External Sector Statistics: current issues and new challenges

Overview of the IFC-Central Bank of Armenia Workshop, Dilijan, Armenia, 11–12 June 2018[1]

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Introduction

External sector data represent a key element of economic statistics, covering a wide range of topics of interest to statisticians, economists, policymakers and the general public; for instance, to measure the importance of external trade, the role of multinational enterprises (MNEs), the wealth of nations etc. Yet the compilation and use of these data face a number of challenges, such as difficulties in getting information from non-residents, allocating firms' global operations by country, and establishing common statistical concepts and processes across jurisdictions.

The **issues and challenges** associated with external sector statistics are continuously evolving, reflecting ongoing economic developments, new data sources and changing analytical requirements. As regards economic developments, a major trend relates to the globalisation of financial systems and value chains in the production of goods and services. This imposes new requirements for data collection and the measurement/estimation of cross-border activities and financial flows. In regard to new data sources, emerging technologies offer various opportunities to improve data collections in both domestic and external areas. Cases in point include the recent emergence of "big data" sources and associated techniques, the increasing integration of micro- and macro-level data sets and the re-use of administrative data sets for statistical purposes. These developments tap a potentially rich vein of previously unused or underused statistics that can be mobilised to present a more comprehensive picture of a country's international accounts; but they also lead to specific challenges, not least in terms of resources required for handling this new type of information. Lastly, analytical requirements on topics related to external accounts are also evolving. Obviously, the global aspect of the Great Financial Crisis of 2007–09 (GFC) and its spillover across regions have put a premium on the availability of adequate external data to underpin policy analysis by national authorities or

[1] The views expressed here are those of the authors and do not necessarily reflect those of the Bank for International Settlements (BIS), the Central Bank of Armenia (CBA), or the Irving Fisher Committee on Central Bank Statistics (IFC).

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international bodies. Indeed, a significant number of the recommendations of the Data Gaps Initiative (DGI) initiated in response to the GFC and endorsed by the G20 relate to the external sector.[3]

In view of the importance of the factors mentioned above, the Irving Fisher Committee on Central Bank Statistics (IFC) and the Central Bank of Armenia (CBA) held a joint **workshop on "External Sector Statistics"** in June 2018 in Dilijan, Armenia. This event provided a welcome occasion to revisit the current issues related to external sector statistics and the challenges faced by central bank statisticians in finding appropriate sources, compiling indicators, and making use of them. It was also an opportunity to explore new methodological concepts and techniques and revisit global statistical standards, not least to promote greater harmonisation and cooperation in the international statistical community. The event brought together about 45 statisticians and economists who shared their country's experiences – all these presentations, as referred to in this overview, are included in this IFC Bulletin.

In his opening remarks, Vakhtang Abrahamyan, Deputy Chairman of the CBA, stressed the importance of external sector statistics for policymakers. This was particularly the case for small open economies like Armenia, given the significant influence of international trade on domestic activity and inflation. More generally, and as noted by Aurel Schubert, Director General of Statistics of the European Central Bank (ECB) and Vice-Chair of the IFC, issues relating to external sector statistics have become a key, recurring theme in international forums since the GFC, reflecting in particular a stronger policy focus on external risks and vulnerabilities.

The discussions were organised along **six thematic sessions**. Session 1 dealt with key issues and challenges in data compilation and discussed various sources and methods used in compiling external statistics. Session 2 focused on quality issues and how different countries deal with data quality improvements, with the presentation of specific use cases. Session 3 explored new data sources and techniques, with a focus on the pros and cons of "big data". Session 4 highlighted specific measurement problems associated with statistics on balance of payments (BOP)[4] and international investment positions (IIP), while Sessions 5 and 6 focused, respectively, on global interconnections and on the measurement and analysis of external risks and vulnerabilities. A concluding session summarised the main findings.

