>	
Exchange traded	
Over-the-counter (cleared)	
Over-the-counter (not cleared)	

Appendix V. On the Categorization of Crypto Assets in Official Statistics

Marco Espinosa-Vega and James McAndrews

In a recent paper, Rod Garratt and Neil Wallace review the distinction between two types of money, outside and inside. “Most economists distinguish between inside and outside money. Inside money is inside the economy in the sense that each unit is someone’s asset and someone else’s liability. That is, inside money disappears if there is sufficient consolidation across the balance sheets of agents in the economy. Outside money, in contrast, does not disappear when balance sheets are consolidated.”¹

Economists classify Federal Reserve notes and reserves issued by the central bank as outside money. This is justified by the following logic, from Ricardo Lagos, focusing on whether the assets are in zero net supply in the private sector: “Outside money is money that is either of a fiat nature (unbacked) or backed by some asset that is not in zero net supply within the private sector of the economy... Inside money is an asset representing, or backed by, any form of private credit that circulates as a medium of exchange. Since it is one private agent’s liability and at the same time some other agent’s asset, inside money is in zero net supply within the private sector.”²

In official statistics, however, this distinction, between private and public money, and between inside and outside money, is overlooked. Instead, for *accounting purposes*, both notes and reserves of central banks are considered “liabilities backed” by the assets held by the central bank.

This has resulted in difficulties of categorizing some self-redeeming digital assets. Individuals are willing to use well-established monies or commodities as a medium of exchange because they believe “that others will do the same” in the future. And as explained in Garratt and Wallace, these self-redeeming digital currencies “do not yield utility as might ownership of a Picasso and is not an input into the production of other things as is farmland, a factory” (we note that such assets are not “valuables” in SNA terminology).

Self-Redeeming assets

The definition of assets with corresponding liabilities, in official statistics, overlooks a key difference between inside money and outside money. The paper by Kumhof et al. discusses this interpretation of central bank, or outside, money.³ It persuasively argues **that central bank reserves and currency are not “liabilities” of the central bank in the conventional sense.**

Consider a household that owns a deposit account at a commercial bank with positive balances—a financial asset. The household approaches the issuing bank and requests redemption of the bank’s deposit liability. The bank can do so in several ways: by providing the household with currency or with a deposit in a different bank.

¹ Rodney Garratt & Neil Wallace, 2018. “Bitcoin 1, Bitcoin 2, ... An Experiment In Privately Issued Outside Monies,” *Economic Inquiry*, Western Economic Association International, vol. 56(3), pages 1887–1897, July.

² Ricardo Lagos, “2006 Inside and Outside Money” Federal Reserve Bank of Minneapolis Research Department Staff Report 374 May 2006.

³ Kumhof, Michael and Allen, Jason G and Bateman, Will and Lastra, Rosa M. and Gleeson, Simon and Omarova, Saule T., *Central Bank Money: Liability, Asset, or Equity of the Nation?* (November 14, 2020). Cornell Legal Studies Research Paper 20–46, Available at SSRN: <https://ssrn.com/abstract=3730608> or <http://dx.doi.org/10.2139/ssrn.3730608>.

Crucially, the bank has assets to “back” its deposit liabilities. Now consider a bank approaching the central bank to redeem currency. It is returned currency or reserves—another liability of the central bank. It is not offered some asset owned by the central bank, which is unlike the case with the commercial bank.

Therefore, we suggest a characterization of financial assets that is more aligned with the economic understanding of money: to classify financial assets as either redeemable into some other financial instrument, or, alternatively, as self-redeeming. Self-redeeming financial assets include financial gold (gold used for financial purposes), currency, and central bank reserves. Commercial bank deposits and other “conventional” near-monies, such as money market mutual fund shares, are redeemable into some other financial instrument.⁴

In this classification system, some crypto assets, such as bitcoin, would be catalogued as self-redeeming. Others, such as the liabilities of “stablecoins” that are redeemable into other financial instruments would not be classified as self-redeeming. It is important to note that central bank issued currency and reserves are “backed” by assets owned by the central bank, as well as being supported by legal tender status in law and other types of institutional support. In contrast, Bitcoin, for example, has no “backing.”

This approach would align the treatment of crypto assets with that of financial gold, as a financial asset without corresponding liability (in official statistics terminology), but it would also expand the general category to include currency and central bank reserves.

In this note we offer a new perspective, on the topic, which aligns with some recommendations made by Heys et al. It likened crypto assets without corresponding liability to financial gold. Although gold prices are volatile, gold is used as a store of value—a quintessentially monetary objective, or property of “good money”.

In line with this perspective, this paper recommends creating a new Valuables category within the Financial Account and classifying self-redeeming crypto assets, like Bitcoin, and financial gold within this new Valuables account. A more radical, albeit harder to implement, proposal, would have all outside money be classified into this new account.

In the following decision tree, all financial assets are classified as either a medium of exchange or not. Along the medium of exchange branch, we then classify such media as either self-redeemable or not. For monetary assets such as currency or demand deposits in commercial banks, this categorization is congruent with the economic notion of outside and inside money, respectively. The categorization as self-redeemable or not is more extensive, however, as it can be applied to crypto assets. An asset such as bitcoin, which acts as a medium of exchange does not have a corresponding liability, or, in other words, is self-redeemable. Stablecoins tokens that offer redemptions, in contrast, are more akin to commercial bank deposits. Redeemability is a clearer category than some have suggested, as we discussed in the notes above. General Accounts include fixed-income securities.

⁴ Equity is not a self-redeeming asset as in bankruptcy, the equity may be “redeemed” by allocation of the assets to be liquidated or conserved, ownership in a new enterprise, or proceeds from the sales of assets. A self-redeeming asset is one for which bankruptcy does not allow any transfer into a different type of claim. Consequently, EFT shares and MMMF shares, even though holders may not redeem them and “withdraw” assets from the fund, are not self-redeeming.

Figure 1. Financial Asset Decision Tree

	Medium of Exchange	Self-redeeming	Examples
		Yes	Currency, monetary and non-monetary gold, CBDC
	Yes		
		No	Commercial bank deposits, B-Money, E-money stable coins
Financial Asset			
		Yes	None
	No		
		No	General accounts

Source: (Espinosa-Vega and McAndrews)

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