EUROPEAN CENTRAL BANK

EUROSYSTEM

CENTRAL BANK STATISTICS –
WHAT DID THE FINANCIAL CRISIS CHANGE?

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**FIFTH
ECB CONFERENCE
ON STATISTICS
19 and 20 October 2010**

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CONTENTS

FOREWORD

The series of biennial conferences on statistics held by the European Central Bank (ECB) has become an important forum for an exchange of views on the statistical requirements for central bank policy-making. The Fifth ECB Conference on Statistics which was held in October 2010 has provided a wide range of policy-makers, including a number of Governing Council Members, the European Parliament and the European Commission, and the financial sector, the media and the world of academia with the opportunity to review further demands for central bank statistics. Such a review is particularly important in light of the financial crisis and for monetary policy and macro-prudential analysis.

Almost all contributors spoke of the continuous and growing need for timely and high-quality statistics. Euro area monetary, financial and economic statistics, including an aggregate measure of price developments, do indeed play a crucial role for the ECB's monetary policy purposes, enabling the ECB to fulfil its prime responsibility of maintaining price stability in the euro area. I am proud that the ECB has delivered its Treaty mandate that is price stability. Indeed, euro area average yearly inflation over the first 12 years of the euro stands at 1.97%. This reflects our definition of price stability, namely our aim to keep annual inflation rates in the euro area below 2%, close to 2%.

The expertise and infrastructure developed by the ECB and the European System of Central Banks are also now well-placed to fill the information gaps revealed by the financial crisis and can make a significant contribution to supplying statistical information for macro-prudential purposes and to provide the statistical support for the work of the European Systemic Risk Board.

This conference has also made a significant contribution to the process supported by the G20 of providing reliable, timely and, above all, comparable global financial statistics. These statistics should focus not just on our own economy, but also on partner economies world-wide. To urgently close the information gaps revealed by the financial crisis, a wide range of economic and financial statistics should be created which are mutually consistent, reliable and timely as well as comparable across countries and economies.

I consider that the necessary strengthening of economic governance, particularly in the euro area, must go hand-in-in hand with significant enhancements in economic statistics, including guaranteed reliability in government finance statistics, full adherence to governance and quality provisions for EU statistics and a full assurance that statistical indicators supporting enhanced macroeconomic surveillance and policy-making will be based firmly on accepted statistical methodologies.

The conference has been a success in terms of the debate on future demands for central bank statistics beyond the financial crisis. The expertise, experience and thought-provoking ideas of the participants, reflected in their remarkable contributions to the discussions, have enriched this debate and will lead to important future initiatives.

Jean-Claude Trichet

President

SUMMARY OF CONTRIBUTIONS

AUREL SCHUBERT AND RICHARD WALTON

New demands relating to European System of Central Banks (ESCB) statistics for financial stability and macro-prudential purposes, central banks' initiatives in meeting these new challenges, and the role of statistics in central bank communication, were the themes during the Fifth European Central Bank (ECB) Conference on Statistics.

This introduction provides a summary of the contributions and discussions contained in the rest of this volume. These contributions can be split into four parts. First, ECB President Jean-Claude Trichet provided his views on the subject. Second, Sharon Bowles, Chair of the European Parliament's Committee on Economic and Monetary Affairs, made the keynote speech. Third, there were the conference sessions themselves:

1. central banks' statistical initiatives to meet new challenges;

2. G20 initiatives on financial statistics: the way forward;

3. what is new in the demand for ESCB statistics, for financial stability and macro-prudential purposes?

4. the role of statistics in central bank communication.

Finally, Jürgen Stark, Member of the ECB's Executive Board, delivered his concluding speech to the conference.

In his opening address, Jean-Claude Trichet reflected on: 1) the necessary strengthening of economic governance, particularly in the euro area, which should go hand in hand with enhanced statistics; 2) recent ECB initiatives to enhance EU statistics; 3) statistical information for macro-prudential purposes; 4) EU statistics as a model for global statistics.

It is essential to strengthen further the euro area dimension of surveillance and policy adjustment, and three essential points were made in terms of the statistical implications for the "quantum leap" needed in the current upgrade of economic governance reform. First, the reliability of government statistics underlying the Excessive Deficit Procedure and the Stability and Growth Pact must be guaranteed. Data deficiencies are best documented in action plans to be monitored at the EU level. Moreover, in terms of both reliability and timeliness, government finance statistics should be available almost without delay for decision-makers and the public at large. Second, there should be mechanisms to ensure full compliance with the provisions on governance and quality laid down in the European Statistics Code of Practice of the European Statistical System (ESS). Third, policy-makers should be given a full assurance that the statistical indicators

supporting enhanced macroeconomic surveillance are robust and timely; where compiled by the ESS, the European Statistics Code of Practice should apply.

He highlighted a number of ESCB statistical initiatives by quoting examples of new monetary and financial statistics, more consistent euro area balance of payments statistics supported by drawing on the Centralised Securities Database (CSDB) Phase 2, the joint ECB and European Commission survey on access to finance by euro area small and medium-sized enterprises, and the planned Eurosystem survey on household finance and consumption. He also expected the timeliness of euro area accounts to be improved to no later than 90 days after the end of the reference quarter.

For his third theme, the ECB President noted that, in line with the European Council conclusions, the legal framework assigns the ECB the job of providing statistical support to the European Systemic Risk Board (ESRB). The ECB statistics function has – with national central banks in the EU – an infrastructure of statistical databases, internationally agreed standards and data transfer formats, registers of financial institutions, tested procedures for handling confidential data, and a detailed and proven methodology as well as related software for compiling financial statistics. He singled out four types of statistical deliverable: 1) macro-financial information relating to the macroeconomic environment, financial market data, and information on financial market infrastructures; 2) macro-prudential information on regulated and unregulated financial intermediaries; 3) information on exposures to counterparties, in particular from a ''security-by-security'' securities holdings database supported by the CSDB; 4) ad hoc information produced from one-off surveys. The ECB, moreover, has been working with the Committee of European Banking Supervisors (CEBS) to link the ECB's monetary and financial statistics requirements with the supervisory reporting templates; at the same time, the ECB and the Committee on European Insurance and Occupational Pension Supervisors (CEIOPS) have been working towards an optimal system for reporting by the insurance sector under the Solvency II Directive. Even more important has been the regular flow of data from the reporting agents in the EU financial system, via national and European databases, to the ESRB. He commended the close cooperation between the future European Supervisory Authorities (ESAs) and their predecessors, CEBS, CEIOPS and Committee of European Securities Regulators (CESR), with the ECB Directorate General Statistics and the ESRB Preparatory Secretariat recently established within the ECB. The statistics departments of the national central banks of the EU Member States are involved via the ESCB Statistics Committee.

For his fourth theme, the ECB President outlined the importance of comparable statistics in a globalised world in which decision-makers and the public at large need to focus not only on their own economy, but also on key partner economies. Experience in the euro area confirms the traditional statistical paradigm that more aggregated data, such as euro area or world aggregates, are more reliable than their component data. He commended the report from the International Monetary Fund (IMF) and the Financial Stability Board (FSB), entitled "The Financial

Crisis and Information Gaps",[1] produced with significant input from the ECB. As new collections of data from reporting agents will be required in several, if not almost all, G20 economies in order to close information gaps, he noted that a multi-year programme, combined with an appropriate governance framework and sustained policy support, is needed to implement the recommendations. Moreover, he welcomed the principal global indicators (PGIs) that are comparable for the G20 economies, including the euro area. The relevant website maintained by the IMF[2] had been enhanced recently and is also supported by six other international organisations, including the ECB.

He concluded that evidence-based decision-making in modern economies is unthinkable without statistics. This applies a fortiori to monetary and financial stability policies. The financial crisis has revealed information gaps that should be closed by creating a wide range of economic and financial statistics that are mutually consistent, reliable and timely. The effective and efficient collection, compilation and dissemination of European statistics requires a well-developed statistical infrastructure, including, most importantly, a team of skilled and experienced statisticians familiar with European and international cooperation. High-quality statistics are central to the foundations of public and private sector decision-making throughout our societies.

The first session, "Central banks' statistical initiatives to meet new challenges", was introduced by the Chair, George Provopoulos, Governor, Bank of Greece. He emphasised that timely and accurate information was indispensable for sound policy choices, whereas insufficient information and/or inaccurate information undermined the implementation of sound policies. To recall Plato: "For it is experience that enables our span of life to proceed according to art, whereas lack of experience leaves us at the mercy of chance."[3] He made two observations on the present data gaps: the information deficiencies related to financial institutions and, in particular, the interconnections between these institutions intra-nationally and internationally; allied to the fact that they are only identified after a financial crisis.

Marko Kranjec, Governor, Banka Slovenije, then spoke about "Changes in reporting, data collection and decision support systems". He focused on the project developed by Banka Slovenije for a multi-purpose reporting scheme (reporting items and standards, common code lists) used by financial institutions for the benefit of monetary policy, supervision and financial stability. The main feature of the "matrix" reporting system was the reconciliation of harmonised reporting requirements. The basic principle is that information be compiled and provided only once. The project had enjoyed strong support from the banking, insurance and securities industry. It utilised modern technology in relational databases, data warehouses and electronic communications.

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1   See http://www.financialstabilityboard.org/publications/r_091107e.pdf.
2   See http://financialdatalink.sharepointsite.net/default.aspx.
3   Plato's Gorgias – 448 B. Translation by W. Hamilton and C. Emlyn-Jones (2004), Penguin Books, UK.

His conclusion was that the financial crisis had demonstrated the comparative advantages in a multi-purpose database of meeting the micro and the macro data needs of supervision, monetary policy and financial stability analysis, the risk management needs of firms, and also the needs of the future European Systemic Risk Board, encouraged by the work which the ECB had initiated within the Joint Expert Group on Reconciliation (JEGR) of credit institutions' statistical and supervisory reporting requirements. The work of this group must continue, he felt. The reconciliation of different data requirements should be recognised as one of the most important European projects on financial data collection.

In the session's second presentation, "Macro-prudential and financial stability statistics for improving financial analysis of exposures and risk transfers", Peter Praet, Chairman, ESCB Banking Supervision Committee (BSC) and Executive Director, Nationale Bank van België/Banque Nationale de Belgique, identified improvements in statistics which capture both risk exposures at the individual bank level and also in a cross-sectional and specific temporal dimension of system-wide risk. He noted that interpreting statistics correctly is probably as important as increasing the amount of information available to regulators and supervisors.

To measure risk would require developing statistics which captured the interconnections between institutions and the transfers of risk across sectors, particularly those caused by credit derivatives. Techniques were also needed to capture the systemic importance of individual institutions whose failure had the potential to generate systemic risk. These included early warning systems based on aggregate indicators and macro stress tests based on sectoral/aggregate data. The major data gaps in measuring key criteria of systemic risk and systemic importance, namely interconnectedness, included: interbank and bilateral cross-border exposures; exposures of locally operating branches that are supervised abroad; coverage of financial institutions outside the regulatory perimeter; and measurement of credit risk transfer across sectors of the economy and national borders. In terms of priorities, he highlighted recent statistical initiatives undertaken by the ECB/ESCB and the related importance of timely, harmonised and high-frequency data for the EU banking sector, including firm-level information for a set of large and complex financial groups and securities issues and holdings statistics. Similarly, the EU insurance sector would benefit from timely, harmonised and high-frequency (e.g. quarterly) data. Moreover, it was crucial to enhance the existing data for the macro-financial environment by including, for example, high-frequency data on residential and commercial property prices.

He then dealt with the statistical initiatives to fill these gaps, in particular: 1) the collection of consolidated banking data (CBD) which would be extended to include cross-border exposures by sector and by individual EU country; 2) the compilation of new statistics on securities holdings, based on security-by-security information that permits the holding data to be linked to information on the characteristics of the individual securities and their issuers, in order to provide a much more accurate assessment of credit risk; 3) enhancement of financial and non-financial accounts, in order to provide "from-whom-to-whom" information on financial instruments; 4) the use of data from credit registers.

Furthermore, the measurement of credit risk transfer undertaken via the issuance of securities had been developed through harmonised statistics on banks' securitisation and loan sales and integrated with balance sheet statistics on securitisation vehicles. He also referred to the feasibility of integrating large and complex financial groups (LCFGs) within an extended Register of Institutions and Assets (RIAD). He appreciated the work done by the Joint Expert Group on Reconciliation (JEGR) in bridging elements of the statistical and supervisory reporting frameworks, so as to reduce the reporting burden on credit institutions. Cooperation with CEBS is vital for ensuring that its standard templates reflect not only micro-prudential data needs, but also those for macro-prudential purposes.

The discussant, Manuel Marfán, Deputy Governor, Central Bank of Chile, and Chairman, Irving Fisher Committee on Central Bank Statistics, noted a commonly held view that the blind spots in central bank statistics lay in their assessment of risks from financial innovation and transmission mechanisms, and that collective and prioritised enhancement efforts were better than individual efforts. The key advantages of the multi-purpose reporting scheme, or "matrix", of Banka Slovenije was its flexibility, a consistent "from-whom-to-whom" approach and its multi-purposeness. Regarding Peter Praet's paper on future macro-prudential statistics, EU and ECB collective initiatives and prioritisation to enhance better measurement (and understanding) of financial risks in their various forms and interconnections are of "paramount importance".

He described four common features of systemic financial crises: 1) the failure of systemic links in the payments chain and the impact of this on liquidity risk; 2) the risks in a portfolio of assets showing positive correlations (an assessment of systemic portfolio risk should not consider gains from negative correlations); 3) "sudden stops" or "flights to safety" from classes of financial agent or firms, countries or regions, from access to external financing, or from assets, all of which may propagate systemic risk; 4) there is no "bust" without a previous "boom" – the impact of potential asset price misalignment should be an essential component of any macro-prudential approach.

He concluded by illustrating how central banks' "top-down" statistical efforts could be as productive for macro-prudential analysis as "bottom-up" statistics, which may show decreasing returns in assessing the systemic impact of the same combination of shocks. Central banks should be more active in constructing databases on asset prices: the assessment of (convergence in) asset prices is essential for macro-prudential analysis and easier than the assessment of financial quantities.

The conference's second theme, "G20 initiatives on financial statistics: the way forward", opened with introductory remarks from its Chair, Aurel Schubert, Director General Statistics, European Central Bank and Chairman, ESCB Statistics Committee. He invited the audience to consider the following initiatives: 1) providing lengthy and consistent aggregated macroeconomic time series for policy analysis; 2) integrating highly granular micro data (loans and securities) to assess financial network risk; 3) utilising surveys in support of risk assessment; 4) standardised reporting.

The first paper of the second session, "Toward a global risk map", was presented by Stephen G. Cecchetti, Economic Adviser and Head of the Monetary and Economic Department, Bank for International Settlements (co-authored with Ingo Fender, Special Adviser, and Patrick McGuire, Senior Economist, Bank for International Settlements). He observed that a global risk map of matrices of bilateral exposures could allow in principle the measurement of any vulnerability in the financial system and be constructed by a statistical framework which allowed a global analysis of interlinkages and the build-up of risk. The primary lessons for statistics were to capture the full balance sheets of financial institutions and their interconnections and common exposures more effectively. He then highlighted five principles in the collection of statistics to inform a global risk map: 1) aggregate statistics for financial institutions' on- and off-balance-sheets to show counterparty exposures and interlinkages; 2) statistics on financial intermediaries and, specifically, for the "major international financial institutions" and their most important counterparties; 3) harmonisation of reporting frameworks and better and more detailed disclosures; 4) statistics on the maturity and currency breakdowns of the assets and liabilities of financial institutions; 5) reporting by residency and by consolidated data calculated worldwide for head offices, all branches and subsidiaries, and consistent locational data in which activity is reported separately based on the country where it is taking place. These five principles are found in BIS banking statistics illustrating the assessment of systemic risks from cross-currency funding and maturity mismatching as well as currency carry trades.

He saw potential to provide more maturity and currency detail in BIS international banking statistics to produce a global risk map with which to analyse interconnections, exposures – including derivatives by sectors – and on-balance-sheet leverage. In principle, reporting agents could be extended to key non-bank financial institutions, and the information could include over-the-counter (OTC) derivatives and securities. Global risk maps bring their own challenges in a reporting template which should include information on exposures, including derivatives by asset classes, repurchase agreements and securities lending, and interbank markets. This work, collecting counterparty credit data for the use of supervisors and constructing a risk map for possible public dissemination, is part of efforts by the Financial Stability Board. Public dissemination could be achieved courtesy of the joint availability of data by entity – nationality (consolidated) and location (residency) – which, together with existing flow-of-funds and balance-of-payments statistics, could provide balance sheets of households and of non-financial and financial entities for cross-border and domestic business.

The second presentation in this session, "Financial statistics for the United States and the crisis: what did they get right, what did they miss and how should they change?", was presented by Michael G. Palumbo, Deputy Associate Director, Division of Research and Statistics, Federal Reserve Board (co-authored with Donald L. Kohn, Senior Fellow, The Brookings Institution, and Matthew J. Eichner, Deputy Associate Director, Division of Research and Statistics, Federal Reserve Board). He recalled that, as empirical economists, they were optimistic that models could be developed to allow more and better data to show unusual patterns of financial flows across sectors and emerging imbalances of potential systemic impact. Difficulties exist in collecting a relevant static dataset

against a background of the dynamic innovation of the financial system. New data should be deployed more in signalling drivers of change within financial instruments and activities and in investigating inconsistencies.

He reviewed the macroeconomic data ("Integrated Macroeconomic Accounts of the United States") to reveal, in the period leading up to the financial crisis, large increases in household sector leverage, which dropped during the crisis and recession of 2008 and 2009, as well as a decline in household saving and a consequent rise in net household borrowing due to a rapid increase in new residential mortgages. The household sector's move from net supplier to net user of funds to finance mortgage debt came not from saving, but, in large part, from borrowing in the rest of the world, which shifted from a net borrowing position vis-à-vis the US domestic sectors to a net lending position. The aggregate series, moreover, did not convey the credit risk contained in the rapid increase in mortgages and the vulnerability of borrowers to a downturn in house prices or incomes, nor did it convey the growth of maturity transformation in short-term funds to finance long-term financial instruments by the shadow banking sector.

Three examples were used to illustrate why the formal aggregate macroeconomic time series of leverage had failed to provide signals of vulnerability, notably the substantial increase in mortgage credit risks, the decline in underwriting standards, and the links between new mortgage lending and an increase in house prices. Furthermore, the extent of repo funding, maturity mismatching and collateral changes to new and riskier securities by the shadow banking system in its funding of mortgages was not revealed by the aggregate dataset for asset-backed commercial paper or repo transaction volumes.

Finally, he asserted the importance of appropriate investments in comprehensive and timely aggregate financial statistics, together with data from other sources which would bring risks, trends and anomalies into sharper focus, in order to complement the signals sent by more aggregated data. A massive and static financial stability data collection to fill data gaps would have failed to understand the rapid growth in credit to the non-financial sectors and the transfer of risk from the financial system through the securitisation of assets. Financial stability work should focus on: 1) coordinated aggregate and targeted, specialised data; 2) aggregate data to assess leverage and risk-taking, correlated exposures between interconnected firms and maturity transformation. The Federal Reserve System has projects under way to assess leverage and maturity transformation.

The discussant, Carlos Costa, Governor, Banco de Portugal, introduced the financial crisis as a crisis of globalisation, i.e. the increase in cross-border exposures, and the complexity of their interconnectedness stimulated by financial innovation and, in particular, securitisation. The European Union's policy response was the establishment of the European Systemic Risk Board and, at the global level, the G20 process. Both causes of the crisis underline the importance of the national accounts by institutional sector, which is also reflected in Recommendation No 15 of the report to the G20 on information gaps. This report compliments the ECB and Eurostat on their work in producing the integrated financial and non-financial accounts for all institutional sectors of the euro area.

The recent crisis provides an example of how vulnerabilities in the non-financial sector, e.g. the household sector, can feed back into the financial system, and vice versa. Moreover, the sector accounts cover the economy as a whole – including the "shadow banking sector" – and its interconnectedness with the regulated financial sectors and the non-financial sectors.

He pointed out how both contributors agree that more data should be made available. Regarding the way forward, Cecchetti, Fender and McGuire have derived from the crisis five principles to guide the collection and compilation of statistics, presenting these in five key words: "quantities", "intermediaries", "consistency", "maturities and currency", and "joint residency and consolidated reporting". The authors assign a particularly high value to complementing residency and sector-based data with group consolidated data. They argue that this may prevent the legal challenges surrounding the sharing of firm-level data and would be only one step removed from what could be done with complete global risk maps. However, he commented that more conceptual analysis is needed of the degree to which both types of statistics can be integrated. Eichner, Kohn and Palumbo emphasise the dangers of static data collection in an effort to understand a financial system that is highly dynamic; they find in favour of collecting additional, comprehensive and timely aggregate financial data, complemented by a reliance on less traditional sources of information to illustrate trends and potential anomalies visible in the aggregate data. Another important point is the need to adopt a multi-disciplinary approach in order to help determine the possible risks associated with a financial product. To move from product analysis to balance sheet representation, and from there to aggregate statistics, was, in his view, essential for determining whether there are reasons to believe that we are dealing with a problem that may have systemic implications. This makes it necessary to have national accounts, sectoral accounts and institutional accounts together with an understanding of both the balance sheet and the products. It is a broader, multi-disciplinary approach that goes beyond mere statistical work.

Sharon Bowles, Chair of the European Parliament's Committee on Economic and Monetary Affairs, delivered her keynote speech during the conference dinner. She began by saying that the financial crisis, the sovereign debt aspect and economic governance have made statistics sexy. Everyone now wants them, and not just the sexy ones (figuratively speaking), since demand has increased for all kinds of data. "The financial crisis has had an impact on European statistics, for improvements in knowledge of new products and of services from housing markets to communication of statistical information, and for quality in terms of both reliability and speed and new regulatory procedures such as the bank stress tests." Quality was a vital necessity. Furthermore, there was a need for standardised and internationally consistent methods of accounting; in that context, the EU and the ECB have been at the forefront of promoting a strong international quality framework and global indicators.

She stood by her views expressed in June 2010, namely: "Accurate statistics and improved verification of the reliability of aggregate data provided to Eurostat are essential prerequisites for any improvements to economic governance in

the Union." In addressing data within the context of economic surveillance, including the role of the European Systemic Risk Board, the Committee's views were that there must be the right methodological tools and transparency based on harmonised economic indicators, and further harmonisation of the methodologies for the calculation of budget aggregates, in order to facilitate comparisons between Member States. The European Systemic Risk Board's assessments of financial stability should be included within the multilateral surveillance framework.

The Feio report[4] also contains a section on improving the reliability of EU statistics aimed at enhancing the role of Eurostat. Again, this includes on-site inspections without notice, requiring disclosure of when there has been an independent audit and harmonising public finance data based on standardised and internationally acceptable methods of accounting. We also require consistent and open disclosure of certain off-balance-sheet liabilities, in particular in respect of future payments required for public sector pensions and for long-term contracts with the private sector for the leasing and provision of public facilities.

Market intelligence is crucial both for a fuller understanding of what financial data have captured, and also for spotting trends earlier. How are we going to use it, and would that be for real-time analysis or ex post checking? In practice, data analysis and speed are fundamental to prevention rather than to cure.

The third session, "What is new in the demand for ESCB statistics, for financial stability and macro-prudential purposes?", was introduced by its Chair, Lex Hoogduin, Executive Director, De Nederlandsche Bank. He reflected on data gaps that had been revealed by the Asian crisis and the steps that had been taken to address these data gaps, most notably by the IMF in its Special Data Dissemination Standard. Moreover, not all data gaps had been addressed, for example the G22 disclosure of international exposures of hedge funds. The current data gaps are different in that they involve the shadow banking system, off-balance-sheet liabilities and systemic linkages. As systemic risks change over time, it is important that we first analyse the needs carefully in order to measure for macro-prudential purposes, then determine the resulting data needs. Better statistics alone do not prevent the emergence of structural problems and it is impossible to construct a complete picture of the complex and evolving global financial system. Our efforts should be focused on meeting those data demands that are most relevant to strengthening macro-prudential supervision.

He then recalled current initiatives which were based on flexible data collections, including the linking of the ECB's Centralised Securities Database (CSDB) to a database for securities holdings statistics, a central credit register and registers of large financial groups, e.g. Eurostat's Euro Group Register and the ECB's Register of Institutions and Assets Database (RIAD) initiative. Micro-prudential data collection would be influenced further by initiatives such as work by the BIS: 1) extending statistics on OTC derivatives; 2) "Qualitative survey on credit terms

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4   A draft report by Diogo Feio on improving the economic governance and stability framework of the Union, in particular in the euro area. Please see: *http://www.europarl.europa.eu*

in secured lending and OTC derivatives markets"; 3) expanded banking statistics. Finally, several changes were under way regarding international financial reporting standards (IFRS) and the Capital Requirements Directive (CRD). De Nederlandsche Bank was already using more micro information for macro-prudential supervision.

In this session's first presentation, "Information requirements for macro-prudential oversight and the role of central banks", Vítor Constâncio, Vice-President, European Central Bank, welcomed the fact that the statistical function provides a key underpinning for the effective implementation of the macro-prudential function. In particular, a comprehensive and granular information base is required for timely detection of the build-up of vulnerabilities, e.g. in the form of financial imbalances. New demands for statistics to support macro-prudential analysis and oversight constitute a challenge shared by the authorities responsible for safeguarding financial stability. Given the global nature of the financial crisis, important initiatives are addressing the agenda set out by the G20 for improving financial statistics. The EU authorities and the ECB are playing an active part in this. The ECB's extensive statistical know-how has been developed over the past 10 to 15 years to satisfy primarily the needs of monetary policy analysis. In more substantive terms, this institutional expertise relates to: 1) the development of harmonised requirements for quantitative statistical information derived from heterogeneous national sources; 2) the codification of these requirements in legal acts and their implementation in actual reporting formats; 3) the timely production of large datasets. This expertise and infrastructure developed by the ECB and the ESCB can make a valid contribution to meeting the statistical information needs required for the macro-prudential functions of the ESRB – in the shortest possible time frame for that matter – while keeping a lid on costs and the reporting burden for respondents.

The ECB/ESCB already has a solid macro-financial statistical base. Statistics cover the financial system (existing statistics for financial markets, money, banking and investment funds, plus information on insurance companies and pension funds) and the financial system's operating environment (integrated euro area financial accounts). Moreover, qualitative information will assess vulnerabilities in the non-financial sector (survey launched in 2009 by the ECB jointly with the European Commission on access to finance for small and medium sized enterprises) and in household sectors (micro data from the Household Finance and Consumption Survey).