1. Sources and methods for the compilation of external sector statistics

The first session, chaired by Robert Kirchner (Deutsche Bundesbank), was devoted to the sources and methods for the compilation of external sector statistics. The first presentation, by the BIS, highlighted some **key issues and challenges of relevance to data compilers** in central banks. It also presented several recommendations to enhance the analysis of the international position of countries. First, central banks statisticians should make a greater use of existing micro-level data sets to complement traditional, macro-level external sector statistics. Second, it was worth

[3] See FSB-IMF, "The financial crisis and information gaps", 2009, for the first phase of the DGI; and IMF and FSB, "The financial crisis and information gaps – sixth implementation progress report of the G20 Data Gaps Initiative", 2015, for its second phase (2016–20).

[4] For a description of the BOP statistical framework, see International Monetary Fund, *Balance of Payments and International Investment Position Manual* – Sixth Edition (BPM6), 2009.

exploring the vast array of "big data" and alternative information sources as well as the powerful emerging technologies that can help to analyse them. Third, one should pay greater attention to the global dimension of financial and non-financial entities and their economic interdependencies, which cross national borders. This third recommendation was key to facilitating the measurement of external exposures, which is a complex exercise and requires various inputs and analyses. For instance, BIS work has emphasised the need to consolidate corporates' external exposures at the group level,[5] in turn allowing for a more holistic view of a country's external position compared with the residency-based approach of the System of National Accounts (SNA) framework.[6] Certainly, this requires the use of common identifiers, such as the global Legal Entity Identifier (LEI), and adequate parent relationships if the perimeters of global firms are to be identified.[7]

The importance of identifiers was echoed by the Central Bank of Cyprus presentation highlighting the usefulness of **adequate business registers** for the compilation of external sector statistics. The business registers used by the central bank and other stakeholders in Cyprus cover all institutional/legal economic units and are a primary source for the sectoral classification of firms' activities. They can be mobilised to construct surveys to directly collect financial information from selected business entities involved in external sector activities. Registers can also be used for various other purposes, for instance to distinguish resident and non-resident groups, track MNEs' activities, and provide granular information on foreign direct investment (FDI), portfolio and other investment flows.[8] In fact, business registers appear to be in increasing demand in many countries, and there are ongoing initiatives to better link these domestic records to cross-border registers, especially in the European context.[9]

A complementary approach to having comprehensive registers is to rely on selected samples of firms. This was illustrated by the CBA contribution, which highlighted **the use of surveys** as an important source of information for estimating foreign remittances, a key element of the BOP statistics for a small open economy like Armenia's. Indeed, inward remittances are a major source of foreign exchange, and it is important for the central bank to obtain a full picture – including an estimation of the flows and details on the profile of remittance senders and recipients. Unfortunately, data collected from commercial banks are not sufficient to yield this information. Nor do they account for informal and in-kind remittances, leading to a potentially large underestimation of Armenia's BOP position. To address these gaps,

[5] For the specific case of national banking systems, see for instance P McGuire and P Wooldridge, "The BIS consolidated banking statistics: structure, uses and recent enhancements", *BIS Quarterly Review*, September 2005, pp 73–86. For a more general discussion on nationality-based statistics, see B Tissot, "Globalisation and financial stability risks: is the residency-based approach of the national accounts old-fashioned?", *BIS Working Papers*, no 587, October 2016.

[6] See European Commission, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations and World Bank, *System of National Accounts 2008*, 2009.

[7] See Legal Entity Identifier Regulatory Oversight Committee, "Collecting data on direct and ultimate parents of legal entities in the Global LEI System – Phase 1", 10 March 2016.

[8] The international accounts' functional categories comprise five items: FDI; portfolio investment (which will generally include investment below the FDI 10% threshold); financial derivatives (other than reserves) and employee stock options; other investment; and reserve assets (2008 SNA, #26.80).

[9] A noteworthy example is the Euro Groups Register (EGR) pilot project, launched by Eurostat in 2006 for the creation of a European Business Register on MNEs; see ec.europa.eu/eurostat/statistics-explained/index.php/EuroGroups_register.

the CBA has developed specific surveys and is using this information as a complement to administrative data sets and banks' customer reports. These data provide policymakers with a more granular understanding of the flow of external remittances, which would not be otherwise known from the aggregated BOP accounts.

