



Development of Financial Sectoral Accounts: New Opportunities and Challenges for Supporting Financial Stability Analysis

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Paper prepared for the 34th IARIW General Conference

Dresden, Germany, August 21-27, 2016

Session 2A: Integrating Micro and Macro Approaches to National Income Analysis

Time: Monday, August 22, 2016 [Afternoon]

Development of financial sectoral accounts: new opportunities and challenges for supporting financial stability analysis

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The development of financial sectoral accounts is high on the global policy agenda. These accounts basically draw from the traditional national accounts framework, augmented to present information on financial flows and positions. Several steps that have been taken in recent years to refine some aspects of these statistics, with the ultimate goal of building “Integrated sectoral financial accounts”. Such information can be instrumental for supporting financial stability analysis as highlighted during the Great Financial Crisis of 2007-09 and its aftermath. Further progress can be achieved by drawing on the “micro data revolution” currently underway, despite a number of challenges.

Section 1 reviews the main concepts related to financial accounts. Section 2 highlights the post-crisis efforts to improve these accounts in the aftermath of the Great Financial Crisis and Section 3 provides a number of examples of the use of the data collected to support financial stability analysis. Section 4 discusses the potential opportunities provided by micro data to enhance the financial accounts framework, and Section 5 concludes.

1. Financial sectoral accounts: a multi-faceted concept

1.1. The SNA framework as a starting point

The concept of financial accounts has a variety of flavours. It is basically drawing from the traditional national accounts framework, augmented to present information on financial flows (often called the “*Flow of Funds*”) and positions (the “*Balance sheets accounts*”). Several steps have been taken in recent years to refine some aspects of these statistics, with the ultimate goal of building “*Integrated sectoral financial accounts*”.²

The starting point for developing financial accounts is the System of the National Accounts (2008 SNA; see European Commission et al (2009))³ and in particular its measurement of the “real sphere” of the economy through the so-called “*Current accounts*”. These accounts do not describe any

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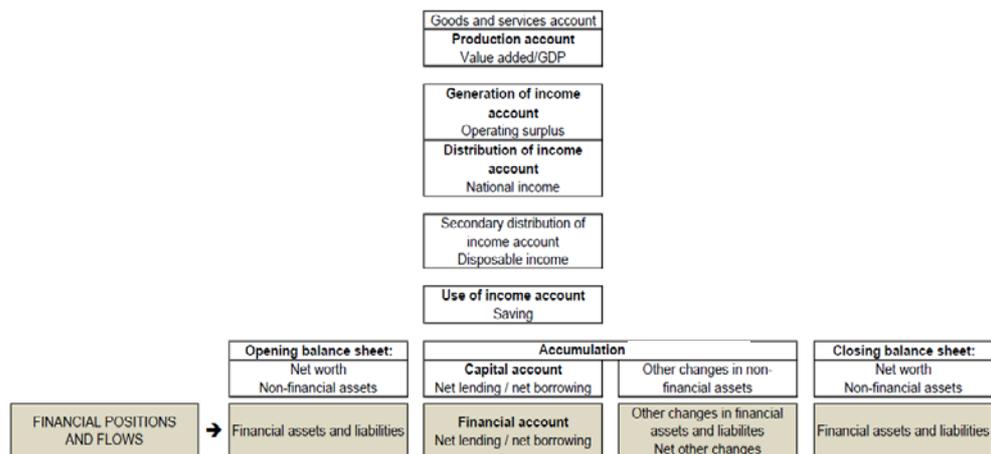
² See Shrestha (2011) for a general presentation of financial accounts.

³ Available at <http://unstats.un.org/unsd/nationalaccount/docs/SNA2008.pdf>. For an introduction to the national accounts framework, see, for instance, Lequiller and Blades (2014) or Carnot et al (2011), Annex I.

financial operations, but there is, however, a close interconnection: many financial operations reflect the decisions taken by economic agents either to borrow from (resp. to lend to) others because they need to use more (resp. less) resources than what they have at their disposal – say, a firm will need to borrow to buy new machines.

Over time, the SNA has developed a specific set of accounts describing the whole spectrum of financial operations. The first is the *Capital account*, which encompasses the net acquisition of non-financial assets by economic agents during a specific time period and the way of financing this acquisition. The *Financial account* then registers for each sector the evolution of its situation in terms of financial assets and liabilities – these flows can be the result of “real” economic activities (eg need to finance an investment) or simply reflect economic agents’ decisions to lend/borrow financial assets among themselves (these later type of transactions are particularly relevant among financial institutions). Two other accounts are also important. One is the *Revaluation account*: since the prices of assets evolve over time (and quite rapidly for financial assets), the net wealth of an economic agent will change depending on the valuation gains or losses registered during a given period. Another is the *Account for other changes in volume of assets*, which will register the variations in assets and liabilities that do not reflect valuation movements or real transactions of financial instruments; for instance when debt is written off. All these recorded flows constitute the *Accumulation account*, which basically provides the evolution of financial assets and liabilities over a given period due to the various possible factors (borrowing/lending decisions, valuation movements, etc.).

Chart 1: The national accounts framework, financial flows and positions⁴



In turn, the financial flows recorded in the accumulation account reflect the evolution of the stock (positions) of financial assets and liabilities of economic agents. This constitutes the *Balance sheet accounts*, which record the positions in terms of assets (non-financial and financial) and the liabilities (which can only be financial). It is thus a matrix showing the balance

⁴ Taken from European Commission et al (2009) and Fassler et al (2012).

sheets of the various institutional sectors, including their assets and liabilities and, as a total, their net worth. A key element is to ensure that flows during a specific period and the positions recorded before (in the *Opening balance sheet account*) and after (in the *Closing balance sheet account*) are fully consistent (cf Chart 1).

1.2. Refinements

There are, schematically, three important challenges with the recording of financial flows and positions. The first is that the granularity of the SNA framework has traditionally been limited; typically the various economic agents have been regrouped in the household, financial corporations, non-financial corporations and government sectors (and in the rest of the world aggregate for non-residents). But recent financial crises have underscored the importance of developing a more granular approach, esp. regarding the financial sector. Indeed this sector plays a key role in intermediating financial transactions and ensuring the matching of lending and borrowing decisions of the various economic agents in the economy; moreover, this intermediary role can have different features depending on what sort of financial institution (eg a bank, a hedge fund) is involved. A second challenge is that financial assets and liabilities comprise a large and increasingly complex world of instruments, which can have different implications for lenders and borrowers. For instance, a liability can be issued in the form of share, or can be a loan provided by a bank; the nature of the actual commitment will have different implications for the debtor agent. And a third challenge is information on the counterparty. If an agent increases its liability, it may be important to know who is the corresponding agent willing to finance this liability – and support the risk of (no) repayment later on.