However, statistics on financial sectors collected for financial stability purposes require different formats and features than those collected for monetary policy purposes. Therefore, consolidated banking statistics covering the entire EU banking sector have been the prime aggregated data source for conducting financial stability analysis. Similarly, in order to assess risks to financial stability stemming from investment fund activities (e.g. hedge funds), coverage on the basis of "locational" statistics – reflecting where these funds actually operate, rather than where they are registered or domiciled – would be necessary.

Aggregate macro-financial data will be needed to assess conditions in specific sectors with implications for system-wide risks. This requires harmonising, increasing the frequency and extending coverage to the whole of the EU of statistics for the banking sector and other financial sectors such as insurance. The harmonisation of consolidated banking and insurance data heavily depend on financial supervisory reporting in the EU. Furthermore, it requires effective coverage of the non-regulated financial sectors – which include money market funds, structured investment vehicles, off-balance-sheet vehicles (reliant on banks' credit lines) and securities lenders – and of asset-backed commercial paper and the securities lending markets. Furthermore, the integrated euro area financial accounts should: 1) be expanded to the EU, and 2) have more granularity in balance sheet exposures and additional breakdowns into types of financial instruments, so as to enable an assessment of the transmission of instability across financial intermediaries and markets.

A bottom-up analysis relies on micro-level or firm-specific information, which is then aggregated to produce sectoral or system-wide assessments of the stability of the financial system and also to enhance the quality of macro stress tests. The focus is on identifying risk concentrations and linkages between key nodes (i.e. firms), necessitating information on interlinkages between the financial system's leading players via a number of different channels or markets and more detailed information on exposures, maturity mismatches and leverage. Macro-prudential analysis assesses the collective behaviour of financial institutions and the way in which this may pose risks to the overall system. Micro-prudential analysis addresses institutions and is responsible for assessments at the individual firm level. Recent initiatives in central bank statistics attempt to address some of the data issues, e.g. by means of "from-whom-to-whom" information for deposits and loans from financial corporations, and also via work under way on securities holdings statistics to create from-whom-to-whom data for sectors of the euro area economy. In order to possess the relevant micro data, there is a clear need for close cooperation between the ESRB and micro-prudential supervisors, in particular the ESAs, which are likely to collect information from supervisory reporting and pass on firm-specific information to the ESRB upon reasoned request. The ECB and the ESCB, in their supporting role to the ESRB, will collaborate with the ESAs to ensure that the approaches to data collection are both effective and efficient, preventing any duplication of work.

In his concluding remarks, Vítor Constâncio noted that narrowing the data gaps will take time and that strict prioritisation of the development work is necessary. There is a need to ensure flexibility in the statistical processes so that it is possible in future to account for financial innovation and other forms of structural developments more effectively. The global dimension of the financial crisis clearly illustrates that close cooperation is needed at a global level. In this respect, the ECB is committed to making a significant contribution to the important global initiatives under way to limit information gaps, led in particular by the Financial Stability Board and the IMF. The ESCB has notched some remarkable achievements in developing and collecting statistics on the common monetary policy for the euro area, while the knowledge, expertise and technical infrastructures in the ESCB statistics community are once again well-prepared to meet the data needs for macro-prudential analysis.

The second presentation during the session was delivered by Elemér Terták, Director of Financial Institutions, Internal Market and Services, European Commission. In "The new EU framework for macro-prudential oversight: what information is needed and how can we ensure it reaches the ESRB in the most efficient way?", he discussed three issues relevant to fulfilling the ESRB's mandate: 1) the information gaps to be closed; 2) relations between the ESRB and the European System of Financial Supervision; 3) the global context of macro-prudential analysis.

First, the information gaps illustrate the challenges to keep pace with financial innovation and the increasing complexity of the global financial system. In particular, he referred to the lack of information on the "shadow banking" system, on risk transfer instruments (including "over-the counter" derivatives), on complex structured products, and on the degree of interconnectedness between large financial institutions. Better indicators were needed to assess the potential systemic risks within unregulated or lightly regulated financial institutions and instruments and non-banking financial institutions, and to monitor the impact of transfers of risk across institutions and markets. This is the background to the Commission adopting legislative proposals to ensure better disclosure in the field of derivatives, and to the Council and Parliament agreeing to enhance the disclosure of securitisation exposures in reforms to the Capital Requirements Directive. With regard to better access to information on systemically important financial institutions, substantial progress should result from work by the Committee of European Banking Supervisors (CEBS) on future common reporting (COREP). Moreover, the establishment of the new framework for micro-prudential supervision will improve the flow of information between home and host authorities within colleges of supervisors. Further progress was also needed in the area of macroeconomic indicators. This is critical for studying the interactions between financial and real sectors. The quality of principal European economic indicators (PEEIs) should be improved in order to address remaining deficiencies in the area of services and labour markets and also to examine the feasibility of "flash estimates", i.e. GDP growth estimates 30 days after the reference period.

For his second theme, he reviewed the data inputs that would enable the ESRB to carry out effective macro-prudential risk assessment. A comprehensive database should cover: 1) financial market indicators and statistics; 2) interest rates and asset prices; 3) financial stocks and flows; 4) macroeconomic indicators, prudential indicators and "soft indicators" such as surveys of investor sentiments or lending standards. It will also be necessary to develop appropriate methodologies to assess interlinkages between financial institutions, financial markets and the real economy. The ESRB will have to build on a wide range of sources – statistical offices, supervisors, central banks, market data providers – and potential synergies between different providers will need to be maximised. Particularly relevant will be access to a set of micro-prudential indicators, ranging from solvency requirements to data on liquidity risk, leverage ratios and risk concentration ratios. Combining macro and micro data – a major innovation in the new framework – is vital for ensuring effective interplay between macro and micro-prudential supervision.

The ESAs and national supervisory authorities will have to provide the ESRB with their specific knowledge of EU financial sectors and with a timely flow of harmonised micro-prudential data. The ESAs will act as the main counterparts in collecting and channelling micro-level data to the ESRB. The ESRB will also need data at individual level for large and complex intermediaries, while access to individual data should be subject to a "reasoned request" and accompanied by safeguards on specific confidentiality requirements.

Particularly relevant will be market intelligence and a regular and open dialogue with market participants. This will play a key role in strengthening the information base of the ESRB and identify business models, investment strategies and financial innovation. Moreover, the ESRB could play an important role in reducing over-reliance on ratings and help find appropriate substitutes, for instance by enabling market participants – through relevant and timely information – to conduct their own independent credit analysis.

Finally, he addressed the need for the ESRB to take into account the international coordination of macro-prudential policies and the county-specific nature of systemic risks, and for it to establish efficient cooperation with its peers within and outside the EU. Hence, under the G20 process, the work of the ESRB needs to tie in with the work of the FSB and IMF and, in particular, the US Financial Stability Oversight Council and the Swiss banking authorities on international data comparability, and also to address information gaps.

The key messages of the discussant, Elisabeth Pauly, Director General Statistics, Banque de France were that: 1) central banks can also bring to the ESRB a unique set of expertise due to the variety of their functions and their involvement in a vast range of operational tasks, and also the unique position from which they can monitor market developments and financial innovations and detect early signs of systemic risk in good time; 2) efforts are still needed in the field of statistics with a view to conducting comprehensive, accurate and well-founded macro-prudential assessments, with coverage of the whole of the EU as a precondition for conducting financial stability analysis; 3) the need to mix statistics and data derived from other sources such as market-based information, in particular the effective coverage of non-regulated financial sectors. Moreover, she noted that the most challenging issue is defining the information necessary to produce a mapping of all the sources of risks stemming from interconnectedness. This was because it should ideally encompass exposure on the part of any individual financial firm not only in respect of EU counterparties, but also vis-à-vis counterparties worldwide. To be informative, data would probably need to be produced at a high frequency and should cover all financial instruments, including derivatives. She considered taking a more qualitative approach that would involve enhancing bilateral contacts with market participants. Finally, there is a need to follow a multi-dimensional approach, using both hard and market data, qualitative information and any relevant anecdotal evidence. Such a flexible and pragmatic approach would allow the ESCB to provide the most efficient support to the ESRB in its macro-prudential oversight functions.

The final session, "The role of statistics in central bank communication", was chaired by Athanasios Orphanides, Governor, Central Bank of Cyprus.

He invited the audience to seek ways to improve central bank communication since effective communication is a crucial element of central bank policy-making. Statistics are crucial for clear and effective central bank communication. A key challenge is how to provide better information and, in particular, how to help households and businesses understand the economic and policy environment, and thus to take better decisions. For policy-makers, effective communication requires clarity in order to reduce uncertainty and to facilitate better decisions. For statisticians effective communication requires explaining what statistics attempt to measure. He gave examples of the need in the financial crisis to adapt statistics, to improve the general public's understanding of policy measures and to develop better statistical tools to identify macro-prudential risks, and thus to avert future crises. The identification of best practices in statistics can help enhance the clarity and effectiveness of central bank communication.

In his examination of "Central banks should be boring – or should they? Communicating central bank statistics to the general public", Andreas Ittner, Executive Director, Financial Stability, Banking Supervision and Statistics (co-authored with Aurel Schubert, Director General Statistics, European Central Bank and Chairman, ESCB Statistics Committee) set out to prove that central bank communication with the general public did not have to be boring, but was a continuous, lively and modern task in enhancing the effectiveness of monetary policy and fostering financial stability. Based on their policy functions and decisions, their closeness to financial markets, their long-standing expertise and credibility and – last, but not least – the public good of such information, central banks were well-placed to provide the public with reliable central bank statistics. Central bank statisticians needed to be flexible enough to react quickly to new information demands and to be proactive in communicating transparently.

Communication with specialised audiences and the general public obliges central banks to disseminate relevant and reliable statistics in various forms and to communicate through many different channels while adopting new technology, e.g. statistical visualisation tools that provide decent graphics and metadata in order to make data understandable and freely accessible. Communication must be "smart", targeted and addressed through the various media. The internet had become the main channel of communication, and the authors provided examples of best practices in presenting comparable national data in a user-friendly and well-timed manner: 1) the Joint Dissemination Framework of euro area statistics and national contributions, which is available on all Eurosystem websites and in which harmonised information is presented using the familiar look and feel of national central bank websites; 2) in the G20's principal global indicators (PGIs).

Central banks had to act as both transmitters and translators. In order to reach large audiences or target groups there was a need to reduce complexity. There should also be appreciation of what the general public wants and a quick and flexible response mechanism to provide these (changing) needs for central bank

statistics: from information on the rate of price inflation to times of crises when the emphasis moves the stability of the banking system and specifically the banks in which the public has deposited its money-this means data on banks' exposure, equity capital, securities and deposits.

He argued that credibility was crucial for any producer of statistics, but especially for central banks that were ideally placed to provide the public with statistics they can trust and understand because of their independence in producing and communicating reliable statistics.

An important aspect of ensuring this credibility while maintaining the public's confidence in central bank statistics was to comply with international quality requirements in data production and to make these quality standards transparent. Quality approaches, like the ECB's Statistics Quality Framework or the IMF's Data Quality Assessment Framework, set ambitious standards for the production as well as communication of statistics. According to the ECB's Statistics Quality Framework, statistical output is deemed fit for purpose if it is relevant and complete, accurate and reliable, consistent, timely and accessible.

In Austria, the channels and forms of statistical communication used by the Oesterreichische Nationalbank (OeNB) have evolved with the needs of users and the potential of information technology. The internet, via the OeNB's website (and supported further by the OeNB's statistics hotline), is the prime distribution channel for obtaining OeNB statistics. A dynamic data search tool makes it possible to compile tables according to individual needs. One of the strategic goals of the central banks, the Eurosystem and the ESCB is to serve as leading providers of financial statistics. This would make European facts and figures "countable" and "tangible", thereby contributing to "European Union identity" by representing Europe's diversity and unity through a statistical lens.

In conclusion, central bank statisticians need to develop more user-friendly, understandable and accessible means of communicating statistics, contribute to improving financial literacy that will help people understand statistics, and react more flexibly to changing information demands.

In "Talking numbers: central bank communications on monetary policy and financial stability", Petra Geraats, Faculty of Economics, University of Cambridge, then argued that central banks could improve the way in which they provide quantitative information about monetary policy-making and financial stability by focusing more on conveying underlying uncertainty and using measures that include parameters of the distribution function. She addressed how central banks globally have been (increasingly) talking numbers about their monetary policy-making, as illustrated by quantification of the primary objective along with a dramatic increase in published numerical macroeconomic forecasts and, to a lesser extent, voting records. It was important for macroeconomic projections to be both timely and informative. Central banks should communicate uncertainty by providing up-to-date (medium-term) forecasts for inflation and output every quarter and also by publishing the projected policy decision-making process, i.e. voting records.

She discussed measurements of the success of central bank credibility in maintaining price stability, focusing on medium to long-term private sector inflation expectations which provide a real-time key statistic. By using the probability distribution for inflation outcomes consistent with price stability in the ECB's Survey of Professional Forecasters (SPF), the inflation probability for two and five years ahead provides a quantitative measure of the credibility of the ECB in terms of meeting its primary objective of price stability in the medium term.

Construction of financial stability statistics for financial institutions – in order to distinguish liquidity and solvency, leverage, off-balance-sheet activities and the shadow banking system – poses huge challenges. Better information on financial interconnections is needed, while producing effective real-time indicators and predictive statistics for systemic risks is also challenging. She noted that greater ex ante transparency could be beneficial for financial stability, but that ex post disclosure may be detrimental. As a result, it is important for central banks to provide regular communications on financial stability. A final conclusion is that central banks should not just be talking numbers, but focusing more on numbers that measure uncertainty.

The discussants – Elga Bartsch, Morgan Stanley, and Frank Paul Weber, La Tribune – saw statistics as an integral part of central banks' communication strategy.

Elga Bartsch noted that the provision of empirical evidence by central banks enhanced their transparency and accountability. In this regard, the independence of the ESCB in collecting data is vital for the credibility and integrity of the statistical data. Making trusted statistics available actually helped to correct false perceptions. It was also important to interact with user groups and to make full use of information from the financial markets. For example, market economists are key users of statistics and, through their information-processing capabilities, their macroeconomic analyses can provide sounding boards. She noted a number of practical suggestions for improving the communication of statistics: 1) e-mail alerts for new data when available on the website; 2) prompt updating of databases; 3) a focus on special factors in order to interpret data correctly. The ECB offers good cross-country tables. Her statistical wish list included: 1) data in Excel format underlying the charts in the ECB Monthly Bulletin; 2) more timely data on the collateral pledged to the ECB and the use of the ESCB refinancing operation by country; 3) cross-country tables for euro area national central bank balance sheets; 4) seminars to review new statistics and statistics which the ECB thinks should be used more (e.g. flow of funds). Central banks should aim not to be boring with their statistics and their analyses of these. Statistics should reduce "noise" while also increasing the amount of "news." Finally, to make statistics even more relevant, it could make sense to use visual aids to support press conferences.

Frank Paul Weber, La Tribune, noted that the presentation of the macroeconomic forecast was a tool for increasing transparency, but above all "for determining and explaining the appropriate policy stance for forward-looking monetary

frameworks such as inflation targeting". In his view, these macroeconomic forecasts or assessments form a solid rock in the current sea of uncertainty. Central bankers are asked not only to deliver inflation-free growth, but above all certainty. People want to make the right choice based on what the people most in the know, i.e. the central bankers, are saying. He also discussed disclosure of the decision-making process for monetary policy and whether non-disclosure deprives the private sector of useful descriptive and predictive statistics on monetary policy-making. He concluded that publication of the minutes or of voting at ECB monetary meetings would help to "normalise" the way people and market participants view the decision-making process. Central banks are doing a great deal to be transparent, but could do more to reduce uncertainty and thus fear among the general public about the future.

The closing address of the conference, "Central bank statistics: what did the financial crisis change?" was delivered by Jürgen Stark, Member of the ECB's Executive Board, who first recalled that central bank statistics will need to cover a wider range of financial sub-sectors, instruments, markets and geographical areas. Moreover, it is not just changes to central bank statistics that are required: the most recent phase of the financial crisis has exposed the gaps in government finance statistics. To support the Stability and Growth Pact and maintain credible budgetary surveillance, we need more reliable and timely data in this regard.

The establishment of the ESRB and the ECB's involvement within it will require a wide range of initiatives and responses in the field of statistics. The statistics needed in order to provide a deep understanding of two phenomena – risk-based instruments and the large degree of interconnectedness and interdependencies between financial intermediaries – were not sufficient for predicting the scale and severity of the crisis. At least three new avenues were being pursued by the ESRB in addressing needs for both monetary policy and financial stability purposes: 1) greater integration of various sets of information and the specific use of the integrated quarterly euro area accounts by institutional sector; 2) greater granularity and flexibility of datasets based on micro databases and registers; 3) a wide range of new statistics, for example on investment funds, insurance corporations and pension funds, loan securitisation by banks and the activities of securitisation vehicles.

The new demands point to additional data collections in central bank statistics: 1) timely, harmonised and high-frequency (quarterly) data for the EU-consolidated banking sector, as well as for individual EU countries and selected non-EU economies; 2) financial institutions outside the banking sector, including insurance corporations and pension funds and also hedge funds and securitisation vehicles; 3) interlinkages within the financial system (including exposures between institutions of the banking sector and institutions in non-regulated markets); 4) data collections through surveys.

In conclusion, he emphasised that the ESCB will be developing its statistics further so as to align them more closely with the data requirements for ECB monetary policy and financial stability purposes. In particular, they will need to focus much more strongly on new risk-based instruments and the exposure

of banks and other financial institutions outside the banking sector to certain asset classes and geographical areas. Moreover, we need to address gaps in the information on interlinkages within the financial system. These changes to central bank statistics will not be enough: the importance of timely and reliable government finance statistics cannot be overestimated. If the credibility of one specific set of European statistics is damaged, there may be spillover effects on other sets of data in Europe.

World Statistics Day – according to Jürgen Stark – is a very fitting occasion on which to call for joint efforts to build further trust in statistics. At the same time, we also have to accept that we will not be in a position to measure everything we would like to measure. This relates in particular to those entities that are located outside the EU, but which nevertheless may impact significantly on EU financial markets and institutions. Hedge funds are a case in point. International initiatives, e.g. under the auspices of the G20, are likely to bring about solutions in the longer term.

Day 1 Tuesday, 19 October 2010

14.30 – 15.00	Opening address: **The continuing quest for reliable and timely statistics** **Jean-Claude Trichet**, President, European Central Bank
15.00 – 17.00	**Session 1: Central banks' statistical initiatives to meet new challenges**
	Chair: **George Provopoulos**, Governor, Bank of Greece
	Changes in reporting, data collection and decision support systems: the case of Slovenia
	Marko Kranjec, Governor, Banka Slovenije
	Macro-prudential and financial stability statistics for improving financial analysis of exposures and risk transfers
	Peter Praet, Chairman, ESCB Banking Supervision Committee, and Executive Director, Nationale Bank van België/Banque Nationale de Belgique
	Discussant: **Manuel Marfán**, Deputy Governor, Central Bank of Chile, and Chairman, Irving Fisher Committee on Central Bank Statistics
17.00 – 20.00	**Session 2: G20 initiatives on financial statistics: the way forward**
	Chair: **Aurel Schubert**, Director General Statistics, European Central Bank, and Chairman, ESCB Statistics Committee
	Toward a global risk map
	Stephen Cecchetti, Economic Adviser, Head of the Monetary and Economic Department, Bank for International Settlements
	Ingo Fender, Special Adviser, Bank for International Settlements
	Patrick McGuire, Senior Economist, Bank for International Settlements
	Financial statistics for the United States and the crisis: what did they get right, what did they miss and how should they change?
	Michael Palumbo, Deputy Associate Director, Division of Research and Statistics, Federal Reserve Board
	Matthew J. Eichner, Deputy Associate Director, Division of Research and Statistics, Federal Reserve Board
	Donald L. Kohn, The Brookings Institute
	Discussant: **Carlos Costa**, Governor, Banco de Portugal
20.00	**Keynote speech**
	Sharon Bowles, Chair, European Parliament's Committee on Economic and Monetary Affairs

Day 2 Wednesday, 20 October 2010

8.30 – 10.30   **Session 3: What is new in the demand for ESCB statistics for financial stability and macro-prudential purposes?**

Chair: **Lex Hoogduin**, Executive Director, De Nederlandsche Bank

Information requirements for macro-prudential oversight and the role of central banks

Vítor Constâncio, Vice-President, European Central Bank

The new EU framework for macro-prudential oversight: what information is needed and how can we ensure it reaches the ESRB in the most efficient way?

Elemér Terták, Director of Financial Institutions, Internal Market and Services, European Commission

Discussant: **Elisabeth Pauly**, Director General Statistics, Banque de France

10.30 – 12.00   **Session 4: The role of statistics in central bank communication**

Chair: **Athanasios Orphanides** Governor, Central Bank of Cyprus

Central banks should be boring – or should they? Communicating central bank statistics to the general public

Andreas Ittner, Executive Director, Financial Stability, Banking Supervision and Statistics, Oesterreichische Nationalbank, and **Aurel Schubert**, Director General Statistics, European Central Bank, and Chairman, ESCB Statistics Committee

Talking numbers: central bank communications on monetary policy and financial stability

Petra M. Geraats, Faculty of Economics, University of Cambridge

Discussants: **Frank Paul Weber**, La Tribune, **Elga Bartsch**, Morgan Stanley

12.00 – 14.15   **Central bank statistics: what did the financial crisis change? Jürgen Stark**, Member of the Executive Board, European Central Bank

14.15 – 16.30   **ECB World Statistics Day: Central bank statistics in a global context**

16.30   End of conference

THE CONTINUING QUEST FOR RELIABLE AND TIMELY STATISTICS

JEAN-CLAUDE TRICHET

I would like to welcome you, on behalf of the Executive Board of the European Central Bank, to our biennial European Central Bank (ECB) statistics conference. I am delighted that the conference has once more attracted many distinguished participants from central banks around the world, European and international institutions, the financial sector, academia and the media.

As many of you know, the conference was originally scheduled for April this year, but had to be postponed because of the Icelandic ash cloud. Making a virtue out of necessity, the conference now also contributes to marking the first World Statistics Day tomorrow on "twenty-ten-twenty-ten". World Statistics Day has been designated by the General Assembly of the United Nations to remind us all of the importance of official statistics and the core values of service, integrity and professionalism. Also on behalf of Mr. Stark, I would like to invite you to join us in a dedicated ECB event tomorrow afternoon, to celebrate World Statistics Day.

Two years ago, I concluded my address before this conference saying, "European policy-makers need to have at their disposal a wide array of timely, high-quality statistics on which to base their decisions". This conclusion has been fully vindicated by the financial and economic crisis, both globally and in Europe. The necessary strengthening of economic governance, particularly in the euro area, must go hand-in-hand with enhanced statistics.

The ECB makes extensive use of a wide range of economic and financial statistics. The ECB is also a producer of selected European statistics for its own decision-making purposes and for the public at large. The European Parliament and Council have underlined the fact that European statistics are developed, produced and disseminated by both the European System of Central Banks (ESCB) and the European Statistical System (ESS).[1] To minimise the reporting burden and enable the efficient development, production and dissemination of European statistics, it is important to reinforce the close cooperation between the ESCB and the ESS, and notably to foster the exchange of confidential statistical information between the two systems for statistical purposes.

I would like to address four themes today: first, the statistical component of a quantum leap in euro area economic governance; second, recent ECB initiatives

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1   The European Statistical System is the partnership between the statistical authority of the European Union, namely the Commission (Eurostat), and the national statistical institutes and other national authorities in each Member State that are responsible for the development, production and dissemination of European statistics.

to enhance European statistics; third statistical information for macro-prudential purposes; and fourth European statistics as a possible model for global statistics.

I   STATISTICAL IMPLICATIONS OF A QUANTUM LEAP IN ECONOMIC SURVEILLANCE

It is essential to strengthen further the euro area dimension of surveillance and policy adjustment. In a speech three days ago,[2] I reviewed the recent Commission proposals from a euro area perspective and highlighted where we need more ambition still for the euro area, in order to safeguard the smooth functioning of our monetary union.

Today, I would like to outline in more detail what we need in terms of the statistical implications for the 'quantum leap' that is needed in economic surveillance. There are essentially three points.

First, the reliability of the general government statistics underlying the Excessive Deficit Procedure and the Stability and Growth Pact must be guaranteed when they come out. While the government finance statistics of the overwhelming majority of the Member States is reliable, this does not yet apply to all of them. Yet as we are in a highly integrated union, we need reliable statistics not just from the majority of Member States – we need it from each and everyone, no matter how large or how small the country is. We have seen that the potential for loss of credibility affects the entire union.

Therefore, in cases of data deficiencies, the recently amended powers of the Commission (Eurostat) regarding the quality assessment of statistics in the context of the Excessive Deficit Procedure must be applied in full. This is best documented in action plans to be monitored at the European level. Moreover, in terms of both reliability and timeliness, government finance statistics would benefit in several countries from closer integration of the budget process, in particular among different parts of general government. Where the planning, execution and monitoring of public budgets is a well integrated process, reliable government finance statistics are available almost without delay for decision-makers and the public at large. Why would GDP, which is an economy-wide concept, be available in a timelier manner than statistics on general government deficit and debt?

My second point is that there should be mechanisms to ensure that governance and quality provisions laid down in the European Statistics Code of Practice of the ESS[3] are fully adhered to. This is best achieved by reinforcing the binding nature of the European Statistics Code of Practice and enshrining its minimum standards, in particular on professional independence, in a European legal

2   "Global governance and euro area economic governance", World Policy Conference, 16 October 2010.
3   See   http://epp.eurostat.ec.europa.eu/portal/page/portal/quality/documents/VERSIONE_ INGLESE_WEB%20new%20links.pdf

act. Simultaneously, the alignment of national statistical legislation with the principles of the Code of Practice and the Regulation on European statistics[4] should be accelerated.

Third, we must have full assurance that the statistical indicators supporting enhanced macroeconomic surveillance are robust and timely available. We must have assurance that indicators – such as international indebtedness, unit labour costs and other indicators of competitiveness – are firmly based on accepted statistical methodologies, ideally already legislated, and that the degree of estimation in compiling them is limited. Where compiled by the ESS, the European Statistics Code of Practice should apply.

These three points are absolutely essential and it is in the fundamental interest of all euro area members that they are included in the current upgrade of the economic governance reform.

2   RECENT ECB INITIATIVES TO ENHANCE EUROPEAN STATISTICS

Let me recall that the primary objective of the ECB is to maintain price stability, defined as euro area annual inflation below, but close to, 2% over the medium-term. It is worth noting that over the first 11¾ years of the euro, the average annual euro area inflation has been 1.97%. The ECB is in its 12th year of existence and, as you see, its mandate is fully fulfilled. Moreover, inflation expectations over the medium to longer term remain firmly anchored in line with the ECB's objective. This has been an outstanding achievement in the first few years of Economic and Monetary Union – and it is an achievement to which European statistics have made an important contribution.

