The growing use of Central Balance Sheet Data Offices' information in the wake of the Great Financial Crisis

Overview of the IFC-ECCBSO-CBRT Conference

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1. Introduction – Granular balance sheet information

Importance of analysing firm-level data after the Great Financial Crisis

If anything, the Great Financial Crisis (GFC) of 2007–09 highlighted the importance of looking at the financial exposures of economic agents. Since then a key focus has been to enhance the provision of National Accounts-based aggregated information on financial positions, particularly with respect to the development of integrated sectoral accounts.[2] The GFC also underscored the need for "going beyond the aggregates" to better analyse micro-level situations that could potentially have systemic implications.[3] One key reason is that financial stress experienced at the level of individual entities, transactions or instruments can quickly reverberate to the entire financial system.

Indeed, a key element of the policy response after the GFC was to fill the data gaps related to these two aspects. Following the initial recommendations of the Financial Crisis and Information Gaps report of 2009[4] – issued by the International Monetary Fund (IMF) and the Financial Stability Board (FSB) and endorsed by the G20 – the international Data Gaps Initiative (DGI) emphasised the need for a better understanding of the financial system at both the macro- and microeconomic levels. It explicitly recognised the importance of collecting more granular data to "*help*

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[2] See Tissot (2016): "Development of financial sectoral accounts: new opportunities and challenges for supporting financial stability analysis", *IFC Working Papers*, no 15, November.

[3] See IFC (2016): "Combining micro and macro statistical data for financial stability analysis", *IFC Bulletin*, no 41, May.

[4] International Monetary Fund and Financial Stability Board (2009): "The financial crisis and information gaps", *Report to the G20 Finance Ministers and Central Bank Governors*, October.

straddle the divide between micro and macro analysis".[5] It also noted the challenges posed by the lack of data on non-financial corporates – with a specific recommendation (no 14) relating to "*data on non-bank corporations' cross-border exposures, including those through foreign affiliates and intra-group funding (…)*".

Central Balance Sheet Data Offices (CBSOs) can clearly play a major role in addressing such information needs. Although there are no unified practices or definitions, one will generally understand the expression "central balance sheet data" as the information covering **firms' individual financial statements**. Given that a large part of the financial sector (eg banks, insurance companies etc) is supervised and reports such data, the focus is usually on the balance sheets of **non-financial corporates**.

A number of countries have established CBSOs to collect, store, disseminate and analyse individual data on corporate balance sheets. Most of these CBSOs are located at the central banks and associated with their statistical functions. The **information collected** is usually derived from multiple sources, depending on national practices and/or institutional factors – related, in particular, to the legal framework governing the collection of firm-level information, the degree of confidentiality and the ability to share it among authorities. CBSO data may thus vary significantly from one country to another, in terms of periodicity, accounting consolidation and perimeter.[6] They can be derived from multiple sources, in particular administrative registers, statistical surveys and official financial reporting data sets. Reflecting this complexity, a growing number of central banks are exploring "big data" techniques to deal with the large amount and complexity of information that can be included in such databases.[7]

Not only do the statistics collected vary but their **usage** can also be very diverse. National experiences show that CBSOs comprise a wealth of information to support financial stability analyses, facilitating the understanding of financial linkages and the assessment of fragilities:[8] for instance, the importance of banks' credit exposures to non-financial corporates, the extent of firms' reliance on specific funding sources etc. They can also provide useful insights into the economic performance of the corporate sector, including, for instance, the impact of their foreign operations and investment decisions. Furthermore, they help to assess the impact of public policies, such as monetary policy measures targeting specific borrowing segments (eg SMEs), macroprudential tools or even fiscal policy actions.

5 International Monetary Fund and Financial Stability Board (2015): "The Financial Crisis and Information Gaps", *Sixth Implementation Progress Report of the G20 Data Gaps Initiative*, September.

6 In practice, CBSO data almost always include information on balance sheet positions and income statements derived from non-financial corporations' financial accounts. In several countries, this information is combined with various data sets, for instance those from central credit registers (information on loans granted by credit institutions to companies), business registers (providing general characteristics for each corporation) and other descriptive data about companies, such as information on group structures. For more details on national practices, see ECCBSO (2015): "Report 2015 – Products and services of the European CBSOs", December.