The importance of blending various data sources for BOP compilation was underscored by the Central Bank of Malaysia's presentation of the country's external sector statistics data collection framework. This **integrated framework** provides a unified source for the consolidation of external sector statistics and relies on several administrative data sets and surveys – eg a dedicated IIP survey, reports on cross-border flows, customs records of goods and services. In addition, specific efforts have been undertaken to limit the reporting burden, improve data quality and reduce turnaround time. This framework has proved instrumental in ensuring the dissemination of external statistics to key stakeholders, including policymakers.

2. Data quality issues and improvement initiatives

This session, chaired by Jacek Kocerka, Narodowy Bank Polski (NBP), dealt with data quality issues, which cover several aspects: the consistency, frequency and timeliness of the data collected; the process for deriving final estimates from primary information; errors and omissions; and data revisions. Additional quality challenges reflect ongoing structural changes, such as globalisation, the greater availability of bilateral data, and the need to harmonise data concepts and definitions across countries. Hence, data quality issues touch on a wide array of statistical as well as methodological questions, as highlighted by the four country experiences presented in the session.

A first challenge presented by the NBP relates to the **handling of primary sources of information** to compute BOP statistics, with a particular focus on company records from accounting statements.[10] The related balance sheet and profit and loss information can be very useful to allow companies to report directly from accounting system in accordance with BOP rules. Yet there are several methodological issues, especially as regards the valuation of business entities and the fact that accounting data are not always consistent with the SNA/BOP framework. These difficulties call for careful verification and adequate transformation of primary data into compiled external sector statistics.

A second key challenge analysed by the CBA is due to **errors and omissions**, which have been a perennial issue in BOP statistics. In theory, such errors should not exist in the framework supporting the SNA and BOP statistics, because of their underlying "quadruple-entry bookkeeping" accounting system.[11] However, in practice, BOP compilation relies on multiple sources of information and there are important reconciliation issues due to the various errors and omissions across the

[10] See in particular Inter-Agency Group on Economic and Financial Statistics, "Consolidation and corporate groups: an overview of methodological and practical issues", IAG reference document, October 2015.

[11] The "quadruple-entry bookkeeping" accounting system underlying the SNA (2008 SNA, #3.112) combines two elements, ie the vertical double-entry bookkeeping principle used in business accounting and the horizontal double-entry bookkeeping convention, which ensures the consistency of relationships between different institutional units; for a presentation, see B Tissot, "Development of financial sectoral accounts: new opportunities and challenges for supporting financial stability analysis", *IFC Working Papers*, no 15, November 2016.

data sets involved. In Armenia, for instance, statistics on remittances, dividend payments and trade invoicing are among the common sources of BOP discrepancies. Significant efforts are under way to address these data quality issues, by enhancing the comprehensiveness of the information collected and by refining estimation techniques, for example through the conduct of ad hoc surveys.

A third challenge is to **access foreign information** to enhance the consistency of external statistics, as emphasised by the Central Bank of Luxembourg. This is particularly important for a small open economy like Luxembourg's, whose financial sector is large, open and diversified. Asymmetries in FDI reporting as well as sizeable errors and omissions are key obstacles when calculating the country's external position. To enhance the consistency of BOP/IIP, a harmonised survey strategy has been developed to monitor stock/flow across sectors. This work has also greatly benefited from the sharing of more granular data with foreign jurisdictions, especially in the context of the data collections put in place by Eurostat and the ECB. The development and use of unique identifiers, such as the global LEI, will also facilitate this task in the medium term.

A last key challenge relates to the **measuring of domestic economic activities of non-residents**, as highlighted by the Bank of Spain presentation focusing on the specific area of real estate. Non-resident real estate investment has increased significantly in Spain, particularly in relation to secondary dwellings in major tourist locations. The provision of accurate data on foreign ownership of domestic real estate was thus a key objective, not least to analyse regional economic developments, monitor fiscal positions and assess external flows (eg imputed rents) and positions (eg value of the stock of properties) so as to enhance the computation of BOP and IIP statistics. To do so, the Bank of Spain is relying on various administrative data sets collected by different public agencies.

