Indicators to support monetary and financial stability analysis: overview of the seventh IFC conference

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The seventh IFC conference on "*Indicators to support monetary and financial stability analysis: data sources and statistical methodologies*" was hosted by the BIS in Basel on 4–5 September 2014. It was opened by Muhammad Ibrahim, the IFC Chairman, who welcomed the 139 participants representing central banks and statistical agencies from 60 countries. He underlined the importance of the main theme of the Conference given the new environment that has emerged from the 2007-08 financial crisis and which will have lasting implications for central bank statisticians, among others.

In his opening remarks, Hervé Hannoun, the BIS Deputy General Manager, stressed that the increasing involvement of central banks in macroprudential policy will give rise to new data needs, in addition to those required for supporting monetary policy. Data collection, processing and analysis will all need to adapt accordingly. One example, where it is essential to make progress, is measurement issues around inflation and inflation expectations. Low or negative inflation in a number of countries is raising important issues for central banks, reflecting not only their "traditional" monetary policy mandate, but also their new financial stability focus.

The conference was a good forum for reflecting on these issues. The first two sessions covered the new indicators for monetary policy and financial stability in the aftermath of the financial crisis. Recent advances in the development and use of such indicators were presented, with a focus on accuracy, comparability and comprehensiveness. The third and fourth sets of sessions dealt with the use of sample surveys, micro and granular data, new statistical methodologies and techniques to enhance monetary and financial stability analysis at central banks, especially in the presence of data gaps. A special session was devoted to household finance statistics. Two main themes emerged from the closing panel discussion: communication around statistics and the use of micro versus macro data.

Session 1: New indicators for monetary policy

The overarching theme of the first session on *New indicators for monetary policy,* chaired by Aurel Schubert, European Central Bank, was how to condense several monetary indicators into a single one to serve as an input for policymaking. Several central banks shared their experiences of using composite indicators for (i)

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assessing the impact of monetary policy and (ii) for monitoring economic developments.

Regarding the first objective, ie measuring of *the impact of monetary policy*, one example was presented by the ECB. It has built a set of indicators that reflect the cost of bank borrowing in the euro area. The indicators capture the lending rates faced by households and non-financial corporates in each member country. They are constructed as a weighted average of monetary financial institutions' lending interest rates, encompassing lending to various borrowers and providing a simple maturity breakdown. The aim is twofold: firstly to facilitate the analysis of the transmission mechanism of monetary policy and the pass-through of policy interest rates to actual lending rates; and secondly to assess the fragmentation of lending conditions across the euro area.

The National Bank of the Republic of Macedonia has also developed an indicator that measures the actual monetary policy stance once policy actions have been transmitted through the financial system. The objective is to assess the financial conditions experienced by economic agents in the real sector once commercial banks have adjusted their lending behaviour to changes in monetary policy. To obtain the indicator, a structural VAR model is estimated that incorporates both non-policy and policy variables. This approach aims at facilitating the analysis of monetary policy as a stabilisation tool.

Turning to the second objective, ie *the monitoring of economic developments*, several composite indicators have been developed to facilitate the work of monetary authorities. For instance, the Central Bank of Malaysia has designed a Holistic Inflation Surveillance Framework to gauge how various demand, cost, supply and expectation elements can both directly and indirectly impact inflation. The aim is to fine-tune the analysis of rapidly-changing inflation dynamics by better monitoring first-round effects (inflation pervasiveness) and second-round effects (inflation persistence) arising from a price shock. The framework also comprises a means of forecasting the inflation path (and the associated probability distribution), using a number of techniques. These include a nowcasting model (1 month ahead), a univariate model (3-6 months ahead), a VAR and Phillips curve model (12-24 months ahead), and a structural/DSGE model (beyond 24 months).

Bank Indonesia has also built an indicator for monitoring how the real economy is impacted by external shocks. The approach relies on the identification of various vulnerability indicators, the collection of which can be used as an early warning system. A composite index is then constructed that facilitates the monitoring of external sector fragilities.

Lastly, the Central Bank of Nigeria related its experience computing a group of macroprudential indicators in order to analyse the effects of economic factors on the financial system. Apart from its usefulness for financial stability purposes (see below), the monitoring of these indicators can be a key element for informing monetary policy decisions.