Over the years, there have been several refinements to cope with the above challenges and better support financial stability analyses. In particular, significant improvements have been already brought by the last version of the SNA, with the related focus on three main areas: the balance sheet approach, sectoral financial accounts, and from-whom-to-whom tables. The related initiatives have taken place in parallel and the following description is, by design, a simplification of the various efforts undertaken.

A first initiative has been the Balance-sheet approach (BSA) developed in particular by the IMF after the Asian crisis in the early 2000s.⁵ The aim of the BSA is to show countries' balances sheets with a specific focus on those financial instruments that can play an important role in triggering crises. This facilitates the monitoring of the sources of financial fragilities, which can schematically be grouped in four categories. One is the maturity mismatch, ie when the term of the assets or sources of revenues is longer than the one of the liabilities. Another is the currency mismatch, say when a country has to pay its debt in US dollars while its resources are mainly denominated in domestic currency. A third source of fragility is the capital

⁵ See Allen et al. (2002) for the analytical framework for understanding crises in emerging markets based on examination of stock variables in the aggregate balance sheet of a country and the balance sheets of its main sectors; Hofer (2005) for a review of the IMF related work; and Mathisen and Pellechio (2007) on how IMF requirements for SDDS have improved the dissemination of data supporting BSA analyses.

structure mismatch, for instance when a firm investing in fixed, illiquid assets is issuing debt to finance them. Yet a last one is solvency risk, when liabilities can be repaid, but not immediately, for instance due to the difficulty to liquefy assets rapidly. A large amount of countries have started reporting such BSA indicators to the IMF, with specific attention being paid to the maturity and currency composition of the main financial instruments at the country level.

A second area of focus has been the development of (relatively granular) sectoral financial accounts. The objective is to have a holistic framework that encompasses economic data for all the various sectors of the economy in an integrated way, ie including the real sector, the external sector, the fiscal sector and the financial sector and its subsectors. To this end, one has to set up a detailed matrix describing all the assets and liabilities, covering the main instruments, and this for each of the main sectors of the economy considered. The aim is to cover all the non-financial accounts – so as to record all physical assets (eg produced and non-produced assets) – as well as the financial accounts – covering financial assets and liabilities, by type of instruments. The SNA recommends to present this sectoral information on a non-consolidated basis: that is, an asset held by a sector unit vis-à-vis another unit of the same sector should not be netted out. Indeed, should one decide to consolidate financial flows between institutional units of the same sector, that would prevent the capturing of lending relationships within each single sector and could be detrimental for financial stability analyses: intra-sector financial flows can be large and have destabilising systemic effects, as observed on the occasion of the Great Financial Crisis (GFC) of 2007/09 (Dembiermont et al (2013)).

Table 1: The “From-whom-to-whom” approach⁶

Lending sector	Financial corporations		Non-financial corporations		Households		Government		Rest of world	
	A	L	A	L	A	L	A	L	A	L
Borrowing sector										
Financial corporations - Instruments										
Non-financial corporations - Instruments										
Households - Instruments										
Government - Instruments										
Rest or world - Instruments										

The third main initiative has been the development of from-whom-to-whom (FWTW) tables. The bottom line is to break down all the financial assets and liabilities of a specific sector by its counterparty sectors. For instance, the sector that holds the liability of a debtor sector will be identified, as will be the sector that has issued the liability owned by a creditor sector as an asset. Hence, the goal is to design the full matrix recording all the financial flows and positions of all the sectors and on a FWTW basis. This matrix has three dimensions, as it shows the assets (and liabilities) of each sector vis-à-

⁶ See European Commission et al (2009) and Fassler et al (2012). A and L denote the assets and liabilities, respectively, of the various sectors listed in the columns of the table, declined by instruments.

vis each counterparty sector, and by type of instrument (Table 1). One source of complexity is that the concepts are often blurred. FWTW tables are sometimes described as the “*Detailed Flow of Funds*”,⁷ while the simpler concept of “*Flow of Funds*” will be typically understood as the set of tables recording the financial flows registered by sector over a certain period and/or the related balance sheet positions measured before and after the occurrence of these flows.

1.3. Integrated financial accounts

In principle, the detailed three-dimension matrix of the financial accounts – that is, the fully-fledged record of all financial transactions between counterparty sectors on a FWTW basis, both in terms of flows and positions, and by instruments – should be full consistent with the “traditional” SNA framework. It is sometimes referred to as the “*Integrated sectoral financial accounts*”.⁸

A key advantage of these integrated accounts is to facilitate economic analysis: financial transactions can be identified as the counterpart of real sector operations (for instance a corporate willing to invest and issuing debt instruments held by households) or as “pure” financial transactions (for instance interbank lending). It is also important for consistency. First, the SNA is based on the double-entry bookkeeping convention, so that each operation by a given sector has its mirror image in another one. For instance, goods produced by a corporate (as described in the production account) will be consumed by the household sector agents (as described in the use of income accounts). The principle, to echo the French chemist Lavoisier, is that *nothing is lost, nothing is created, everything is transformed*.⁹ In particular, the framework of the financial accounts is a key tool to ensure the consistency of transactions recorded among economic agents, since by definition the asset owned by one economic agent is the liability of another agent (and this for each type of instrument). A second key element is the consistency between flows and stocks: that is, the flows recorded during one period have to be consistent with the related balance sheet positions observed both before and after this period.

In an ideal world, sectoral financial accounts should be integrated in a “strong sense”: ie there would be no discrepancies at all between the financial transactions and the economic activities reported in the underlying

⁷ The three-dimensional “*from-whom-to-whom*” tables’ presentation is also referred to as the “*flow of funds matrix*” in the SNA (see 2008 SNA #2.10, #2.150 and Chapter 27). Simpler accounts without counterparty information are usually referred to as “*financial accounts and balance sheets*”.

⁸ The SNA provides accounts that are comprehensive, consistent and integrated “*in that all the consequences of a single action by one agent are necessarily reflected in the resulting accounts, including the impact on measurement of wealth captured in balance sheets*” (#1.1). To be integrated, “*the same concepts, definitions and classifications must be applied to all accounts and subaccounts*” (#2.3). Integrated accounts are described precisely in the SNA Chapter 2 (eg #2.75 and #2.125-9).

⁹ “*Rien ne se crée, ni dans les opérations de l’art, ni dans celles de la nature, et l’on peut poser en principe que, dans toute opération, il y a une égale quantité de matière avant et après l’opération ; que la qualité et la quantité des principes est la même, et qu’il n’y a que des changements, des modifications* » (Lavoisier, 1789).

national accounts framework, and this across all the sectors of the economy. In practice, however, there are discrepancies not least because the data are diverse, incomplete, and collected for various purposes and by different actors. Integration is therefore obtained in a “weak sense”, by ensuring the joint efforts of compilers to integrate the accounts as much as feasible (possibly leading to remaining gaps and/or discrepancies). Very often the integration work will focus on specific sectors and/or instruments. Depending on priorities, some integration will be requested at a certain minimum degree, while other integration efforts will be encouraged on a voluntary basis.