3. New data sources and techniques

The third session, chaired by Aurel Schubert, ECB, was devoted to the emerging landscape of new data sources and technologies, ie "big data". The ongoing information revolution offers a lot of promise, with an access to new data sets that can be more extensive in terms of statistical coverage, as well as possibly offering higher quality and greater timeliness. In addition, associated "big data" software and artificial intelligence techniques can provide new and innovative ways to compile and analyse statistics.[12] The four papers presented in this session dealt with these aspects, shedding light on both the new statistical sources and the innovative techniques associated with "big data".

As regards **new "big data" sources**, recent country experiences have shown the usefulness of capturing the very granular information they provide for the compilation of external sector statistics and the analysis of cross-border connections. This was confirmed by the work presented by the CBA on incorporating e-commerce data into BOP statistics. For a small economy like Armenia's, e-commerce – that is, the use of online platforms to buy and sell goods – has grown rapidly and now represents a sizeable share of external trade. But e-commerce can relate to a wide range of transaction types (eg non-resident transactions, small value transactions)

[12] For an overview of central banks' ongoing initiatives in the use of big data techniques, see IFC, "Big data", *IFC Bulletin*, no 44, September 2017.

and involves various countries and payment systems, making it difficult to capture with the existing statistical apparatus. The CBA tried to overcome these problems by using various, complementary sources, including administrative data (eg customs), enterprise surveys and commercial banks' customer and payment records. While these efforts have helped to better capture the associated external flows, which can be quite volatile, the degree of quality of these new sources has proved challenging.

This was echoed by two cases reported by the Central Bank of the United Arab Emirates. The starting point was the recognition that "traditional" main sources for the compilation of BOP data – eg ITRS,[13] surveys and administrative data sets – have significant limitations in terms of timeliness, identification of transactions, and quality. To address these challenges, the central bank has embarked on the collection of **complementary data at a granular level**, covering two "big data" areas. First, the collection of SWIFT[14] transaction-by-transaction data: each SWIFT message, incoming and outgoing, is captured by the central bank's statistical system and aggregated for BOP compilation as well as for analytical purposes. These new data help in particular to better measure the origin, destination, currency, volume, value and purpose of external transactions. The second "big data" area relates to plastic card transactions, which provide a wealth of information covering the transactions of tourists (both incoming and outgoing), with detailed breakdowns by amount, activity and region.

Another big data source of growing interest to central banks in general, and to the Bank of France in particular, relates to **derivatives transactions**.[15] But this information is difficult to capture for statisticians compiling IIP/BOP aggregates, given the complexity of these data: ie the variety of derivatives contracts (eg equities, interest rates, FX), the geographical distribution of the trades, their organisation (ie whether they are traded over-the-counter (OTC) or in exchanges), their valuation, stocks/flows adjustments etc. However, important efforts have been made since the GFC to improve information on the size and structure of the derivatives market, especially with the data collections led by the BIS in surveying the OTC market[16] and the guidelines developed by the Financial Stability Board (FSB).[17] In the case of France, the reporting framework has been significantly strengthened and provides regular information on derivatives transactions and their associated attributes (eg notional

[13] A key component of the external data collection framework of many economies is the international transactions reporting system (ITRS), formerly known as foreign exchange record system. The ITRS differs among countries but has many common features described in particular in Chapter 4 of the Balance of Payments and International Investment Position Compilation Guide; see www.imf.org/external/pubs/ft/bop/2014/pdf/BPM6_04F.pdf. For an example of country experience with ITRS, see for instance "International Transactions Reporting System (ITRS): challenges and opportunities to support monetary policies in Indonesia", presented on the occasion of the Regional Seminar for Asian Countries on "Recent Developments in Central Bank Statistics" co-organised by the BIS, Bank Indonesia and the ECB on 20–21 March 2017; see www.bis.org/ifc/events/ifc_ecb_bankindonesia/regsemasiancountr_42.pdf.