In line with the allocation of responsibilities between the ESCB and the ESS for collecting, compiling and disseminating European statistics, the monetary analysis of our monetary policy strategy is mainly supported by statistics compiled by the ESCB.[5] In 2009 and 2010 the ECB, supported by the national central banks of the Eurosystem, has been implementing two ECB regulations on enhanced Monetary Financial Institutions' balance sheet statistics and on securitisation vehicles.[6] These regulations introduced reporting requirements for loan securitisations, in particular, and new statistics on the assets and liabilities of these vehicles. The aim is to compile more detailed monthly and quarterly data to be published for the first time in June 2011. In addition, new statistics on euro area money market funds and on other investment funds, including hedge

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4   Regulation (EC) No 223/2009 of the European Parliament and of the Council of 11 March 2009 on European statistics (OJ L 87, 31.3.2009, p. 164).
5   An updated overview of all available ECB statistics has recently been published in "ECB statistics: an overview". See http://www.ecb.europa.eu/pub/pdf/other/ecbstatistics anoverview/2010en.pdf
6   Regulation (EC) No 25/2009 of the ECB of 19 December 2008 concerning the balance sheet of the monetary financial institutions sector (Recast) (ECB/2008/32) (OJ L 15, 20.1.2009, p. 14); and Regulation (EC) No 24/2009 of the ECB of 19 December 2008 concerning statistics on the assets and liabilities of financial vehicle corporations engaged in securitisation transactions (ECB/2008/30) (OJ L 15, 20.1.2009, p. 1).

funds,[7] were released in December 2009. Following the adoption of the new ECB Regulation addressing banks' interest rate statistics,[8] the monthly banks' interest rate statistics are now produced more quickly and are available already one month after the Governing Council's monetary policy decisions. Further new and enhanced statistics are being compiled based on data already available at the national level, such as data from credit registers and supervisory data. A key example is detailed statistics on insurance companies and pension funds, which are also expected to be published from June 2011 onwards. As you can see, there is considerable and very tangible progress in the area of monetary and financial statistics. All these developments will contribute to enhanced monetary analysis and are also available for in-depth financial stability analysis.

The economic analysis of our monetary policy strategy benefits from much more consistent statistics on the euro area balance of payments. The size of the statistical discrepancy in balance of payments statistics has been decreasing substantially in recent years. The quality of these statistics has also improved, in particular by drawing on the Centralised Securities Database (CSDB),[9] Phase 2 of which went live in spring 2009. The CSDB also supports the compilation of investment fund statistics, the residual maturity of government debt securities and new statistics on securitisation vehicles. The ECB will publish the results of the third wave of the joint ECB and European Commission survey on the access to finance of small and medium-sized enterprises in the euro area later this week, and fieldwork is being carried out for the Eurosystem survey on household finance and consumption.

The flagship of the cooperation between the ESCB and the ESS on European statistics remains the quarterly euro area accounts. These provide a consistent statistical framework for the ECB's monetary and economic analysis, both for transactions and balance sheets. The euro area accounts are also widely used in the ECB Financial Stability Review. The main challenge remains more timely delivery, no later than 90 days after the end of the reference quarter. The ECOFIN Council supports this timeliness objective [10] and it is my expectation that the ESCB and the ESS will achieve it by 2014 as currently planned.

In addition to the European statistics provided by the ESCB, the ECB relies, for the purposes of its monetary policy and particularly for its economic analysis, on a wide range of economic statistics provided by the ESS. They include, in particular, the Principal European Economic Indicators that are endorsed by the Economic and Financial Committee (EFC) through its Status Reports on

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7   Regulation (EC) No 958/2007 of the ECB of 27 July 2007 concerning statistics on the assets and liabilities of investment funds (ECB/2007/8) (OJ L 211, 14.8.2007, p. 8).
8   Regulation (EC) No 290/2009 of the ECB of 31 March 2009 amending Regulation (EC) No 63/2002 (ECB/2001/18) concerning statistics on interest rates applied by monetary financial institutions to deposits and loans vis-à-vis households and non-financial corporations (ECB/2009/7) (OJ L 94, 8.4.2009, p. 75).
9   See "The 'Centralised Securities Database' in brief", available at http://www.ecb.europa.eu/pub/pdf/other/centralisedsecuritiesdatabase201002en.pdf
10   ECOFIN Council conclusions on EU statistics of 4 November 2008 and of 10 November 2009.

Information Requirements in EMU. These annual reports are prepared jointly by Eurostat and the ECB's Directorate General Statistics.[11]

3   STATISTICAL INFORMATION FOR MACRO-PRUDENTIAL PURPOSES

Let me now turn to statistical information for macro-prudential purposes. The upcoming launch of the European Systemic Risk Board (ESRB) and the entire European System of Financial Supervision (ESFS) including the three European Supervisory Authorities will have important statistical implications. When developing the statistical support needed for the ESRB, we may distinguish between the "input", the "throughput" and the "output" of the statistics function.

Let me start with the core of the task, which is the "throughput" – namely the compilation of statistical information. All statistics on the financial institutions, financial markets and financial market infrastructures of the EU as a whole, including sufficiently granular breakdowns, depend first and foremost on a sizeable team of statisticians who are well-versed in the legal provisions to be observed, trained and experienced in the economic and financial stability requirements, knowledgeable about the statistical concepts and methodology related to data on the financial system, familiar with the IT infrastructure to be applied, and used to cross-border cooperation in a European and international environment.

Such a team has been built and maintained by the ECB and the national central banks of the EU to provide European financial and economic statistics for monetary policy purposes. In addition, the ESCB statistics function offers sophisticated tools, such as statistical databases, internationally agreed standards and data transfer formats, registers of financial institutions, tested procedures for handling confidential data, and an array of proven methodologies and software for collecting and compiling financial statistics.

The "output" comprises a large number of statistical deliverables needed to support the work of the ESRB. Much work still needs to be done and it is appropriate that the final statistical framework for the macro-prudential oversight of the financial system will be decided by the ESRB. I would like to distinguish between four main types of statistical deliverables.

The first is macro-financial information relating to the macroeconomic environment, financial market data and information on financial market infrastructures.

The second is macro-prudential information on regulated and unregulated financial intermediaries. This comprises sufficiently granular aggregated micro-prudential information across countries and financial sectors, as well as individual information on large financial intermediaries.

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11 See also the article entitled "Update on developments in general economic statistics for the euro area", in the February 2010 issue of the ECB Monthly Bulletin.

The third type of statistical deliverable is information on exposures to counterparties, which will draw, in particular, on a securities holdings database containing data on a security-by-security basis, and will be supported by the CSDB. Detailed and reliable data on securities issues and holdings are indispensable to any systemic risk assessment. The CSDB would be best complemented by a public reference data utility providing standardised information on instruments and entities that would be operated on the basis of an international agreement.

The fourth type of statistical deliverable is ad hoc information obtained via one-off surveys where it is undisputed among statisticians that only regular and tested data flows that are connected to the internal accounting systems of reporting agents limit the reporting burden with a lasting effect, and produce a timely and reliable output.

Concerning the "input" – namely the collection of data – the reporting burden of financial institutions could be reduced by improving processes to ensure that information is only reported once. One example of this streamlining is the use of supervisory data to compile macro-financial statistics. Here, the ECB and the Committee of European Banking Supervisors (CEBS) have published a bridging manual aligning the ECB's monetary and financial statistics requirements with the supervisory reporting templates developed by CEBS and have created a relational database identifying similarities and differences between the two frameworks.[12]

It is even more important to reach a common understanding on the regular flow of data from the reporting agents in the EU financial system, via national and European databases, to the ESRB. In this context, I also welcome the fact that the ECB and the Committee on European Insurance and Occupational Pension Supervisors (CEIOPS) are working on an optimised usage of the future data reporting by the insurance sector under the Solvency II Directive.[13] Clearly, there is a difference between the use of confidential micro data for statistical purposes and their use for policy purposes. This distinction is respected in the day-to-day business of any developed statistics function. To achieve detailed agreements on the flow of data, I count on a very fruitful cooperation between the three future European Supervisory Authorities and their predecessors, CEBS, CEIOPS and the Committee of European Securities Regulators (CESR), the ESRB preparatory Secretariat recently established at the ECB, and our Directorate General Statistics. The statistics departments of the national central banks of the EU Member States are involved via the ESCB Statistics Committee.

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12 "MFI balance sheet and interest rate statistics and CEBS' guidelines on FINREP and COREP", February 2010.
13 Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of insurance and reinsurance (Solvency II) (recast) OJ L 335, 17.12.2009, p. 1.

4 EUROPEAN STATISTICS AS A MODEL FOR GLOBAL STATISTICS

The financial crisis not only had an impact on individual economies and groups of countries; it also had a global dimension. The Group of Twenty Finance Ministers and Central Bank Governors (G20) now has a much more important role than it did before the financial crisis. It established a Working Group on Reinforcing International Cooperation and Promoting Integrity in Financial Markets that called on the International Monetary Fund (IMF) and the Financial Stability Board (FSB) to explore information gaps and propose ways to strengthen data collection. The report of the IMF and the FSB, entitled "The Financial Crisis and Information Gaps",[14] makes 20 high-level recommendations to address the measurement of risks in the financial sector, international financial linkages and the vulnerability of economies to shocks, as well as the communication of official statistics and was endorsed by the G20 in November 2009. I am pleased that this report was produced with significant input from the ECB.

As new collections of data from reporting agents will be required in most G20 economies to close information gaps, a multi-year programme, combined with an appropriate governance framework and sustained policy support, is needed to implement the recommendations. The G20 have therefore received an action plan in June 2010, detailing the recommendations and timetables for their implementation. This action plan was welcomed recently also by the International Monetary and Financial Committee of the IMF Board of Governors.

Although the need for more comprehensive and more comparable statistics extends beyond the G20 economies, the G20 have volunteered to set an example. Because of the economic importance of the G20 economies, their data are sufficient to compile reliable and timely key world aggregates, such as quarterly GDP, within two months of the end of the reference quarter. Experience in the euro area confirms the traditional statistical paradigm that more aggregated data, such as euro area or world aggregates, are more reliable than their component data.

Comparable statistics are important in a globalised world in which decision-makers and the public at large need to focus not only on their own economy, but also on key partner economies. I welcome the development of the principal global indicators (PGIs) that will be comparable for the G20 economies, including the euro area, and which are similar to the Principal European Economic Indicators for Economic and Monetary Union. The PGI website maintained by the IMF[15] is supported by six other international organisations, including the ECB.

5 CONCLUSIONS

Let me conclude. Evidence-based decision-making in modern economies is unthinkable without statistics. This applies a fortiori to monetary and financial

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14 See http://www.financialstabilityboard.org/publications/r_091107e.pdf
15 See http://financialdatalink.sharepointsite.net/default.aspx

stability policies. The financial crisis has revealed information gaps that we have to close while also preparing ourselves for future challenges. This is best achieved through creating a wide range of economic and financial statistics that are mutually consistent, thereby eliminating contradictory signals due to measurement issues. The main aggregates must be both reliable and timely, and, in a globalised world, they should be comparable across countries and economies.

Reliability and timeliness are key for statistics, but may seem to be conflicting objectives. This is more the case in the short-term, as the production frontier for compiling statistics can be enhanced in the medium term by a higher degree of automation. The effective and efficient collection, compilation and dissemination of European statistics requires a well developed statistical infrastructure, including, most importantly, a team of skilled and experienced statisticians familiar with European and international cooperation. I take tomorrow's World Statistics Day as an occasion to remind all of us of the importance of high-quality statistics. They are central to the foundations of public and private sector decision-making throughout our societies.

I   CENTRAL BANKS' STATISTICAL INITIATIVES TO MEET NEW CHALLENGES

INTRODUCTORY REMARKS

GEORGE PROVOPOULOS

The session will deal with statistical initiatives taken by central banks in light of the ongoing global crisis that broke out in August 2007. Timely and accurate data are indispensable for sound policy choices, whereas insufficient data and/or inaccurate data undermine the adoption of sound policies.

Would better data have helped identify the unsustainable positions on banks' balance sheets in the run-up to the crisis? Clearly, it is impossible to provide a definitive answer to this question. What can be said, however, is that the availability of such data would have led to improved monitoring of the system-level risks that contributed to the crisis. Therefore, better statistics could have helped mitigate the global crisis and would have contributed to improved management of it.

Information gaps have long played a role in the unfolding of financial crises. For example, following the crisis in Latin America in the mid-1990s, the international community identified a need to improve the flow of information that would provide a swift reaction to a financial crisis. In response, in 1996 the IMF set up the Special Data Dissemination Standard (SDDS), which aimed to mitigate financial crises by enhancing data availability.

Why, then, are we still dealing with these issues fifteen years later? One reason is that the recent crisis differs fundamentally from earlier crises. Earlier crises tended to be country-specific or region-specific. For example, the 1990s saw a succession of region-specific crises – including the crisis in the European Monetary System in 1992-93, the Latin American crisis of 1995-96, and the Asian crisis of 1997-98. Consequently, the earlier IMF initiative was aimed at improving the availability of country-specific data.

In contrast to those earlier crises, the current crisis originated in the financial sector and has been global in nature. In this regard, existing data gaps concern information deficiencies related to financial institutions, in particular, the interconnections among these institutions – both intra-nationally and internationally. To help prevent such crises in the future, the availability of high-quality data on the global linkages of financial institutions will be crucial.

Financial stability analysis and macro-prudential surveillance depend importantly on our ability as central bankers to identify, collect and disseminate data. While filling data gaps is part of a statistician's routine work at the national level, it can also be encouraged by changes in institutional arrangements at the supra-national level. I should add that the establishment of the European Systemic

Risk Board is a major advance at the European level in addressing cross-border financial crises.

The need for better-quality statistics exists not only at the pan-European level, but also at the level of individual countries. In his presentation, my colleague Marko Kranjec, Governor of Banka Slovenije, will describe the way his bank, in the run-up to the adoption of the euro, reorganised its data collection function, utilising a multi-purpose reporting model that serves all statistical, supervisory and financial stability needs.

Then, Peter Praet, Executive Director of the Nationale Bank van België/Banque Nationale de Belgique, who is in charge of financial stability at the Bank and also Chairman of the Banking Supervision Committee of the ECB, will explain the way credit risk transfer instruments, in particular credit derivatives, increase the interconnections between banks. He will also discuss the difficulties that connections among institutions and products create for those who seek to monitor risk exposures.

Manuel Marfán, Deputy Governor of the Central Bank of Chile and Chairman of the Irving Fisher Committee of the BIS, will be our discussant for this session. I am looking forward to what I think will be an interesting exchange of views.

CHANGES IN REPORTING, DATA COLLECTION AND DECISION SUPPORT SYSTEMS: THE CASE OF SLOVENIA[1]

MARKO KRANJEC

1   INTRODUCTION

This presentation describes the statistical reporting system used by Banka Slovenije in its execution of statistical, supervisory and monetary policy functions. It also explains the reforms during the run-up to Slovenia's membership of the European Union and the subsequent adoption of the euro. Banka Slovenije's experience could be useful for other countries that will ultimately adopt the euro.

The legally defined functions of any central bank need proper information support, regardless of whether the central bank runs its own, independent monetary policy or contributes to the monetary policy of Monetary Union. Central banks nowadays usually take care of monetary and financial stability, payment systems, and often banking and/or wider financial supervision as well. The functional and institutional arrangements of these duties vary between countries in practice, even within EMU.

Even though the functions of the central banks in general have not changed substantially, their activities nevertheless need to be restructured and adapted to external changes such as technical developments, financial innovations, and financial and economic crisis. In such cases, information support cannot remain unchanged, which will undoubtedly impact on statistical reporting.

This review introduces a specific case, which involves the development of statistical reporting for central bank functions in the contemporary environment, and offers some consequential general considerations.

2   A NEED FOR CHANGE IN STATISTICAL REPORTING

The accession negotiations for EU membership conducted in 2000 demonstrated the need for Banka Slovenije, as the central bank of a future EU member country, to harmonise statistical data collection and reporting in line with ECB requirements. Traditional reporting by credit institutions to the central bank had to be adapted and, where necessary, modified as well as harmonised with statistical requirements and definitions contained in the ECB's regulations and

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guidelines.[2] It soon became obvious that the existing reporting system could not be adjusted or reformed in part, thus making the main issue the direction in which to develop a new reporting system.

2.1   Initial position and requirements

In developing a new reporting system it was vital for Banka Slovenije to retain a tradition of, and positive experience with, common balance sheet reporting of credit institution data, as used for multiple purposes – notably prudential supervision – as well as for statistical and analytical ends.

Another key element for the design of the new system was that the previous reporting system had been based on high-quality accounting data used by reporting agents (banks) for their business decisions. Banka Slovenije was aware of this, and consequently also wished to retain this connection with business accounting records in the new reporting system.

However, the limitations of the common reporting system were assessed as an obstacle to the harmonisation of financial statistics in line with EU requirements. In spite of relatively detailed balance sheet data being compiled for many purposes until 2001, it became evident that the limited scope of these was unsuitable for the systematic expansion of the common report and required the compilation and submission of many additional sub-reports. Crucially, it was not possible to expand and augment the details of the most interesting and policy-relevant reporting items, such as loans and deposits; nor was it possible to introduce more detailed breakdowns. Another problem was that changes to reporting systems were rather complicated, time-consuming and costly both for reporting and for receiving entities (Banka Slovenije). Thus, it was decided that the dimensions of the new solution should allow more flexibility and facilitate subsequent changes.

Therefore, a solution had to be found for (i) a common multi-purpose report, (ii) a report which would be accounting-based, and (iii) a report with a flexible structure.

3   DEVELOPMENT

The decision to start a project for the development of a new reporting system was adopted by Banka Slovenije in 2001. From the very beginning, reporting entities were heavily involved in order to find mutually satisfactory solutions that would be simultaneously efficient and cost-effective. The new reporting framework for common data collection was intended to serve a variety of purposes, in particular the need to provide timely and accurate information for supervisory and monetary policy needs. The reporting entities were frequently consulted during the development stage and actively supported the most important decisions.

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2   Regulation ECB/2001/13, Regulation ECB/2001/18, Guideline ECB/2002/5, Guideline ECB/2003/2.

Two major types of problem affected the course of the project:

- the need for conceptual reconciliation: conceptually different reporting requirements, e.g. for statistical and supervisory needs, can be combined successfully either through the alignment of different concepts that may satisfy all users of reports or through more detailed granulation. To achieve reconciliation, an extensive process of coordination between different services was needed;

- timing: changes to supervisory and statistical requirements took place over time without paying heed to previous changes in "counterparty" reporting (e.g. statistical requirements were defined before supervisory changes such as IASs, FINREP, COREP or Basel II had been finalised).

3.1   Main characteristics of a common reporting system

Thorough preliminary analyses showed that the *matrix reporting system* was the most appropriate solution, given the initial constraints in terms of reporters' data needs and technical possibilities. The agreement struck between Banka Slovenije and reporting entities on this issue was the most significant milestone of the whole project.

Under the matrix system, all related data needs (e.g. those linked to a balance sheet):

- are organised in a common reporting system for additional purposes;

- use the combination of *reporting items* (rows = economic categories) and standard common *code lists* (columns = required attributes);

- are systematically designed to be multi-dimensional, but presented in a simplified way as two-dimensional matrices.

In such a system, the logical output (in the technical sense) from reporters would be a flat table with data records extracted directly from the data warehouse system.

The reporting items are (in the case of the balance sheet) defined as balance sheet items contingent on the multiple aims of reporting, e.g. statistical and/or supervisory. Multi-purpose reporting demands reconciliation between all the data needs it covers. In practice, this means reconciliation between supervisory/financial stability, statistical and analytical requirements, whereby statistical requirements are diversified further (for the purposes of monetary and financial statistics, external statistics and financial accounts).

Special attention was paid to the accounting base of the reporting system for the balance sheet report. The chart of accounts, or general ledger of credit institutions, provides a backbone for the matrix reporting system. Due to specific

circumstances at the beginning of matrix reporting, a new reporting system has been connected solely with the existing accounting report.

The standard code list is a breakdown of a specific attribute (e.g. country of residency of the counterparty or original maturity) for one or several purposes. It is important not to mix together breakdowns for different purposes (defined by attributes) in one code list, but to keep these separate. If different purposes (e.g. statistical and supervisory) are combined in a single code list, the breakdowns are usually more detailed (granular). Breakdowns of the same kind for different purposes have to be commonly defined, which requires further reconciliation efforts. Experience also shows that exceptions should be avoided in reporting, as they complicate matters.

In theory the number of codes in the standard code list is unlimited, and the same goes for the number of reporting items. This gives the system the desired flexibility, thus making it easy, technically at least, to introduce subsequent changes in reporting.

One drawback with a multi-purpose reporting system is that *no cutting-off- the-tail or sampling reporting* is possible, because the supervisory requirements demand data from all licensed reporting entities.[3]

Balance sheet data (factual tables), transactions and revaluations as well as other data (e.g. interest rates) compiled in a common report are all notified at a single, i.e. monthly, interval. This makes reporting, and potential revisions especially, much easier compared to combinations of monthly and quarterly requests.

While *reception and control of the matrix reports* are handled within the statistics department, the data are also used for other purposes. Therefore, automatic built-in controls at the reception phase ensure that the data can be used for all the central bank's functional needs, particularly supervision and analysis.

The matrix reporting system was initially a narrow reporting system, but later upgraded to its broader version. Gradual upgrading was fully supported by the reporting agents as it enabled them to develop technical solutions at the right pace and with moderate costs.

4 PROJECT IMPLEMENTATION

Work on the new project began in March 2002. The project's aim was to define a conceptual and technical framework in which to ensure balance sheet reporting for the needs of monetary and banking statistics as well as other Banka Slovenije needs. A joint balance sheet reporting system explicitly targeted the integration of the statistical requirements contained in ECB/2001/13 and ECB/2001/18 (later, also 2003/2) with the needs of banking supervision, the needs of

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3 These possibilities are offered in the statistical regulations on balance sheet items (ECB/2001/13) and interest rates (ECB/2001/18).

monetary policy during the period prior to adoption of the euro, and other needs (e.g. financial stability).

During the project implementation phase, the political decision was taken for Slovenia to join the euro area as soon as possible. This required very rapid harmonisation of the measurement of all macroeconomic aggregates, particularly those linked to the criteria for adopting the euro. With the aim of ensuring price stability, the central bank began implementing a monetary policy with interest rates as its main policy instrument. This required the harmonisation of statistics on interest rates in accordance with Regulation ECB/2001/18. Banka Slovenije prepared a sample reporting system for the country's eight largest banks (monetary financial institutions, or MFIs) as a forerunner to comprehensive reporting on all MFIs. The introduction of the new concept of matrix reporting was followed by the necessary harmonisation processes to support monetary policy decision-making. Simultaneously, information provided by reporters also covered supervisory function needs. The amount of detail was fixed at the lowest possible level, usually taken from contractual documentation and from banks' relations with individual clients. Such a breakdown of data also facilitated the compilation of other useful information for a variety of purposes.

Cooperation with the reporting entities has been arranged through Slovenia's banking association, as the reporting entities in this case are monetary financial institutions. The number of monetary financial institutions (statistical section S.122), which varies between 20 and 30, has enabled frequent meetings with the representatives of all reporting entities.

After these initial steps, Banka Slovenije codified the reporting requirements by decree and through guidelines. Matrix reporting started in 2004 and has included the following milestones:

- narrow phase of new reporting, with three-monthly matrix reports, began in:
  - November 2004 (balance sheet items),
  - December 2004 (revaluation items),
  - May 2005 (interest rates);

- reporting entities were originally all other MFIs, i.e. ESA 95 sector S.122;

- the matrix's design comprised the ECB's harmonised requirements in the field of monetary and financial statistics, a host of other statistical requirements as well as assorted supervisory and financial stability needs. Full reconciliation with supervisory requirements was postponed initially, but the matrix was linked to basic supervisory balance sheet statements;

- further changes to original reports:
  - November 2005: three sub-reports on interest rates and one report on interest rate risks were incorporated within the new system,
  - May 2006: the system was upgraded courtesy of the introduction of IAS-compliant data.

More widely reconciled reporting of MFIs was initially deferred, but then prepared gradually before being finalised in autumn 2009. Thorough preparations for the revised reporting instructions took two years of cooperation between statisticians, supervisors, analysts as well as banking accountants. These modifications, which are in line with the ECB's revision requirements, were introduced in July 2010, with profit and loss matrix items due to be implemented one year later.

The revised reporting system comprises non-consolidated balance sheet data, off-balance-sheet balances, profit and loss accounts and the interest rates of credit institutions.

New requirements introduced in 2010 include:

• revisions prompted by ECB regulations on balance sheet and interest rate statistics;

• supervisory requirements on credit institutions, including non-consolidated balance sheet – core FINREP;

• statistics on financial accounts;

• further external statistical needs.

The existing three matrices were reduced to just two (one relating to balance sheet and off-balance-sheet items with interest rates; the other to flows), as anticipated at the outset. In practical terms, the matrices have been broadened significantly by showing more detailed breakdowns of reporting items and additional code lists. The successful introduction of the revised matrices has allowed some existing separate reports to be discontinued. Despite a significant increase in the integration of supervisory and statistical needs, the flexibility of the new data collection system produced temporal consistencies along with many additional granularities (e.g. amount of each type of guarantee for certain loans to individual customers). Plans for a third phase of the project are under way, in which the remaining attributes of the credit register (from balance sheet reports) will be included. This will enable another separate report to be discontinued.

Encouraged by the success of multi-purpose matrix reporting for monetary financial institutions, the decision was taken to extend this method so that it also covers the reporting of non-monetary financial institutions. An initial opportunity came with the requirements of Regulation ECB/2007/8 on statistics from investment funds. Slovenia's securities market agency, ATVP, which oversees capital markets in Slovenia, recognised the advantages of matrix reporting and supported its introduction by the reporting entities, which accepted the proposal. Joint reporting began in January 2009, taking on board the requirements contained in Regulation ECB/2007/8 and Regulation ECB/2001/13 for money market funds, as well as providing statistics on financial accounts and other Banka Slovenije requirements (in particular, monitoring financial stability) and ATVP supervisory requirements. Reporting is not only based on Banka Slovenije know-how, but also – wherever possible – uses the same solutions

(such as code lists) as when reporting on MFIs, thus linking both reports into a single system. After a year of successful reporting, all the parties involved appear to be very satisfied with the new system.

Banka Slovenije in the meantime has already begun to cooperate with the country's insurance supervision agency on expanding multi-purpose reporting so as to include insurance companies and pension funds (supervised by ATPV). Preparations are under way to define reporting needs and find technical solutions.