2. Post-crisis efforts to improve financial accounts

While this was not, and by far, the main cause of the GFC, public authorities have realised that important information had been missing on the financial system and had to be collected. Hence a key element of the policy response after the crisis was to enhance the availability of financial statistics esp. to address financial stability issues (Borio, 2013). In 2009, the International Monetary Fund (IMF) and the Financial Stability Board (FSB) issued *The Financial Crisis and Information Gaps* report to explore information gaps and provide appropriate proposals for strengthening data collection (International Monetary Fund and Financial Stability Board, 2009). This initial Data Gaps Initiative (DGI-I) endorsed by the G-20 comprised 20 recommendations focussing on three key statistical domains.¹⁰

This effort was from the onset clearly inserted within the general financial accounts framework. Indeed, a key objective reiterated on this occasion was to develop “integrated sectoral financial accounts” and to complement the “traditional” SNA framework by presenting information on financial flows and positions. In particular, recommendation #15 of the first DGI Initiative invited international organisations¹¹ to “*develop a strategy to promote the compilation and dissemination of the balance sheet approach (BSA), flow of funds, and sectoral data more generally*”. In this context, the challenge posed by the lack of data was clearly recognised, especially on households and non-financial corporates; to this end it was highlighted that “*data on nonbank financial institutions should be a particular priority*”.

As a result, all the G-20 economies have developed plans to improve their financial accounts statistics. A data template on sectoral accounts was finalised in 2012 and available sectoral accounts data have started to be made publicly available through the OECD.¹² Specific steps have been taken

¹⁰ For the relevance of the first DGI initiative for financial stability analysis, see Heath (2013).

¹¹ The Inter-Agency Group on Economic and Financial Statistics (IAG) comprises the Bank for International Settlements (BIS), the European Central Bank (ECB), Eurostat, the International Monetary Fund (IMF, Chair), the Organisation for Economic Co-operation and Development (OECD), the United Nations (UN) and the World Bank (WB). It was established in 2008 to coordinate statistical issues and data gaps highlighted by the global crisis and to strengthen data collection.

¹² See OECD (2014) as well as www.oecd.org/std/na/oecd-national-accounts-financial-accounts-and-financial-balance-sheets.htm; information is available to a varying extent for Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland,

to report the data for the BSA, and countries adhering to the SDDS Plus¹³ are expected to disseminate on a quarterly basis a minimum set of internationally comparable data on sectoral balance sheets, with a focus on the subsector details of the financial corporations. In parallel, significant attention has been paid to the implementation of agreed data templates through outreach, technical assistance, and training.

As a member of the IAG, the BIS has been particularly supportive of these international initiatives, especially through the activities of its Irving Fisher Committee on Central Bank Statistics (IFC).¹⁴ Specific attention was devoted to (1) reviewing best practices and ensure adequate knowledge-sharing among countries; (2) making central bank authorities aware of the related issues and, when relevant, propose recommendations for further progress; and (3) promoting coordination among the various international organisations involved in this area.

The initial phase of the DGI highlighted the limited availability of reliable and timely statistical data in various domains. Moreover, it also showed that imperfect statistical harmonisation at the international level is challenging the collection of comparable data across jurisdictions. To address these challenges, the international community decided to launch in 2016 the second phase of the DGI (DGI-II) in order to implement “*the regular collection and dissemination of comparable, timely, integrated, high quality, and standardized statistics for policy use*” over the next five years (International Monetary Fund and Financial Stability Board, 2015). Three main areas were identified for specific attention, ie the monitoring of risks in the financial sector, the assessment of interlinkages (in terms of vulnerabilities, interconnections and spillovers), and the adequate communication of official statistics (Heath and Goksu (2016)). Table 2 presents the precise list of recommendations as well as their link with the first phase of the DGI.

As for its first phase, the second DGI phase entails considerations that are specifically targeted to financial accounts, with two particular areas of action. Recommendation #5 is related to the shadow banking sector, whose monitoring can be greatly enhanced through the provision of sectoral accounts data. The second recommendation (#8) is more generally to “*Compile and disseminate, on a quarterly and annual frequency, sectoral accounts flows and balance sheet data, based on the internationally agreed template, including (...) other (nonbank) financial corporations sector, and develop from-whom to-whom matrices for both transactions and stocks to support balance sheet analysis.*”

Turkey, United Kingdom and United States, as well as for a number of non-OECD countries (eg Brazil, South Africa).

¹³ The Special Data Dissemination Standard Plus (SDDS Plus) was established in 2012 and goes beyond the focus of the SDDS by putting an emphasis on countries that have systematically important financial sectors that are integral to the working of the international monetary system. All SDDS subscribers can also, and are encouraged to, adhere to the SDDS Plus.

¹⁴ See Tissot (2014).

Table 2: The recommendations in the two phases of the Data Gaps Initiative

First Phase (2000-2005)	Second Phase (2016-20)
I.1: Mandate of the DGI	II.1: Mandate of the DGI
Build-up of risk in the financial sector	Monitoring risks in the financial sector
I.2: Financial Soundness Indicators (FSI)	II.2: FSI
I.3: Tail risk	
	II.3: FSI Concentration and Distribution Measures
I.4: Aggregate leverage and maturity mismatches	
	II.4: Data for Global Systemically Important Financial Institutions (GSIFIs)
	II.5: Shadow Banking
I.5: Credit default Swaps (CDS)	II.6: Derivatives
I.6: Structured products	
I.7: Securities data	II.7: Securities Statistics
Cross-border financial linkages	Vulnerabilities, Interconnections, and Spillovers
I.8&9: Data for Global Systemically Important Financial Institutions (GSIFIs)	
I.12: International Investment Position (IIP)	II.10: IIP
I.10&11 Coordinated Portfolio Investment Survey (CPIS) & International Banking Statistics (IBS): Participation / Enhancement	II.11: IBS II.12: CPIS
I.13&14: Financial and non-financial corporations' cross border exposures	II.14: Cross border exposures of non-bank corporations
Vulnerability of domestic economies to shocks	II.13: Coordinated Direct Investment Survey (CDIS)
I.15: Sectoral accounts	II.8: Sectoral accounts
I.16: Distributional Information	II.9: Household Distributional Information
I.17: Government Finance Statistics (GFS)	II.15: GFS
I.18: Public Sector Debt Database (PSDS)	II.16: PSDS
I.19: Real estate prices	II.17: Residential Property Prices II.18: Commercial Property Prices
Communication of Official Statistics	Communication of Official Statistics
I.20: Principal Global indicators	
	II.19: International Data Cooperation and Communication
	II.20: Promotion of Data Sharing

Source: Tissot (2016a).