[14] The network provided by the Society for Worldwide Interbank Financial Telecommunication (SWIFT) allows financial institutions to share information about financial transactions in a controlled environment. For information on countries' participation in SWIFT, see for instance Committee on Payments and Market Infrastructures (CPMI), "Methodology of the statistics on payments and financial market infrastructures in the CPMI countries (Red Book statistics)", August 2017.

[15] See IFC, "Central banks and trade repositories derivatives data", IFC Report, October 2018.

[16] For an overview of the BIS contribution on the monitoring of the derivatives market, see B Tissot, "Derivatives statistics: the BIS contribution", Invited Paper Session 089, International Statistical Institute World Statistics Congress, 2015.

[17] See for instance FSB, "Implementing OTC Derivative Market Reforms", October 2010.

amounts, counterparties), which have proved useful for the compilation and analysis of external sector statistics.

Apart from the opportunity of collecting new types of information, BOP compilers are also looking at **new IT techniques and systems** in order to process bigger data sets when compiling external sector statistics, as underscored by the Bundesbank presentation. Technological advances allow for a fully integrated system centralising all the relevant data and meta data, with improved stocks/flows integration, real-time updates, and the possibility to "drill down" and look beyond aggregated reports into the most fundamental, micro pieces of information.

On balance, central banks' experience with "big data" suggest that the increased availability of sophisticated IT software and hardware can be instrumental in both capturing and analysing a more extensive range of external sector statistics, including non-traditional ones. The trend is to develop integrated systems and frameworks to produce harmonised and internationally consistent data. However, it is also important to proceed cautiously in collecting new "big data" sources and implementing innovative IT solutions, using well thought-out use cases. One risk is that this might consume excessive resources in exploring areas that may prove less useful than expected. Another is to pay too much attention to collecting data, and not enough to making use of it – it is very important to separate information from noise.[18]

4. Specific IIP/BOP measurement issues

The session, chaired by Bruno Tissot (BIS), was devoted to measurement aspects that are quite specific to the BOP/IIP framework. Indeed, in addition to the issues covered in the other sessions and that relate to general external sector statistics (eg dealing with errors and omissions, data quality and countries' asymmetries), this framework is quite complex and poses a variety of challenges, some of them country-specific – for instance, for small open economies facing increased globalisation of financial systems and production chains. The presentations in this session focused on four particular topics in this regard, namely the measuring of financial intermediation services, the identification of FDI, "pass-through" activities and round-tripping transactions.

As regards the first issue, the challenges posed by **the measurement of financial intermediation services** were illustrated by a CBA presentation of Armenia's external accounts. The main data sources include reports on financial institutions' balance sheets, loan statistics, and the BIS international banking statistics[19] (used for service import estimations). Given that Armenia is a highly dollarised economy, with the US dollar representing around two thirds of the foreign currency liabilities of the financial system, the estimation of intermediation services requires an appropriate external reference interest rate to be selected, as well as the collection of data on private sector's external liabilities, and the integration of all this varied information into a consolidated, comprehensive framework.

[18] For the need to "connect and not just collect the dots", see for instance A Carstens, "Are post-crisis statistical initiatives completed? Taking stock", Opening remarks at the Ninth IFC Conference, Basel, 30 August 2018.

[19] For an overview presentation, see BIS, "Introduction to BIS statistics", *BIS Quarterly Review*, September, 2015, as well as the data available on www.bis.org/statistics/about_banking_stats.htm.

The second issue, ie **FDI**[20] **measurement**, was highlighted by the Bank of Italy's presentation of imputation techniques used to determine the nationality of foreign shareholders in Italian firms. The problem is that this information, required to estimate the FDI component of the Italian BOP and IIP positions, is missing in the administrative data sets available. A machine learning algorithm has therefore been developed to match the names of foreign firms collected from a large data base of foreign and domestic names, and in turn to automatically establish a clear distinction between foreign and domestic firms when compiling BOP/IIP statistics.

