Closing information gaps at the global level – what micro data can bring

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Abstract

The dual micro/macro dimension of statistics was clearly recognised in the actions undertaken by the global community to have better information in response to the Great Financial Crisis of 2007-09. The Data Gaps Initiative endorsed by the G-20 comprised several recommendations that had, to a varying extent, a micro and macro aspects. Yet the development of these new statistical frameworks has proved challenging. The collection of micro data can bring value from this perspective, by giving access to needed entity-level information, providing distribution information, increasing the quality of macro statistics, enhancing policy making, and expanding the economic knowledge frontier.

Keywords: financial stability; data gaps initiative; micro data; systemic risk; policy making.

JEL classification: C8, D2, E01, E61, F60, G01, G20

Introduction

If anything, the Great Financial Crisis of 2007-09 proved that financial stability issues have both a micro and a macro aspect.[2] At the micro level – that is, at the level of individual entities, transactions or instruments – stress faced in specific areas quickly reverberated in the entire financial system. At the macro level – that is, at the level of the (national and international) economy as a whole, the crisis was preceded a financial boom characterised by rapid credit growth, surging asset prices and accommodative policies which led to the system-wide build-up of fragilities.[3]

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[2] This distinction between micro and macro statistics can be, in practice, less simple than it appears. In particular an intermediate category refers to "granular" data, which may not be available at a "pure" micro level but would comprise breakdowns not available in aggregated macro-data. One reason is that very granular data may not be available in the public domain due to general privacy limitations (for instance a bank cannot communicate one's bank account details) as well as to specific confidentiality rules imposed to the authorities that have access to micro data but are imposed by law to avoid their sharing and/or disclosure (for instance the financial supervisor of a bank will typically be able to monitor its detailed activities but will have a legal obligation to keep it confidential).

[3] For a short introduction on these mechanisms, see BIS (2014; Chapter IV: Debt and the financial cycle: domestic and global). For an overview of the implications of the crisis for economic analysis and policy, see Carnot et al. (2011).

This micro/macro duality matters not only at the conceptual level; it is also a key element to be considered by statisticians and practitioners in their day-to-day work which aims, especially in central banks, at mobilising data to support research, 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.*"

The dual micro/macro dimension of statistics was indeed clearly recognised in the actions undertaken by the global community to have better information in response to the crisis. In 2009, the International Monetary Fund (IMF) and the Financial Stability Board (FSB) prepared *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 and focussed on three key statistical domains, ie the build-up of risks in the financial sector, international financial network connections, and vulnerabilities to shocks. Not surprisingly, each of these recommendations had, to a varying extent, a micro and macro aspects.

Yet statisticians are still in an intermediate phase. Certainly, the shortcomings of analysis based solely on micro- or macro-level data have now been recognised. Micro information alone is of little use if it cannot be properly aggregated, analysed and communicated to policy makers; this was indeed the case in the run-up of the last crisis, surprisingly characterised by both the abundance of statistics and the lack of key information at least at the level of the global system. Conversely, the "macro" picture can be misleading, as it may mask micro fragilities that have system-wide implications; again, the last crisis highlighted how quickly the stress faced by individual firms can spillover to others through financial networks.

While the diagnosis is now widely shared, what is still unclear is how to develop new statistical frameworks that can adequately combine micro- and macro-level information. 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. To this end, the international community has just decided to launch the second phase of the DGI (DGI-II), which aims at "*implementing 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). The collection of more granular data was recognised as a key element of this initiative as it will "*help straddle the divide between micro and macro analysis*".