7 See IFC (2017): "Big data", *IFC Bulletin*, no 44, September.

8 As emphasised by Mario Marcel, Governor of the Central Bank of Chile in his opening remarks at the third meeting of the CEMLA Financial Information Forum held in Santiago on 4–5 October 2017 under the auspices of the Central Bank of Chile (www.cemla.org/actividades/2017/2017-10-iii-reunion-fif/2017-10-iii-reunion-fif0.pdf).

This last aspect has clearly increased since the GFC with the growing importance of evidence-based policies undertaken.[9]

The need for sharing national experiences

The issues just discussed clearly highlight the need for the sharing of information on national experiences relating to CBSO data, especially among central banks. At the European level, the European Committee of Central Balance Sheet Data Offices (ECCBSO) is a consultative body created in 1987 by a group of central banks managing a CBSO.[10] Its main objectives are to improve the analysis of non-financial corporate data, especially by exchanging relevant information, and to assess how the information could be used to accomplish central banks' functions in fields such as statistics, economic and financial research, financial stability, financial supervision and financial risk assessment.[11]

In response to an invitation by the ECCBSO, the IFC decided to co-organise with the Central Bank of the Republic of Turkey (CBRT) a workshop on these issues. A key objective was to present experience gained by the ECCBSO to the broader community of central banks involved in BIS/IFC activities. Another objective was to provide a global platform for the sharing of national experiences in collecting granular balance sheet-type information as well as to facilitate communication among the various stakeholders – especially between the producers of statistics at official institutions and the end-users of the statistics, in particular for policy purposes and academic research.

A key issue covered by the workshop related to the **value added** of central balance sheet information. While it is widely acknowledged that this information can help gauge company-level vulnerabilities – eg the relative strength of a specific firm, its default risk or its fragilities in terms of maturity and currency mismatches – there are also important data limitations, in particular with respect to availability, quality, frequency and timeliness.

A second issue has been the growing demand for CBSO-type information to **support public policies** in the aftermath of the GFC. As regards monetary policy, the various quantitative easing policies implemented have relied on the use of new, unconventional tools that often require access to firm-level data. As regards microfinancial supervision, there has been a growing focus by banking supervisors and other supervisory authorities on non-financial corporate information, not least to better understand the credit and counterparty risks borne by financial institutions. Similarly, the increasing importance of macroprudential policies and analyses has put a premium on a better monitoring of firm-level fragilities with potential system-wide implications. This often requires access to, and aggregation of, relatively granular data.

[9] See Tissot (2017): "Using micro data to support evidence-based policy ", International Statistical Institute 61st World Statistics Congress, July.

[10] ECCBSO members are largely made up of European central banks but they also comprise a significant number of statistical offices. They also include Cerved Group Spa, an Italian company that is one of the major credit rating agencies in Europe. Several international organisations, including the BIS, participate as observers. See https://www.eccbso.org/wba/default.asp.

[11] See ECCBSO (2015).

A third issue is whether CBSO-based information can be used for wider **research purposes**. In particular, there has been growing interest among academic circles for using firm-level data to explore the drivers of microeconomic performance, including, for example, the impact of leverage, the determinants of profitability and the assessment and management of exposures (eg hedging operations). However, such studies often depend on the ability to match CBSO information with other firm-level data sources, such as detailed loans and securities data.

A fourth issue is that the actual use of CBSO data can be constrained by **confidentiality** considerations. For instance, a large part of firm-level information cannot be accessed by the general public without being anonymised. Such considerations also constrain the ability of firms to conduct benchmark analysis for comparative purposes.

A last issue is how recent efforts to use CBSO data fit within related **international initiatives**, such as the DGI, the Statistical Data and Metadata Exchange (SMDX) standard[12] and the Legal Entity Identifier (LEI) project.[13] In particular, the more active use of granular balance sheet information is likely to depend on progress achieved in other areas, such as revisions to confidentiality rules, the sharing of data among domestic and international public authorities, the use of common identifiers and efforts to enhance the links between micro indicators and macro aggregates.

The main themes of the conference

Opening the meeting, Erkan Kilimci, Deputy Governor, CBRT, emphasised that the event was a **key opportunity** for connecting the producers and users of CBSO data. Bridging the gap between these two groups was essential since the GFC. His intervention focused on four themes. The first one was the importance of capturing non-financial institutions when conducting financial stability analysis, not least because of the importance of network and spillover effects. The second one was that there was always a financial dimension to "real economic issues", such as the determinants of investment, SME access to credit and productivity performance. The third was that traditional macro statistics were insufficient to understand fully the functioning of the global financial system, which required the integration of granular data into a system-wide perspective. Last, there was a need for greater cross-country harmonisation of firm-level databases, for instance, to get a better grasp of cross-border linkages and to conduct benchmarking exercises.