There are, however, a number of challenges related to these indicators. While they can be useful to provide input into monetary policy decision-making, there is a need to ensure that they are accurate and comprehensive. As regards *accuracy*, a drawback of composite indicators is that their apparent simplicity may mask a number of underlying issues. One example is survival bias: for instance, the measurement of the transmission of monetary policy tends to capture the financial conditions faced by those firms that continue to exist after a specific shock, not of

those that may have closed their business because of their inability to access credit. Another accuracy issue is that composite indicators mix a number of heterogeneous components: for instance, financial conditions indices typically mix fixed and floating lending rates, various loan maturities, and so on. Yet another aspect is that cross-country comparisons can be complicated when using composite indicators. For instance, the monetary transmission mechanism, as measured by the ECB's borrowing cost indicators, can be distorted by the fact that competitive structures differ across various national banking sectors.

Turning to the issue of *comprehensiveness*, the conference highlighted policymakers' need to rely on more than just a single indicator to inform their decisions. That is particularly the case when gauging monetary conditions. For instance, an innovative monetary policy stance index like that of the National Bank of the Republic of Macedonia can help assess the effectiveness of both conventional and unconventional policy instruments. However, the actual reaction function of the central bank often depends on other factors such as the constraints (in Macedonia's specific case) posed by the exchange rate regime. Even an approach that encompasses a large range of indicators, like the holistic inflation analysis framework introduced by the Central Bank of Malaysia, may still be unreliable for making comparisons across sectors and over time. Changes in economic dynamics (eg the degree of persistence of an inflation shock) and structural breaks (eg changes in policy regimes) are additional factors complicating the construction of composite indicators that can pass the test of time.

Session 2: New indicators for financial stability

The second session on *New indicators for financial stability,* chaired by Gülbin Sahinbeyoglu, Central Bank of the Republic of Turkey, showed that financial stability monitoring can be enhanced by (i) constructing and using composite financial conditions indices based on macro variables and (ii) aggregating micro data reported at the granular level by individual institutions.

Regarding the construction and use of composite financial conditions indices based on macro variables, several central banks presented their work in this area. Their indicators are generally constructed by averaging various sectoral indices and applying a specific weighting methodology. The monthly Financial Conditions Composite Indicator (FCCI) constructed by the Reserve Bank of India covers the banking and monetary sectors, as well as equity, bond and foreign exchange markets. By controlling for the effects of macroeconomic fundamentals, the information value of these financial indicators is used to (i) track financial stability as an explicit policy variable, (ii) identify periods of financial stress, and (iii) provide signals of possible future tensions. In particular, a so-called Composite Leading Indicator has been constructed to detect early warning signals of financial stress in the Indian economy.

A similar approach has been followed by the Central Bank of Nigeria in developing a composite financial system stability index (FSSI) for the Nigerian financial system. This FSSI is derived by applying statistical and empirical normalisation methods to various indicators of banking system strength, equity market performance and insurance industry soundness. The index aims to capture episodes of stability and vulnerability in the financial system and can be used as a

composite indicator to support financial stability analysis. This approach also complements parallel work conducted at the Central Bank of Nigeria and presented in Session 1: the computation of financial soundness indicators based on macroprudential indicators allows for the assessment of the resilience of the banking industry (in addition to informing monetary policy decisions).

The BIS has also developed a regular monitoring at the macro level of the global financial system for financial stability purposes. The aim is to assess the level of global liquidity, a concept defined as the degree of ease of financing in global financial markets. While it is hard to summarise this concept in a single indicator, the objective is to monitor the funding conditions of financial intermediaries, which, in turn, influence the build-up of vulnerabilities in the whole financial system in the form of asset price inflation, leverage, or maturity or funding mismatches. The indicators monitored and published by the BIS try, therefore, to measure these "footprints" of global liquidity. For instance, the cross-border US dollar positions of global internationally active banks are a gauge of (i) the ease by which they get international funding, (ii) their ability to channel dollar funds to the rest of the economies in which they operate, and (iii) the sources of potential contagion between major financial centres in times of stress.

Turning to the more micro level, a number of central banks presented ways to use institution-level data to support financial stability analysis, and in particular identify system-wide vulnerabilities/contagion channels. The Bank of Italy's approach assesses the interaction of individual banks' balance sheets using their granular bilateral exposures to identify the transmission channels of financial stress – going beyond the simple propagation effects due to the cascading of counterparty defaults. Such contagion/network analysis allows one to detect those financial institutions that can have a "systemic" impact and thereby provides useful information for regulatory authorities. It also echoes the analysis conducted by the Bank of Russia, which calculates a range of indicators for Russian commercial banks, based on their individual balance sheet data (such as loan-to-deposit ratios, or net stable funding ratios). Information on the funding structure of the banking industry is deemed useful for monitoring macroeconomic conditions and episodes of financial stress.