The new data collection exercises undertaken in response to the financial crisis have highlighted five main contributions of micro data. A first is to *collect "pure" micro information* to assess the situation of a specific institution or market; eg the balance sheet composition of a large bank considered as having systemic importance. A second is to have a *sense of the distribution of economic indicators*; to judge, for instance, how aggregated figures for the banking sector may cover a wide range of situations depending on particular sub-groups ("fat tails"). A third contribution is to enhance the *quality of macro statistics*: the idea is to use the richness of micro, granular data sources to enhance the accuracy / details of "traditional" macro

statistics. A fourth contribution is *policy assessment*: micro information can be instrumental to track individual responses to public policy decisions and, in turn, the overall impact of these policies. The fifth and last contribution relates to *economic understanding*: micro statistics can trigger a paradigm shift in the knowledge frontier, by highlighting the interest of a different representation of the economy.

What does this implies for the collection 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)? This paper argues that the collection of micro data can be instrumental in fulfilling the objectives highlighted above. It is accordingly structured along five sections, ie access to micro information, distribution information, quality of macro statistics, policy assessment, economic understanding. All these sections describe the (i) value added of mobilising micro data and integrating them in an encompassing macro framework to address a particular objective and (ii) the way this is being implemented in the context of the ongoing international statistical initiatives to ensure a proper mobilisation of micro-type information at the global level. These international initiatives comprise mainly the ones referred to in the DGI as well as the financial regulatory work that is being done in parallel in response to the crisis, especially by the Financial Stability Board (FSB) and the Basel Committee on Banking Supervision (BCBS). Section 7 concludes.

2. Macro-relevant, "pure" micro information

The crisis showed that aggregated data is not enough: one need to take into consideration "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 a well as over time.[4] From this perspective, aggregated information can prove meaningless and even sometimes misleading if it masks needed information.

Hence, when 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.

Obviously, national financial supervisors are the first in line to require access to institution-level information 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

[4] For these two financial stability dimensions (across the financial system at a point of time; and over time), see Crockett (2000).

Hub (IDH) set by the BIS (see FSB (2011) for the initial overview of this project). This collection is governed by the senior authorities[5] supervising the major financial centres (the Hub Governance Group, HGG), who are sharing institution-level information deemed relevant for the stability of the global financial system. Strict procedures have been set up to ensure accuracy, confidentiality, completeness and timeliness of these statistics. And a particular effort has been made to coordinate banks' compliance with reporting guidelines so as to achieve international comparability.

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.[6] They encompass a variety of micro indicators – based on banks' assets (exposures), liabilities (funding) and off-balance figures (contingent positions) – aiming at assessing interlinkages among the institutions surveyed as well as with their key counterparties ("network effects") and the concentration of these institutions in specific sectors and markets ("size effects"), with various frequencies (eg weekly, monthly and quarterly).

In terms of analytics, the value of different combinations 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. For instance, 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 of time.

The set-up of the Hub was organised in the context of the DGI-I recommendations #8 and #9 along three phases. Phase I, started in 2013, involved the collection of simple I-I ("*Institution-to-Institution*") bilateral data to measure the G-SIBs' exposures to their major counterparts; for instance, the claims of Deutsche Bank on BNP Paribas. It also comprised I-A ("*Institution-to-Aggregate*") data to assess the concentration of G-SIBs to specific sectors and markets; for instance the claims of Deutsche Bank on Russian residents. These latter I-A data are in fact the institution-level data underlying the consolidated international banking statistics (IBS) collected by the BIS: for instance the data reported for Deutsche Bank in the example above will be a subset of the IBS data published on the claims of all German banks vis-à-vis Russian residents. The data collected by the IDH have progressively become more detailed in parallel with the implementation of the enhancements of the IBS in the context of the DGI-I (recommendation #11). In particular, greater detailed information has been made available in terms of instrument and counterparty sector breakdowns. Phase II, launched in 2014, focused on I-I liabilities, ie information on the largest funding providers (bank and non-banks) of a bank like Deutsche Bank, as well as on

[5] Hub data are shared among national supervisors and macro-prudential authorities of the jurisdictions participating in the granular data collection. A number of IFIs also will receive special information derived from it.