The meeting was fruitful in offering **various perspectives** on these issues, underscoring the importance of the burgeoning literature on the use of firm-level data. The first session presented data that could be extracted from CBSOs, based on various country experiences. The second session focused on how this information could be used to assess financial sector risks, especially with respect to the banking system (which could be heavily exposed to non-financial corporates). The third session focused on the non-financial sector, highlighting the opportunities provided

[12] On the SDMX, see IFC (2016): "Central banks' use of the SDMX standard", March.

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

by CBSO information to analyse risks in the "real economy", for instance, to assess the creditworthiness of firms or their exchange rate exposures. The fourth and last session discussed the use of CBSO data for economic research and for the general assessment of financial stability issues.

2. A framework for collecting firm-level balance sheet data

The first session, chaired by Gülbin Şahinbeyoğlu, CBRT, provided a general overview of the **kind of firm-level balance sheet information** that was available in CBSO-type databases. A key difficulty was to cover the non-financial sector. This could be achieved by combining various sources of information – especially when there was no compulsory reporting of firms' financial data, as was the case in Germany, or when such a combination of statistical sources could significantly enhance the quality of the CBSO database maintained by the central bank, as in Portugal. Moreover, there were important efforts to coordinate data collection exercises across countries, especially in Europe, to better capture the global activities of corporate groups.

The first presentation, by the Deutsche Bundesbank, illustrated ongoing central bank initiatives – especially, but not only, in Europe – to set up large-scale and comprehensive CBSO databases. A main objective was to **collect individual records** on non-financial firms' financial accounts. But one had to deal with sensitive data protection issues, especially in Germany where there was no compulsory system for the collection of such information. This was a particular problem for small German firms as it was difficult to capture information on them. To address these challenges, a large "data pool" combining multiple statistical sources, including internal information derived from the central bank's own rating activities and commercial data sets, was constructed. Despite these efforts, small firms were under-represented and coverage of the service sector remained relatively weak. A second important aspect of the German experience was the initiative to facilitate information dissemination for scientific use. In particular, a secure research centre was established by the central bank to provide data analysis services for researchers – noting, however, that the internal data pool could not be directly accessed by these users and that balance sheet information had to be anonymised before being shared.

The second presentation, by the Bank of Portugal, also stressed the importance of matching firm-level databases but from a slightly different angle. While in the German case the focus was on improving the **coverage** of firms, in Portugal it was to enhance the **quality** of the information collected in the central bank's CBSO database. Matching CBSO data with other firm-level databases – available both within the institution (eg central credit registry data, securities statistics and information reported by monetary and financial institutions) and outside it (eg tax authority business information and wage and employment records) – was a way of controlling and improving the quality of the CBSO database. The central bank's experience underlined the need to apply careful and systematic quality checks when constructing micro databases, a task that was often underestimated by the users of such firm-level information.

The third presentation, by the National Bank of Belgium, described the collection of **pan-European firm-level information** in the context of the ERICA project.[14] The goal was to set up a common database for around 10 countries to monitor the adoption of the International Financial Reporting Standards (IFRS)[15] and analyse firms' financial statements (eg financial structure, sectoral diversification, profitability etc). Two benefits of this cross-country approach were highlighted. First, it allowed the capture of information on non-financial groups on a consolidated basis, which was becoming of increasing relevance with the development of Global Value Chains (GVCs)[16] and the expansion of the foreign operations of global groups (given that the use of "traditional" residency-based sources of firm-level information was increasingly showing its limitations).[17] Second, the pan-European nature of the database allowed for useful cross-country comparisons of key economic indicators, such as corporate profitability and financial structures, helping, in turn, to identify country- or sector-specific effects.