The Central Bank of Ireland also mobilises granular, security-by-security data to enhance the oversight of the Irish money market funds (MMFs) industry. A number of specific indicators have been identified to support such analysis, in particular, investor outflows/inflows and average yields, broken down by funds' characteristics (eg size, investor base). Since these funds play an important role in determining the funding and liquidity of Irish financial intermediaries, their monitoring appears useful for financial stability analyses at large.

A key takeaway of session 2 was the recognition that there is value in using more granular (institution-level) data, even when presented in aggregate. It helps to identify vulnerabilities that macro indicators collected at a sector- or country-level can less easily capture. One major point of debate, however, was whether all aspects of financial conditions can be summarised by a single indicator. For instance, a specific leading indicator can be selected because of its usefulness during an observed period of stress, but it may be less effective on other occasions. Moreover, other indicators may exhibit superior leading properties as circumstances evolve.

Sessions 3 A – 4 A: the use of sample surveys

Can central banks make use of surveys to supplement other statistical data collections in order to fill information gaps? The answer from these sessions, chaired by Eugeniusz Gatnar, National Bank of Poland, was undoubtedly positive: the use of surveys can help enhance monetary and financial stability analysis, especially by getting a better picture of areas that are not well covered by more "traditional" statistics. However, there are a number of challenges.

As regards the *use of surveys for financial stability purposes*, in the first of its presentations, the Central Bank of Nigeria reported on its recent experience assessing agents' financial positions, such as domestic financial situation and income. Moreover, a specific survey of foreign assets and liabilities is targeted to enterprises with foreign investment and helps to measure the size of foreign financial flows in the country. All this information is deemed instrumental in assessing the resiliency of the financial system and its smooth functioning.

Similarly, the first presentation by Bank Indonesia showed how a hedging survey is used as a tool to identify potential risks faced by non-bank private companies in managing their external debt, particularly currency risk and interest rate risk. The survey results help to assess the size of the private sector external debt that is hedged, with information by sector, type of risk exposure, and type of hedging instruments. The authorities can thus devote specific attention to those companies that do not hedge their external debt and are vulnerable to currency risk (eg when their revenues are primarily in domestic currency). Based on the risks identified, specific macroprudential policy tools can in turn be deployed to influence agents' level of debt, its composition, and the use of hedging.

Turning to the *use of surveys for monetary analysis,* Nigeria relies on a number of enterprise and household surveys. In particular, its business and consumer surveys help to generate reliable, accurate and timely information on economic agents' expectations, thereby facilitating the calibration of the instruments used by monetary policy and its effectiveness. A second paper by the Central Bank of Nigeria showed how consumer confidence data can support the modelling and forecasting of household consumption in the country. Similarly, the experience of the Reserve Bank of India is that qualitative business tendency surveys provide flexibility in tracking economic developments in a timely manner, compared to more conventional methods. One example is the quarterly Industrial Outlook Survey, which appears to outperform other data in capturing short-term movements and in anticipating turning points in the Indian economy. This survey information can therefore be of key interest for monetary authorities.

Several presentations underlined the usefulness of surveys when there is a lack of "real" economic data. One example, reported by Bank Indonesia, is to use surveys as "leading information". Because they provide useful insights into the real state of the economy and into the economic outlook, firms and household surveys are used for "nowcasting" exercises and short-term projections. Similarly, one issue faced by the Bank of Mauritius is that of the uncertainties surrounding output gap estimates and therefore the assessment of potential inflationary pressures. This stems from the absence of sufficient data collected in some sectors (eg tourism) when compiling GDP figures. In fact, the use of additional indicators (eg hotel occupancy rates) can significantly improve output gap estimations. A specific Business Perspective Survey is therefore being designed as a survey-based approach for

capturing retail activity to enhance output gap estimates. The flagship short-term economic survey of the Bank of Japan (the Tankan survey) is a long-established source of information on the economic situation and outlook for Japanese enterprises. This survey has been recently expanded to include new items in order to get additional information on inflation expectations, both at the level of the firm and the economy in general. Evidence presented at the conference suggested that this new information is particularly valuable for the central bank: first, it captures the distribution of inflation expectations depending on a firm's size and the industrial sector in which it operates; second, it complements other sources on inflation expectations.