3. The usefulness of financial accounts: recent achievements supporting financial stability analyses

Efforts to develop financial accounts have already led to a vast amount of information that can be mobilised for financial stability analyses. In the case of the BIS, such information has been particularly useful in three key policy

areas: (1) the monitoring of post-crisis deleveraging patterns (using newly available financial liabilities data consistent across countries and sectors); (2) the identification of non-bank financial intermediation services provided by so-called “shadow bank” entities (using more granular information on the financial sector); and (3) the propagation of liquidity conditions across countries (using a more precise identification of cross-border and cross-sector financial flows).

3.1 Post-crisis deleveraging patterns

The GFC underscored the central role played by debt in the build-up of crises, and of the necessity for reducing leverage after the ensuing bust. From this perspective, the analysis of pre- and post-crisis debt patterns, both across sectors and countries, was greatly facilitated by the balance sheet information provided by sectoral financial accounts. This was instrumental in allowing the BIS to compute a new credit dataset that is consistent both across major countries and sectors.¹⁵

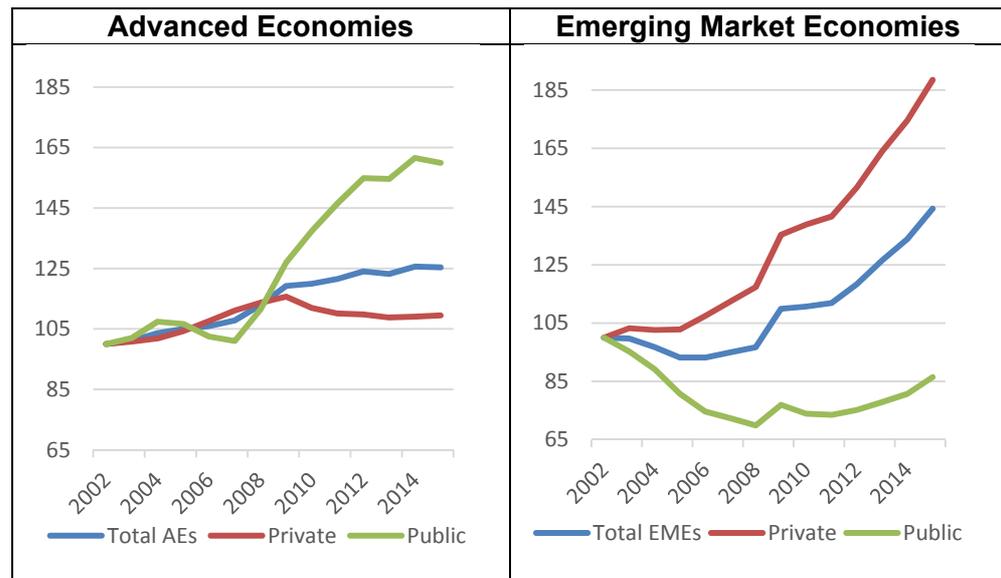
To assess country leverage after the GFC, it is important to distinguish the evolution of financial positions by sectors. As regards the non-financial private sector, a common pattern is that its debt as a percentage of GDP is expanding rapidly in boom years characterised by rapid credit growth, surging asset prices, accommodative policies and the system-wide build-up of fragilities. This trend quickly reverses after the bust as balance sheets have to be repaired. Yet the rhythm of this deleveraging can vary markedly, depending in particular on policy incentives to ensure that debt is repaid by debtors and /or written off by creditors. Turning to the public sector, its financial position usually deteriorates sharply after the bust and for several years in crisis-hit economies, reflecting the strain on public finances of bailing out the financial system as well as the effect of output losses on fiscal accounts. This can lead to a fast and protracted expansion of government credit-to-GDP ratios, which can in turn bring its own risks in terms of financial stability – cf the long-lasting difficulties experienced by a number of euro area countries in the early 2010s that had let their public debt soar after the GFC.

The result is that, for the economy as a whole, post-financial crisis developments will depend on the combination of private (usually down) and public (usually up) leverage patterns. In aggregate, total debt may remain quite high even many years after the bust. Moreover, history shows that different scenarios can happen (Dembiermont et al (2015)). A widely-recognised example of successful deleveraging occurred in a number of Nordic countries that saw a collapse in their banking systems in the early 1990s: private sector debt came down quickly in Sweden and Finland after the crisis and this was accompanied by a sharp deterioration in government accounts. However, this situation did not last too long and the public debt trajectory was able to correct downwards rapidly once most of the deleveraging of the private sector had been completed. A rather opposite example relates to the situation in Japan at the beginning of the 1990s. Private sector deleveraging was quite muted after the crisis, and was mainly concentrated in the non-financial corporate sector. Household debt as a percentage of GDP continued to rise slightly several years after the crisis and

¹⁵ <http://www.bis.org/statistics/totcredit.htm?m=6%7C326>.

did not correct afterwards. The restructuring of the financial system was delayed over a long period of time, with banks continuing to keep a large amount of bad debts in their books. Japan's public debt rose, though less rapidly initially than it did in the Nordic cases, reflecting the slower repairing of banks' balance sheets. But at the end, the government debt position worsened over a much longer period of time and ended up much larger.

Chart 2: Private and public debt patterns before and after the Great Financial Crisis



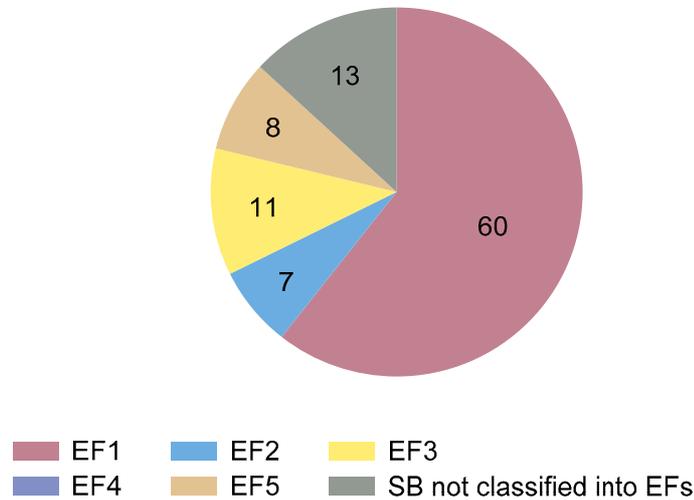
Notes: Evolution of total, private (non-financial sector) and public debt in % of GDP in Advanced and Emerging economies, 2002-2016 (2002=100); regional aggregates using PPP weights; market values, except EMEs' public debt in nominal terms.
Source: BIS; author's calculations.