The last presentation, by the CBRT, provided a **wider perspective** on data collection efforts. As underlined by the GFC, it was essential to set up a proper macroprudential framework to analyse systemic risk from a holistic perspective. This called for a careful monitoring of systematically important institutions as well as of their interactions with each other – the so-called network effects. Doing so required looking at the wide range of potential linkages among economic units, including financial relationships, risk exposures, operational links etc. At the macro level, the aim was to develop integrated financial accounts so as to obtain a comprehensive picture of counterparty relationships within the economy. At the micro level, more granular information on the financial position of globally systemic entities was warranted. Post-GFC efforts had been devoted to the collection of such information for financial institutions, for instance, with the setting up of the International Data Hub hosted by the BIS in the context of the DGI (the trigger for which had been the publication of the "Top 50 Counterparty report").[18] More attention would need to be paid to the monitoring of non-financial corporates, for instance to assess the system-wide impact of their potential defaults, debt repayment failures and

[14] The ERICA Working Group of the ECCBSO focuses inter alia on the impact of the IFRS standards on European CBSO databases. To that end, the group created the ERICA (European Records of IFRS Consolidated Accounts) database, which includes around 1,000 non-financial listed groups in participating countries. For an example of recent work, see in particular ERICA Working Group of the ECCBSO (2017): *"European non-financial listed groups: analysis of 2015 data"*, January.

[15] A vast majority of jurisdictions currently require the implementation of the IFRS for all or most domestic publicly accountable entities (for an assessment of progress relating to global accounting standards, see http://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/). In Europe, all publicly listed corporations are required to use IFRS (involving around 8,000 companies whose securities trade on a regulated market, with a few, temporary, exceptions).

[16] See BIS (2017): *87th Annual Report*, Chapter VI, "Understanding globalisation".

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

[18] See Bese Goksu and Tissot (2017): "Monitoring systemic institutions for the analysis of micro-macro linkages and network effects", International Statistical Institute 61st World Statistics Congress, July; and Senior Supervisors Group (2014): "Senior Supervisors Group progress report on counterparty data", January.

difficulties in rolling over debt. Balance sheet information on the household sector was another important piece of the puzzle from this perspective.[19]

3. CBSO information to monitor risks in the financial sector

The second session, chaired by João Cadete de Matos, Bank of Portugal and Chair of the ECCBSO, dealt with the use of CBSO data for risk assessment, with a focus on the **creditor's perspective**. CBSO-type data sets on non-financial corporates could provide useful insights into the financial system's vulnerabilities because its exposures to the non-financial sector. In particular, it was key for assessing default risk, both at the firm and sectoral levels, and for understanding the risks borne by lending institutions as well as by central banks in their liquidity operations.

The first presentation, by the Bank of Italy, analysed risks to the Italian banking sector stemming from the **excessive provision of credit** to specific sectors. Granular information, combining bank supervisory data and borrower balance sheet data, allowed for the estimation of firm-level indicators of financial risk, such as probability of default (PD) and loss given default (LGD). In turn, such measures helped to assess the concentration of a given bank's credit exposure to specific sectors, for instance, to the construction sector, which appeared to be relatively more vulnerable because of the cyclicality of its activity, its higher risk profile and its correlation with other sectors. Such bank-level information on sectoral credit concentration was useful in gauging the stability not only of the lending institutions taken in isolation but also of the financial system as a whole. By identifying the contribution of the various sectors to systemic risk, the approach provided important insights for macroprudential authorities willing to take preventive actions against potential financial stability threats.

The second presentation, again by the Bank of Italy, also looked at the fragility engendered by the banking system's provision of credit but from a different angle. Instead of analysing the **individual default risk** characteristics of a bank's borrower, attention was put on the borrower's **repayment behaviour**. This issue had become particularly important in Italy, reflecting the important stock of non-performing loans (NPLs) accumulated in the aftermath of the GFC as well as slow insolvency and recovery procedures. The starting point was that borrowers tended to delay their loan repayments in a selective way, for instance, when a bank was perceived to be weak. This seemed to be particularly the case for large firms that borrowed from multiple banks. Moreover, such a selective behaviour appeared to have a local dimension, being more frequent in those regions where legal enforcement was weak. By matching balance sheet registry data (providing borrower-side information), supervisory bank level reports (providing lender-side information) and credit registry data (providing information on specific loans), one was able to assess the risk of such "borrower runs".

The third presentation, by the Bank of Spain, focused on the assessment of the risks posed to financial institutions by **SME lending**. The financing constraints of small firms had gained a lot of attention in Spain, following post-GFC public initiatives to facilitate SME access to bank credit. In particular, financial institutions

[19] See IFC (2015): "Assessing household financial positions in Asia", *IFC Bulletin*, no 40, November.

were required to provide (confidential) reports assessing the credit quality of particular SMEs in order to reduce information asymmetries. These reports were based on a wide range of firm-level data, including financial statements, central credit registry data, individual solvency and credit history information, credit ratings and the relative position of firms within a given sector. While this project was instrumental in providing standardised information on SMEs and facilitating banks' lending decisions, it also highlighted a number challenges posed by the use of granular, firm-level data (eg the treatment of anomalous data points, confidentiality issues and sample coverage).