The estimation of "**pass-through activities**"[21] in FDI statistics is another significant issue. In the case of Finland, such activities reflect the fact that substantial FDI inward funds (recorded as the country's liabilities) are passed through Finnish enterprises and transformed into FDI outward funds (recorded as assets). It is thus important to distinguish these different types of flow, which is currently done by (i) calculating FDI according to the directional principle and (ii) isolating pass-through entities as special purpose entities (SPEs).[22] The method presented by the Bank of Finland allows for pass-through flows to be calculated using weights to estimate FDI liabilities against FDI assets at a granular level; in turn, the data can be aggregated across enterprises and groups to arrive at country estimates, without requiring additional data collections.

The last issue highlighted by the National Bank of Ukraine presentation relates to the estimation of **round-tripping transactions**.[23] Round-tripping reflects the fact that entities can move funds in and out of the economy for a variety of reasons, including tax optimisation, exchange rate hedging, operational aspects etc. This can result in erroneous BOP/IIP estimates, especially as regards estimates of FDI flows, as many and various entities can be involved in the chain of related transactions. Estimates of round-tripping are captured through a variety of sources including the country's trade reports (ITRS), surveys to determine the ownership structures of enterprises, and sectoral analyses. The results can vary significantly both across financial instruments and over the years.

5. Global interconnections

This session, chaired by Mher Barseghyan (CBA), was devoted to the impact of global interconnections for external sector statistics and presented a number of recommendations for statistical compilers in order to address the associated challenges. From this perspective, the three papers presented emphasised the need

[20] See OECD Benchmark Definition on FDI, fourth edition (OECD (2008)).

[21] See 2008 SNA Chapter 21, especially #21.41: "'Pass through funds' or 'funds in transit' are funds that pass through an enterprise resident in one economy to an affiliate in another economy, so that the funds do not stay in the economy of the affiliate. These funds are often associated with direct investment".

[22] See 2008 SNA Chapter 4, especially #4.55-6: "There is no common definition of an SPE but some of the following characteristics may apply (…). Such units often have no employees and no non-financial assets. They may have little physical presence (etc.)".

[23] Round-tripping is a business practice consisting of selling an asset with an agreement to buy it back later on. In the case of FDI, round-tripping often relates to domestic funds channelled through offshore centres back to the local economy in the form of direct investment; for a recent analysis, see D Aykut, A Sanghi and G Kosmidou, "What to Do When Foreign Direct Investment Is Not Direct or Foreign – FDI Round Tripping", *World Bank Policy Research Working Paper*, no 8046, April 2017.

to (i) have a comprehensive statistical framework covering the external sector; (ii) make use of so-called mirror data; and (iii) monitor large global groups at the entity level.

As regards first the **need for a comprehensive statistical framework**, a telling example has been the ECB road map developed for the euro area external statistics since the establishment of the monetary union in the late 1990s. This project went through several phases, with the production, over time, of bilateral data, monthly BOP, detailed breakdown of counterpart trading partners by geography, sectors and instruments and, later, breakdown into stocks and flows as well as by trade and services. Despite this significant progress, there are still several areas for potential improvement for European statisticians, such as linking micro and macro data sets, measuring cross-border inter-linkages, and assessing the associated risk exposures and vulnerabilities. To this end, the ECB has defined a medium-term strategy focusing on the development, production and dissemination of external sector statistics. Development involves providing fit-for-purpose data, with long series, comprehensive coverage, and granular breakdowns. Production relates to the treatment of information asymmetries and better-quality data in terms of timeliness and consistency. Finally, dissemination of comprehensive data is key to supporting analysis by policymakers and other users.