[6] For the framework related to the Basel Committee's methodology for assessing and identifying (G-SIBs) see BCCS (2013). For the actual list of G-SIBs, see FSB (2015). This list is updated on a regular basis as part of the review of the largest 75 banks identified by the BCBS, and can differ somewhat from the list of institutions actually reporting data to the Hub.

its funding structure (eg use of wholesale funding). With the decision to start the implementation of Phase III at end-2015, additional I-A information will be provided for the consolidated balance sheet of each G-SIBs, with detailed breakdowns by counterparty country, sector, instrument, currency and maturity.

3. Distribution information – a new data dimension

As analysed above in the case of G-SIBs, there are clear cases for which it is essential to collect detailed, institution-by-institution data to support economic analyses and macro policies. But often there is no such need (and it may not be very easy from an operational perspective either…). What instead matters is 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. Another example is when household debt is low on average but concentrated on a very limited 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 household sector (recommendation 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 are at the tail of the distribution and that can cause system-wide disturbances (DGI-II #3).

This work is clearly important for policy purposes. 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. Moreover, the need for distribution information is likely to become even more pressing in the post-crisis period, for instance reflecting greater attention paid to policy redistribution effects in a low interest rates environment. 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.[7]

Obviously, access to micro data is instrumental to facilitate the production of distribution information, which can be easily derived from granular information obtained through surveys,[8] administrative databases,[9] or even web-based indicators ("big data").[10] The task is however not straightforward, as it requires a good understanding of the links between the "macro" (often national accounts-based) world and "micro", granular databases. One challenge relates to the type of micro 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. Micro data for better macro statistics

There is a growing consensus to recognise the benefits of collecting micro data as a way to improve macro statistics. Attention has in particular focussed on the development of "integrated sectoral financial accounts" which complete the traditional system of national accounts (SNA) framework by presenting information on financial flows and positions and on a sectoral basis (Tissot, forthcoming). An important feature is that the financial assets and liabilities of a specific sector are broken down by main instruments and counterparty sectors. This constitutes the so-called *from-whom-to-whom* tables, which provide information on who is financing whom, in what amount and with which type of financial instrument.[11] In particular,

7 For a review of macro prudential policies and related data implications, see Gadanecz and Jayaram (2015).

8 See IFC (2009).

9 The term "administrative" comprise a variety of aspects. Administrative datasets can be publicly available from public or private sources (eg balance sheet data for listed companies or even regulatory reports when they are made publicly available in some countries). They can be derived from private sources (eg banks' loan registers) and made available to specific authorities under strict confidentiality rules. Or they can be "pure" administrative data collected by the authorities themselves in their conduct of public policies (eg social security registers).

10 For the various dimensions of what is understood as "big data", see Irving Fisher Committee on Central Bank Statistics (2015).

11 The SNA's three-dimensional "from-whom-to-whom" tables presentation is sometimes referred to as a "flow of funds matrix"; see European Commission, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations and World Bank (2009).

recommendation #15 of the first DGI Initiative invited international organisations to "*develop a strategy to promote the compilation and dissemination of the balance sheet approach (BSA), flow of funds, and sectoral data more generally*".

Micro data sources can play an important role to support the compilation of financial accounts (Cadete de Matos, 2015). These accounts requires a wealth of information, for instance a breakdown of flows and positions by borrowing as well as lending sectors as well as a decomposition by type of instruments, ideally including information on original and/or remaining maturity. In theory, this information 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.[12] An important feature of these datasets is that they have a large sample size and relatively high quality information. 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. Furthermore, these data sources have generally a good coverage of the relevant economic agents and may have a relatively low collecting cost for statisticians, for 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 the national accounts 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 scare, esp. when declined by instruments; not surprisingly, recommendation #15 stated that "*data on nonbank financial institutions should be a particular priority*". 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

[12] Cf the "administrative records revolution" (Guiso (2015)), with the possibility of a "new age" of combining various, large administrative records.