The described multi-purpose national collection of supervisory and statistical data is based on the simple notion that the provision and preparation of information should be done only once and with a minimum reporting burden, but while maintaining high-quality statistics. This is in compliance with the principles endorsed by the Governing Council of the ECB in December 2007 within the long-term vision of the Eurosystem's statistics.

5   GENERAL CONSIDERATIONS

What are the main benefits of joint reports for statistical and supervisory requirements?

i)   The reporting entities prepare reports for statistical and supervisory purposes from the same set of data (e.g. balance sheet) that can be broken down in different ways.

ii) It is possible to produce more consistent decision-making support information for different levels (e.g. micro versus macro) or for different functions (monetary policy, supervision, etc.).

iii) Data in a joint report are compiled and transmitted only once, thus reducing reporter time and costs.

iv) One potential common benefit could be a reconciled report at the EU level for cross-border reporting entities. For this reason, the work of the Joint Expert Group on Reconciliation (JEGR) is extremely important and should be consolidated in the future. Unsurprisingly, the representatives of the EU banking industry strongly support those efforts.[4]

v)   Another benefit of having single reporting for different data sets is major simplification and a lighter workload in terms of the reception and control of data, both for data reporters and recipients.

In the jointly defined reporting system, relations between conceptually different data requirements are determined uniformly for all reporters. This is not the case

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4   This was conclusively demonstrated at the JEGR seminar with the (banking) industry on 28 April 2008.

with separate reports, where the relation between different reports is not defined. This feature increases the reliability and homogeneity of data and also heightens their applicability. As a rule, the reconciliation of conceptually different data requirements leads to more detailed breakdowns through lowest common denominators.

Matrix reporting is a suitably flexible tool for defining detailed multi-dimensional data reports. It is technically demanding, however, and the efficient management of such reports is only possible with the use of relational databases, data warehouses and electronic communication means. These technologies are common nowadays, and are also widely used already by financial institutions, especially those whose complex business dealings involve multiple customers and products. Therefore, it is only reasonable to extend the use of current technical developments to reporting systems, whereby the number of reporting cells should no longer be a significant constraint or cost.

Matrix reporting also influences the development of relational databases and data warehouses both for reporting and recipient entities. It should not be forgotten that data compiled for systematic multi-purpose reporting is useful for the reporting entities' own management needs and encourages further development of data warehouses for their specific needs. It enables them to detect potential errors and inconsistencies through drill-downs and is thus a perfect tool for supporting the management of operational, liquidity and credit risk.

The reformed reporting system also demands organisational rationalisation of data management by all parties involved in the reporting process, as there are fewer streamlined reports to deal with. Experience shows that it is easier to report and compile fewer, but more detailed, reports containing related data as opposed to more reports containing less detailed data.

The project has also clearly shown that the organisationally separate functions of statistics, supervision, financial stability and research can draw on a common multi-purpose database for all their needs. This is an important integrative element for the most important central banking functions.

6   CONCLUSIONS

As we emerge from the most severe financial and economic crisis of the modern era, lessons can also be drawn in terms of the financial statistics function. At the beginning of the crisis, regulators and supervisors were lacking certain relevant and important items of statistical information linked to modern financial instruments, derivatives and exposures.

Under such circumstances, it is of paramount importance to provide new information as quickly as possible and with minimum disruption to the established reporting systems. The efficient execution of policy objectives for monetary and financial stability and supervisory functions linked to financial institutions can only happen when timely and relevant information is available. This is precisely

the case with the multi-purpose reporting of financial institutions for statistical, supervisory and financial stability needs, as described earlier. Such a reporting system has many comparative micro and macro-level advantages. It is detailed and flexible enough to meet the data needs of supervisors, central banks and controllers of financial stability, for example the future European Systemic Risk Board.

Since there is no such flexible and efficient reporting system in place as yet at the European level, it appears important to support and prioritise developments towards this goal. For that reason, work on the reconciliation between different data requirements should be recognised as one of the most important projects in data collection ever to be undertaken in Europe's financial sector. The work begun by the JEGR group in 2008 on the initiative of the ECB should therefore be continued, broadened and strengthened.

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MACRO-PRUDENTIAL AND FINANCIAL STABILITY STATISTICS FOR IMPROVING THE FINANCIAL ANALYSIS OF EXPOSURES AND RISK TRANSFERS

PETER PRAET

I   INTRODUCTION

It is with great pleasure that I am able to contribute to this conference. As Chairman of the Banking Supervision Committee of the European System of Central Banks (ESCB), I am very much aware of the challenges posed in the financial analysis of risk exposures.

In my paper today, I would like to identify potential improvements to the measurement of fragility in the financial system. Indeed, the increasingly complex nature of financial institutions' risk exposures and the interactions between institutions has made the understanding of systemic risk more difficult and raised particular measurement challenges.

In fact, looking solely at the level of an individual bank's balance sheet, the analysis and evaluation of risk exposures have become considerably more complex. Firstly, technology and modelling advances have added complex products to banks' traditional exposures, thereby complicating risk evaluation. Secondly, the evolution of banking activities and business strategies has meant that the credit risk of an asset is no longer necessarily the primary source of risk for banks. In addition, high leverage and maturity mismatches have made institutions particularly sensitive to even small changes in some of these risks.

Although evaluating risk exposure at the individual bank level is necessary in order to assess the likelihood of distress, this alone is not enough. Banks are interconnected, and the extent of these interconnections can affect the potential health of a bank. Interconnectedness implies that an adverse shock which generates sufficiently large losses at one bank may be transmitted to other banks, particularly during times of stress. Interconnections occur both directly through interbank deposits, loans, derivatives and other securities, and indirectly through common exposures to similar assets or risks. Prior to the start of the crisis, credit risk transfer instruments, in particular credit derivatives, had enhanced interconnectedness further by increasing common exposures across institutions and linking banks' balance sheets in complex or nested ways. To the extent that credit risk transfer instruments redistribute risk within the banking system, as opposed to transferring credit risk from banks to institutions outside the system, the impact of interconnectedness will be magnified.

Alongside this cross-sectional dimension, the temporal dimension of aggregate risk also poses challenges for regulators and supervisors. During boom periods, banks may extend credit excessively, leading to an unrecognised build-up of risk. Credit supply may then be drastically reduced in recessions, in part due to binding

capital constraints, with an amplifying impact on the real economy. Therefore, a better understanding of the meaning and measurement of risk at the system-wide level is of paramount importance for financial stability. Developing statistics which capture the interconnections between individual institutions as well as the feedback between the financial system and the real economy can facilitate this purpose. However, as the current crisis demonstrates, interpreting statistics correctly is probably as important as increasing the amount of information available to regulators and supervisors.[1]

I will begin my presentation with an overview of the main challenges involved in understanding risk at the system-wide level. I will then discuss some techniques used to measure systemic risk, as well as the systemic importance of individual institutions. I will also explore the implications for the data needs of supervisors. Finally, I will review some recent statistical initiatives undertaken by the ECB/ESCB aimed at better measuring individual risk exposures, and the cross-sectional and temporal dimensions of aggregate risk.

2 HOW TO UNDERSTAND RISK AT THE SYSTEM-WIDE LEVEL?

In this section, I will define two connected, yet distinct concepts: *systemic risk*, and an institution's *systemic importance*. I will then identify their main driving factors. My focus will be on financial institutions rather than on markets or instruments, as the conceptual challenges relating to financial institutions are greater.

2.1 Systemic risk and its drivers

Defining systemic risk is by no means straightforward. This is due to the fact that systemic risk is multi-faceted: there are many sources and channels of systemic risk that are not mutually exclusive and may materialise in conjunction with each other. Furthermore, there is no uniform view regarding the correct scope of the concept of systemic risk; a key question is whether the focus should be solely on vulnerabilities within the financial sector or also on the ultimate impact on the real sector. As a result, no single, widely accepted definition of systemic risk exists.

Two potential definitions of systemic risk that adopt a broader scope are the following: "the risk of a crisis in the financial sector and its spillovers into the economy at large"; and "the risk of disruption to financial services that is (i) caused by an impairment of all or parts of the financial system and (ii) has the potential to have serious negative consequences for the real economy".[2]

In general, the degree of systemic risk is determined by the *level* of individual risk from the system's components as well as the *dependence* of these risks across the different components within the system. This dependence is essentially driven

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1   See Borio (2010).
2   Acharya et al. (2009) and IMF/BIS/FSB (2009).

by two factors: *systematic shocks*, which may simultaneously hit institutions exposed to common risk factors; and *spillover effects*, which involve propagation of shocks from one institution to other parts of the financial system.

Literature on the subject has identified several channels through which spillover effects may operate, including direct exposures between financial institutions via the interbank money market and counterparty relations, the adverse effects of asset fire sales, information asymmetries leading to adverse selection and contagious bank runs, and feedback loops between the financial and the real economy. Overall, these channels can be classified as specific elements of the general concept of "interconnectedness", both between financial institutions within the financial system as well as between the financial system and the real economy.

2.2 Systemic importance and its drivers

As suggested earlier, systemic risk may result from either a simultaneous shock to several institutions or from a shock to a single institution which then propagates through the system. Hence, it is important to identify those institutions whose failure has the potential to generate systemic risk. Like the definition of systemic risk itself, definitions of systemically important financial institutions also differ. In general, however, it can be said that, in its narrowest sense, a financial institution can be regarded as systemically important if its failure or malfunction were to have a significant, adverse impact on the financial system. Just as sources of systemic risk may vary, so spillover effects from an institution's failure may operate through multiple channels.

Commonly defined factors determining the systemic importance of a financial institution relate to the institution's *size*, its *interconnectedness* to the rest of the system, and the degree of *substitutability* of the institution or its activities.[3] Often, these factors interact and reinforce one another. In this context, it is important to stress that asset size alone may fail to shed much light on the importance and complexities of the interconnections that a banking group may have within a financial system, especially given the growing importance of banks' off-balance-sheet activities. Therefore, knowledge about such interconnections can help in mapping how, or if, strains in a large banking group could spread to other institutions or markets. The ECB has taken an important first step towards statistically identifying banking institutions that meet certain characteristics of scale based on balance sheet size and, beyond this, towards identifying those which are systemically relevant on the basis of a multiple indicator approach.[4] In order to assess how important a banking group actually is for the smooth running of the various intermediation, risk transformation and management processes operating within the system, a broad set of key business activity characteristics is needed, and the methodology proposed by the ECB marks a

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3 See IMF/BIS/FSB (2009).
4 See ECB (2006) for more details. See also Section 3.1 for general information about indicator-based approaches.

clear improvement over simply selecting banks on the basis of asset size and arbitrarily choosing a threshold asset value or a certain number of institutions.

Finally, it should be noted that systemic risk and systemic importance, despite sharing many features, are nonetheless separate concepts that differ in their defining aspects and drivers. For instance, even in the absence of (individually) systemic institutions, the level of systemic risk may be high. This may be the case, for instance, in a financial system consisting of small, unconnected banks with a large degree of common exposure; even though the system does not contain (individually) systemically important banks, the level of systemic risk is high as the banks may be simultaneously hit by a systematic shock. Therefore, different methodologies as well as data requirements may be needed to measure these two concepts.

3   MEASUREMENT OF RISK AT THE SYSTEM-WIDE LEVEL

3.1   Techniques for measuring systemic risk and systemic importance

Both before and during the current crisis, a fair amount of literature has been written on techniques for measuring systemic risk and the systemic importance of institutions.

One widely-used technique for measuring *systemic risk* has its origins in Merton's firm value model, or *contingent claims analysis*. Merton's model is an essential starting point for modelling the credit risk of an individual firm. In this model, the value of the firm's equity and debt have pay-offs that resemble those of call and put options; for instance, pay-off to equity is equal to the pay-off of a European call option on the firm's asset value. This implies that the probability of a firm defaulting essentially depends on three parameters: the leverage of the firm; volatility; and the mean return from the asset value process. Multivariate extensions of Merton's model are useful for modelling the default risk of a portfolio of firms (these are the so-called structural models of portfolio credit risk). In the context of measuring systemic risk, the relevant portfolio is that of the financial institutions that make up the financial system. Under a number of assumptions regarding probabilities of default (PDs) and loss given defaults (LGDs) along with an assumed dependence structure, an aggregate loss distribution, representing the total losses of all the institutions within the financial system, can be derived from the losses of the individual institutions.[5]

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[5] See, for example, Tarashev, Borio and Tsatsaronis (2009) and Huang, Zhou and Zhu (2009). It should be noted that these studies use the contingent claim analysis framework as a first step in determining the systemic importance of financial institutions. Notably, as a second step they use specific allocation procedures to allocate the total level of systemic risk to individual institutions.

Other examples of techniques aimed at measuring systemic risk, with an emphasis on the interactions between the financial and real sectors, include *macro stress-testing exercises* and *early warning systems*.[6]

As noted earlier, there are several potential sources of *systemic importance*. Therefore, one of the main challenges when navigating through the existing literature on the measurement of systemic importance is not the range of methods available; rather, the real issue is sorting out what methods reflect which sources of systemic importance. Broadly speaking, techniques to measure systemic importance can be classified in three categories: indicator-based approaches; network approaches; and co-risk measures.

Indicator-based approaches consist of aggregating several quantitative indicators to produce a measure of systemic importance. These indicators are a proxy for different factors that could render a financial institution critical for the stability of the system. Some indicators that have been proposed in recent work include, for instance, total assets (as a proxy for size), total interbank liabilities and assets (as a proxy for interconnections) and share of non-traditional banking activities (as a proxy for substitutability). Each institution receives a "score" for each of these indicators, after which an aggregation technique must be applied to produce a single synthetic measure of its systemic importance.

Network approaches[7] are focused mainly on mapping the interlinkages between the financial institutions. Inter alia, this requires data on interbank loans, including cross-border exposures, as well as information on credit risk transfer instruments. Mapping of the interlinkages is an important task, because they constitute an important channel through which spillover effects may operate (e.g. counterparty relations). Once these interlinkages are properly established, simulations of shocks to specific institutions allow tracking of the domino effects on other institutions in the network. The strength of such domino effects determines the systemic importance of a particular institution.

Given the substantial data requirements of the indicator and network approaches, techniques based on market information have recently received considerable attention. *Co-risk measures* infer the impact of the failure or distress of a financial institution directly from market data, such as stock returns or credit default swap (CDS) spreads, by making use of statistical methods with minimal assumptions. The best-known co-risk measure, CoVaR (Conditional Value at Risk), involves a two-step process.[8] First, the CoVaR of institution i is calculated as the VaR of the whole financial sector conditional on institution i being in distress. Second, the difference between the CoVaR of institution i and the unconditional VaR of the financial system is calculated. This difference (ΔCoVaR) captures the marginal contribution of institution i to systemic risk within the financial system.

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6   See, for example, Foglia (2009) for the former set of techniques and the IMF (2010) for the latter.
7   See, for example, Elsinger, Lehar and Summer (2006) and Nier, Yang, Yorulmazer and Alentorn (2007).
8   See, for example, Adrian and Bunnermeir (2009).

In other words, ΔCoVaR represents the maximum (euro) spillover losses to the entire system given the maximum losses for an individual institution.

As is obvious from this short description of techniques used for measuring systemic risk and systemic importance, a major challenge consists of improving the quality of data to better capture notions such as interconnectedness (both across institutions and products), size and substitutability. This is elaborated in more detail below. In addition, it is worth noting that techniques used to measure systemic importance do not always identify the same institutions as being important. There are many reasons for this, including the nature of the data used and the assumptions made, which differ across techniques. This highlights the importance of considering at least two different approaches when assessing the systemic importance of a group of institutions.

3.2   Data demands and data gaps

The previous section showed how analytical tools can contribute to measuring systemic risk and systemic importance. Since the value added of these tools is also determined by the quality, timeliness and suitability of the data used, it is essential to ensure a robust statistical basis for macro-prudential analysis.

The ECB, with the support of the national central banks, is working to make improvements in order to support both the Eurosystem's responsibilities in the field of financial stability and the statistical needs of the forthcoming European Systemic Risk Board (ESRB). More specifically, the new EU supervisory architecture will require the availability of data reflecting a *complete coverage of financial sectors and markets* (ranging from banking, insurance and pension fund sectors to securities markets and the non-regulated financial sectors) as well as *wider geographical coverage* allowing for EU-wide analysis and more extensive country monitoring.

Articulating data needs in two main directions – "top-down", focusing on the *macro-financial environment*; and "bottom-up", focusing on *firm-level and group data* – is deemed essential in order to make ongoing systemic risk assessments. Indeed, for macro-prudential analysis detailed data are needed on interconnectedness and concentrations that collectively account for the network risks. Aggregated sector-wide information can mask important differences between institutions, precluding an analysis of common exposures of systematically important institutions, which prevents any proper assessment of the soundness of, for example, so-called "*large and complex financial groups*" which may play a key role in the overall stability of the financial system.

Against this background, what current major data gaps for measuring systemic risk and systemic importance should be addressed? As I mentioned earlier, interconnectedness, i.e. linkages with other system components, represents one of the key criteria (together with the concepts of size and substitutability) for measuring both concepts. A lack of data on *interbank exposures* prevents the use of methodologies aimed at assessing interconnectedness. In fact, there are significant data gaps in relation to *bilateral cross-border exposures* and *exposures*

of locally operating branches that are supervised abroad. Moreover, statistics for financial stability should be expanded and refined to cover *financial entities that fall outside the regulatory framework* (e.g. hedge funds, private equity, etc.) and that may not disclose information on their exposures and operations in a sufficiently granular manner to allow assessments of their systemic relevance. At present, the lack of a sufficient level of detail (e.g. on geographical, maturity and sector loan exposures, as well as on non-performing loans and provisioning) in publicly available data precludes conducting macro stress-testing of the credit portfolios of large and complex banking groups in the euro area. At the financial system level, moreover, the ability to simulate the propagation of local shocks within the system requires an extension of coverage to the whole of the EU, as well as the inclusion of information on issuers and holders (so-called "from-whom-to-whom" accounts). Finally, a notable gap in the statistics available to policy-makers has been the measurement of *credit risk transfer* across macroeconomic sectors and geographical regions, which should be addressed as part of an integrated statistical framework.

In terms of prioritising data needs, I would highlight the importance of timely, harmonised and high-periodicity data for the EU banking sector, including *firm-level information* for a set of large and complex financial groups. Similarly, for the EU insurance sector, timely, harmonised and high-periodicity (e.g. quarterly) data are desirable. Moreover, it is crucial to enhance existing data for the *macro-financial environment* in order to make them more suitable for macro-prudential analysis by including, for example, high-frequency data on residential and commercial property prices. Finally, developing an infrastructure that is able to pool available information and make it possible to reply to ad hoc needs in a timely and efficient manner would be crucial in allowing for the analysis of the potential impact of specific events, like exposure to a certain market or geographical area when this is not covered by regular data collections, or for the analysis of changes due to financial innovation before regular data collections can be amended.

4   STATISTICAL INITIATIVES TO MEET DATA DEMANDS

Having provided an overview of data needs and data gaps, I would now like to turn to the current statistical agenda, in particular those initiatives currently under way that are aimed at filling the gaps highlighted above. The Statistics Committee (STC) is actually now working in close cooperation with the Banking Supervision Committee (BSC) to further enhance the already well-developed statistical basis of the ECB/ESCB in order to allow the risk-based measurements necessary to support the ECB's financial stability function and the ESRB. This includes ensuring coverage of the entire EU.

A key initiative being taken at the moment is the enhancement of the *collection of consolidated banking data (CBD)*. CBD, which have traditionally been used for the BSC's annual review of banking stability, should be improved in timeliness and frequency terms for a set of key indicators, thus marking an important first step in supporting the envisaged quarterly meetings of the ESRB. The addition of

further breakdowns to encompass *more granular data* on cross-border exposures to individual EU27 countries, exposures towards counterparty sectors in relation to banks' loan portfolios, non-performing loans, and the original and residual maturities of bank liabilities, had also been considered, but their implementation would need to wait until after further harmonisation of the underlying supervisory data. In this regard, it should be noted that CBD are essentially a subset of the reporting templates (FINREP and COREP) developed by the Committee of European Banking Supervisors (CEBS) for supervisory purposes. While the implementation of these templates currently varies across countries, CEBS is reviewing these templates in order to implement uniform formats from 2012. This also represents an opportunity to satisfy the needs for macro-prudential analysis, particularly those of the ESRB. Indeed, current proposals foreseeing the collection of increasingly granular data could be somewhat helpful in this regard. For example, COREP already makes provision for the reporting of data on individual securitisations and has also now been expanded to cover information on large exposures. If suitably implemented, these datasets could provide a great deal of relevant information on risk concentrations, thus filling an important gap in network analysis.

It is acknowledged that the focus for macro-prudential purposes needs to be on systematically important financial institutions. To this end, the STC is currently assessing the feasibility of integrating *large and complex financial groups (LCFGs)* based on supervisory concepts of consolidation within an extended "*register of institutions and assets" database (RIAD)* to be maintained by the ECB/ESCB. Moreover, in order to conduct systemic risk analysis there is a need to go beyond a simple focus on individual supervised entities by further developing an integrated framework in the interconnections between systemically relevant institutions and common risk concentrations. For this purpose, additional geographical, sector and instrument breakdowns may be needed. Inasmuch as these data may not be easily available under FINREP or COREP, they could be sourced at least in part from the harmonised statistical datasets originally designed primarily for the purposes of monetary policy analysis, using monetary financial institution (MFI) balance sheet statistics, along with the increasingly detailed data available on banks' loan exposures, particularly to households, and BIS consolidated banking statistics for cross-border positions.

In addition, these statistical datasets could be used to enhance other elements of macro-prudential analysis. In particular, they could improve the measurement of credit risk transfer. Harmonised statistics on banks' securitisation and loan sales, integrated with balance sheet statistics on securitisation vehicles (so-called *financial vehicle corporations – FVCs* will shortly be available. In addition, the ESCB is now reviewing securities issues statistics (SECs) to assess whether the existing so-called "short-term" statistics are still fit for purpose. Moreover, the STC is also embarking on the compilation of comprehensive new statistics on securities holdings based on highly granular security-by-security information aiming at providing complete "from-whom-to-whom" data for sectors of the euro area economy. I will come back to these statistics shortly. The use of derivatives, in particular the *credit default swap*, is also an important segment to monitor as it is of primary importance from a financial stability perspective. The starting

point for statistics on credit derivatives is the currently available BIS statistics. The ECB has also benefited from the US Depository Trust and Clearing Corporation (DTCC) disclosure of weekly data and ensured a sufficient degree of consistency between these very frequent and timely market data and the biannual BIS statistics, thus increasing the capacity of central banks to monitor market developments, identify potential disruptions and improve monetary policy and financial stability analysis. The ECB/ESCB has also started to look into the potential use of data from credit registers for statistical and other purposes which could potentially yield additional data on financial sector credit developments at a high level of granularity. Finally, and no less important than other initiatives, the ECB/ESCB has developed a fully integrated set of *financial and non-financial accounts for the euro area economy* which makes it possible to measure financial linkages between all sectors of the economy as well as their articulation with the real economy. Furthermore, these statistics are being enhanced to provide full "from-whom-to-whom" information on financial instruments while extending their coverage to the entire EU.

Returning to the work on *securities holdings statistics*, this may be regarded as a fairly clear-cut example of a statistical dataset with high potential for macro-prudential analysis. The provision of statistics on securities holdings represents a key statistical dataset in which both the individual and system-wide perspectives mentioned in the introductory part of this speech are being enhanced in respect of an instrument (securities) under which many exposures have proven to be concentrated. In principle, information on holders (creditors) is collected on an aggregated basis at least per economic sector. The only exception would be for LCFGs, where the aim would be to have individual information.

The intention is to collect information on holdings at the most granular instrument level, i.e. security by security, so that information is available on the individual debtors. Collecting data at this level of granularity enables the holding data to be linked to information on the characteristics of the individual securities and their issuers – such as information on tranches and ratings, which in turn would permit a much more accurate assessment of credit risk than is possible with aggregated information. Indeed, the ESCB will be using its securities reference database, the "Centralised Securities Database", which includes detailed information on most securities traded on financial markets where European investors are involved, in order to link information on holdings to the characteristics of the individual securities. The granularity provided by this dataset has the advantage of ensuring substantial flexibility, making it possible to derive statistics that can be adjusted quickly in response to financial innovations, for instance with regard to developments in available instrument types.

The STC has already started to take steps in 2010 to produce experimental statistics based on this approach, and initial tests have been conducted. Although the data are not fully available as yet, coverage is already significant for key instruments. The STC is also investigating further enhancements to data collection in order to bridge identified gaps and with the aim of developing a more comprehensive dataset covering a fuller range of both instruments and holder information.

Looking ahead, the main challenge is to integrate the frameworks based on micro-supervisory and statistical information sources, thus ensuring an increasingly consistent methodological basis. In this sense, I appreciate the work produced by the Joint Expert Group on Reconciliation (JEGR), under the auspices of the ECB and CEBS, aimed at bridging elements of the statistical and supervisory reporting frameworks as well as at identifying reconciliation options between them, leading to a reduction in the reporting burden on credit institutions. Cooperation with CEBS along these lines is therefore vital in order to ensure that its standard templates reflect not only the micro-prudential data needs, but also those for macro-prudential purposes. For instance, this is being pursued by reconciling statistical and supervisory data definitions and by mapping the exposure classes of supervisory reporting with the corresponding ESA 95 sector categories.[9] This work may help compilers at national level to develop more integrated information systems, which would then serve both statistical and supervisory purposes.

5   CONCLUDING REMARKS

In conclusion, I would like to refer back to my opening point: statistics should not only capture risk exposure at the individual bank level, but should also address the cross-sectional and temporal dimensions of system-wide risk. As we all know, system-wide risk cannot be determined simply by averaging or aggregating risks at the micro level. Hence, the availability and quality of genuine euro area statistics – i.e. those which are more than just the sum of the national data of the Member States – is of paramount importance. To this end, the ESCB recently embarked on vital work that will help to support both the Eurosystem's responsibilities in the field of financial stability and the statistical needs of the European Systemic Risk Board. While these initiatives are much needed, I believe they represent only a first step in assessing the various dimensions of risk, in particular the transfer of risks across sectors. We are therefore probably only at the start of our journey towards establishing a *macro-prudential and financial stability statistical framework*.

Let me finish by stressing the need to be reasonable about what we can expect from statistics. Since risk within the system is endogenous, statistical instruments may never be able to capture fully all types of potentially emergent risk. However, this should not stop us from making further attempts to understand the complexity of, and the interlinkages between, the different types of risks that exist, nor deter us from trying to measure these more accurately.

9   For information about the work of the JEGR, see: www.ecb.europa.eu/pub/pdf/other/mfi balancesheetinterestratesstatisticscebsguidelines201002en.pdf

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CENTRAL BANK STATISTICAL INITIATIVES TO MEET NEW CHALLENGES: A COMMENT

MANUEL MARFÁN

I   INTRODUCTION

The two papers in this session, although different in scope, share the view that a number of blind spots in central banking statistics came to light with the financial crisis of 2008-09.