The last presentation, by the Central Bank of the Republic of Austria and the Deutsche Bundesbank, reviewed the **in-house credit assessment systems** (ICAS) used by those central banks and, in particular, the Common Credit Assessment System (CoCAS) developed jointly by the two institutions. Central banks' rating activities have gained importance after the GFC with the general development of liquidity-based operations and the related need to assess the credit quality of eligible assets used as collateral. A proper credit assessment framework had to be set up for this task. It relied on the combination of granular balance sheet data, statistical models and expert judgement. These efforts also highlighted the importance of collaboration among central banks in order to adequately capture the characteristics of internationally-connected corporate groups and assess cross-country factors. Of note, this framework relied heavily on the use of CBSO-type data but also generated, in turn, a new source of firm-level information (ie internal credit ratings) that could be of use for policy.

4. CBSO information to assess vulnerabilities of non-financial corporates

The third session, chaired by Robert Kirchner, Deutsche Bundesbank, discussed the importance of CBSO information for the analysis of financial fragilities in the **non-financial corporate sector**. The various presentations showed that one could use firm-level information to better analyse default risks, capital structures, "access to finance" risks and trade credit-specific problems.

The first presentation, by the Bank of Portugal, showed how the **creditworthiness** of Portuguese firms could be measured by looking at granular firm-level information. In particular, one could compute the probability that a specific firm would default on its banking obligations or move between rating classes. This type of exercise was based on the matching of individual corporate balance sheet data (eg assets and liabilities, profit and loss statements and cash flow information) and central credit registry information on borrowers, especially NPL data. Significant cleaning work was required when using such micro data sets (eg need to deal with incoherent data points or minor banking relationships). Complex statistical techniques were also in demand – for instance, to select the most important explanatory factors among a vast range of available variables, group individual firms into homogeneous risk classes and produce synthetic risk indicators for policy use.

The second presentation, by the European Central Bank, showed the usefulness of granular balance sheet data to analyse the determinants of **corporate capital structures** and, in particular, the degree of leverage (ie total debt-to-asset ratios) and maturity structure of liabilities (ie importance of short- versus long-term debt).

Various factors had to be considered, including firm-specific ones (eg profitability, size) and also sectoral, regional and country ones.[20] In particular, growing attention was being paid in Europe to the role played by institutional factors and local environmental conditions in driving firm leverage. This, in turn, was facilitating the understanding of the drivers of microeconomic performance and monetary policy transmission. The analysis presented was based on cross-country granular balance sheet information collected from a number of European countries in a harmonised way – the Bank for the Accounts of Companies Harmonised (BACH) database.[21]

The third presentation, by the CBRT, emphasised the usefulness of CBSO information for assessing the vulnerability of non-financial firms in **emerging market economies** (EMEs). A key element was that their access to credit had been significantly eased, reflecting accommodative global liquidity conditions in the aftermath of the GFC, higher risk appetite in global financial markets and large capital inflows.[22] Granular balance sheet information was particularly useful to assess the fragilities that had developed in the corporate sector, the way these fragilities had been managed and how changes in economic conditions (eg tighter global financial conditions and sudden reversals of capital flows) could create new vulnerabilities. In particular, CBSO data helped to assess the weighted cost of firm capital (combining the costs of equity and debt funding), the degree of firm leverage (relative to an "optimal" financing structure) and foreign currency and debt rollover risks.

The last presentation, by members of the ECCBSO Financial Statement Analysis Working Group, showed how firm-level accounting information could be instrumental for analysing **trade credit**, which played an important role in the overall financing of European companies. While this information was often disregarded in financial statements, it could shed light on firms' payment behaviour: for instance, to analyse the time needed to settle transactions with customers (trade receivables) and suppliers (trade payables). The analysis emphasised: (i) the crucial role played by trade credit for the liquidity management of non-financial firms; (ii) the considerable disparities existing across countries as well as sectors as regards customer-collection and supplier-payment behaviour; and (iii) the variation over time of these effects, both at the country- and continent-wide levels.