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 above. 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.[13] Moreover survey data tend to provide information that is not fully consistent with national accounts 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 survey 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 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.

5. Designing and assessing policies

Micro data offers new opportunities to support macroeconomic analyses and guide policy decisions. They are obviously indispensable for the monitoring task of micro prudential authorities conducted at the level of individual institutions. Granular data is also required for the implementation of specific policy actions targeted at specific market segments or instruments. For instance, the design, calibration and implementation of macroprudential tools (eg loan-to-value limits, debt servicing limits) require close monitoring of available data. Almost by definition, granular data are needed to properly assess the effectiveness of such targeted policies and mitigate possible unintended consequences over time (eg agent behaviours in response to these policies, overall impact on the economy). Lastly, data are needed to decide when, and how, to reverse previous policy decisions.

Micro data certainly present several benefits from this perspective. First, they are rich enough to be used for various policy purposes, ie macro- and microprudential,

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

fiscal, structural and monetary policies, so that they can be used by multiple users.[14] Second, data sources that are granular enough can be combined to take into consideration multiple dimensions. And another benefit is the flexibility allowed by micro data, as new information requests can be addressed more easily without having to organise another ad hoc statistical collection exercise. This, at least in the longer run, should also reduce the reporting costs and burden on economic agents.

Reflecting the above, micro data have played an increasing role to support policy making since the Great Financial Crisis. Two main forces were at stake. The first has been the development of policy tools that need to be applied at a granular level. An obvious example is the growing variety of macroprudential measures adopted, focussing on specific instruments (eg underwriting standards for mortgages, explicit loan-to-value limits, debt servicing ratios), creditor sectors (eg capital buffers for banks), and borrowers (eg taxation, structural measures addressed to specific market segments). Another example relates to monetary policy: the assessment of (granular) credit risk is instrumental in determining the quality and conditions of assets that can be used as collateral in monetary policy operations, and which have been in increasing demand in the aftermath of the crisis with the development of quantitative easing policies. Lastly, a number of fiscal policy actions have been taken in a granular way to prevent financial fragilities, for instance to dampen targeted buoyant asset markets.

The second force has been the reworking of the designing of public policies so as to better factor in the crisis' lessons. This is particularly the case in the area of financial regulation, with the active involvement of the various standard-setting bodies hosted by the BIS in Basel. Almost all new regulatory initiatives are now supported by some kind of granular data collections, something that was almost inexistent less than ten years ago.[15] Quantitative impact studies (QIS) have now become a central element of these new indicator-based frameworks developed to, among other tasks, draw the lessons of previous policies, assess the ex-ante impact of new measures, identify additional areas of weakness, and clarify the functioning of regulation by measuring feedback effects, behavioural responses and unintended consequences. Moreover, they facilitate the assessment of the cross-impact of the various regulatory requirements introduced in parallel: for instance, by shedding light on how banks' leverage ratio would evolve in response to change in their capital ratio requirements. The BCBS has been leading ahead in this evolution, and has developed in recent years a large number of regular monitoring reports on various items such as capital regulation, liquidity rules, the selection and measurement of G-SIBs (Basel Committee on Banking Supervision, 2015)[16]. Its work is now underpinned by an extensive quantitative framework for the collection and analysis of institution-level data (Ingves, 2013). Other Basel-based groups such as the International Data Hub,

[14] 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).

[15] Although a number of QIS exercises were launched in the early 2000s with regard to the Basel II capital framework. The number and complexity of such exercises have however expanded markedly after the crisis.

[16] Especially related to the semi-annual monitoring of the impact of *Basel III: A global regulatory framework for more resilient banks and banking systems*, *Basel III leverage ratio framework and disclosure requirements*, *Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools* and *Basel III: The Net Stable Funding Ratio on a sample of banks*. See www.bis.org/bcbs/qis.

the FSB and the International Association of Insurance Supervisors (IAIS) are also increasingly participating in this new way of steering and implementing policy.