Yet monetary authorities can also usefully conduct surveys to obtain data that are usually not captured in the "traditional" apparatus of the national accounts. That is particularly the case when assessing the state of financial conditions and their impact on economic agents' spending. For instance, bank lending surveys can convey useful information on credit standards – especially for small and medium-sized enterprises – that is not available from other sources. The Bank of France presentation emphasised that "traditional" quantitative credit statistics are of limited use for simultaneously assessing credit supply and demand. Indeed, while opinion surveys can show how credit standards are applied by bankers and are perceived by borrowers, and how possible rationing effects can therefore arise. For instance, the Bank Lending Survey coordinated by the Eurosystem has been used to assess the dynamics of credit supply and demand for French SMEs, estimated through a dynamic disequilibrium model relating qualitative surveys' opinions and actual credit flows. The presentation by the ECB also emphasised the usefulness of the Survey on Access to Finance of Enterprises (SAFE) sponsored by the European Commission and the ECB. Another advantage of qualitative survey data is that they can be matched with other, quantitative micro data sources, for instance business registers containing firms' level financial information.

Participants confirmed that sample surveys can allow central banks to fill data gaps and improve their monetary and financial stability analysis. In fact, a number of central banks are using the same surveys for both monetary and financial stability analysis – a duality emphasised in the papers presented by the central banks of Nigeria and Indonesia, among others.

However, challenges remain. Low response rates, sampling bias, interpretation errors, discontinuities in the composition of the panel of respondents, inadequate methodologies are among the various problems that need to be overcome to ensure sufficient survey quality, as highlighted in the Indonesian case – these problems appear particularly acute for those surveys conducted by telephone, as reported by the ECB presentation. Another difficulty relates to the combination of granular datasets. For instance, matching the European SAFE survey with firm balance sheet data can provide useful information, but it also raises issues in terms of the preservation of respondents' confidentiality as well as sample representativeness. Lastly, survey data can raise important cross-country comparability issues, as reported in the ECB study on SMEs' access to credit.

Sessions 3 B – 4 B: Granular and micro data

Another avenue for supporting central banks' policies and analyses is to mobilise granular data – or so-called "disaggregated", or "micro data", ie economic information that is broken down at the individual level of households or firms. These sessions, chaired by Charles Thomas, Federal Reserve Board of Governors, highlighted the usefulness of such data, which can complement the more traditional information provided at a more aggregated level, for instance by the national accounts framework.

One area of interest is credit information. Many central banks rely on individual loan data, derived from several sources such as central credit registers, private credit bureaus, individual loan repositories as well as micro credit surveys. This information efficiently supports the banks' financial stability and monetary analysis as well as microprudential supervision tasks. For instance, the Bank of Korea has obtained micro data from private registries set up to assist creditors in evaluating individual borrowers' credit quality. Timely information is available on how credit is provided to customers (eg type of loans), their loan payment behaviour (eg credit incidents) and the situation and sustainability of their balance sheets. That is a key input supporting the central bank's monitoring of macroeconomic and credit conditions as well as financial stability risks.

Authorities may even use micro data to assess a very specific segment of the credit market. For instance, the Czech National Bank has started collecting information on renegotiated loans. Loan renegotiations have become frequent, especially in the housing area in the recent period of falling interest rates, and can have important financial stability implications, as credit institutions are competing forcefully to attract clients. The Central Bank of Ireland also uses loan-level data to assess lending conditions in the SME sector. Such a micro credit data set allows for a deeper understanding of lending to this sector, by providing information that is not available from aggregate statistics – eg lending by customer types, loan pricing trends, maturity profile, and loan characteristics by sector. The first paper presented by the ECB during the session reported on the European System of Central Banks collection of granular data from various sources, which helps to better assess borrowers' creditworthiness as well as the credit risks borne by lenders.

A second and growing area of interest is the use of micro data to support the development of macroprudential tools. The Reserve Bank of New Zealand (RBNZ) presented the data collection exercises set up to support its macroprudential policy functions. For instance, in 2013 it introduced a limit on loan-to-value ratios (LVR) so as to slow down the rapid increases in house prices and household debt (LVRs were one of the four instruments adopted under its new macroprudential policy framework). The central bank had to mobilise data that was sufficiently granular and harmonised across various credit institutions so as to support the implementation of these LVR restrictions. A second ECB presentation showed how information from supervisory reports – the "Consolidated Banking Data",[2] can serve as an input for its macroprudential analyses. These micro data can be aggregated by bank size, type

[2] These data are collected at the level of individual credit institutions for various variables and covering the whole spectrum of the banking business, from balance sheets or profits and losses to capital adequacy and asset quality.

of banks (eg foreign banks) and regions. The information is used in the context of the regular European quarterly macroprudential review exercises aimed at assessing the systemic risk faced by national and EU financial systems. They can be complemented by other similar indicators such as the Key Risk Indicators computed by the European Banking Authority (EBA) for its monitoring of the EU banking system.