Both papers highlight the statistical gaps with regard to assessing the risks that modern financial innovation has brought into the system.

They also agree that collective efforts to enhance central banking statistics are more effective than individual efforts and should be prioritised therefore within the EU.

2   BRIEF REFLECTIONS ON THE PAPERS BY MARKO KRANJEC AND PETER PRAET

Most of Governor Kranjec's paper analyses an almost decade-long project aimed at overhauling the collection and reporting of Banka Slovenije (BS) statistics, in order to meet EU and ECB standards.

The outcome is BS's "matrix", a multi-purpose reporting system for which the paper argues a persuasive case.

However, the recent crisis proved that the statistical standards of the EU (and, I would add, of the rest of the world) have lagged behind financial innovation, creating a blind spot for prudential purposes as well as for assessing the transmission mechanisms once the crisis erupted.

The main explicit finding: data collection and reporting standards must catch up, and further prioritisation of collective efforts within the EU and the ECB is needed in this respect.

The main implicit finding (in my opinion): the ECB should consider a device such as BS's "matrix" for future statistical efforts within its EU remit, given its advantages of flexibility allied to a consistent "from-whom-to-whom" approach and a multi-purpose structure.

If such a matrix approach were to be introduced in Chile, we would have already completed some of the work, while in other areas we would be lagging behind.

Many financial transactions produced in Chile by regulated agents – especially banks – are reported daily, including domestic derivatives and cross-border

non-deliverable forwards (NDFs) in which banks can participate. This information proved useful for the Central Bank of Chile (CBC) after the collapse of Lehman Brothers in its role as supervisor and regulator of the payments system in domestic and foreign currency.

The main component that Chile does not have as compared to BS's matrix is that the databases compiled by other specialised regulatory institutions – Superintendencia de Bancos e Instituciones Financieras (SBIF) for banking; Superintendencia de Pensiones (SAFP) for pension funds; Superintendencia de Valores y Seguros (SVS) for capital markets and insurance – are not available for the CBC and/or not always compatible with the needs of the CBC.

Peter Praet's paper, in my opinion, may be divided into two different parts:

1. A thoughtful and "reasoned" revision of concepts and measurement techniques on systemic risk, including an identification of data needs and gaps;

2. a review of the statistical initiatives taken at the EU level in this respect.

I will comment on these in reverse order.

I had some difficulty with following the second part, especially since I am not acquainted (as I am sure you all are) with the acronyms not defined in the text. The moral of the paper, however, is clear: EU and ECB collective initiatives to enhance better measurement and understanding of financial risks in their various forms and interconnections are of "paramount importance" (same wording as in Governor Kranjec's paper). Existing efforts in this direction should be prioritised accordingly.

Peter Praet also points out that these initiatives are just the beginning of a long journey.

The first part of the paper is indeed fascinating as well as provocative in a positive way. I will not comment on the few parts where, in my opinion, further discussion is needed. Rather, I will try to complement Peter Praet's view with some additional contributions, many of which came to mind as I read through his paper.

3   SYSTEMIC FEATURES OF AN ECONOMY LOCATED IN A FINANCIALLY SEISMIC ZONE

Chile is located in a seismic zone. Chileans of my generation have experienced at first hand both the worst and the fifth-worst mega-earthquakes in recorded history, the second one just seven months ago. Because of our world-class construction standards, many specialists from across the globe are now in Chile and attempting to improve their knowledge of the strengths and weaknesses of frontier technologies in structural engineering.

Chile is also located in a financially unstable region. In terms of domestic impacts, Chileans of my generation have experienced two mega economic

crises – in the mid-1970s and in the early 1980s – the local severity of which was comparable with the Great Depression. We have also witnessed the impact, especially in our neighbouring countries, of the "tequila" crisis, the Asian crisis and the Russian default of 1998, the Argentinean debacle of 2001-02, and the recent global crash.

With more than one observation on systemic crises, permit me to list a few examples of features common to all of them.

I will not discuss the economics of why these features occur, although I do recognise that they are connected to each other. I will separate them simply for analytical purposes.

The payments chain ("If my debtors don't pay me, I cannot pay my creditors") is an essential component of the assessment of liquidity risk.

Notice that the sentence above also applies to solvent agents. Fire sales are usually a means to obtain liquidity when a relevant (systemic) link in the payments chain fails. When such a failure is not identified urgently in time, liquidity constraints mutate rapidly into solvency problems.

Commercial banks as an aggregate, and individual mega-banks, are systemic links. The point is to identify additional systemic links in the payments chain. Clearly, investment banks were systemic, as was General Motors in the United States.

The question of "from-whom-to-whom" in assets and liabilities is relevant for solvency analysis, while the question of "from-whom-to-whom" in cash flows is relevant for liquidity risk analysis.

Portfolio risk assessment normally considers that overall risk can be reduced by taking advantage of negative correlations from either future returns or the likelihood of default.

A systemic shock affects all assets in the same direction, so financial correlations are positive when assessing systemic risk. Once a systemic shock is ignited, the perception is that correlations become positive. Alas, the result is a financial stampede towards the safest assets, thereby expanding and propagating the systemic impact.

Traffic congestion may be a systemic result of a mass of rationally behaved drivers. By analogy, portfolio diversification on a massive scale is a main source of modern systemic vulnerability. If a sufficiently large number of investors tries to benefit from what are (initially) observed as negative risk correlations, these become endogenously positive and remain unobservable until it is too late.

An assessment of portfolio systemic risk should consider the endogeneity of risk correlations. This has been a staple component of banking regulation since the arrival of Basel I capital adequacy, which gave each asset an intrinsic risk

weight regardless of its correlation with the rest of the portfolio. Systemic risk assessment of other types of financial intermediation (hedge funds, investment banking) is, to my mind, still pending.

The Long-Term Capital Management bankruptcy, Brazil's sovereign risk after the Russian default of 1998, and the dot.com bubble offer some painful examples of the effect of risk correlation reversals.

In a crisis, riskier classes of financial agents are rationed out of credit regardless of the solvency or sound financial history of individual agents belonging to the same class.

All emerging markets were rationed out of credit markets during the Asian crisis of 1997-98 regardless of the assessment of their resilience.

The concept of "sudden stops" developed by Guillermo Calvo is considered a key element for understanding systemic shocks ("It is not the speed that kills you; it is the sudden stop").

Candidates for sudden stops are those classes of assets that become the pets of financial markets during periods of de-intermediation and/or expansion into exotic markets. Depending on the aggregate size of those assets, sudden stops may become an important propagation device of systemic risk.

In 1998-99, Chilean "blue chips" faced a sudden stop in external markets, while small and medium-sized firms suffered an internal sudden stop, jeopardising the payments chain.

During the 2008-09 crisis, the CBC monitored on a weekly basis the behaviour of credit flows from foreign banks to domestic ones, and provided foreign currency when needed. The CBC compiled detailed information, including the term horizon, interest rates, amounts, currency, creditor information and collaterals. This information proved useful when it came to monitoring access to international capital markets and assessing financial stability.

At the domestic level, the Chilean authorities vigorously expanded a programme of partial public guarantees for bank re-lending to small and medium-sized firms, preventing a sudden stop. The CBC, meanwhile, was providing the system with generous liquidity.

4   FINAL REMARKS

Trying to identify a financial bubble ex ante is a futile exercise. Nobody can prove that a bubble is a bubble until it has burst.

What is true is that bubbles are inflated by an optimistic outlook of events with no previous history. Excess optimism about the impact of structural reforms and/or relevant technical innovations is common to all booms that have ended

in crises. Nobody can assess in advance the true future effects of events that cannot be predicted accurately.

A cure for excess optimism is to assess the convergence conditions underlying a potential asset price misalignment, and then gather the impact of an "type II error". Double-entry charts showing the probability of a financial crash and the impact of such an event should be an essential component of any macro-prudential approach.

"Bottom-up" statistical efforts can be effective at first, but at some point they show diminishing returns, given the difficulties of identifying ex ante what the relevant "blind spots" are. For instance, more granular data to make stress tests and the like more sophisticated are very useful and also essential for assessing the "first round" impacts of a combination of shocks. The systemic impact of the same combination of shocks is almost impossible to estimate, since financial interdependencies would need arbitrary and intractable granular data modelling.

In my opinion, "top-down" statistical efforts can be equally beneficial for macro-prudential analysis. For the sake of illustrating the point I will provide a couple of examples.

At the end of the day, vulnerability/resilience to systemic shocks has to do with whether the liabilities of a class of relevant agents are imprudent or not – imprudent, in the sense that sustainability is not granted in likely pessimistic scenarios. A "flow change in liabilities" (i.e. without considering capital gains/losses) is a measure of how much an agent is reliant on "other agents' savings", for example standard measures of the public sector borrowing requirement. Aggregate ratios such as "flow change in M3" / national savings or the like can act as a proxy for detecting aggregate imprudent behaviour. I know of no systemic crisis trigger that could not be anticipated by that kind of aggregate measure, which, of course, can and should be disaggregated if necessary.

Central banks are very active in constructing databases on financial quantities. Quantitative databases are of secondary importance to private sector decisions, but of paramount importance for assessing systemic risk. Central banks are not active in constructing databases on asset prices, except for real estate. On the contrary, central banks tend to rely on databases provided by private firms (e.g., Bloomberg, Reuters). Asset price databases are essential for private sector decisions, and agents willingly pay to have access to them. The providers of these databases, in turn, construct a public good with full intellectual property rights. The assessment of asset prices is as essential for macro-prudential purposes as the assessment of quantities. Central banks should be more active in this respect, especially since convergence conditions are far easier to assess in price than in quantity.

DISCUSSION SUMMARY

In his introduction, **George Provopoulos** (Governor, Bank of Greece) opened the session by noting – against a background of the origin of the current crisis lying mostly in the financial sector – that the most relevant data gaps relate to deficiencies in information on financial institutions and on the interconnections between these institutions at national and international level.

Marko Kranjec (Governor, Banka Slovenije) stressed the importance of a common database for central bank policies. In this regard, he presented Banka Slovenije's "matrix" with its multiple applications and usages. He highlighted the achievement of more reliable data information for the different central bank functions, the advantages of the reduction in reporters' costs, and the simplification of reception and control of the data, both for data reporters and receivers.

Manuel Marfán (Deputy Governor, Central Bank of Chile, and Chairman, Irving Fisher Committee on Central Bank Statistics) focused on the potential application of this multi-purpose reporting system, in which the granular databases of financial supervisors were shared by the bank. He noted that even though the matrix presented a persuasive argument, the recent crisis proved that statistical standards in the EU (as well as globally) lagged behind financial innovation, thereby introducing a blind spot for prudential purposes and for assessing the functioning of transmission mechanisms once the crisis erupted.

Peter Praet (Chairman, ESCB Banking Supervision Committee, and Executive Director, Nationale Bank van België/Banque Nationale de Belgique) focused his speech on the updates to the measurement tools and indicators for financial system fragility and on the fundamental importance of the concepts of *systemic risk* and *systemic importance of an institution*. Furthermore, he listed the ECB initiatives on taking responsibility for the statistical needs of the forthcoming European Systemic Risk Board. These demands for statistics require a larger availability of data, to reflect a "*complete coverage of financial sectors and markets*" as well as "*a wider geographical coverage*" which would allow for EU-wide analysis and more extensive country monitoring.

In the discussion, **Manuel Marfán** recorded his appreciation for the EU and ECB initiatives to enhance the measurement and understanding of financial risks in their various forms and interconnections. He also appreciated the discussion on the underlying explanation of financial shocks and transmission mechanisms reported by **Peter Praet**. Moreover, **Manuel Marfán** observed that, except for safety assets, risks are positively correlated with systemic shock, and as a result, an assessment of portfolio systemic risk should consider the endogeneity of risk correlations. In a crisis, classes of financial agents are rationed out of credit, not because of the solvency or the sound financial history of individual agents, but by virtue of belonging to a same class of credit. This component was considered in the Basel II capital adequacy framework, which gave each asset an intrinsic risk weight, whatever its correlation with the rest of the portfolio.

This feature should not be overlooked in the new EU framework. Depending on the aggregate size of such assets, sudden stops may become an important propagation device of systemic risk.

Petra Geraats (Faculty of Economics, University of Cambridge) considered that the issues regarding a *systemically important institution* were a "red herring". It was not size that mattered, but the similarity in – and strategy of – investment and risk management.

Peter Praet commented that it was seen as easier to monitor one or two major institutions. He also saw the standardisation debate as an issue in this regard. To push non-standard financial products into central counterparty systems with the associated standardisation needs was a current debate within the industry. On the one hand, this pointed to the easier measurement of exposures and risks, yet conversely other risks are emerging. There was also a debate regarding whether to focus more on single indicators of exuberance in a broad, albeit less complex framework of statistics.

Charles Thomas (Federal Reserve Board) asked whether there was agreement from supervisors to use the same data system and from individual banks to trust central banks with their statistical (micro data) reports. He observed that, in general, the major hurdle was the release of confidential data by the data collectors.

Marko Kranjec clarified that supervisors were unsympathetic initially about sharing a common reporting framework, but, together with reporting agents, they accepted it was a viable initiative.

2 G20 INITIATIVES ON FINANCIAL STATISTICS: THE WAY FORWARD

INTRODUCTORY REMARKS

AUREL SCHUBERT

It is a great pleasure for me to chair this session looking at the future of **G20 initiatives on financial statistics**.

The former British Prime Minister, Tony Blair, once gave the following advice on new policies that would appeal to the public:

"We need two or three eye-catching initiatives… [and] I should be personally associated with as much of this as possible."

In a similar vein, the papers we are about to hear provide ample evidence that a modern statistical system is indispensable for conducting monetary, fiscal and financial stability policies.

To provide some illumination on these issues, it is my great honour to introduce our two eminent speakers:

- **Stephen Cecchetti**, Economic Adviser and Head of the Monetary and Economic Department at the Bank for International Settlements; and

- **Michael Palumbo**, Deputy Associate Director of the Division of Research and Statistics at the Federal Reserve Board.

I am also honoured to introduce our discussant:

- **Carlos Costa**, who has been Governor of the Banco de Portugal since June 2010 and who was previously a Vice-President of the European Investment Bank.

I am very much looking forward to **Stephen Cecchetti** discussing how a global risk map of giant matrices of bilateral exposures could – in principle – allow the measurement of any vulnerability in the financial system and pave the way for **initiatives** to construct a global analysis of interlinkages and the build-up of risk. At the same time, Stephen will propose a pragmatic, step-by-step approach which adjusts to actual developments in the literature and in financial stability policy-making.

Michael Palumbo, in his presentation, will discuss the difficulties that exist in collecting a relevant static dataset, against a background of dynamic innovation within the financial system, and will point to **initiatives** in new data for signalling drivers of change in financial instruments and activities as well as in investigating inconsistencies.

In this context, permit me briefly to suggest my own thoughts on possible **initiatives**. They would include:

1. **Providing long and consistent aggregated macroeconomic time series for policy analysis**. The euro area national accounts by institutional sector can, for example, be used to determine the level of interconnectivity between sectors in the economy and to monitor the build-up of imbalances and vulnerabilities.

2. **Integrating highly granular micro data to assess financial network risk**. Integration can include detailed information on exposures of financial institutions, thereby enabling instantaneous analysis of their concentration to issuers of securities, countries, currencies, maturities and counterparty sectors.

3. **Utilising surveys in supporting risk assessment**. Integration may involve: i) qualitative, survey-based information (e.g. bank lending surveys and surveys on companies' access to finance), ii) ad hoc surveys on (lending) exposures, and iii) structural distributional information (e.g. surveys of household finance, debt and wealth).

4. **Standardised reporting.** Bringing together different datasets for reporting by significant large banking and insurance groups, through a common register of the relevant institutions and groups, the appropriate combination of definitions and concepts (e.g. Joint Expert Group on Reconciliation, Solvency II) and development of a stance on transparency and standardisation via a review of the Transparency Directive and a possible "Reference Data Utility".

TOWARD A GLOBAL RISK MAP [1]

STEPHEN G. CECCHETTI, INGO FENDER AND PATRICK McGUIRE

ABSTRACT

Global risk maps are unified databases that provide risk exposure data to supervisors and the broader financial market community worldwide. We think of them as giant matrices that track the bilateral (firm-level) exposures of banks, non-bank financial institutions and other relevant market participants. While useful in principle, these giant matrices are unlikely to materialise outside the narrow and targeted efforts currently being pursued in the supervisory domain. This reflects the well-known trade-offs between the macro and micro dimensions of data collection and dissemination. It is possible, however, to adapt existing statistical reporting frameworks in ways that would facilitate an analysis of exposures and build-ups of risk over time at the *aggregate* (sectoral) level. To do so would move us significantly in the direction of constructing the ideal global risk map. It would also help us sidestep the complex legal challenges surrounding the sharing or dissemination of firm-level data, and it would support a two-step approach to systemic risk monitoring. That is, the alarms sounded by the aggregate data would yield the critical pieces of information to inform targeted analysis of more detailed data at the firm or market level.

I   INTRODUCTION [2]

Data are the eyes and ears we use to see and hear what is happening in the financial and economic world. Anecdotes, introspection, personal experience and modelling can help us figure out where to look and organise our thoughts. In the end, though, it is the data that tell us what is going on. Without data, we are deaf, blind and, in both senses, dumb. The need for data is especially acute in macroeconomic analysis for policy, where a bird's eye perspective

is indispensable. Aggregate data on prices, output, employment, credit, money and the like provide monetary and fiscal policy-makers with the information that allows them to monitor and meet their stabilisation objectives.

As the financial crisis deepened in the 18 months from August 2007, it quickly became apparent that we were partially blind because of significant gaps in our statistics. In some cases, we were not collecting the right data, and, in others, we were not using effectively what we had. While it remains unclear whether improved analysis could have reduced the intensity of the crisis, better and timelier information would almost certainly have simplified the task of managing and containing the crisis as it evolved. Filling these gaps in the data is thus an important challenge on our way towards improving our monitoring of systemic risk and hence the regulation and supervision of financial institutions.

It is worth emphasising at the outset that, because of the global nature of the financial system, systemic risk is a global problem. This means that our measurement and monitoring of risk must have a global dimension, unless we wish to give up on the benefits of globalisation and return to a financial system where institutions and markets are restricted to operating inside national boundaries. As a result, and as will become apparent from our arguments below, a clear need exists for increased sharing of international information and for enhancement of the centralised analysis that is already being pursued in a variety of organisations, including the Bank for International Settlements (BIS).

Over the past year or so, the problem of data gaps has attracted an increasing amount of attention. Numerous exercises are under way to identify and fill the gaps revealed by the crisis.[3] This is an enormous challenge, and what can get lost are the big picture implications. That is, implications going beyond any specific gaps in the data for a particular market or set of institutions. Are there *datasets* or statistical *concepts* that hold lessons for how data should be collected in the future? In this paper, it is our intention to step back and look for the broader *strategic lessons* of the crisis that we can then use to guide us in developing specific data requirements for identifying and measuring the accumulation of risks in the financial system as a whole.

In this spirit, we shall proceed as follows. In section 2, we describe what we see as the primary lessons for statistics that emerge from the crisis. High on the list is the need to see both the entire balance sheets of financial institutions and the interconnections and common exposures arising from them. In section 3, we present some recent work that builds on these lessons. While our primary focus is on the BIS's well-known and widely used international banking statistics, we also touch on the lessons the crisis holds for datasets beyond those collected by the BIS. With this analysis in hand, in section 4 we turn to the problem of building a global risk map, as well as the challenges this poses for the international exchange of data and the need for a broader statistical reporting framework to support it. The final section concludes the paper.

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3   See, for example, FSB and IMF (2009), which includes a list of 20 detailed recommendations for improving data collection and analysis.

2   SYSTEMIC RISK: LESSONS FROM THE CRISIS

Events during the fourth quarter of 2008 underscored the importance of understanding the scale of risk exposures within and between large globally active financial institutions. We now know that in the run-up to the crisis, much of the explosion in borrowing was underpinned by cross-currency funding arrangements and large-scale maturity mismatches. While the trigger for the crisis was common exposure to a particular class of assets, US sub-prime mortgages simply acted as the match that lit the fuse on the combustible mix of long-term illiquid dollar-denominated assets financed by a combination of short-term dollar liabilities and foreign currency swaps. When European banks in particular started to experience losses, concerns about counterparty risk disrupted funding relationships and turned what should have been a small brush fire into a global conflagration.[4]

Looking back at this experience, we can say that the entirety of financial institutions' balance sheets – their assets *and* liabilities, their *off-balance-sheet* positions, including lines of credit and derivatives positions, and their *counterparty arrangements* – all played a role. The challenge now is to find a way to monitor these factors. Doing so means both changing the way we use existing data and changing the data that we collect.

To understand the problem, we find it useful to start with a set of *core questions* that surfaced during the crisis. Every one of these is difficult (or impossible) to answer using the data we currently have available. Here is a list of *three* big questions that help organise our thinking:

Question 1: *How can a* **central bank** *monitor the global use of its currency?*

- If there were an international lender of last resort, how much of each currency would it need to stockpile in advance?

- In the absence of such a lender, how large are the funding requests that I would face in a crisis, and where would they come from?

- How large are speculative carry trade positions in my currency? Are these trades contributing to volatility in my exchange rate?

Question 2: *What information do* **policy-makers** *need (in addition to home country supervisory data) to monitor systemic financial stresses?*

- How reliant on cross-border financing are my corporate borrowers? How reliable are the lenders?

- How similar are the international portfolios of financial institutions headquartered in my country to those of equivalent entities in other countries? Are there clustered exposures or crowded trades?

4   See BIS (2008), chapter VII, and BIS (2009), chapter II, for a detailed description of these events.

Question 3: *What data could help **financial market participants** improve market discipline?*

- We now know that, before the crisis, European banks had long (and long-term) US dollar positions they had funded using short-term foreign exchange (FX) swaps. Would euro-dollar swap spreads have been 20 basis points wider in 2006 if the global asymmetry in the size of these positions had been widely known and publicised?

- Would pricing for interbank funding be more efficient if participants could see the build-up of system-wide funding stresses? If, for example, institutions had known the extent of reliance on short-term wholesale sources of funds, would prices have been different? How about concentrated asset exposures?

Box 1   Systemic risk – definition and measurement

Definition

Systemic risk in the financial system is analogous to pollution. It is an externality that an individual institution, through its actions, imposes on others. As commonly understood, this externality takes two forms. The first is the joint failure of institutions at a particular point in time resulting from their *common exposures* to shocks from outside the financial system or from *interlinkages* among intermediaries. The second is what has come to be known as *pro-cyclicality*. This is the term used to describe the phenomenon that, over time, the dynamics of the financial system and of the real economy reinforce each other, increasing the amplitude of booms and busts and undermining stability in both the financial sector and the real economy. Each has different policy implications and involves different challenges in terms of monitoring and measurement (see, for example, Caruana (2010)).

Common exposures and interlinkages create the risk of joint failure. Assessing their importance means focusing on both how risk is distributed and how the system responds to either an institution-specific shock or to a common shock that damages everyone. In the first case, we need to assess the risk of contagion through credit or funding exposures on the one hand, and the possibility of asset fire sales on the other. In the second case, systemic effects would arise as a direct consequence of similarities in the structure of institutions' balance sheets and funding patterns.

In the context of systemic risk, pro-cyclicality is about the progressive build-up of financial fragility exacerbating booms and increasing the risk of catastrophic collapse. As costly experience has taught us, the financial sector can endogenously generate systemic risk in ways that are often difficult to capture. New financial products with unseen risks can be introduced. Margins and haircuts, increasingly lax during booms and progressively more stringent in busts, will exacerbate price fluctuations in markets. Moreover, institutions have a natural tendency to become less prudent during cyclical upturns and more prudent during downturns. Add to this the fact that during periods of steady, high real growth, financial market volatilities tend to be low and risk premia compressed. Taking all of this together, the implication is that traditional measures of aggregate risk tend to look lowest precisely when risk is at its highest.

Box I   **Systemic risk – definition and measurement (continued)**

Measurement

Over the past several years, research has progressed along four broad tracks: *distributional models* and *stress testing*, which are designed primarily to address the risk arising from common exposures and interlinkages; *leading indicators*, focusing on counter-cyclicality; and *vulnerabilities analysis* that combines everything. We shall briefly describe each of these in turn.

Distributional models. Using a variety of methods based on assumptions about individual firms' probabilities of default or failure, and the correlation of default events, researchers first measure the extent of systemic risk in the system, then allocate it across financial firms.[1] These methods capture systemic risk arising from both common exposures and interconnectedness.[2] Crucial inputs into the current versions of this analysis are some combination of equity prices and credit spreads. These are used for the dual purpose of estimating the likelihood of firm-level failure (where balance sheet data are another crucial input) and the bilateral correlations that deliver the systemic risk estimate. A key advantage of the distributional models is that they generate explicit loss estimates from widely available data. In addition, since they are based on price data, these methods embed both the extent of institutions' leverage, which is very difficult to capture directly, and its distribution across the system. Unfortunately, the advantage gained from using price data is balanced by the disadvantage that prices used as measures of risk are at their least reliable when the risks are highest. In other words, price-based, distributional models of systemic risk are going to be at their worst when we need them most. This leads us to ask: what could help? The answer is bilateral exposure data.

Stress testing. The goal of stress testing models is to measure how a financial system will respond to negative shocks and to trace the effects of common exposures and interlinkages.[3] While the analysis can be done at the sectoral level, completing the job requires granular exposure data at the individual firm level. This, in turn, requires access to detailed supervisory information. Researchers have done such work in some jurisdictions and for some institutions.[4] Depending on the methodology, it is then possible to distinguish defaults directly caused by external events from those triggered by defaults of other banks. Interestingly, the results available thus far, which use national data, suggest that second-round effects associated with counterparty risk are of secondary importance.[5] Yet, as we think of the need to evaluate systemic risk at the global level, we are naturally led to ask whether the same would hold true in a cross-border context. Is the probability of joint bank failure for large international institutions driven primarily by common exposures? Answering this question obviously

1 This raises the crucial issue of choosing the appropriate delineation of the system on which to focus. See BIS, FSB and IMF (2009) for more detail on the challenges involved in this context.
2 Examples include the portfolio credit risk models that are being adapted for systemic risk analysis. See, for example, Huang et al. (2009).
3 See Borio and Drehmann (2009b) for a review of the literature.
4 Examples include Blåvarg and Nimander (2002) and Graf et al. (2005).
5 See Elsinger et al. (2006), based an analysis of comprehensive data for Austria.

Box 1   Systemic risk – definition and measurement (continued)

requires that we have data to perform stress tests at the global system level. At this point, any such exercise would be restricted to using sectoral data or would founder due to the lack of sufficient firm-level information across national jurisdictions.