As a result of these two forces – development of micro policy tools and of indicator-based policy designing – micro data are being increasingly used for setting up policies, ensuring their effective implementation, monitoring their impact, and revising them afterwards in case of need. This trend is, obviously, raising significant challenges for public statisticians, as it requires the build-up of well-defined survey processes, IT systems and fully automated workflows to ensure in particular a certain degree of replicability and sufficient data quality checking.

6. A new 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 Great Financial Crisis of 2007–09 showed the 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.[17]

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 framework of the System of National Accounts (2008 SNA; see European Commission et al (2009)). 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.[18] 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":[19] 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.

[17] For a review of the methodological and practical issues related to the consolidation of corporate groups, see Inter-Agency Group on Economic and Financial Statistics (2015).

[18] For an introduction to the national accounts framework, see, for instance, Lequiller and Blades (2014) or Carnot et al (2011), Annex I.

[19] The concepts are similar but not exactly overlapping. Consolidated data capture the exposures of affiliates but aggregate this information at the group level. On the other hand, nationality information can be displayed at the level of the affiliates before their consolidation (cf for instance the BIS international banking statistics, for which one dataset is presented on a nationality though non-consolidated basis).

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. The BIS consolidated IBS collect data on internationally active banks' foreign claims broken down by the nationality of the reporting parent banks at the top level of consolidation and by the country of residence of the counterparties. They build on measures used by banks in their internal risk management systems and are broadly consistent with the consolidation scope followed by banking supervisors. In particular, one part of the IBS is presented on an ultimate risk basis, ie claims are attributed to the country where the final counterparty resides (taking account of risk transfer mechanisms such as guarantees). For simplicity's sake, the nationality concept is applied here at the reporting bank group level but also at the level of the counterparties of this reporting bank. That is, the positions of each initial (immediate) borrower are reassessed to take into account the transfer of risks to the ultimate borrower.

Another important BIS data set collected on a consolidated basis is the international debt securities statistics (IDS). It is compiled from a granular, security-by-security database that enables unique identification of each security. This allows each bond to be identified by its nationality defined as the residency of the parent company controlling it. Turning to the IMF, the compilation of the Financial Soundness Indicators (FSIs) is based on data on a consolidated basis for deposit-takers. The OECD has also developed a framework for collecting information on multinational enterprises (MNEs) on a consolidated basis.

Certainly, the computation of such datasets is posing significant challenges. A key issue 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. The recently introduced Legal Entity Identifier (LEI) is a 20-digit reference code to uniquely identify legally distinct entities that engage in financial transactions. Work is ongoing to develop principles and standards for aggregating this information at the level of ultimate parents of legal entities.

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. 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. 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 (an activity which has numerous implications for the conduct of national policies). It can also help identifying spillover effects form national policies to other areas. 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)).

Lastly, additional progress is under way in the standardisation of reporting financial operations – including the definition of a unique transaction identifier (UTI) and unique product identifier (UPI). This will further facilitate the ability to share granular data and combine them in new, still unpredictable ways.

7. Conclusion

As summarised in the table below, micro data can bring a lot a value to address the information gaps revealed by the Great Financial Crisis. The international community is very well aware of that, and in fact many of the recommendations of the DGI have, to a significant extent, a micro data dimension. The financial regulatory response to the crisis is also another important development force. As shown in the summary Table on *The role of micro data in international statistical initiatives* below, micro data sources can play a key and multiform role to support the following objectives:

- access institution-level information that is relevant for the financial system as a whole;
- provide a sense of the distribution of macro-economic indicators;
- enhance the quality of macro statistics;
- better support the design, implementation and assessment of evidence-based policies; and
- expand the knowledge frontier, by bringing new ideas and concepts to our attention.

The role of micro data in international statistical initiatives

Area	Initiatives [1]	Access to granular data	Information on distribution (4th 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.

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