A third area of interest is the use of micro data to refine macroeconomic statistics in specific areas, for instance to cover the activities of financial institutions. One example is the Bank of Japan's use of newly available, micro-level data disclosed by mutual funds in their investment reports. This fund-level data can serve to enhance the statistical estimates of household incomes and savings in Japan's financial accounts. Another example is the international banking statistics compiled by the BIS. Reporting central banks collect bank-level information on their internationally active credit institutions, and they transmit country-level aggregates to the BIS. That information can be used for various financial stability issues – eg country risk exposures, funding risks in different currencies, banks' role in the transmission of financial stress across countries. Numerous enhancements are being implemented for this dataset, which will further raise its usefulness for analytical and policy purposes.

A fourth area relates to *debt securities*. The BIS and the ECB shared their experiences with the compilation and use of large security-by-security databases. The BIS explained that, while it publishes statistics on domestic and total debt securities that are derived from countries' aggregated sources, it also compiles international debt securities (IDS) using micro level market data. This enables unique identification of each security and its issuer and provides a wealth of information. In particular, it allows issuers to be classified based on their residence ("immediate issuer"), or on the residence/nationality of their parent corporations ("ultimate issuer"). Such information allows one to better understand the risks borne by issuers and the economic groups they belong to. It can be used for various kinds of financial stability analysis, for instance when assessing the international issuance of emerging market borrowers through the foreign entities controlled by them.

Further on the topic of debt securities, the third ECB presentation noted that the European System of Central Banks (ESCB) has been compiling security-by-security data on holdings of debt securities and shares by euro area residents. The information on cross-border holdings, for different holding and issuing sectors and types of securities, can be particularly useful for monitoring the degree of financial integration in the euro area. For instance, one can measure the share of government debt in one country which is held by non-domestic residents – quite an important indicator, as highlighted during the sovereign crisis of recent years.

The sessions' discussions of country experiences highlighted the challenges posed by the collection and use of micro data, particularly with respect to data quality, confidentiality, cost-benefit issues and comparability. First, the volume and complexity of very granular data make it more difficult to maintain data quality. Indeed, micro datasets tend to be less complete than aggregated ones: the more granular the data are, the more likely there will be significant gaps. Second, a balance needs to be struck with respect to confidentiality: drilling deep down into individual (entity-level) data adds substantial information that aggregated data would not deliver; but collecting, storing, using and disseminating information based on micro-data requires overcoming confidentiality restrictions or at least

offering confidentiality safeguards. In fact, granular data are often sensitive by nature. Central banks and other authorities typically have a statutory and/or legal obligation not to disclose information about individual institutions, except for specific, precisely identified purposes. These limitations need to be communicated to the potential users of the data, who can be disappointed by limited data access (especially when different levels of access exist depending on the type of users). Third, granular datasets can be very labour- and time-intensive and costly to build and manage. In particular, such statistics require extensive cleaning and quality checking, possibly leading to lengthy delays when publishing aggregates. This means that a careful cost-benefit analysis needs to be conducted before deciding on the collection of micro-data, especially when the information is not already easily available in the internal systems of the reporting entities. Lastly, there are harmonisation and comparability issues between granular databases prepared by various institutions or set up in different jurisdictions. That can pose a challenge for any cross-sector and/or cross-country analysis that relies on micro-data. A key recommendation of the panels in this respect was to ensure that granular data are collected on a very structured basis, with the use of clear definitions, identic data formats, and proper IT infrastructures and analytical tools.

Session 3 C: statistical techniques and methodologies

This session, chaired by Jacques Fournier, Bank of France, reviewed a number of new statistical techniques and methodologies that have been mobilised in the aftermath of the recent crisis for financial stability purposes, in particular to: (i) monitor the propagation of financial stress across countries and/or sectors; (ii) better assess the development of systemic risk over time; and (iii) address data limitations.