The increased availability of sectoral financial accounts for a large number of both advanced and emerging economies since the GFC has allowed the BIS to set up a database showing sectoral debt patterns in a way that is as consistent as possible across countries and sectors. This in turn has provided a rich source of information to monitor the post-crisis adjustment process that is still very much underway today. Almost ten years after the bust, overall debt reduction seems to have only just started (Chart 2). Total debt in the non-financial sector of the advanced economies affected by the crisis has continued to expand up to 2016, by about 35 percentage points of GDP since 2007. While there are important differences between jurisdictions, the debt dynamics of the advanced economies in aggregate has resembled more the pattern of those of Japan than of the Nordic countries in the early 1990s. Despite its recent slight decrease esp. in the corporate sector, aggregate private debt has failed to correct significantly. And government debt has continued to rise steadily, in a manner reminiscent of Japan's trend deterioration in the 1990s (and unlike the large but temporary deterioration followed by a rapid improvement in fiscal positions experienced during the Nordic countries' crisis). Turning to emerging economies, the post crisis period of very accommodative financial conditions has been accompanied by a sharp rise in private debt, while public debt has been kept under control.

3.2 New financial intermediation channels

The GFC underscored the importance of innovation in the financial system, which is constantly and rapidly evolving. The increased diversification of actors and products has brought new channels for intermediating funds between borrowers and savers. Various examples include the development of housing finance, the deepening of bond markets, and the banks' move from their "traditional" originate-to-hold intermediation model towards the originate-to-distribute model (eg securitisation).

Chart 3: Shadow banking by economic function: size in % of total shadow banking



Economic Function	Definition	Typical entity types
EF1	Management of collective investment vehicles with features that make them susceptible to runs	Fixed income funds, mixed funds, credit hedge funds, real estate funds
EF2	Loan provision that is dependent on short-term funding	Finance companies, leasing companies, factoring companies, consumer credit companies
EF3	Intermediation of market activities that is dependent on short-term funding or on secured funding of client assets	Broker-dealers
EF4	Facilitation of credit creation	Credit insurance companies, financial guarantors, monolines
EF5	Securitisation-based credit intermediation and funding of financial entities	Securitisation vehicles

Notes: National financial accounts data as of end-2014, 26 jurisdictions; other national sources; FSB calculations.

Source: FSB (2015).

A key phenomenon has been the expansion of shadow banking entities. This category comprises all entities outside the regulated banking system that perform core banking functions and are therefore very active in providing leverage-based maturity and liquidity transformation (Kodres, 2013). This has led to an increasingly opaque and complex network of interconnected financial relationships across a wide range of institutions, markets and instruments. In turn, the interactions between the financial sphere and the real economy have become more diversified, more complex to analyze, and presumably also conducive to the taking of more financial risks by the various agents.

The financial accounts framework can be mobilised to track these entities when they can be identified and analysed within the “Other Financial Institutions” (FSB, 2011a). Since the GFC, the provision of more detailed subsectors within the financial sector has been instrumental in facilitating the identification of these shadow banks and assessing their importance relative to “traditional” banking intermediation channels. In particular, very important subsectors have emerge such as the investment funds (eg equity, fixed income), broker dealers, structured finance vehicles, finance companies and money market funds. The FSB has identified five main types of economic functions performed by shadow banks (Chart 3). Based on this metric, shadow banking is estimated to represent around 55 to 60% of GDP in major advanced and emerging economies, and about 10% of the financial assets (compared to about 50% for “traditional” banks”)

In practice, however, this identification may still be challenging – cf for instance the difficulties to capture hedge funds with the existing SNA framework, or the role played by affiliates in offshore entities – and does differ across countries. Substantial work is being therefore under way to address this issue and in particular to better capture shadow banking in the SNA, especially by the OECD with the support of the FSB / BIS in the context of the DGI (OECD (2016)).

3.3 Assessing global liquidity

The GFC underscored the fact that financial imbalances can occur simultaneously across countries due to the common influence of global factors. This highlights the powerful role played by “global liquidity”, a concept put forward by the BIS and that encompasses the degree of ease in financial conditions (Caruana, 2012).¹⁶ It refers to the property of the system as a whole, resulting from the global interaction of private investors, financial institutions and monetary authorities, and which in turn is setting the tone in countries’ domestic credit and market liquidity conditions. A key element supporting these transmission mechanisms is the role played by international funding currencies which are increasingly used outside the issuing country's borders (McCauley et al, 2015).

Here again, the greater availability of data on financial positions and flows both across sectors and across countries has been instrumental in allowing the assessment of global liquidity. In particular, there is more detailed data available to identify cross-border financial flows to the non-financial sector (BIS, 2015), reflecting the evolution of both bank lending and

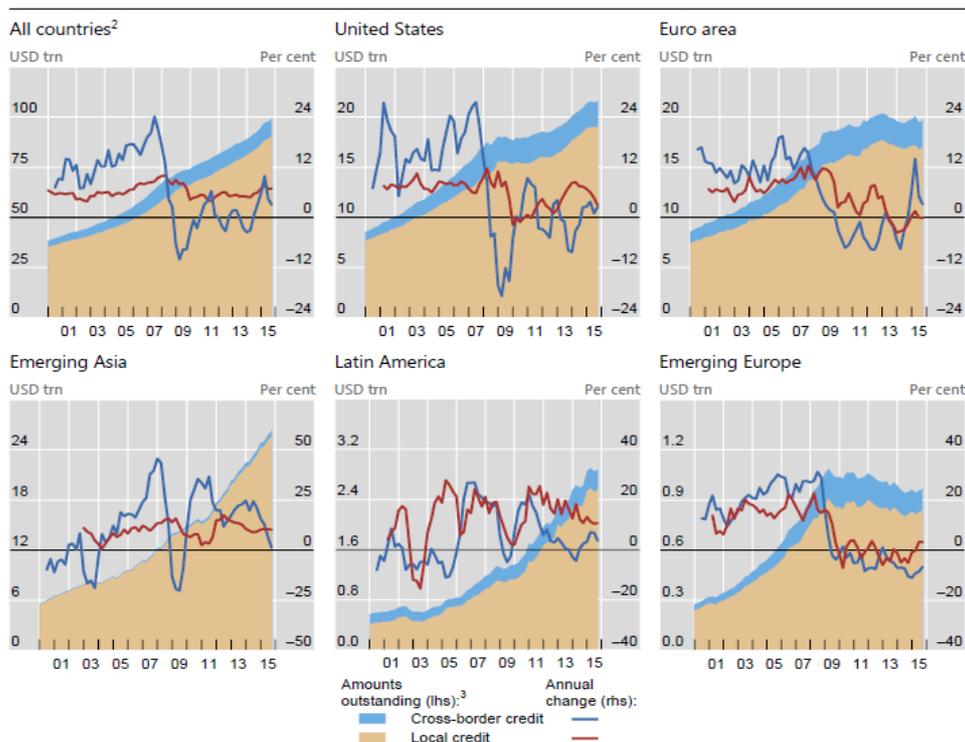
¹⁶: See BIS Global Liquidity Indicators: www.bis.org/statistics/gli.htm?m=6%7C333.

international bond issuance (Shin, 2013). This has enabled the BIS to compute various indicators to assess the respective importance of cross-border and domestic bank credit to non-banks for various regions (see Chart 4 for one example of these indicators). One important input for analysis is the degree to which monetary conditions in one country influences other domestic conditions via their spillover effects through foreign borrowers. A telling example is the recent estimate that banks and bond investors have increased outstanding US dollar credit to non-bank borrowers outside the United States – including affiliates of US residents – to \$9 trillion today, underscoring the importance of the links between US monetary policy and credit extended globally (McCauley et al (2015)).