5. CBSO information for general economic research

By contrast to the preceding two sessions, which mainly focused on the assessment of financial vulnerabilities in the financial and the non-financial sectors, the last session chaired by Bruno Tissot, BIS and IFC, showed how CBSO-type information could be mobilised to answer a variety of **general research questions**. In particular, the presentations stressed that such information could be quite useful for analysing

[20] See ECB (2017): "Decomposition techniques for financial ratios of European non-financial listed groups", *Statistics Paper Series,* no 21, May.

[21] See ECB (2015): "The Bank for the Accounts of Companies Harmonised (BACH) database", *Statistics Paper Series,* No 11, September.

[22] For an illustration, see the Global Liquidity Indicators of the BIS at: http://www.bis.org/statistics/gli.htm?m=6%7C333.

the determinants of firms' exports, the benefits arising from foreign ownership, the impact of uncertainty on business activities and currency mismatches.

The first presentation, by the CBRT, showed how granular balance sheet information could explain firms' **export performance**. The data matched companies' financial statements with risk assessment information provided by banks, allowing for an analysis of the behaviour of almost 4,000 manufacturers classified by various characteristics – eg sector, import intensity, size, age and share of foreign currency debt. This information helped analyse a wide range of economic issues, such as firms' responses to exchange rate movements – which could vary depending, for instance, on the import intensity of exports, currency mismatches or firm size (reflecting the higher probability that large firms hedge against exchange rate movements). A key takeaway was that mature Turkish firms were well inserted in GVCs and appeared less sensitive to exchange rate movements.

The second presentation, by the Bank of Italy, started with the general finding that **foreign-owned firms** tend to perform better than domestic ones. This could reflect multiple factors, such as the fact that foreign parent companies tend to transfer superior technology and organisational practices to their local affiliates or the existence of a selection bias (when foreign firms select domestic companies they want to acquire). To better analyse these issues, one could compare the observed performance of a foreign-owned firm with a counterfactual scenario, that is, if the FDI operation had not taken place. Using a panel data set covering a large sample of Italian companies and comprising, in particular, firm-level balance sheet data, the study showed that the performance of Italian firms actually improved after an FDI operation. But this favourable "foreign ownership premium" was mainly concentrated in the service sector and differed depending on the origin of the parent company. In particular, it was estimated to be higher when the controlling parent was from an advanced economy while it was absent when the parent was a holding-type company located in an offshore financial centre.

The third presentation, by the CBRT, analysed the impact of **uncertainty** on firm performance. Traditional analyses of such effects relied on some kind of aggregate measures of uncertainty at the country level, say macro forecast errors or the variance of some financial market indicators. But the impact of economic uncertainty might differ at the level of individual firms, for instance, reflecting the importance of sunk costs, information asymmetries between borrowers and lenders or simply different degrees of risk aversion. To capture these dimensions, the study matched firm-level data on balance sheets and income statements with the CBRT's manufacturing sector business tendency survey. This latter source provided firm-specific information on the perception of uncertainty and its impact on individual prospects in terms of production, domestic demand and foreign demand. In particular, the survey allowed for the building up of an uncertainty indicator for any specific firm by comparing the survey's response on its current situation with its expected business conditions. The resulting database helped to estimate in a highly granular way the impact of uncertainty on employment growth, which appeared to depend on the specific characteristics of a given firm, such as its export orientation, its size or its credit constraints.

The last presentation, by the BIS, also stressed the importance of "going granular" when looking at corporate vulnerabilities. One telling example related to the measurement of **currency mismatches**. Traditional indicators relied on country-level aggregate measures of such mismatches, which were no longer a problem in

most EMEs. But this was almost entirely due to the stronger foreign exchange position of the official sector – higher forex reserves and lower foreign currency government debt. Currency mismatches in the non-official sectors of EMEs were larger and had significantly increased in recent years. In addition, a significant proportion of EME foreign currency corporate bonds had been issued by financing vehicles located abroad and this borrowing was not captured by residency-based statistics. For this reason, usual measures could significantly understate the true size of the recent increase in currency mismatches for EME corporates. To address these issues, one would benefit from access to more granular, microeconomic data on corporate balance sheets. Yet such data might still not be sufficient to capture derivatives-related activity at the global, consolidated group level (ie with non-resident counterparties) as well as the full range of (untested) guarantees between the parent company and its offshore subsidiaries. From this perspective, there was a need for promoting more (granular) data sharing between national authorities.[23]

[23] See IFC (2016): "The sharing of micro data – a central bank perspective", December.