On the topic of *how systemic risk can evolve at a specific point in time*, the Bank of Italy's presentation looked at how micro-data can be mobilised to track the propagation of shocks in the financial system. The structure of the unsecured interbank money market plays an important role in this context. It acts as a network transmitting private information among banks and generating spillover effects in the prices of loans – particularly during times of acute uncertainty, ie when market participants' expectations are heterogeneous.

As regards the time dimension of systemic risk, the last financial crisis underscored the importance of taking a long-term perspective to assess the building up of financial fragilities. That puts a premium on using all the data that can be made available and for a period of time that is wide enough to cover the (long) financial cycles, and also on using various statistical techniques to extend available series. In this context, the BIS presentation discussed the methodology recently adopted to select and link various statistical series to produce long-term series on credit to the private sector, spanning several decades.

Turning to data limitations, several presentations reviewed particular techniques to meet users' needs despite incomplete data. One source of data gaps is confidentiality, which limits the use of micro-data, especially when these data are derived from different countries. The ECB presented the "distributed micro-data analysis" method to fill such gaps, by making available aggregated data with sufficient information on the distribution of the underlying (and not disclosed) micro-based dataset. The methodology was applied to construct a dataset

containing the distribution of several financial indicators derived from anonymised firm-level information (eg balance sheets, profit and loss accounts). Similarly, the Central Bank of Malaysia presented a method to estimate ("best-fit") probability distributions. The analysis is based on the distributions of the original set of data, so as to use its information without accessing individual data points. This was applied in particular to assess interactions in the financial industry.

In contrast, an opposite issue with the increasing use of micro-data is *a surfeit of information*. The Dutch National Bank showed how the rise in non-bank financial entities has led to an unsustainable workload for compilers of statistics. The use of stochastic sample design (incorporating random sampling instead of a systematic data reporting scheme) helped to reduce the number of reporters. It also, somehow counterintuitively, improved the quality of both aggregated data estimates and breakdowns. That was because the freeing of more capacity to check the reports and provide support to reporting entities led to a more efficient data collection system and alleviated reporting burdens.

Discussions during the session focussed on what central banks should bear in mind when contemplating the possible use of such statistical techniques. On the one hand, these methods can help to limit data collection exercises and/or enhance their efficiency – an appealing proposition when resources are scarce, data are incomplete and the statistical burden already high. On the other hand, they rely on implicit or explicit modelling assumptions that should be carefully tested. Moreover they can also be highly demanding, for instance in terms of computation, and their complexity may be disorienting. In any case, it is key to properly communicate to users on the techniques utilised and their inherent limitations.

Session 4 C: policy indicators (public debt and macroprudential data)

The recent crisis has underscored the need for reliable policy indicators in the area of public finance and prudential supervision. Indeed, many countries have made substantial efforts since 2007/08 to cover national data gaps in these areas, not least in the context of the Data Gaps Initiative endorsed by the G20. This session, chaired by Katherine Hennings, Central Bank of Brazil, thus provided a timely platform to take stock of country experiences in this domain.

A first avenue is to collect better fiscal data. The South African Reserve Bank and the Bank of Thailand described their respective experiences with public debt statistics. In South Africa, significant progress has been achieved through the broadening of these statistics to include all levels of government and public enterprises. Data has also been added on loan guarantees extended by the government, on instrument breakdowns (eg index-linked debt securities) and on holding sector. A main objective is to provide sufficient information to enrich and put into context the analysis of fiscal positions. Nonetheless, a number of challenges remain with regard to the measurement of public debt – eg treatment of IMF Special Drawing Rights (SDRs), identification of the holders of government debt securities, difficulty of getting a comprehensive view of the government's balance sheet, move to full accrual accounting.

In Thailand, the authorities have focussed on the establishment of internationally accepted standards for fiscal transparency. The aim is to improve the comprehensiveness, quality and timeliness of fiscal data. These transparency efforts have been focussing on three dimensions: fiscal reporting, fiscal forecasting and fiscal risk analysis, with a view to strengthening sovereign credibility.

A second avenue is to mobilise various other data sources, using the full spectrum of the national accounts. In particular, the Bank of Korea has worked on the compilation of detailed Flow of Funds that show linkages between debtor and creditor sectors ("who does what with whom"). These statistics are deemed to be very useful for better analysing financial interconnectedness and in turn the specific financial position of certain sectors such as the government (eg identification of the holdings of public securities by non-residents). But the new data collected in the context of the just-introduced 2008 system of national accounts are still in their early stages of development. In addition, a number of compilation issues arise, especially regarding the consistency of creditors' and debtors' data and the relatively limited identification of the counterparts holding financial assets. The joint ECB/Netherlands Bank presentation highlighted the importance of enhancing capital stock estimates in the euro area, with sufficient breakdowns by asset types and a specific focus on non-financial assets data (eg housing), which are often incomplete.