Chart 4: Global liquidity indicators, by regions

Global bank credit to non-banks, by borrower region

Banks' cross-border credit plus local credit in all currencies¹



Further information on the BIS global liquidity indicators is available at www.bis.org/statistics/gli.htm.

Source: BIS (2016).

4. Integrating micro data: new opportunities for improving financial accounts?

In parallel to the renewed policy interest for developing financial accounts, the GFC underscored the importance of micro information. It showed that financial stress experienced at the level of individual entities, transactions or instruments can quickly reverberate into the entire financial system.

The shortcomings of analysis based solely on macro-level data have now been recognised, and statisticians are looking into ways to better

incorporate micro data to support research, economic analysis and policy making. The need, as summarised by Borio (2013), is to have “*good information about the system as a whole and the individual institutions within it – that is, we need to see the forest as well as the trees within it*”. Obviously, rapid improvements in technology (the “big data revolution”) also facilitate the taking into consideration of very granular information by macro statisticians, economists and policy makers.

Indeed, the various recommendations of the G-20 DGI have, to a varying extent, a micro and macro aspects, and the second phase explicitly recognises the particular importance of collecting more granular data so as to “*help straddle the divide between micro and macro analysis*”. Yet statisticians are still in an intermediate phase. While the diagnosis is now widely shared, what remains unclear is how to develop new statistical frameworks that can adequately combine micro- and macro-level information (IFC, 2016). This integration task has proved more complex than initially thought. It remains hindered by the limited availability of reliable and timely statistical data in some domains, particularly at the international level. Moreover, imperfect statistical harmonisation is challenging the collection of comparable, entity-by-entity data among financial institutions, not least across jurisdictions. These are obvious difficulties, and it will take time to address those.

Nevertheless, the new data collection exercises undertaken in response to the GFC have highlighted several important contributions of micro data– that is, data that is granular enough to capture the situation of one economic agent within a given institutional sector (one household, one firm etc.). As regards financial accounts more specifically, micro data can provide three main benefits: they can help to improve macro statistics; they can complement them by providing other type of information; and they can offer a new way to look at economic phenomena (Tissot, 2016a).

4.1 Micro data to improve financial accounts statistics

There is a growing consensus to recognise the benefits of collecting micro data as a way to improve the direct collection of statistics and support the development of “integrated sectoral financial accounts” (Cadete de Matos, 2015). These accounts requires a wealth of information that can be derived from granular “administrative” datasets, which typically include databases maintained by financial institutions or by public authorities, including public credit registries on individual loans data, security-by-security databases, central balance sheet databases, etc. (Bean 2015)¹⁷ An important feature of these datasets is that they have a large sample size and relatively high quality information, being used for other purposes than “just” statistics. Moreover, the information can be mobilised in a flexible way so as to compute a wide range of different indicators, even more so when they can be combined to other datasets through a common identifier (Cadete de Matos, 2014). Furthermore, these data sources have generally a good coverage of the relevant economic agents and may have a relatively low compilation cost for statisticians, for

¹⁷ Cf the “administrative records revolution” (Guiso (2015)), with the possibility of a “new age” of combining various, large administrative records.

instance when their collection is the by-product of an administrative operation (eg inscription to a public register).

But a key challenge is to integrate in a structured, consistent way all the various data available at granular level into a comprehensive macro framework. Financial transactions are usually not registered in line with the SNA standards because they were not initially thought to be part of this framework: concepts (eg risk indicators), reporting entities (for instance within consolidated financial group), valuations (eg accounting treatments) etc. do not automatically coincide. A second, and related, challenge is the fact that financial data come from heterogeneous sources: for instance information on debt instruments can be derived from a security-by-security database, while other information can come from credit registers, regulatory authorities, etc.; these elements can in particular undermine international comparisons. Micro data's inherent complexity can also lead to sizeable delays in the production of the statistics, as they require substantial investment costs (eg IT, algorithmic methods, human resources, skill mix) and can raise important quality issues. Indeed, a number of countries have experienced significant difficulties as they embarked on the collection of, for instance, large-scale exhaustive security-by-security databases. A third challenge is the lack of data. In particular, financial information on households and non-financial corporates can be scarce, esp. when declined by instruments. Yet a last issue is related to legal and confidentiality aspects. Data at the level of individual institutional units can be very sensitive and are usually protected by stringent rules. So far, this has been a key obstacle for the sharing of micro data among statisticians esp. those in charge of compiling financial accounts. Important efforts are ongoing to address these issues by revisiting the implementation of confidentiality rules and using anonymization / cryptographic techniques.

For sure, micro is not necessarily a synonym of completeness. There are alternative ways to enhance macro statistics without necessarily relying on the collection of a huge amount of exhaustive and granular information. For instance, one can limit the collection of micro data to a selected group of units and instruments, and “extrapolated” to the wider economy by using sampling techniques. Surveys are interesting in this context because they can be less costly to collect – compared to setting an exhaustive micro-data collection exercise – and can nevertheless be useful for distributional analysis, as seen below. They can also provide information that is difficult to find elsewhere, such as time use information, self-report assessments, and subjective expectations (Bover, 2015). But they have also a number of drawbacks, especially in terms of timeliness, comprehensiveness, updating (being typically not conducted every year, and the data collected may vary from one survey to another) and accuracy.¹⁸ Moreover survey data tend to provide information that is not fully consistent with SNA aggregates due to the concepts, definitions and statistical practices employed; similarly, surveys may not be consistent among themselves, a good example being the traditional consumption and wealth surveys which have different household samples.

Nevertheless, a number of initiatives have tried to enhance this integration and ensure that the granular data collected are consistent or “matched” with the macro framework (La Cava (2015)). Statistical matching

¹⁸ For instance surveys can suffer from bias, measurement errors, and representativeness problems (Meyer et al (2015)).

can facilitate the consistency of the granular information collected (with the national accounts-based framework, over time, and internationally), its complementarity (allowing both “top-down” and “bottom-up” types of analysis) and its adaptability. Other avenues can be explored too. One is to link survey data and administrative datasets, for instance credit registers and loan application surveys (Jiménez et al (2014)). Attention has also focussed on developing panel databases derived from administrative data sets or diaries, with the same households sampled over time (instead of cross-sectional surveys with different households sampled for each period). The objective is to build longitudinal panel data sets that are sufficiently rich at the micro level, available in a timely manner, and regularly updated over time.