A second lesson in order to address the statistical issues posed by global interconnectedness is to reconcile the positions between a country's BOP/IIP account and its mirror image in the Rest of the World (ROW) account.[24] The **use of mirror statistics** to reconcile differences between countries' reports has been facilitated in recent years with increased international cooperation and greater harmonisation in statistical reporting, not only in the European region but also more globally. Yet, as highlighted by the Bank of Portugal experience, there are many difficulties when reconciling these two approaches. While some of the differences arise due to the "traditional" quality issues of errors and omissions in external accounts (see Section 2 above), there are also more fundamental issues. Structurally, the BOP/IIP accounts are balanced as mirror accounts with the ROW, with assets on one side being liabilities on the other and vice versa. However, due to methodological differences in accounting treatment, these items may not always balance. One example is that monetary gold is recorded as an asset of the central bank in the IIP, while it is not recorded as a liability in the ROW account vis-à-vis the central bank.[25] Another is that financial derivatives are recorded on gross basis on the IIP side while they are counted on a net basis on the ROW account. And there are various definitional issues and errors that lead to discrepancies when calculating net lending/net borrowing of the ROW (mirror of BOP) and the net worth of the ROW (mirror of IIP). One way to deal with these difficulties is to set up a comprehensive data compilation framework, introduce more granularity in the estimates, and incorporate the ROW perspective of the country's external accounts when compiling the BOP.

[24] The account showing the stock levels of assets and liabilities originating in the total economy held by non-residents and of foreign assets and liabilities held by residents, called the IIP in BPM6, is drawn up from the point of view of residents whereas in the SNA it is drawn up from the point of view of the ROW (2008 SNA, #13.2).

[25] Monetary gold is gold to which the monetary authorities have title and is held as a reserve asset: it comprises gold bullion, which can be a financial asset only for the central bank or central government (2008 SNA, #11.45).

A third recommendation is to better assess the **activities of individual global groups**. This was highlighted by the presentation of a joint project by the Bank of France and Deutsche Bundesbank to measure intra-group flows of complex MNEs operating in France and Germany. The cooperation involved regular meetings and exchanges of information between the external statistics divisions of the two institutions. The aim was to better understand how MNEs' global supply chains span over various countries, with the associated cross-border flows of goods and services, the transfer of claims between headquarters and affiliates, as well as internal pricing mechanisms. From this perspective, the project has been successful in streamlining statistical reporting as well as in harmonising the conceptual treatment across borders. At the same time, its costs in terms of resources and institutional arrangements have been significant.

6. Measurement and analysis of external risks

The last session, chaired by Gagik Aghajanyan, CBA, dealt with the measurement and analysis of external vulnerabilities. A key objective supporting the compilation of external sector statistics is to provide policymakers with high-quality and timely data on the risks associated with external flows so that they can formulate effective policy responses. This was of particular importance for small open economies, which are for instance very vulnerable to adverse changes in external financial conditions. The range of risks potentially associated with the external sector can be quite large.

A first type of risk relates to the **influence of external conditions** on the domestic economy. As highlighted by the NBP's presentation, it is important to identify such potential vulnerabilities with sufficient granularity. For instance, the impact of external macroeconomic and financial conditions can vary depending on the sectors considered in the domestic economy. Using a probability of default model for a panel of non-financial firms in Poland, the study found that the risk of bankruptcy due to stress in system-wide financial conditions was higher for small and medium-sized enterprises, especially in the services sector, while export-oriented firms with a stronger financial position performed better. Another example was that the larger enterprises in the IT, communication and mining sectors would be more at risk in case of an external demand shock.

A second source of external vulnerabilities is the **impact of foreign capital flows** on the domestic economy.[26] As emphasised by the Central Bank of Chile's presentation, accurate measurement of FDI flows is particularly important when assessing external vulnerabilities in a globalised economy. This puts a premium on the availability of high-quality and timely data to support policy decisions. Yet the experience of an open economy such as Chile's is that the measurement of FDI is uncertain especially when dealing with MNEs, given the cross-border nature of their operations and financing (see Section 5 above). In particular, these multinationals use diverse channels and vehicles to transfer funds across countries. To better capture these aspects and measure both FDI flows entering into the country and outward investments made by Chilean nationals, the central bank carries out an annual survey of FDI. The advantage of this survey is to be able to "zoom in" in specific sectors where the influence of FDI is important. This granular information is further validated with

[26] For a general discussion on these statistical issues related to global capital flows, see "Assessing international capital flows after the crisis", *IFC Bulletin*, no 42, February 2017.

other sources, such as administrative records, companies' financial statements and regional economic information.