A third avenue is to enhance the analyses based on available fiscal data. The first ECB presentation detailed in this context some new indicators on government debt securities. In particular, granular, security-by security information is being collected in the ECB Centralised Securities Database and can be used to construct useful indicators on government debt service, nominal yield, and instrument breakdowns. These shed light on governments' expected disbursements related to the servicing of their debt and the associated refinancing needs (and risks). Such an analysis is interesting from both a fiscal and a financial stability perspective. It also provides useful information on the monetary transmission mechanisms, eg from policy rates to government yields. Lastly, the data are used for cross-country comparisons.

As emphasised in the second ECB presentation, "the monitoring of government debt is not enough". It has to be complemented by the assessment of the financial positions of other economic agents (eg households, non-financial corporates), because they can have spillover effects on both the financial sector and the government. A recurring theme in the session was *the issue of consolidation*, especially in the context of the developments of financial accounts on a from-whom-to-whom basis. Non-consolidated data may suit international comparisons better, and is indeed recommended by national accounts standards. In fact, consolidating financial flows between institutional units of the same sector would prevent the capturing of lending relationships within each single sector. That could be detrimental for financial stability analyses, since intra-sector financial flows can be large and have destabilising systemic effects. On the other hand, one could also argue that the claims held by a sector unit on another unit of the same sector should be netted out. Furthermore, non-consolidated data include intra-group financing, while consolidated data at group level could be more meaningful from this perspective.

Another important issue with respect to public sector statistics is whether to measure *net versus gross debt*. Deducting assets from liabilities may be meaningful,

but their value can change quickly over time and valuation practices may differ markedly across countries (especially for non-financial assets). Moreover, there are still important differences among countries as regards the way to measure public debt indicators – eg at nominal (or face) value or at market value. The current situation of very low interest rates has led to higher debt market values for several countries, which may overstate their underlying indebtedness.

Another measurement question to consider is that of the *intertemporal financial positions* of the government, which include future tax flows as well as all liabilities (especially contingent liabilities arising from pension rights). Discussions suggested that a useful way forward would be to compile various indicators of public debt based on alternative concepts in order to provide different, albeit complementary perspectives.

Session 5: household finance statistics

The recent financial crisis has highlighted the need for policymakers to specifically monitor the indebtedness and vulnerability of households when trying to identify emerging threats to financial stability. The final session of the conference, chaired by Luca Errico, International Monetary Fund, addressed progress and remaining challenges in the area of measuring household liabilities and assets, including housing, as well as the construction of vulnerability indicators.

The first ECB presentation emphasised the importance of monitoring specific ratios of household financial fragility, in particular debt service-to-income and debt-to-asset ratios. The analysis conducted with these data includes country heat maps (assessment of vulnerabilities by household groups), cluster analysis (determination of groups of countries presenting similar characteristics, using principal component analysis techniques) as well as conditional quantile regressions (to assess the joint distribution of vulnerability ratios by groups of households). This approach requires having information not only on debt, but also on income and assets. It should be sufficiently granular, because individual household characteristics (both across and within countries) are found to play a key role in explaining aggregate fragilities. The study presented relied on micro information on households' wealth and income, available in the new Eurosystem Household Finance and Consumption Survey. This survey was also referred to in a second ECB presentation. It illustrates how consumption patterns can be influenced by population heterogeneity. Another interesting application is the identification of those population segments that contribute to national savings rates most.

The Central Bank of Norway presentation concurred in stressing the importance of a granular approach, since "aggregate data hide important information". In fact, household characteristics are heterogeneous, debt is concentrated on a narrow group of borrowers, and their situation depends on the value of their housing as collateral. Moreover, the distribution of debt across households is changing over time. Administrative register data have been compiled using Norwegian tax returns and other surveys, helping to capture the dynamics of household characteristics and vulnerabilities over time (eg birth-cohort studies).