4.2. Micro data to complement SNA-type information

The GFC showed that relying on aggregated data provided by the “traditional” SNA framework is not enough. For assessing financial stability fragilities at a macro level, it is often essential to understand what lies behind aggregated numbers and dig into the data in a granular way (Cadete de Matos, 2015). For instance, a country-wide indicator can reflect the homogeneous situation of a group of economic agents or, in contrary, the combination of idiosyncratic positions. Non-linearity effects mean that, on average, the implication of an aggregate number will differ from the picture that one can derive from the sum of individual situations.

“Pure” micro information

Micro data can bring this kind of more granular information that is needed. A first avenue is obviously to collect “*pure*” *micro information* that is relevant from a macro perspective. Fragilities can arise at the level of specific institutions (eg Lehman Brothers) or financial market segments or instruments (eg US subprime mortgages) that will have implications for the financial system as a whole. Such micro-level information can have a systemic importance but be masked by “traditional” macro, aggregated indicators. This raises a particular challenge for financial stability purposes, since fragilities may differ significantly across economic agents both at a point in time as well as over time. From this perspective, aggregated information can prove meaningless and even sometimes misleading if it masks needed information.

Obviously, national financial supervisors are the first in line to require access to institution-level information to monitor systemic risk in their own jurisdictions. At the international level, the collection of micro data for global systemic institutions have been promoted by the FSB and is being conducted with the operational support of the International Data Hub (IDH) set by the BIS in the context of the DGI-I recommendations #8 and #9 (see FSB (2011b) for the initial overview of this project). By nature, the focus has been on consolidated financial institutions, ie the headquarters and their affiliates, irrespective of the location of the residency of these affiliates. Because of their sheer confidentiality, the data to be collected have to be closely monitored by the senior authorities supervising the major financial centres, who decide to share institution-level information deemed relevant for the stability of the global financial system. Strict procedures have to be set up to ensure accuracy, confidentiality, completeness and timeliness of these statistics, which can have a very important market value.

Actual data have started to be collected for a subset of the global systemically important banks (G-SIBs) that have been characterised as of “systemic importance” by the FSB and the BCBS (BCBS, 2013). They encompass a variety of micro indicators – based on banks’ assets (exposures), liabilities (funding) and off-balance sheet figures (contingent positions) – aiming at assessing interlinkages among the institutions surveyed as well as with their key counterparties (“network effects”) as well as the concentration of these institutions in specific sectors and markets (“size effects”).

In terms of analytics, the value of these micro data will depend on circumstances, eg the need for a specific monitoring of a single institution or of the exposures of a number of them to a given counterparty or risk factor, etc. Making sense of the data and presenting them in a synthetic way is therefore quite challenging: it requires the developing of ad hoc analytical tools and metrics to capture “micro specific” situations that are of system-wide relevance. The purpose is not to simply consolidate the micro data collected and analyse the aggregated situation of all G-SIBs taken together; it is rather to filter the (large) amount of data available and extract the specific information deemed important for macro financial stability analyses at a specific point in time.

Distribution information

Another, more intermediate approach, is to compute distribution information. Instead of collecting detailed, institution-by-institution data (which may not be very easy from an operational perspective ...), the purpose is to have indicators on how average macro indicators reflect the particular “micro” situation of individual entities; attention will thus focus on the distribution of these indicators for the population being considered. For instance, to assess the relative importance of the subgroup of banks that have a very low capital ratio – compared to the average measured for the banking sector as a whole – and that are thus more vulnerable to episodes of financial stress.¹⁹ Another example is when household debt is low on average but concentrated on a very specific type of borrowers (cf the US subprime market).

However, “traditional” macro indicators usually provide little information on how general aggregates are distributed. They have basically three main characteristics: a country of residence (US), a point in time (2014), and a specific indicator value (average capital ratio of banks). The objective is therefore to add a fourth dimension (eg by providing ranges or quartile information) to assess the distribution of the indicator. The aim is to be able to explore the heterogeneity hidden behind aggregate numbers and in particular to analyse the tails of distributions.

A number of recommendations of the DGI-I have been indeed focussing on the development of distribution information. A case in point was the general recommendation (DGI-I #16) for “*statistical experts to seek to compile distributional information alongside aggregate figures, wherever this is relevant... [and in particular]... to link national accounts data with distributional information*”. The new, second phase of the DGI is focussing more specifically on income, consumption, saving, and wealth, for the

¹⁹ For an example of the regular monitoring of G-SIBs data see (BCBS, 2015).

household sector (DGI-II #9). Work on distribution information is also required in other areas, in particular to ensure the regular collection of concentration and distribution measures for financial soundness indicators (FSIs; see International Monetary Fund (2006)). The objective is to complement the overall assessment of the financial sector risks through aggregate measures by taking into consideration the risks posed by institutions that can cause system-wide disturbances (DGI-II #3).

This work is clearly important for policy purposes as it provides information that is not easily captured by standard financial accounts. Distributional data have for long been a useful input to help to better calibrate policies. For instance, the allocation of debt and wealth among households can affect the monetary transmission mechanism.²⁰ Moreover, the need for distribution information is likely to become even more pressing in the post-crisis period. Cases in point are monetary policy issues related to the impact of the newly developed unconventional tools as well as the effects of low interest rates on the distribution of wealth and income. Another growing area of interest is related to the new impetus put on financial stability analyses and policies. The way assets and incomes are distributed within a population is indeed a key element to consider when assessing the “macro” impact of a financial shock (eg house price correction, increase in interest rates). And the increased use of macro prudential tools, which are often targeted at specific groups of economic agents (eg “speculative” investors), markets/sectors (eg housing) and instruments (eg mortgages), will in itself call for more distribution information.

Obviously, some kind of access to institution-level data is instrumental to facilitate the production of distribution information, which can be easily derived from granular information obtained through surveys, administrative databases, or even web-based indicators (“big data”; see IFC (2015)). The task is however not straightforward, as it requires a good understanding of the links between the “macro” world (often SNA-based) and “micro”, granular databases. One challenge relates to the type of data that can be mobilised in these integration exercises, as they may not be consistent between the micro and the macro levels. Another is that the distribution of the variable of interest may be quite different even for relatively comparable indicators. For instance, low-income households are often characterised by a relatively high home ownership rate, so that they differ from the group of low-housing wealth households, as argued by La Cava (2015). As a result household wealth distribution may differ significantly from their income distribution. The bottom line is that distribution information is a new data dimension that makes data analysis richer... but also more complex.