Leading indicators. Regarding time-series measures, a growing body of work focuses on building leading indicators designed to capture the build-up of systemic risk over time.[6] Based on broad, macro variables such as credit-to-GDP ratios, property prices, equity prices and the like, the objective is to identify and measure misalignments that can be used to provide warnings of financial sector distress. Balanced against the clear advantage of their relative simplicity is the fact that early warning indicators constructed using historical episodes may have difficulty in tracking the build-up of risks as the financial and economic environment evolves. Nevertheless, given the potential benefits, it is surely worth looking for ways to improve what has already been done. Here, moreover, we suspect that systematic treatment of cross-border exposures could help, as could credit and asset price data with greater international comparability.

Vulnerabilities analysis. Finally, we have vulnerabilities analysis. This is less a model-based approach to data analysis than it is a mindset or a lens through which to look at the world. We think of it as a collection of qualitative and quantitative techniques (including, but not restricted to, the ones mentioned above) that are used to gauge all types of systemic risk.[7] The idea is to track developments for a wide variety of markets and institutions, using information on both prices and quantities in an effort to spot pressure points in the financial system as early as possible. Because price data are so plentiful, and quantity data are scarce, the indicators employed often use pricing models to infer market assessments of risks and vulnerabilities. Examples include the use of contingent claims models, such as the one in Merton (1974), to generate market-implied default probabilities for individual institutions and efforts to extract information on financial risks, such as implied volatilities, from option prices.

6 See, for example, Borio and Drehmann (2009a). Davis and Karim (2008) provide a survey.
7 Examples include the financial stability reports now published by most central banks and the IMF's Global Financial Stability Reports (GFSRs).

What data do we need to construct a global risk map that can answer these questions? To what extent do existing statistics suffice? Where are the gaps that need to be filled for us to get the answers we need? While we postpone a more detailed discussion of these questions until later, a cursory review of the models and approaches commonly used for systemic risk analysis (see Box 1) suggests that five *principles* are key to finding the answers:

• **Quantities.** Simple aggregate statistics go quite some way towards conveying a broad sense of the build-up of risks. Yet, to move beyond leading indicators to more sophisticated measures of systemic risk, more and better *quantity* data are essential. We see an immediate need for information on the extent of financial institutions' exposures with respect to their peers and their participation in various markets. As should be obvious, this means collecting data in a manner that preserves counterparty information. Importantly, to the extent that trading is channelled through central counterparties and organised exchanges, they would be a natural source for such data.

- **Financial intermediaries.** Ultimately, systemic risk comes from the maturity transformation that arises in the process of allocating savings to their most efficient investment uses. This is the function that intermediaries perform for the economy. Thus, we need to monitor the activities and risk profiles of all the major international financial institutions, regardless of their legal form of organisation, and their most important counterparties.[5] At the time of writing, timely, comprehensive and reliable firm-level information on, say, the world's top 50 banks is not publicly available. While commercial data providers, such as *Bankscope*, offer information on a large number of balance sheet items (often at a very high price), these data are available only with significant lags and with insufficient detail on such essential items as capital composition, currency and maturity breakdowns of assets and liabilities, and off-balance-sheet risk exposures.

- **Consistency.** Across the globe, it is fair to say that mountains of information are available. The problem is that compilation methods across datasets and data providers differ in ways that often make it difficult, or even impossible, to combine information. For example, the compilation of a complete risk profile for a large internationally active institution would almost certainly require combining supervisory information from a variety of jurisdictions. Doing this means having consistent reporting standards. Broadly speaking, we need better and more detailed disclosures across institutions. Existing aggregate datasets (e.g. the BIS international banking statistics, balance-of-payments and the flow-of-funds statistics discussed below) also need to be (further) harmonised so that they provide information in a consistent and comparable fashion.

- **Maturities and currencies.** If we are adequately to capture maturity transformation and (on-balance-sheet) leverage, as well as the maturity mismatch embedded in cross-currency positions, then we need information on the maturity and currency composition of both assets and liabilities. To understand just one risk we need to monitor, it should be noted that when long-term foreign currency assets are financed by short-term domestic currency liabilities, which are then swapped into the target currency via foreign exchange swap markets, this creates rollover risks for the liabilities and possibly the swap position. (This risk relates closely to questions 1 and 3 above; we will return to this shortly.) Such an embedded mismatch can only be monitored with data on combined maturity and currency breakdowns.[6]

- **Consolidated data.** Many datasets suffer from the fact that they are entirely residency-based. This may be less important for GDP – we really do want to know *where* things are produced – but it is a problem for financial information. Take the case of a bank (or even a non-financial corporate) operating globally, borrowing and lending in many countries. If all we know is the location where

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5 This links closely with ongoing work on identifying systemically important institutions. See, for example, BIS, FSB and IMF (2009).
6 Note that information on the instrument type or counterparty type of assets and liabilities (e.g. money market funds, central banks, other banks, non-banks etc.) can be used to infer information about maturities and may be easier to collect than actual maturity detail.

a loan is made, then we cannot consistently relate the bank's exposures to the capital base ultimately supporting it (or the headquarter location where key funding and risk-taking decisions are made). Moreover, not only do we need consolidated data, but we need these data with geographical detail. That is, supervisors in Germany need to be able to see both the subsidiaries of UK banks operating in Germany, which they already know about, and the exposure and funding-related activities of German subsidiaries in the United Kingdom, about which they may not be aware (or at least not in sufficient detail). This is not only an obvious argument in favour of supervisory exchange of information; it also shows that systemic risk assessment cannot proceed adequately without consolidated exposure and funding data (see question 2 above).[7]

To summarise, taking the lessons of the crisis, we believe that relatively simple aggregate statistics, used properly, can help us to gauge the build-up of systemic risks nationally and globally. However, to improve our understanding, to fully exploit the potential of the various approaches used to conduct systemic risk analysis, we need more. We need consistent and comparable data across institutions. We need information on the level of common exposures. In addition, we need data on interlinkages.

Yet how detailed and complete does information on quantities need to be? There are well-known trade-offs between the macro and micro dimensions of data compilation and dissemination. While more granular data enable better analysis, compiling and sharing information becomes progressively more difficult as the number of institutions covered and the detail requested increase. Costs as well as legal restrictions stand in the way. This suggests that it would be wise to start with a focus on detailed data for a small number of key institutions (e.g. the 50 largest). In parallel, broader sets of statistics need to be improved to provide more and better aggregate (i.e. sectoral) data. The ultimate goal is a consistent set of *aggregate* statistics that will allow us to identify *pressure points* at the *sectoral* level, and then to follow up on these signals with a more targeted analysis of detailed (supervisory or ad hoc collections of) data at the firm or market level. This is where the BIS's experience with its international banking statistics can play an important role.

3   ELEMENTS OF A STRATEGY: LESSONS FROM THE BIS BANKING STATISTICS

The BIS maintains an established reporting framework covering the international activities of some 7,000 banking entities from about 40 countries. As such, these international banking statistics (the BIS banking statistics) cover the core of the global financial system. The relatively long time series that they provide can be used for historical comparisons and statistical analysis. Furthermore,

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7   More precisely, uncovering the geographical exposure and funding patterns of financial institutions requires joint availability of consistent and consolidated data collected worldwide across the home office, all branches and subsidiaries, and consistent locational data which capture activity separately based on the country where it is taking place.

it would be possible, at least in principle, to increase the perimeter of reporting to include key non-bank financial institutions. The BIS also maintains information on derivatives and debt that can be used to complement and enhance any analysis utilising the BIS banking statistics.

Critically, the BIS banking statistics largely conform to the five *principles* identified above. Not only do they cover the core financial system but they are also available on a consolidated (headquarter-based) as well as a locational (residency-based) basis.[8] Moreover, since they provide some detail on currencies and information that allows maturities to be inferred, we can examine the mapping of geographical exposure and funding patterns for consolidated national banking systems. These, in turn, can be used to track the evolution of common exposures and interlinkages. They also enable an analysis of positioning (i.e. net short and net long positions) on both sides of any given market covered by the data. Activities in other markets can, to some extent, be inferred by making a number of assumptions.

Before turning to the implications for statistical reporting at the BIS and beyond, we illustrate how current data can be used to assess two sorts of systemic risks: those emanating from cross-currency funding and maturity mismatches (our questions 2 and 3 above); and those arising from speculative carry trades (question 1).

3.1   Monitoring banks' funding vulnerabilities[9]

A prominent feature of the recent financial crisis was the dislocation in *funding markets*. Arising from the *liability* structure of banks' balance sheets, the problem developed when a large number of institutions found themselves in need of US dollars that they had incorrectly assumed they could either borrow directly or obtain through the foreign exchange swap market. Indeed, it was the resulting scramble that led to the need for central bank swap facilities. As already mentioned, the measurement of funding vulnerabilities requires knowledge of commercial banks' globally *consolidated balance sheets*, rather than the balance sheets constructed along national borders. Consolidation matters because (i) stresses build up *across* the balance sheet (as mismatches between the maturity, currency and counterparty of assets *and* liabilities) and (ii) the balance sheets of the relevant decision-making economic units (i.e. internationally active banks) *span national borders*.

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8   The BIS banking statistics consist of four complementary datasets: (i) residency data – locational banking statistics by residency; (ii) nationality data – locational banking statistics by nationality; (iii) consolidated (IB) data – consolidated banking statistics, immediate borrower basis; (iv) consolidated (UR) data – consolidated banking statistics, ultimate risk basis (i.e. adjusted for risk transfers). The residency and nationality data follow balance-of-payments reporting concepts (tracking the international asset and liability positions of banks' offices located in a particular country with respect to counterparties in other countries, and positions with respect to residents of the host country in foreign currencies). In contrast, the consolidated statistics track the worldwide asset exposures – broken down by residency of counterparty – of banking systems, or the set of internationally active banks headquartered in a particular country (e.g. Swiss banks, UK banks, etc.).

9   For an extension of the analysis presented in this section, see Fender and McGuire (2010).

It is important to keep in mind that international funding stresses can only be identified by tracking the patterns in *cross-currency* funding – that is, the degree to which banks' assets are denominated in a currency different from the one in which they issue liabilities. Picture, for instance, a German bank with a large euro deposit base. This bank would like to invest in long-maturity US dollar-denominated mortgage-backed securities (MBSs). To hedge the exchange risk that naturally arises from this position, the bank uses some combination of FX swaps and futures. Yet, the swaps and futures are, by their very nature, *short-term contracts*. The bank will need to roll them over regularly during the period for which it holds the US dollar MBSs. What this means is that, regardless of the maturity structure of the euro-denominated liabilities (they could be the same as the MBSs), the mere fact that the bank engages in cross-currency financing creates a *funding risk*. Put another way, these positions have a maturity mismatch embedded in them. Moreover, if a large number of institutions are doing the same thing – taking euro or yen deposits, swapping them into US dollars and buying US dollar assets – then they will pose a systemic risk.[10]

To see the build-up of this risk, we need data on the FX swap market. Some information is already available in the BIS semi-annual over-the-counter (OTC) derivatives statistics, but these data only include gross figures, so they do not allow us to see the position's direction. In other words, gross FX swap positions cannot tell us whether the reporting entity provided or received a particular currency in the FX swap market.[11] Without knowing the direction, we cannot tell whether the derivatives positions mitigate or exacerbate the existing on-balance-sheet mismatches.

Yet, by making what is an admittedly bold assumption, we can derive a picture of what positions in the FX swap market might look like at the level of national banking systems. The BIS banking statistics allow us to see on-balance-sheet net (assets minus liabilities) positions *by currency* for each national banking system. If we assume that banks have very small open FX positions, then any on-balance-sheet long and short position in a particular currency provides an estimate of the banks' net FX swaps and futures positions in that currency. The top and centre panels of Chart 1 aggregate these on-balance-sheet positions by currency separately for two groups of banks: those with either more or less on-balance-sheet US dollar assets than US dollar liabilities. We label these long-USD banks and short-USD banks. If banks hedge their foreign exchange risk, then these figures imply that long-USD banks (shown in the top panel) demand an estimated aggregate of $1.2 trillion (net) in US dollars from the FX swap market. In return, these banks provide an equal amount of euro, pounds, Swiss francs and other currencies in exchange. On the other side, the short-USD

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10 This is the funding equivalent of a crowded trade; see McGuire and von Peter (2009) for details.
11 The BIS semi-annual OTC derivatives statistics contain information on forwards, swaps and options of foreign exchange, interest rate, equity and commodity derivatives. The BIS also releases statistics on concentration measures for foreign exchange, interest rate and equity-linked derivatives, and data on credit default swaps including notional amounts outstanding and gross market values for single and multi-name instruments.

banks (shown in the centre panel) are net providers of roughly $800 million to the FX swap market. The difference of $400 billion is accounted for by non-bank participants that these data do now allow us to capture.

Measured in any particular currency, total FX swap contracts must balance: total dollars supplied equal dollars demanded. Yet a whole range of ways exists in which supply can equal demand. And some of these can actually turn out to have implications for market pricing. For example, Chart 1 seems to suggest a growing asymmetry – diverging large net positions in the swap market across banking systems – as the crisis was building. In other words, dollar borrowing via FX swaps became increasingly important for the long-USD banks. We now know what happens when the net providers of these dollars (the short-USD banks and non-banks) become skittish about lending to the net demanders when credit risk concerns arise. Are large price movements in a particular currency more likely when the market is asymmetric in this way? Perhaps. Yet we can hardly expect

Chart 1   Long- and short-USD banks' positions, by currency
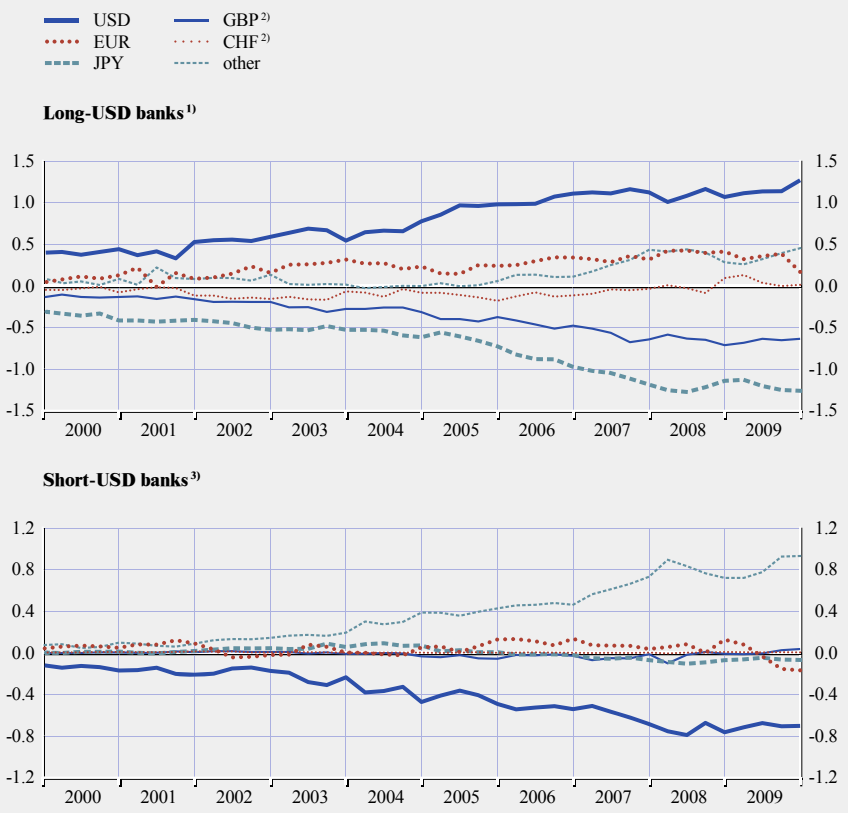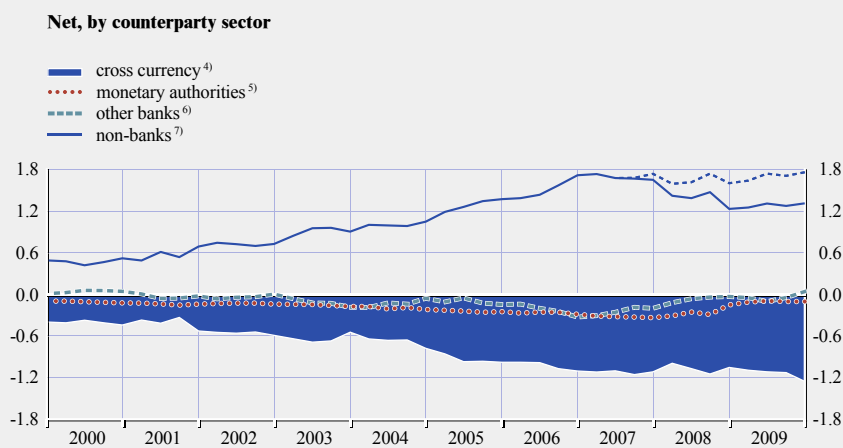
(in trillions of US dollars)

USD   GBP[2]
EUR   CHF[2]
JPY   other

Long-USD banks[1]

Short-USD banks[3]

market prices to reflect such market risks *a priori* when the participants are blind to the overall structure of the market.

The funding risks faced by banks involve more than just rollover risk in the swap market, including also the rollover risk inherent in borrowing *directly* in foreign currencies. To get some sense of the size of this risk, we look at the long-USD banks' investment and funding positions in US dollars. The shaded area in the bottom panel of Chart 1 indicates the size of cross-currency financing into dollar positions (i.e. FX swaps) by these banks – this is simply the inverted quantity plotted as the blue line in the top panel. In addition to this funding, long-USD banks also borrowed dollars from the interbank market (the petrol blue-dashed line in the bottom panel) and from central banks (the red-dotted line), then used these funds to finance their net investment in non-bank entities (the solid blue line). While direct information on maturity is

not available, we can safely assume that interbank borrowing and FX swaps are generally short term. Thus, Chart 1 suggests a significant degree of maturity transformation across the balance sheets of these long-USD banks. The estimated *funding gap* – the gap between the long-term US dollar holdings and the short-term US dollar financing implied by these figures – reached well over $1 trillion for these banks at its mid-2007 peak.[12]

Combining these numbers with experiences during the crisis leads us to conclude that the combination of currency and maturity mismatches creates systemic risks that need to be monitored at a global level. This, moreover, will require the provision of information on bank and non-bank institutions' globally consolidated cross-currency financing positions – something that is only available through international cooperative mechanisms such as the BIS banking statistics.

3.2   Measuring the currency carry trade – the Japanese yen

How big is the carry trade? The answer to this apparently simple question has eluded analysts for more than a decade. In part, this is because the term carry trade is used to refer to several types of financial activity: portfolio diversification by Mrs Watanabe in Japan, low interest rate foreign-currency mortgages in Eastern Europe, and high-frequency speculative positions held by hedge funds and other leveraged investors. Measuring the size of the latter, the *speculative positions*, has proven extraordinarily difficult largely because there are different ways to implement the same speculative trade. However, the potential for a disruptive unwinding of such positions – independent of the exact form a speculator may use for placing the bet – has been a long-standing policy concern.

As we will explain, we believe that the only way to gauge the magnitude of speculative carry trade positions funded in a particular currency is through the interactions in the FX swap market. As in the previous section, we have to infer these positions from mirror images of observable on-balance-sheet positions. Using the example of the yen-funded carry trade, we sketch how this can be done.

To avoid potential confusion, it is worth starting with a definition. We define a carry trade as the combination of borrowing at a low interest rate (a short position that we can think of as issuing a bond or taking out a bank loan) and lending the proceeds out at a high interest rate (a long position, i.e. the purchase of a bond or the provision of a loan). For clarity, let us assume that the speculator is selling a bond and using the proceeds to purchase a bond. Importantly, borrowing and lending can occur at different maturities and in different currencies. If they do, we can break down the carry trade into a yield curve position (which seeks to profit from any *term premium*, where typically the borrowing is shorter term than the lending) and an open exchange rate position (which seeks to profit from the

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12 This is a lower-bound estimate which implicitly assumes that US dollar liabilities to non-banks are long term. The assumption that these liabilities to non-banks are short term gives an upper-bound estimate of $6.5 trillion.

failure of uncovered interest rate parity, i.e. the existence of a *forward premium* where the forward exchange rate does not accurately reflect the future expected spot rate).[13]

In the textbook version of the trade, the investor borrows in a low-interest-rate currency, such as the Japanese yen. He then sells the yen in the spot market for US dollars and purchases a US dollar bond with a yield higher than the rate paid on the yen-denominated loan. Provided that the dollar does not depreciate relative to the yen, the investor will earn at least the (maturity-matched) cross-currency interest rate differential – that is, the difference between the US dollar bond rate and the Japanese yen borrowing rate. If there is a maturity mismatch, then the carry trade investor is exposed to both interest rate risk and exchange rate risk. As a result, these trades are notoriously vulnerable to interest rate, yield curve, and exchange rate movements. Furthermore, when any of these starts to move against the position, there can be a rush for the exits as investors try quickly to rid themselves of both maturity and currency mismatches, thereby creating sudden jumps in interest and exchange rates.

How can we figure out how much of this is going on and whether it poses a systemic risk? First, even though textbooks discuss it this way, very little speculative carry trade activity is done exactly as we have just described. This implies that a simple look at cross-border lending in various currencies will not work. In other words, you will not find evidence for carry trade positions directly on the balance sheets of financial institutions.[14] Instead, a speculator will use derivatives – futures, forwards and swaps – to put on currency carry trade positions. A typical transaction might look like this. A dollar-based hedge fund borrows dollars (step 1) and swaps them for yen (step 2), where the swap rate is determined by the standard covered interest rate parity condition.[15] So far, the investor owes dollars at the dollar interest rate, and has yen. At step 3, the hedge fund sells the yen for dollars in the spot market (which puts downward pressure on the yen/dollar exchange rate), and takes the dollar proceeds and invests them (step 4). At maturity, the position is unwound. The dollar investment matures (undoing step 4), the investor takes the proceeds and buys yen (undoing step 3), which are then used to make good on the FX swap (step 2). Finally, the hedge fund repays the original loan (step 1). While the position is in place, the hedge fund shows a dollar liability and a dollar asset (probably of different maturities). In other words, the speculation that the yen will depreciate against the dollar (or, at least, not appreciate) and the income from the interest rate differential embedded in the FX swap will be invisible if all you see is balance sheet data.

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13 On the forward premium, see, for example, Flood and Rose (2002).
14 Support for this assumption is provided by Galati et al (2007), who scoured the BIS locational banking statistics for yen lending/borrowing related to the carry trade, but did not find much evidence.
15 That is, $(i - i^*) = \frac{(f - s)}{s(1 + i^*)}$, where i is the US dollar interest rate, i^* is the yen interest rate, s is the dollar/yen spot rate, and f is the dollar/yen forward rate at the same maturity as the interest rates.

Importantly, however, in order for the hedge fund to be able to put on the position in the first place, someone has to be willing to provide yen for dollars today in the FX swap market (step 2). So which institutions in the world have both the yen to provide and a need for dollars (and other currencies)? Japanese banks and, perhaps, insurers come to mind. Indeed, estimates suggest that Japanese banks have supplied upwards of $1 trillion worth of yen to the swap market over the last few years – this is the petrol blue-dashed line in the top panel of Chart 2.[16]

The natural counterparty to Japanese banks in the FX swap market is a foreign investor seeking to invest in yen assets. This could be a European or a US bank or a pension fund interested in investing in Japanese equities or bonds. Unlike the hedge fund above, these so-called *real money* investors want to buy and hold yen assets, so they do not sell the yen they get from the swap in the spot market (removing steps 3 and 4). This means that their swap market transactions have no direct exchange rate implications.

How can existing data be used to figure out what is going on? Is there a way to estimate the size of the speculative yen carry trade from FX swaps? The short answer is yes, approximately. The trick is to infer the shaded area – an estimate of the size of the carry trade – in the bottom panel of Chart 2 from the information we have. We can do this by subtracting the amount of yen demand by real money investors in the FX swap market from the total yen volume supplied to the market by Japanese banks. To do this, we need to construct estimates of yen demand from real money investors. For (non-Japanese) banks, we again use the BIS banking statistics to gauge their on-balance-sheet net position in yen-denominated assets. This is shown as the blue area in the top panel of Chart 2, and you can see that it is rather small. If non-Japanese banks fully hedge exchange rate risk, this implies that they are not demanding much yen in the FX swap market, at least on a net basis.

What about the yen position of *non-bank* real money investors? Unfortunately, the breakdowns available in the aggregate data covering non-banks (from sources such as flow-of-funds and balance-of-payments accounts) do not provide any equivalent measure of yen asset demand. So, for want of better data, we use a measure from the BIS debt securities statistics: the outstanding stock of yen-denominated international bonds. If we assume that (a) none of these bonds are purchased by banks (i.e. no double-counting), and that (b) none of these are purchased by yen-based investors in Japan, then the outstanding stock of yen-denominated international bonds equals the total international demand for yen assets by non-Japanese non-bank investors. If these investors hedge their exchange rate risk, then this stock should approximate their demand for yen funding from the FX swap market. The result is the reddish-brown shaded area in the top panel of Chart 2.