The Bank of Italy presentation also emphasised the importance of using micro data to monitor the financial vulnerability of Italian households. As in the case of the ECB, such household-level data can be obtained through household surveys. In addition, these data can be matched with macroeconomic forecasts on debt and income, allowing for the forward projection of households' indicators. This microsimulation model hence allows for the monitoring of how household's fragilities evolve under specific macroeconomic conditions, stress scenarios, and alternative policy actions – something that could not be done using the micro household data alone.

Since real estate is often households' main source of wealth, *residential property prices* are a key indicator of interest to policymakers for their assessment of household vulnerabilities and financial stability risks more generally. However, such statistics were relatively limited in the past, and this became particularly obvious during the recent financial crisis. Moreover, data sources exhibit significant heterogeneity across countries, in particular in terms of types of prices referred to, geographical coverage, quality adjustments and the representation of dwelling types. A third ECB presentation suggested that these major issues could be addressed by (i) having detailed metadata on the statistics available; (ii) harmonising concepts across countries as much as possible, in line with recent European initiatives on both residential and commercial property prices[3]; and (iii) providing clear methodological guidance (the international "Handbooks"). In any event, it was stressed that property prices, despite their statistical shortcomings, can provide useful insights on housing market dynamics and can support financial stability analysis more generally.

A similar message was spelled out in the BIS presentation. In 2009 the BIS was tasked to publish residential property prices in the context of the Data Gaps Initiative endorsed by the G20. Its monthly publication covers 57 countries (as of the beginning of 2015), and the number of series published is above 300. The BIS has in addition selected a single representative residential property price indicator per country. Moreover, long series have been constructed for about half of the reporting countries, and these have proved to be extremely helpful for the analysis of long financial cycles.

Closing panel discussion

The closing panel discussion of the conference centred on two main themes: (i) communication issues related to statistics and (ii) micro versus macro data.

As regards communication issues related to statistics, a first point is that better statistical quality could be achieved through enhanced data sharing among institutions. There are different stakeholders (eg central banks and supervisory agencies) involved in the collection of financial stability data, and there are limitations to the extent to which these data can be shared among them – not to mention the issue of publication for the general public. Difficulties include legal

[3] An harmonised dataset of house price indices has been created by the statistical institutes in the European Union, while for commercial property the European System of Central Banks has recently established an experimental price indicator.

requirements, potential conflicts of interest among independent authorities, and the fact that data access often needs to be reciprocal.

There are even communication challenges within the same institution. Good statistical communication should first be horizontal, by involving the various departments providing and using the data. In fact, engaging with staff with different professional backgrounds and experiences (statisticians, economists, supervisors, etc) can significantly enhance statistical output. Communication should also be vertical, to ensure that the different hierarchical levels of the institution are involved and to gain buy-in from senior management when conducting statistical projects.

Communication should also be enhanced vis-à-vis the public at large. A constant dialogue should be maintained between reporters, compilers and users of data, and statistical compilation methods should be transparent. One recommended form of communication is to perform more analysis with the data and to make them clearly presented to the public. Another important requirement is to ensure regular consultation with data reporters. Their reporting burden should be appropriate to ensure good quality data. And comprehensive cost-benefit analyses are essential to manage users' information needs, and to make them aware that more data will not solve all their problems and may in fact be counterproductive.

The conference also highlighted the need for good communication on statistical issues between advanced and emerging market economies. Reporting rules or guidelines are often established in the former, where there is a lot of statistical expertise. However, they must also be applied by the latter, where they may have less relevance because of idiosyncratic specificities.

As regards the second issue of *micro versus macro data,* there was general agreement that micro data can often yield superior analytical insights into aggregate or macro data. But a balance needs to be found between exploiting the full granularity of the information and protecting its confidentiality. Another challenge in the use of micro data is cross-country comparability, because of potential differences in methodologies (while there is more harmonisation for aggregated, national accounts-type data). A good compromise might be to enrich statistical analysis with indicators such as concentration measures (eg probability distribution) to complement aggregate averages.

Several participants also emphasised the importance of enriching individual data with other statistical information as well as judgement. Composite indicators are good examples. They can be particularly useful in summarising the wealth of statistical data that is being collected in response of the recent financial crisis, especially to support the growing information needs of authorities in the areas of monetary and financial stability. But a single index is often insufficient to characterise conditions or vulnerabilities in the entire economy. It can be particularly challenging to perform cross-country comparisons with composite indicators, because weights and contents differ across countries. Again, good communication and transparency – especially on the methodologies followed and the data sources used – are essential to ensure that statistics can effectively and adequately support monetary and financial stability analysis.