4.3 Micro data can move the knowledge frontier

Micro data offers new possibility in economic thinking. The access to granular information provides perspectives for aggregating data in different ways and thereby to analyse economic issues from another, possibly radically different angle. A case in point relates to analyses focussing on the global financial system as a whole (Heath (2015)), which cannot be solely analysed through aggregated, country-based statistics. Indeed, the GFC showed the

²⁰ For an analysis of how the understanding of the impact of monetary policy requires an appreciation of heterogeneity across households, see for instance Sufi (2015).

importance of collecting information on global, group-level balance sheets for properly assessing firms' economic behaviour and their potential financial stresses. A growing part of corporates' domestic activities is now governed by parent companies located abroad, rather than by the (resident) reporting institutional units. Symmetrically, residents' actions are increasingly influencing the actions of other "controlled" agents located in other sectors and/or countries.

Given that the controlling and controlled units forming a corporate group usually belong to different economies and different sectors, the aggregation of group-level information cannot be consistent with traditional residency based SNA framework. This framework records assets and liabilities of the economic units that are resident in a specific economic territory, information that is progressively losing its relevance with globalisation (UNECE (2011)). What is needed is to capture the claims and liabilities of groups' affiliates that can have an important impact at the level of the parent company, since it is accountable for the business of all the entities under its control and is ultimately bearing the related risks. That requires consolidated group-level, risk-based data, an approach which is often described as "nationality-based": the information of the various institutional units belonging to a group characterised by a specific "nationality" has to be collected and consolidated independently of the residency of each of these units (IAG, 2015).

In order to construct such nationality-based statistics, one needs to access granular, institution-level data. A number of data sets have been developed along these lines, especially at the BIS for banking (McGuire and Wooldridge, 2005), securities (Gruić and Wooldridge, 2015) and derivatives (Tissot, 2015) statistics. Certainly, the computation of such datasets is posing significant challenges.

One issue is comparability. A particular effort has been made to coordinate banks' compliance with reporting guidelines so as to achieve international comparability. But accounting standards continue to differ across regions; while some convergence is being called for by the international community, the concrete application of these standards in each domestic jurisdiction is often judgement-based and may still leave substantial room for differences across countries. Yet a second issue is how to collect consistent group-level information when the group is made of various entities located in different countries, acting in different sectors, and using various legal structures. This puts in particular a premium on developing some kind of identifier to avoid double counting. This challenge is indeed common for all global data collections involving institution-level data. A key requirement is to identify, in all the micro data collected, each institution precisely and the aggregation rules to be applied. Hopefully, the international community is developing tools to facilitate such exercises. In particular the recently introduced Legal Entity Identifier (LEI) code will help to uniquely identify legally distinct entities that engage in financial transactions; in addition, work is ongoing to develop principles and standards for aggregating this information at the level of ultimate parents of legal entities.²¹ Furthermore, additional progress is under way in the standardisation of reporting financial operations – including the definition of a unique transaction identifier (UTI)

²¹ See <https://www.leiroc.org/>, and in particular LEI ROC (2016).

and unique product identifier (UPI). This will further facilitate the ability to share granular data and combine them in new, still unpredictable ways.

The bottom line is that micro data are a prerequisite but also a trigger for new types of economic analysis. By getting rid of “traditional” country boundaries, nationality-based consolidated data facilitate the understanding of who makes underlying economic decisions, who takes on the final risk and who needs to hold sufficient buffers to cover global potential losses (Tissot, 2016b). This, in turn, is moving the knowledge frontier. By allowing the identification of the ultimately responsible unit, one can analyse the ways in which economic decisions are made and, in times of stress, which area is ultimately impacted. Such information is crucial for fiscal, monetary and prudential authorities alike (see Cecchetti et al (2011)). It can be mobilised to enhance the stability of the financial system at the macro level. For example, it facilitates the monitoring of the borrowing activities of global groups outside their resident markets through their offshore affiliates. It can also help identifying spillover effects from national policies to other areas.

5. Conclusion.

The development of financial sectoral accounts has, rightly, become a top policy priority at the global level. Several steps have been taken in recent years to refine the traditional national accounts framework and present information on financial flows and positions.

Already, this information is proving particularly useful for supporting financial stability analyses, such as the assessment of deleveraging across countries and sectors in the aftermath of the Great Financial Crisis, the spillover of domestic conditions to the global financial system, and the assessment of shadow banking sector. All this work has benefited from the progress achieved in compiling financial accounts in recent years.

Yet there is still further work to do. A key aspect is to take benefit of the “micro data revolution” that is currently underway. The collection of granular data can help to have better macro statistics. It can positively complement the SNA-based, macro approaches especially to assess the systemic risks posed by individual institutions, financial instruments and markets. Perhaps more importantly, micro data can provide for new types of economic analyses.

Looking beyond the area of national accounts, international statistical initiatives have underlined the five key benefits micro data can bring for financial stability analysis – ie the provision of access to needed entity-level information, the provision of distribution information, the improvement in the quality of macro statistics, the support of policy making, and the expansion of the economic knowledge frontier (Table 3).

Table 3: The role of micro data in international statistical initiatives to address financial stability issues

Area	Initiatives ⁽¹⁾	Access to granular data	Information on distribution (4 th dimension)	Enhanced macro statistics	Policy assessment	Knowledge frontier
Quality of statistics	II-1			✓		
FSI indicators	II-2, 3 (I-2, 3)		✓		✓	
G-SIFIs	II-4 (I-8, 9)	✓			✓	✓
Shadow banks	II-5 (I-4)	✓		✓	✓	✓
Derivatives	II-6 (I-5)	✓		✓	✓	✓
Securities	I-6, II-7 (I-7)	✓		✓		
Sectoral accounts	II-8 (I-15)			✓		
Distribution information	II-9 (I-16)		✓		✓	✓
International statistics (eg IIP, IBS, CPIS, CDIS, GFS, PSDS, RPPI, CPPI)	II-10, 11, 12, 13, 15, 16, 17, 18 (I-10, 11, 12,17, 18, 19)			✓		
Cross-border exposures	II-14 (I-13, 14)	✓		✓		✓
Granular identifier (eg LEI)	II-4, 5, 6, 14	✓				✓
Data sharing	II-19	✓		✓		✓
QIS exercises	Basel III, II-4, other regulatory work	✓			✓	✓

(1): I- and II- relate to, respectively, the first and second phases of the Data Gaps Initiative (DGI) endorsed by the G-20.

Source: Tissot (2016a)

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The financial sector matters for economic development and poverty reduction, when it works well and when it malfunctions. On the upside, there is increasing appreciation for the financial sector's potential in accelerating economic growth and poverty reduction. New-generation stress test models also aim to capture the amplifying effects of contagion within the financial system and negative feedback loops from the real economy to the financial system (Schmieder, Pühr, and Hasan 2011). Analytical work on assessing the cross-sectional dimension of systemic risk has focused on quantifying the contribution of individual financial institutions to systemic risk. In addition, the analysis should cover the economic and financial environment in.