Putting everything together, we have a measure, albeit rough, of the speculative yen carry trade. What does it look like? Until 2004-05, yen volumes supplied by Japanese banks in the FX swap market roughly matched demand for yen

16 See McGuire and von Peter (2009) and section 3.1 above.

Yen supply and demand in the swap market

— non-JP bank's net JPY positions (right-hand scale) [1]
▬ debt securities (right-hand scale) [1]
- - - JP bank's net JPY positions (right-hand scale) [1]
— JPYFX Rate
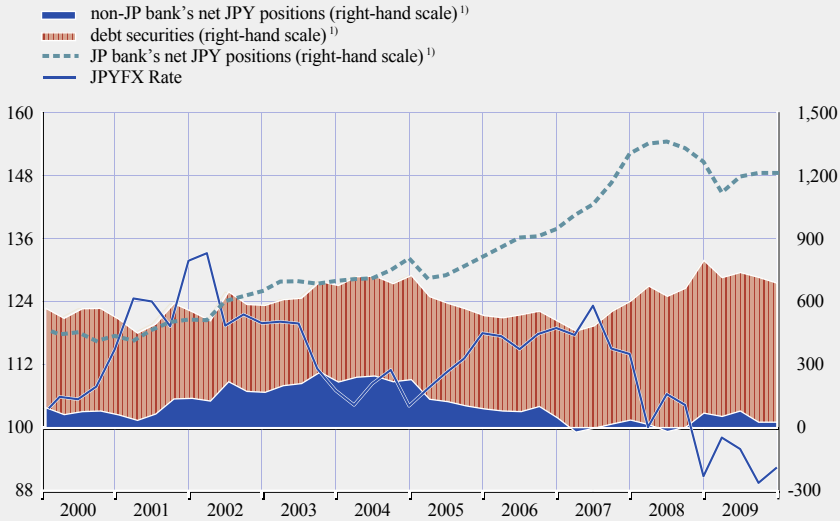
FX futures and swap positions [2]

— speculative yen carry trade (left-hand scale) [1, 3]
···· yen futures position (right-hand scale) [2]
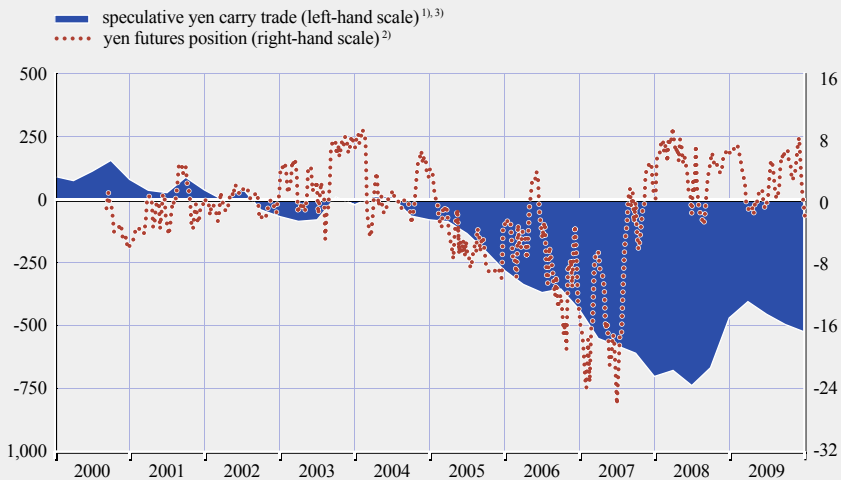
Sources: Commodity Futures Trading Commission; BIS calculations.
Notes:
1) In billions of US dollars.
2) Net non-commercial long positions on the Chicago Mercantile Exchange; derived using average exchange rates of March 2010; in billions of US dollars.
3) Calculated as the (negative of the) gap between Japanese banks' net JPY positions (petrol blue-dashed line) and the sum of the shaded areas in the top panel.

assets from *real money* investors, as proxied by the sum of non-Japanese banks' net on-balance-sheet yen positions and total outstanding international yen-denominated bonds. After 2005, however, the gap, i.e. the difference between the stacked shaded areas and the petrol blue-dashed line, widens considerably.

Unsurprisingly, this corresponds to a period of yen depreciation (the blue line in the top panel) – the carry trade that we have outlined puts downward pressure on the yen – and, at least until the start of the recent crisis, is consistent with other commonly used indicators of carry trade activity. For example, analysts often rely on information on yen positioning by *non-commercial* entities (assumed to be hedge funds and other non-bank financial institutions) in the Chicago currency futures markets. While these data capture only a slice of the global currency futures activity (and miss all OTC positions), they are often used to get a sense of the *direction* of the speculative bid for yen. Moreover, as shown in the bottom panel of Chart 2, these net short non-commercial yen positions grew substantially after 2004, just as our gap measure widens.

What can we conclude from all this? Is it a coincidence? Or is the gap that we infer a reliable measure of speculative carry trade activity? We do not know for sure (given, for example, the gap that opens up between the two measures in the bottom panel for the most recent observations), but the bigger point is that carry trades are largely off-balance-sheet. Without more consolidated information on derivatives positions, there is no way to track them directly. To better understand the FX swap market (and the relative importance of participants therein), what we need is net position data by currency and nationality. Moreover, as in the example in the previous subsection, here again the necessary information can only come from datasets that cover all financial institutions and investors, and also feature both a locational (residency) and consolidated (headquarters) dimension.

3.3   Implications for statistical strategy: the BIS and beyond

Based on the two examples discussed earlier, it should be clear that the BIS banking statistics already possess most of the properties that we would want from a statistical reporting framework geared to financial stability analysis. From this, we draw three sets of implications for the BIS and beyond.

Improving the BIS banking statistics: The crisis highlights the value of consistent banking system data for the analysis of systemic risk. For the BIS, this implies the need to focus on statistical improvements that increase the analytical value of the BIS banking statistics for central banks, the broader financial community and academic researchers. The BIS's experience is that relatively small changes to existing reporting frameworks can generate significant increases in analytical value.

Specifically, we see a need to enhance the ability of the BIS banking statistics to cover the maturity and currency dimensions of banks' (international) activities, and to provide aggregate measures of *on-balance-sheet* leverage. In addition, we hope to be able to increase the granularity of existing data reporting, refining sectoral breakdowns and the like, to allow improved integration of supplementary statistics on key financial institutions, and to selectively add supplementary information on global markets. For the latter, specifically the integration of information on off-balance-sheet activities, central counterparties and trade warehouses can be a useful additional data source (see Box 2 for a short description of the BIS's proposals in these areas; substantively, the Appendix

sketches out a hypothetical reporting template, based largely on the existing structure of the BIS banking statistics, and proposes some broad market and counterparty breakdowns for consideration).

Improvements to the international banking statistics are possible within the following dimensions:

- **Currency and maturity detail.** Our analysis of funding gaps[1] reveals scope for significant improvements based on relatively small reporting changes: specifically, more refined and consistent (i) currency breakdowns, (ii) counterparty breakdowns and (iii) maturity breakdowns across different parts of the BIS banking statistics.

- **De-masking and disaggregating.** A significant amount of the data is actually collected by central banks but not reported on to the BIS (either because of aggregation or because data are masked in the submissions). Compilation is thus possible at low cost, potentially allowing for significant enhancements of the analytical value of the BIS banking statistics.

- **Leverage and derivatives.** Additional enhancements are possible by explicitly covering on-balance-sheet leverage (e.g. by including information on capital and total assets in the reporting), as already done by some reporters, and by trying to better capture derivatives-related exposures (as done, to some extent, in making ultimate risk adjustments).

- **Splicing.** Other existing datasets can be used to further enhance the analytical value of the BIS banking statistics (e.g. by relating exposures to measures of total assets or equity for individual banks, which can then be aggregated up in ways consistent with the BIS banking statistics). The same could be done with other BIS sets of statistics, to better integrate them with the BIS banking statistics and with information available from other sources. A key goal would be to get a sense of asset/exposure holdings, for which data from trade warehouses and central counterparties can be useful (e.g. ongoing work on improving the BIS's over-the-counter derivatives statistics by combining the data on credit default swaps (CDSs) with information provided by the Depository Trust and Clearing Corporation. Similar work would be possible for the BIS securities statistics.

Supplementary data. Further, supplementary statistics could be compiled selectively to enhance the existing focus on international banks and global markets. This could involve the preparation of global aggregates for key indicators already available on a national basis. Examples include ongoing work by the Committee on the Global Financial System (CGFS) on aggregate survey measures of credit conditions. Once a framework for compilation is in place, these efforts could be extended to cover margin requirements/haircuts and similar metrics that can be used to gauge changes in lending standards and to aid the monitoring of build-ups in risk.

1 See section 3.1 above and McGuire and von Peter (2009).

Core system data: As already mentioned, standardised information on the top 50 banks and financial institutions is not publicly available in a detailed and timely fashion. Different data providers supply different levels of detail, but these cannot be easily spliced together. Fixing this problem means redoubling efforts to improve standardisation and enhance disclosure. The goal is to provide better public information so that authorities can improve their monitoring and markets can improve their discipline.

Statistical design more broadly: Finally, if we are to take the crisis-related lessons coming out of the BIS banking statistics seriously, we need to design statistical frameworks so that the same sort of analysis of leverage, maturity mismatch and exposure/funding patterns that is possible for banks can also be done for other sectors. At the risk of repetition, the key here is consolidation. Specifically, existing aggregate data need to be collected to allow joint identification of the *nationality* of the reporting entities' headquarters and the *location* of any particular branch or subsidiary. If all our aggregate statistics follow this principle, we can then complement the locational point of view with a consolidated view, which is necessary for the measurement of balance sheet stresses.

Fortunately, much of the necessary data are already being collected in existing reporting frameworks for the creation of the flow-of-funds and balance-of-payments statistics. All that may be needed are – admittedly non-trivial – changes to existing collection protocols, combined with adjustments to computation methods (see the Appendix for details). The pay-off would be a complete set of consolidated and locational statistics at the sectoral level (for banks, other financial intermediaries, non-financial corporates and households) that could then be used to monitor systemic risk globally and nationally.

4   IMPLICATIONS FOR GLOBAL RISK MAPS AND SIMILAR TOOLS

Global risk maps are the holy grail of systemic risk monitoring. Defined as unified databases that provide data on risk exposures of financial institutions and markets, they would allow supervisors and market participants to monitor the evolution of risks in banks, banking systems and the broader financial market community.[17] Not only would these risk maps provide data inputs for financial stability analysis, they would also serve as the starting point and testing ground for the development of new systemic risk measurement and mitigation tools.

In practice, the creation of a global risk map would require giant matrices of bilateral exposure data to be assembled for a large set of financial institutions and other systemically important entities, possibly grouped by different risk categories. The usefulness, in principle, of such an exercise is self-evident. Done right, it would allow us to read directly from the matrix, at any point in time, the risk exposures among financial institutions and with respect to particular risk factors. This would make it possible, at least in principle, to calculate a whole range of risk and concentration measures both cross-sectionally and over time.

17 See Issing Committee (2009).

That is the theory. What about the reality? As we noted before, in approaching this sort of task, we face trade-offs between the macro and micro dimensions of data compilation and dissemination. The costs of collection and analysis will rise as the scope and scale of the enterprise increase. This means looking for a balance between the degree of disaggregation, the universe of firms included, and the amount of detail covered. This, in turn, relates to the boundaries of supervisory exchange of data and broader statistical frameworks aimed at public dissemination. Armed with our experience in relation to the BIS statistics, we now turn to a brief discussion of each of these.

4.1 Supervisory information exchange

We have mentioned this several times because we believe it to be central to the whole process of systemic risk assessment. The experience of the last few years clearly revealed that supervisors did *not* have all the information they needed to track the build-up of risk going into the crisis. Perhaps more importantly, nor did they have the information they needed to better contain the crisis once it started. In a world with global banks and global financial markets, we have no choice but to set up robust frameworks for supervisory information exchange.

Generally, given the detail needed, such frameworks are likely to focus on a core set of internationally active institutions. That said, the goal has to be to capture these firms' risk profiles, not only individually but also with regard to concentrations of risk arising from common exposures among these institutions and from interlinkages between them and their main counterparties.

What are the main requirements of such frameworks? First, as emphasised earlier, comparability and consistency are key. This means standardising reporting across jurisdictions, including standardisation of any risk measures to be used and the methods for their construction.[18] Second, reporting will have to be flexible enough to allow regulators to react in a timely manner to market innovation, structural trends and moves by institutions to evade what they might see as injurious actions taken in response to the data they are obliged to report. Third, any legal constraints will have to be sorted out to allow international exchange of data. Essentially, what is required is a joint reporting template to be used by supervisors across jurisdictions for internationally active core institutions, based on common definitions for instruments, counterparties and risk measures.[19]

What types of reporting would this entail? Broadly, we can distinguish three types of risk on which detailed information would be needed: *market risk*, *funding risk* and *credit risk* (plus insurance risk, for institutions involved in non-life insurance activities).[20] The capture of exposures across all three risk categories requires detailed information by asset class and/or market as well as the names of the most important individual counterparties.

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18 This may require harmonisation of the regulation and supervision of the core institutions themselves.
19 See Tarullo (2010) for details.
20 See, for example, BCBS, CGFS, IAIS and IOSCO (2001).

Derivatives exposures, which are insufficiently captured, if at all, by existing sets of information and standard disclosures, are a natural starting point. To do the job, supervisors would need information on gross mark-to-market exposures (after counterparty netting) with respect to key counterparties, any collateral held, and net exposures (after netting and collateral). As market conditions can change rapidly, some measure of potential or worst-case exposure would also be crucial (based on an agreed methodology).

Next come *repurchase agreements, securities lending*, and *interbank markets*, and so on and so forth.

Exploratory efforts to collect counterparty-level credit data for supervisory use are under way in the context of the so-called *Senior Supervisors Group*.[21] The idea is to identify the most important counterparties, to monitor their exposures and to analyse the interconnectedness among reporters. The resulting risk map, updated over time, will help identify changes in peer relationships, track the magnitude of these linkages and monitor any concentrations.

4.2   Public information dissemination

Public availability of a global risk map would allow the use of detailed exposure data in the calculation of system-wide measures of risk outside the strictly supervisory domain. This would enable investors, academics and authorities beyond supervisors to conduct their own analyses, improving the monitoring of systemic risks and enhancing market discipline. As a general rule, to the extent possible, both supervisors and the general public should thus be supplied with the same information. Where needed, aggregation can be used to address confidentiality constraints, and reduced reporting frequencies can limit the costs of publicly disseminated datasets.

The possibility of such reporting is currently being considered by the Financial Stability Board (FSB).[22] The BIS is also contributing to this effort. Nevertheless, public dissemination involves significant challenges. This is where the lessons from the crisis as extracted from the BIS banking statistics offer a viable alternative. For example, if *consolidated* (the *nationality* or *headquarter* dimension) as well as locational (the *residency* dimension) data were jointly available for the flow-of-funds and balance-of-payments statistics (including the IMF's Coordinated Portfolio Investment Survey (CPIS)), we could then see the entire balance sheet of households, non-financial corporates and financial institutions. This would allow for a rather detailed analysis of common exposures and interlinkages at the sectoral level, in both domestic and international terms.

Monitoring at the aggregate, sectoral level is but one step removed from what could be done with complete global risk maps. Importantly, it could help sidestep the complex legal challenges surrounding the sharing or dissemination of firm-level data, while supporting a two-step approach to systemic risk monitoring.

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21 See also FSB and IMF (2009), especially Recommendation No 8.
22 See FSB and IMF (2009), particularly Recommendation No 9.

In other words, the alarms that sound in the aggregate data will yield the critical pieces of information – *nationality* of entity, *location* of entity and *risk type* (including funding and exposure risk) – to inform targeted analysis of more detailed (supervisory or other) data at the firm or market level.[23]

5   CONCLUSIONS

The recent financial crisis revealed important gaps in our ability to analyse financial institutions and markets at the system-wide level. Simple aggregate statistics can go some way in gauging the build-up of risks in a broad sense. However, to understand, measure and mitigate systemic risk we need more. From the crisis experience, we take away five *principles* that we believe should guide future statistical collection efforts:

1. **Quantities**: As a complement to the price data we already have, we need to know quantities. We need on-balance-sheet and off-balance-sheet information to evaluate common exposures, interlinkages and counter-cyclicality.

2. **Intermediaries**: As maturity transformers and funding liquidity providers, financial intermediaries are the ultimate sources of systemic risk. We need data that allows us to see what they are doing and how they are doing it.

3. **Consistency**: We need the ability to put together disparate datasets from different sources around the world. This means consistency of reporting frameworks.

4. **Maturities and currency**: Without information on maturity (perhaps inferred from counterparty information) and currency composition, we will not be able to see the risks that stem from mismatches.

5. **Joint residency and consolidated reporting**: Officials in one country need to know what the subsidiaries of their banks are doing in another. Likewise, the regulators in a particular country will want to see stresses building up on the consolidated balance sheets of banks operating foreign offices in their jurisdiction.

Using these five principles, we can act to improve data in a way that will allow us to move significantly in the direction of producing a global risk map – the giant matrices of exposures and funding relationships that would, in principle, allow a measurement of virtually any vulnerability in the financial system. One example already in place is the use of the BIS banking statistics to produce what we might call a "global risk map in the small". While restricted to banks and then only to their international activities, this set of statistics already allows us to analyse (some) interconnections and common exposures at the sectoral level over time. Moreover, relatively small adjustments to the existing reporting would further improve the capabilities of this particular dataset – improvements that the BIS intends to pursue actively over the coming months.

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23 See Eichner et al (2010) for a detailed description of a very similar approach.

How about the set of three *core questions* we raised at the outset of this paper?

- **Question 1:** How can a central bank monitor the global use of its currency?

  Add up consolidated investment and funding positions in your currency across sectors and countries – these are the FX swap market and carry trade examples we described.

- **Question 2:** What information do policy-makers need (in addition to home country supervisory data) to monitor systemic financial stresses?

  They need data on the geographical patterns of funding and investment relationships, including aggregate sources of funding for the domestic corporate sector, and asset and liability information, including currency and maturity mismatches, plus information on all of the entities and sectors providing funding to financial institutions.

- **Question 3:** What data could help financial market participants improve market discipline?

  While we cannot be sure, our sense is that more information on funding sources and common exposures for consolidated entities, including all bank and non-bank financial firms, as well as on non-financial corporates and households worldwide, would help.

All of this leads us to draw an important inference for statistical reporting of *aggregate data* more generally. In particular, tremendous value would come from adding a consolidated (i.e. *nationality*) dimension to commonly constructed locational (residency-based) data. This would make it possible to adapt existing statistical reporting frameworks (such as the flow-of-funds and balance-of-payments statistics) in order to facilitate systemic risk analysis in ways that are only one step removed from what could be done with complete global risk maps. This, in turn, would help to sidestep the complex legal challenges surrounding the sharing of firm-level data. It would also improve our ability to use aggregate data for the identification of vulnerabilities (including information on the *nationality* and *location* of any entity and on the *risk type*) for a deeper drill-down on the basis of more granular data.

APPENDIX

What breakdowns of aggregate statistics do we need? Drawing on our experience with the BIS banking statistics, we outline some tentative answers to that question in this Appendix.

In any data collection exercise, additional detail incurs greater costs. Not only that, but there are many paths to the same result. Our goal here is not to present what *is* the *right* or *best* template, but rather to provide a point of departure for

Assets				
1	**2**	**3**	**4**	**5**
Instrument type	**Counterparty type**	**Counterparty location**	**Remaining maturity**	**Currency**
	Bank	Country A		
		Country B		
		Country C	Short term	
		Country D		
		Country E		
Loan	Corporate			
Debt security				
Equity				
Other				**USD**
	Household	Country A		
	Non-bank financial		Long term	
	Bank			
	Public sector			
	Central bank			
	Inter-office			
		Country B		
		Country C		
Loan	Corporate	Country A		
	Non-bank financial		Short term	
		Country B		
Debt security	Corporate	Country A		**Euro**
	Inter-office		Long term	
		Country B		
		Country C		
Exchange rate swaps		**Interest rates swaps**		**Credit default swaps**

discussions on what material improvements we can realistically hope to make. As a first step, we adopt a broad perspective, describing the maximum of what would be desirable.

Broadly speaking, aggregate data should allow us to assess, at the sectoral and systemic levels, *credit risk*, *country risk* and *market risk* on the asset side; and *currency risk* and *maturity transformation* across the balance sheet. Getting a sense of these risks requires measurement of *liquidity risk* on the asset side, and *rollover risk* on the liability side. This, in turn, means having information on markets, counterparty, instrument, maturity and currency.

The question that faces us is what combination(s) of information in our aggregate statistics would allow us to see where these concentrations of risks are building? Table A.1 presents a somewhat stylised balance sheet with four breakdowns

		Liabilities		
6	**7**	**8**	**9**	**10**
Currency	**Remaining maturity**	**Counterparty location**	**Counterparty type**	**Instrument type**
USD	Short term	Country A		
		Country B	Non-bank financial	Debt security
		Country C		
	Long term	Country A		
Euro	Short term	Country B	Household	
		Country A		
		Country B	Corporate	
	Long term	Country A		
		Country B	Corporate	
			Household	
			Non-bank financial	Deposit
				Debt security
				Other
			Bank	
			Public sector	
			Central bank	
			Inter-office	
Book equity		Country A		
		Country B	Non-bank financial	Equity
			Public sector	
			Corporate	
		Country C		
Exchange rate swaps		**Interest rates swaps**		**Credit default swaps**

(indicated in the column headings), or classifications, for assets and liabilities. Our basic argument is that combinations of quantity data combined with some comparative static analysis can go a long way in allowing us to uncover where important risks are located. At the very least, such data should help to focus targeted discussions with regulatory authorities in various countries that have (or are able to obtain) the underlying firm-level information. In this context, several points are worth highlighting:

- *Reporting unit:* The ideal underlying reporting unit must be a household or the office/branch/subsidiary of a bank, non-bank financial institution or corporate in a particular location (country). These are the reporter types. Ideally, the number of different reporting sectors is the same as the number of counterparty sectors, as listed under counterparty types in Table A.1, column 2.

- **Aggregation:** The balance sheet positions should be aggregated by location (country), reporter nationality and reporter type. For example, Table A.1 could be viewed as the (aggregated) positions of, say, the ten offices of Belgian-headquartered non-bank corporates located in Italy. When all countries and all sectors report, the underlying data blocks can then be further added up to produce (i) total positions for all entities located in Italy (country-level totals on a residency basis), (ii) Belgian-headquartered non-bank corporates' worldwide positions (consolidated global totals for a particular *national sector*), and (iii) Belgian-headquartered entities' worldwide consolidated positions (country-level consolidated exposure totals).

- **Breakdowns:** The breakdowns that we need in order to gauge things such as maturity-transformation risk, counterparty risk, and currency risk are illustrated by drilling down to a particular counterparty type. In other words, for a reporting unit located in country X, the asset side of the balance sheet shows claims on *corporate* borrowers (Table A.1, column 2) located in *country A* (column 3), broken down by *currency* (column 5), *remaining maturity* (column 4), and *instrument type* (column 1). The liability side shows total liabilities to *non-bank financials* (column 10), along with the same breakdowns.

- **Off-balance-sheet positions:** FX swaps, interest rate swaps and credit default swaps are all shown at the bottom of the table – they are "off-balance-sheet". Along with other derivatives, these add an additional layer of exposures (both on the asset and liabilities side of the balance sheet) that can magnify, neutralise or reverse the reported on-balance-sheet positions. Ideally, we would require separate reporting of all items in Table A.1 *before* and *after* off-balance-sheet activities. In other words, we would want to add a layer of *ultimate risk reporting* similar to what is already available for *credit risks* in the BIS banking statistics, but covering all risk categories. For example, for the maturity column we would have exposures after transformation through interest rate derivatives, for currency it would indicate all open foreign exchange exposures after FX swaps, and for credit risk, reporting would be by country location and counterparty type on an ultimate risk basis.[24]

- **Filling in the balance sheet:** Reporting entities will have difficulty filling in all of the cells in Table A.1. In particular, if the reporting institution issues a bond that is traded on the secondary markets, it is unlikely to know the counterparty that holds the bond at any point in time. Thus, columns 8 and 9 on counterparty location and type might be empty. Note that debt securities liabilities are different from, say, banks' deposit liabilities, where both the location and the type of counterparty are typically known to the reporting bank.

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24 We realise that this is conceptually challenging and amounts to a very significant reporting burden, which implies that existing datasets (such as the BIS OTC derivatives statistics) might be enhanced to provide at least *some* of the detail mentioned above.

- In a world where all entities in all countries are reporters, what is missing in one place, can, in principle, be recovered somewhere else. This would require one additional breakdown (not shown in Table A.1) on the asset side of the balance sheet: the *nationality of the counterparty*. For example, the owner of a long-term bond issued by the London subsidiary of a US-headquartered auto company may not be known to the UK issuer, but would be picked up if the Saudi pension fund that owns it reports it as a claim on a US-headquartered corporate located in the United Kingdom.[25] That is, if the asset holder reports both the location and nationality of the counterparty.

How would this help identify the important risks and vulnerabilities? With a perfect, consolidated view of each sector's worldwide consolidated exposure, it would be possible to read off many of the risks we have discussed. For example, in the case described in the text, we would be able to see the institutions covered by Table A.1 that have a long on-balance-sheet US dollar position financed by short-term dollar funding and long-term euro funding. We would know if the on-balance-sheet exposures were large and growing. We would also be able to see the maturity profile of the position, including that of the FX swaps. On the asset side, we would be able to identify concentrations of particular types of assets and risks, and tell if they are large relative to capital. Plus, on the liabilities side, we would be able to see the scale, timing and frequency of required rollovers.

Finally, it should be noted that the breakdowns in Table A.1 are roughly in line with those already available in the BIS banking statistics, but with several important exceptions. First, comprehensive information on the maturity buckets is missing in the BIS data. Second, the currently available breakdown by counterparty type is far less comprehensive (only bank/non-bank; in some data, the public sector is separated out). Third, information on book equity is not explicitly broken down on the liabilities side. Fourth, there is only limited information on banks' off-balance-sheet positions.

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FINANCIAL STATISTICS FOR THE UNITED STATES AND THE CRISIS: WHAT DID THEY GET RIGHT, WHAT DID THEY MISS, AND HOW SHOULD THEY CHANGE?[1]

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ABSTRACT

Although the instruments and transactions most closely associated with the financial crisis of 2008 and 2009 were novel, the underlying themes that played out in the crisis were familiar from previous episodes: competitive dynamics resulted in excessive leverage and risk-taking by large, interconnected firms – a heavy reliance on short-term sources of funding to finance long-term and, ultimately, illiquid positions – and common exposures being shared by many major financial institutions. Understandably, in the wake of the crisis, central bankers, financial supervisors and other policy-makers want to obtain better and earlier indications regarding these critical, and apparently recurring, core vulnerabilities in the financial system. Indeed, gaps in data and analysis, in a sense, defined the shadows in the "shadow banking system" associated with the build-up of financial risks. We agree that more comprehensive real-time data are necessary, but we also emphasise that collecting more data is only one part of the process for developing early warning systems. More fundamental, in our view, is the need to use data in a different way – one that integrates the ongoing analysis of macro data to identify areas of interest by developing highly specialised information to illuminate those areas, including the relevant instruments and transactional forms. In this paper, we describe our concern that specifying the second stage generically prior to processing the first-stage signals may not be fruitful: we can easily imagine specifying, ex ante, a programme of data collection that would look for vulnerabilities in the wrong place, particularly if the actual act of looking by macro or micro-prudential supervisors causes the locus of activity to shift into a new shadow somewhere else – something which, we would argue, occurred during the build-up of risks ahead of this crisis.

I   INTRODUCTION

Although the instruments most closely associated with the financial crisis of 2008 and 2009 – including "option" adjustable rate mortgages (ARMs), structured investment vehicles (SIVs), and "CDO squareds" – were novel, the underlying themes were familiar from previous episodes: competitive dynamics produced growing leverage and risk-taking by large, interconnected firms; heavy reliance on short-term sources of funding to finance long-term and, ultimately, woefully illiquid positions; and common exposures of many major financial institutions to specific credit and liquidity risks. Understandably, in the wake of the crisis, central bankers, financial supervisors and other policy-makers want to expand and improve the information infrastructure so as to obtain better and earlier indications regarding these critical, and apparently recurring, core vulnerabilities in the financial system.