A third source of external vulnerabilities relates to the **foreign exposures taken by domestic entities**. BIS data have highlighted the increased importance of the international global bond market in providing funding to emerging economies – the so-called second phase of global liquidity, following the initial phase during which most cross-border funding took the form of bank loans.[27] To capture this phenomenon, the BIS statistics provide two important sources of information. First, the global liquidity indicators (GLIs),[28] which give an overview of the ease of financing in global markets and of the size of total foreign credit (ie including bank lending and debt financing) to specific economies. Second, the BIS statistics measuring the global issuance of international debt securities,[29] which are defined as securities issued in a market that is not located in the jurisdiction where the issuer resides. These international securities are distinguished from securities issued in the domestic market, using four criteria: the currency of issuance, the location of the security's primary market, the location of its secondary market, and the law governing the issue. The data offer an opportunity to assess the risks associated with countries' external debt in a granular way, providing in particular useful information on its currency breakdown and maturity, in turn highlighting potential solvency/liquidity issues. In addition, BIS debt issuance statistics are available on both a residency and a nationality basis. The first concept is in line with the BOP framework, while the second provides information on the debt exposure of domestic groups associated with their direct issuance in global markets as well as by the indirect issuance of their (non-resident) affiliates located outside the country, especially in offshore centres.

Conclusion

The workshop concluded with a panel discussion which highlighted several lessons. First, the compilation of external sector statistics can greatly **benefit from the use of micro data sets** – eg administrative data sets, registers, surveys, big data sources – to complement traditional macro-level statistics. Indeed, micro data provide a wealth of granular information on external accounts and offer new opportunities to support macroeconomic analysis and policy in this area.[30]

Second, **new "big data" statistics and analysis techniques** are important developments, on which the central banks should keep a close watch. Central bank statisticians have also to be mindful of the implications of the growth of crypto assets and digital currencies[31] from this perspective. Big data and machine learning techniques should be explored, not only to work on the "internet of things" and the

[27] See H S Shin, "The second phase of global liquidity and its impact on emerging economies", keynote address at Federal Reserve Bank of San Francisco Asia Economic Policy Conference, November 2013.

[28] See also the BIS statistics on GLIs at www.bis.org/statistics/about_gli_stats.htm.

[29] See BIS debt securities statistics available at www.bis.org/statistics/about_securities_stats.htm.

[30] For a general discussion on the integration of micro and macro data, see IFC, "Combining micro and macro statistical data for financial stability analysis", *IFC Bulletin*, no 41, May 2016.

[31] See "Cryptocurrencies: looking beyond the hype", *BIS Annual Economic Report*, Chapter V, 2018.

related unstructured data sets, but also on more "traditional" large and complex structured data sets.

Third, there is an urgent need to **address information asymmetries** in external sector statistics and to improve data quality. This puts a premium on the expansion of common identifiers such as the LEI and on using mirror data to validate domestic records, fill the gaps in the related data sets and reconcile differences in BOP and IIP reports. To improve data quality, enterprises and statisticians need to work together to better understand the different concepts of bookkeeping and statistics and to overcome conceptual and practical problems.

Fourth, specific efforts should be made to better **assess the impact of globalisation**, in particular the role played by MNEs and global value chains. Ongoing BIS work in developing nationality-based statistics to complement traditional residency-based frameworks was a key contribution from this perspective.[32]

Lastly, the various challenges faced by those compiling and using external sector statistics call for **greater international cooperation and data exchanges**, especially among central banks. This indeed underscores the role that bodies such as the IFC can play in focusing the attention of the international statistical community. Further efforts should be also made to promote data-sharing,[33] both nationally and internationally, in line with the DGI recommendations.

[32] See B Tissot (October 2016), op cit.

[33] See IFC, "The sharing of micro data – a central bank perspective", December 2016.