One expression of this appetite is the push to collect more data that, had it been available to the community of policy-makers, analysts and investors in "real time," could have allowed vulnerabilities amassing in the years before the crisis to have been recognised and possibly diffused before the systemic crisis took hold. Being empirical economists by training, we are hugely sympathetic to the desire for more and better real-time data, and we are optimistic about the development of models that will allow those data to be put to use in highlighting emerging imbalances of potentially systemic impact. That said, we harbour no illusions about the difficulty of collecting the right data in a timely fashion, particularly because the dynamic nature of our financial system implies that the relevant set of data is a moving target. Major data collection projects naturally take quite a while to design and implement, and, more importantly, are almost always based on the presumption that the systems being analysed remain fairly stable over time.

Standard approaches to aggregate data collection and analysis may simply not be consistent with the dynamism of the financial system, particularly in light of the tendency of innovation continually to shift to outside of the areas to which analysis and scrutiny are most directed. Indeed, a key point we make in this paper is that many of the products most closely identified with the recent crisis and the near-collapse of the financial system – including ABS CDOs (collateralised debt obligations backed by asset-backed securities, or re-securitisations), SIVs, and sub-prime securitisations relying on excess spread and over-collateralisation (and thus, implicitly, the refinancing of mortgages to build up credit support for senior bond tranches) – scarcely existed just a few years ago (and, of course, have now ceased to exist again except as "legacy" positions).

In our paper, we stress that collecting more data, while very important, is only part of the process of developing early warning systems. More fundamental, in our view, is the need to use data in a different way – one that can deliver more flexibility in targeting analyses than static data collection allows. As we describe in the paper, certain aggregate data collected through processes well established prior to the crisis sent signals suggesting material changes in the nature of flows among different parts of the US economy. Yet to understand fully the

implications of these developments and associated risks, it was necessary to deploy a tactical approach that uses the aggregate data as a source of signals regarding where to look, but then brings more granular and specialised information to bear that may have been collected for purposes other than financial stability analysis or even micro-prudential supervision.

Although such an idiosyncratic approach is not customarily part of the empirical economics toolkit – and would have been alien to our more academically-oriented colleagues – it may have offered the best chance to highlight in real time what later proved to be misplaced confidence on the part of a wide range of market participants in the efficacy of risk transfer mechanisms. For example, aggregate data suggests a significant growth in borrowing by households to finance real estate, and the use of equity from appreciated real estate holdings to support consumption. Yet data collected and sold for very specialised commercial purposes, notably targeting solicitations to borrowers, would have been the best, and possibly the only, way to understand the rapid decline of underwriting standards for US residential mortgages subsequent to 2004. However, these data probably did not exist, and probably would not have appeared worth examining in detail prior to, say, 2004.

To resort to a metaphor, the information delivered by expanded and improved, but essentially static, aggregate data can (and should) be relied upon for signals akin to the grainy images captured by reconnaissance satellites which are suggestive, but not dispositive. Improved aggregate data collections can provide the greatest value by highlighting changes and inconsistencies that bear further investigation using other, more focused tools mobilised to deal with a particular anomaly. A key challenge, of course, is that the appropriate tools for this more narrowly targeted work cannot generally be specified ahead of time but must be designed in response to the particular signals teased from the aggregate data. In fact, we are concerned that specifying the tools suited for this second stage generically will not be fruitful prior to considering the first-stage signals: we can easily imagine specifying, ex ante, a programme of data collection that would look for vulnerabilities in the wrong place, particularly if the actual act of looking by macro or micro-prudential supervisors causes the locus of activity to shift into a new shadow somewhere else.

In our longer paper, we flesh out these ideas. There, we begin by reviewing macroeconomic data from the system of national accounts developed in recent years to better illuminate high-level financial flows among different sectors of the US economy. We argue that in a sense these aggregate data back-test fairly well against the recent crisis, sending discernible but grainy signals of substantial shifts in flows across sectors that preceded the crisis.

Subsequently, we use a couple of specific examples to highlight why collection of formal time series may fail to bring these grainy signals into better focus, and could possibly turn out to be counterproductive. We argue that the focus on a fixed set of metrics changes behaviour in a way that diminishes the usefulness of the indicators. Given the dynamic nature of the financial system, the process of specifying these metrics inevitably leads to active management of them,

at which time they cease to fully reflect the risks that they were intended to capture. Finally, we conclude with some comments about the shape of a more dynamic process of analysis, which we argue is more likely to bring into clearer focus the signals sent by more aggregated data.

2   WHAT DID FINANCIAL STATISTICS FOR THE UNITED STATES GET RIGHT IN THE PRELUDE TO THE CRISIS?

In section II of our longer paper, we present information about the US economy that is drawn from an innovative set of macroeconomic accounts which integrates data on real and financial economic activity from distinct primary sources using the System of National Accounts (SNA, 1993). In particular, we present data from the "Integrated Macroeconomic Accounts of the United States" (US-SNA) – an implementation of SNA for the US economy resulting from joint research by staff at the Bureau of Economic Analysis (BEA) and the Federal Reserve Board (FRB).

We use data from the US-SNA to document certain important trends and developments in the period leading up to and during the financial crisis that began in 2007 and the severe recession of 2008 and 2009. First, we track the secular and recent changes in saving, financial investment, and real investment through the capital and current accounts for the household and other SNA sectors of the US economy. We emphasise that, in the period leading up to the financial crisis, the macroeconomic data showed large increases in household-sector leverage brought about by rapid increases in mortgage debt and financed, in large part, with funds obtained from the rest of the world.[2]

Although they are certainly suggestive, these signals provided only limited help to anyone seeking to distinguish between multiple hypotheses regarding the drivers of the trends, which carried very different implications for financial stability analysis. The aggregate nature of data in the national financial and real statistical accounts left them unsuited for illuminating the extent of vulnerability that had evolved in the US financial system.

3   WHAT ELEMENTS OF THE CRISIS DID THE AGGREGATE FINANCIAL STATISTICS NOT CONVEY?

Although financial statistics for the US economy conveyed some important information about rising household leverage more or less in real time, their aggregate nature masked the build-up of important underlying risk factors and did not convey the overall vulnerability of the financial system to a reversal of the flows that had supported economic activity and promoted liquidity and financial risk-taking during the credit expansion. In our longer paper, we highlight in some detail two key elements that contributed to the severity of the financial crisis

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2   Section II of our longer paper is primarily an update of analysis originally presented in Palumbo and. Parker (2009).

that were not conveyed in aggregate financial statistics for the US economy: first, a material increase in the underlying credit risk associated with the rapid growth of home mortgages and a consequent increase in the vulnerability of borrowers to a downturn in home prices or incomes; second, the movement of intermediation on a significant scale to institutions outside the traditional banking sector, which relies heavily on comparatively stable insured deposits as a source of funding, and enjoys access to explicit external liquidity support. In particular, intermediation moved to institutions which were much more vulnerable to a sudden withdrawal of funding.

More specifically, greater vulnerability of the mortgage finance system to a decline in the value of home prices was introduced through two channels. First, a number of new products – including those with non-traditional amortisation schedules and teaser rates – proliferated that both lenders and borrowers believed would generally be refinanced within several years. But an increase in equity from house price appreciation was key to lowering the leverage of home-buyers to an extent where refinancing would be possible. At the same time, the securitisations, particularly of mortgage loans to borrowers with weaker credit, came to rely structurally on the same re-financings, while the consequent prepayments of principal to the securitisation trust, came to build up, over the first years that the mortgage-backed bonds were outstanding, an adequate cushion to protect higher-rated tranches from credit losses. Neither of these developments were captured by aggregate data.

While underwriting was deteriorating, and coming to rely implicitly on the ability of homebuyers to refinance, significant volumes of funding for mortgages and mortgage-backed bonds were sourced from new forms of asset-backed commercial paper conduits that carried only limited contractual liquidity support and incomplete credit support, meaning that these types of conduits faced the possibility of having to sell assets into illiquid secondary markets to repay investors if they ran into difficulties placing (or "rolling over") their commercial paper – which many ultimately did. In addition, an even more important source of short-term funding for private-label mortgage-backed securities was the market for repurchase agreements (repos) – a form of collateralised lending and borrowing that grew to become a major funding source for structured financial products, including some of the more complex and systemically risky instruments (such as senior tranches of ABS CDOs). Indeed, the shift in repo collateral away from the most stable government and agency securities that tend to rise in price and liquidity during periods of market stress, and towards a more heterogeneous mix that included a range of complex structured financial products, ended up contributing significantly to the magnitude of the "liquidity" shock during the crisis. In our longer paper, we emphasise that the aggregate data simply could not convey the extent to which specific and significant vulnerabilities from changes in asset-backed commercial paper conduit structures and repo collateral were shifting in the years before the crisis.

In the wake of the financial crisis, there is clearly an appetite to fill the gaps in data and understanding, which ex post are readily identifiable, and generally to collect more information about activities that might place large institutions and, ultimately, the broader economy at risk. Without discounting the importance of such efforts, we emphasise the need to proceed in a manner which also recognises that the remedy is not merely to collect data going forward on mortgage origination standards and the prevalence of certain funding vehicles; rather, to diminish the likelihood of any future crisis we must change the way that we focus data collection for financial stability analysis. In fact, and as explained further on using two specific examples, a massive data collection effort, focused on filling the gaps that became evident after the recent crisis, will not only fail to make things better, measured against the goal of a more stable financial system, but can also arguably make things worse when data collections are static while financial markets are dynamic.

4.1   A first example: consequences of Drexel Burnham Lambert's failure in 1990

Prior to the near-collapse of Bear Stearns in March 2008, and its sale to JP Morgan Chase, the lessons on the vulnerabilities of broker-dealer firms were mostly extracted from the Drexel failure in 1990. Of the lessons drawn from the Drexel failure, moreover, none were more influential over the ensuing fifteen years than those related to funding. Post-mortems on Drexel revealed that the firm had relied very heavily on the use of short-term, confidence-sensitive, commercial paper in funding its business. These lessons were quickly incorporated into the approaches taken by securities firms, their supervisors, and the community of equity analysts that follows securities firms. Firms responded by actively managing their use of unsecured short-term funds, and commercial paper in particular. Meanwhile, regulators began to monitor the use of short-term unsecured borrowings, and the firms themselves emphasised their minimal dependence on such funding in their public filings and touted their reliance on secured funding.

However, the comfort taken in this reliance on short-term secured funding, while explicitly rejecting short-term unsecured funding as highly confidence-sensitive and fickle, proved to be gravely misplaced during the crisis. At least two realities were not sufficiently appreciated by firms, their supervisors and other observers before 2008. First, the composition of the collateral in the years leading up to the crisis changed slowly, but steadily and fundamentally. When Drexel failed in 1990, the collateral that was funded through repurchase agreements and other types of secured funding arrangements was almost exclusively US Treasury and Agency securities. Such collateral embedded a "right way risk", in the sense that the collateral was likely to rise in value and liquidity during a flight to quality, at precisely the time when institutions lending against and borrowing against such collateral faced stress.

By 2007, however, the repo collateral pool had evolved to include a much wider range of instruments, many of which were not likely to benefit during a flight to quality. By some estimates, the fraction of the more pristine collateral types had fallen to about one-third of the overall funding market. Particularly insidious, of course, were structured products tied to mortgages. Not only were these instruments, it is now clear, less likely than debt issued by the Treasury or agencies to remain liquid during a stress scenario; they were also, because of the assumptions about default correlations that were fundamental to their design, particularly exposed to precisely the sort of systemic risk event that would also impact negatively on financial institutions that were funding these instruments on a secured basis.

4.2 A second example: consequences of losses on CMOs in the early 1990s

If overconfidence in the reliance on secured funding was one recurrent theme during the crisis, overconfidence in the capacity of pooling and tranching to manage default risk stood at the absolute epicentre. Here, too, lessons from previous adverse events made a lasting impression on the psyches of market participants, regulators and analysts. Experiences during an earlier period of market dislocation led to careful tracking of certain metrics, not only externally, as evidenced by the questions that rating agencies asked when reviewing financial institutions' ratings and by equity analysts on earnings calls, but internally as well by risk managers and senior management. Unfortunately, the tracking of these metrics, and their incorporation into the internal risk control systems of financial institutions was not sufficiently resilient towards the dynamic nature of the financial markets.

In the early 1990s, a number of financial institutions, including some investment banks like Solomon Brothers, experienced outsized losses related to holdings of certain tranches of mortgage-backed bonds known as collateralised mortgage obligations (CMOs). More particularly, the losses related to the holding of certain "residual" or "equity" tranches that concentrated interest rate risk. In the years that followed, both internal and external watchdogs became very focused on these tranches. While the creation of these bonds, which concentrated exposure to certain risks, was critical to bringing lucrative securitisation deals to market, it was understood that not distributing these products to parties willing and able to bear these risks placed structuring banks in jeopardy of one sort or another. As the securitisation market grew and evolved, including by increasingly securitising assets that entailed not only interest rate risk but also credit risk, the mantra remained that distribution of the most risky tranches must be carefully managed and monitored. And so they were, with management providing assurances and supporting metrics to regulators, rating agencies and, on a more limited scale, to the public through filings and commentary on conference calls.

As market practices evolved over the past fifteen years, often the so-called "mezzanine" tranches became the key to completing securitisations. Investors, such as hedge funds and other specialists, were paid generously to own the lowest pieces of the capital structure. The most senior securities, on the other

hand, were attractive at moderate yields to any number of investors. The middle ranges often proved the most difficult to place, as these did not carry yields like the lower tranches, yet were clearly significantly more risky than the most senior liabilities.

As the pace of securitisation activity continued to accelerate after the turn of the century, some institutions found it increasingly difficult to distribute the mezzanine bonds. Although free of the stigma accorded to the residual or equity tranches, there was enough sensitivity to any build-up of these marginally investment-grade instruments for pressure to build for some solution: developing new distribution channels, or slowing the speed with which the factory was churning out product. Any appetite to slow the factory was, of course, limited by the profitability of the enterprise. So several institutions solved the problem in a different way that ultimately had very profound consequences for themselves and the broader financial system.

By relying not just once but also a second time on pooling and tranching technology, mezzanine bonds could be re-securitised, supported by a new capital structure. As this process played out at the firms most affected, the lower tranches of the re-securitisation were small and sized-and-priced to move. The bulk of the liabilities from the re-securitisation consisted of highly-rated bonds. Not only was the normal diversification benefit from pooling assets relied upon in assessing the likelihood that different parts of the capital structure would experience losses through defaults; in many cases, additional diversification effects were recognised, as multiple pools of assets, or pools of different types of assets, were combined to back a single re-securitisation deal. However, given the finite cash flows generated by the underlying assets, the need to direct these with sufficient generosity to the lower tranches to ensure distribution, and the large proportion of senior bonds, the yields on the highly-rated bonds produced through re-securitisation were anaemic.

The combination of high ratings and low yields turned out to be a very dangerous one for financial institutions. If the yields had been greater, more of the product would presumably have been purchased by investors who had the capacity to assess the relevant risks. Had the instruments appeared to be lower quality, and looked more like residual tranches, firms' internal and external risk control processes would have quickly sounded alarm bells at a dangerous build-up of undistributed product. However, those systems were not attuned to concentrations of highly-rated instruments: risk managers, who carefully watched the balance sheet "footings" of traditional residuals, were less alarmed by highly-rated bonds, and financial controllers were less likely to aggressively force markdowns of highly-rated securities to levels that would have facilitated sales to more risk-tolerant investors. The regulatory capital signals were also muted, given the heavy reliance on ratings in most regulatory capital regimes. As a result, many large financial institutions ended up with tens of billions of dollars of super senior ABS CDOs on their balance sheet, and large volumes of similar instruments held in less obvious ways, for example in structured investment vehicles (SIVs), or conduits that were highly dependent on the secured funding discussed earlier.

4.3 Discussion

Through the two examples, we have tried to make the point that, in the world of finance, where institutions and markets are continually evolving and individuals are highly sensitive to incentives, it seems less shocking that focusing on certain metrics would erode their usefulness. Nor is it surprising that elements of the financial system should evolve such that risks migrate toward instruments and strategies less likely to sound alarms.

This, however, should not constitute an argument against an empirical approach to understanding risks in the financial system, or data collection exercises; rather, it underscores the dangers of static data collection, in an effort to understand a financial system which is highly dynamic. It also suggests that those wishing to understand the system cannot view their task as analogous to that of the physicist or weather forecaster, who has the luxury of dealing with a physical system that (even if not perfectly understood) is not continuously changing and where measurements relevant in one decade will continue to shed light during the next decade. Rather, we need to act more like the intelligence analyst who must combine a variety of signals to form a mosaic that sheds light on the plans of an adversary. Key to this latter methodology is a fundamental recognition that the system being considered is dynamic, and more attention devoted to any one signal increases the likelihood that this signal will cease to be relevant, or perhaps even become misleading.

This realisation suggests a paradigm for expanding the use of data in financial stability analysis. We have argued that aggregate statistics usefully signal unusual patterns of financial flows across sectors and emerging imbalances that should stimulate targeted analysis reliant upon additional sources of information collected specifically to investigate anomalies that presumably differ each time and cannot be predicted in advance. Just like the intelligence analyst who begins by staring at the grainy satellite image, but follows up by bringing other resources to bear to understand what he or she is seeing, changes in some of these aggregate measures could be the impetus for further work that would elucidate what particular instruments and activities are driving the change. Thus, we are in favour of collecting additional comprehensive and timely aggregate financial data. However, given how quickly transactional forms evolve, particularly when they are tied to metrics against which firms or positions are judged, this must be complemented with a second stage of more-targeted analysis relying on less traditional sources of information that are specifically utilised to illuminate trends and potential anomalies visible in the aggregate data.

An approach that relies on these two distinct stages – expanded collection of aggregate data followed by collection of more targeted and specialised information – could have been helpful in the period leading up to the recent crisis. In theory, such an approach could have identified in the aggregate data signs that credit provision to the non-financial sectors of the economy was growing rapidly. Likewise, aggregate data could have offered hints that the transfer of risk from the core financial system to other sectors was not growing commensurately with the increase in the securitisation of assets. Such signals might have motivated

earlier efforts, using specialised granular data, to drill down into the types of transactions that, over a short period of time, came to dominate the mortgage and secured funding markets prior to the crisis.

5   CONCLUSIONS

The market turmoil of 2008 and 2009 demonstrated once again that, while the particular instruments and transactions are novel in each crisis, the underlying themes are recurring. In general, financial crises create and are then perpetuated by illiquidity: triggering "shocks" cause critical funding to be suddenly withdrawn from some institutions or activities, and concerns about liquidity rapidly become concerns about solvency. Only at this point does the degree to which major institutions share common exposures suddenly become clear. As market participants struggle to reduce leverage in an atmosphere of vanishing liquidity and correlated exposures, market participants become reluctant, even unwilling, to transact with one another. Thus, pressures quickly spread through the financial system.

The task at hand for supervisors and policy-makers is to better understand future changes in the financial system and the associated vulnerabilities with the new institutional arrangements and transactional forms that are created. These efforts will in turn require expanded and improved measurement and analysis of financial activity – efforts that, we believe, should be structured around two principles. First, work on, and analysis of, aggregate data and more-specialised data must proceed in tandem. We believe that such coordination with the analysis of aggregate data leading to the identification of areas where work with more-specialised data should be the target ought to be a key aspect of the paradigm for future financial stability work. Second, and in a similar vein, we believe that the analysis of aggregate data should be structured to be neutral with regard to specific transactional forms, and focused instead on the recurring underlying themes associated with financial instability – competitive dynamics leading to greater leverage and risk-taking, correlated exposures among interconnected firms, and maturity transformation that results in a critical vulnerability to sudden withdrawals of funding.

At the Federal Reserve System, efforts broadly consistent with the approach we have described are currently under way. Multi-disciplinary teams are engaged in quantitative surveillance regarding a wide range of activities that carry potential risks for systemically important financial institutions and for the broader financial system and macroeconomy. For example, these teams are analysing volumes and prices in asset, credit, and short-term funding markets, and are prepared to delve more deeply and specifically should unusual trends or patterns arise. Comprising economists, supervisors and accountants with a range of specific backgrounds and expertise, these teams are capable of collaborating with other specialists in the Federal Reserve System, in industry, at other US and international agencies, and in academia, as particular situations may warrant. In addition, the Federal Reserve Board has initiated a new, quarterly Senior Credit Officer Opinion Survey on Dealer Financing Terms to collect qualitative

information about the availability and terms of credit in securities financing and over-the-counter derivatives markets. This survey provides a new opportunity for identifying changes in behaviour and tendencies in segments that, as noted earlier, are important conduits for leverage – and, therefore, systematic risk – in the financial system. Given the expanded responsibilities and authorities of the Federal Reserve and the Financial Stability Oversight Council – and in light of the creation of the Office of Financial Research and the Consumer Financial Protection Bureau – in the Dodd-Frank Wall Street Reform and Consumer Protection Act, we anticipate additional opportunities and initiatives to monitor and scrutinise developments in the ever-evolving financial system.

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CARLOS COSTA

on:

• **Stephen G. Cecchetti, Ingo Fender and Patrick McGuire,** *Toward a global risk map*

• **Donald L. Kohn, Michael G. Palumbo and Matthew J. Eichner,** *Financial statistics for the United States and the crisis: what did they get right, what did they miss, and how should they change?*

Let me start by saying that I very much enjoyed the two presentations made by Mr Cecchetti and Mr Palumbo just now. I believe that, although different in their approaches, the proposals may be seen as complementary and that they help us to understand why, at the present juncture, it is necessary to revisit the way financial statistics are produced and used. Both proposals point out pragmatic ways for central bank statistics going forward.

As should be apparent by now, the recent financial crisis was, to a large extent, a crisis of globalisation. The dynamics of increasingly integrated markets and economies – while fostering global growth and productivity – were the source of their own fragility and ultimately undermined their stability.

Market participants underestimated especially the potential for severe disruption from the exponential increase in cross-border exposures, as well as the complexity of their interconnectedness. I think that financial innovation played a crucial role in this respect. Securitisation increased the level of leverage among intermediaries, by increasing the length of the chain of intermediation and also by allowing the establishment of systemic connections between core institutions and the shadow banking systems

This greatly amplified counterparty risk and made it more difficult to measure and assess. Moreover, it also implied that the efficient market hypothesis was being questioned by the crisis. Price information was clearly not sufficient for assessing the extent to which markets could be disrupted. The relevant information would have mostly involved quantities relating to counterparty exposures, which, however, were not sufficiently available.

On top of that, public authorities were not prepared to deal with this type of situation: their analytical and regulatory toolbox had not evolved to match the speed and nature of transformation in the financial system. The focus was largely micro-prudential and the tools were mostly microeconomic. Accordingly, the interaction among the various elements in the financial system and between the financial system and the broader economy led to the far-reaching implications that made the crisis Global. There is wide consensus that a new regulatory approach should focus on providing authorities with a new set of analytical and

policy tools which allow them to monitor systemic linkages in the broadest way possible and to mitigate system-wide threats.

The new financial architecture, at European and at the global level, includes strong emphasis on macro-prudential supervision aiming at lowering the likelihood of a systemic event and at reducing its effects.

The establishment of a European Systemic Risk Board with analytical, statistical, administrative and logistical support from the ECB is a key policy response in the European Union in this area.

The response on the global level is coordinated at the level of the G20 and delivered the strengthening of the Financial Stability Board It also resulted in the report, "The Financial Crisis and Information Gaps", by IMF staff and the FSB Secretariat to the G20 Finance Ministers and Central Bank Governors in November 2009, which was complemented by an Action Plan with firm timetables for addressing the recommendations in the forthcoming months.

The two proposals for refocusing central bank statistics after the financial crisis show some similarities and differences.

Both contributions underline the importance of the national accounts by institutional sector, a fact that is also reflected in Recommendation No 15 of the report to the G20. This report praises the ECB and Eurostat on their integrated financial and non-financial accounts for all institutional sectors of the euro area in line with international standards. The recent crisis provides an example of how vulnerabilities in the non-financial sector, namely the household sector, might feed back into the financial system, and vice versa. The national accounts by institutional sector also advance the analyses of the interrelationship between the non-financial and the financial accounts in terms of balance sheets, transactions and revaluations, such as between developments in residential property prices and the indebtedness of the household sector. Moreover, the sectoral accounts cover the economy as a whole, including the "shadow banking sector" and its interconnectedness with the regulated financial sectors and the non-financial sectors. Palumbo's paper argues that the US's existing System of National Accounts broadly enables the performance of reliable and comprehensive risk surveillance and risk assessment tasks. Similarly, Cecchetti *et al.* take as lessons from the crisis the fact that aggregated statistics, when used properly, can help to gauge the build-up of systemic risks nationally and globally, and take the financial accounts statistics as a starting point for developing a global risk map.

Both contributions agree that more data need to be made available and that national accounts by institutional sector and sectoral accounts are important for gauging the risks associated with the financial sector.

Although they seem to diverge to some degree as to the way forward, in my opinion such divergence is not substantial, but more a matter of perspective.

Cecchetti *et al.* derive five principles from the crisis to guide the collection and compilation of statistics, presenting these under the key words "quantities", "intermediaries", "consistency", "maturities and currency" and "joint residency and consolidated reporting". While the first four principles are important, the authors assign a particularly high value to complementing commonly used residency and sector-based data with group-consolidated data. I think this is a very important point that needs to be underlined. They argue that this may prevent the legal challenges surrounding the sharing of firm-level data and would be only one step away from what could be done with complete global risk maps.

While it seems to me very sensible to complement national accounts by sector – which present institutional units aggregated to economic sectors and economies – with macro-prudential statistics that aggregate institutional units to consolidated companies, namely banking groups, a more conceptual analysis is invariably needed of the degree to which both types of statistics can be integrated. Of course, we are dealing here with different types of statistics, which implies that some conceptual work has to be developed in order to guarantee that, at the end of the day, we know how to work properly with statistics that may be very different in their scope, e.g. as regards geographical coverage, while we should also deal with the risk of data redundancy.

Nonetheless, a global risk map is appealing and deserves further research by statisticians and financial stability experts in close cooperation.

Concerning Palumbo's paper, I would like to stress that it shows a certain degree of scepticism as to the possibility of collecting all the "right" data in a timely fashion, because, due to the dynamic nature of the financial system, the relevant set of data is a moving target. The idea behind the paper is that although statisticians strive to catch up with financial innovation, their statistical toolbox is insufficient to cope with the pace of financial innovation.

Palumbo *et al.* refer to the metaphor of the Heisenberg Uncertainty Principle and argue that many of the products most closely identified with the recent crisis and the near-collapse of the financial system scarcely existed just a few years ago and have now ceased to exist again, as the Drexel example fully illustrates. Moreover, this is why I believe that such methodological scepticism is a good approach – it makes us aware that we do not always succeed in catching up with financial innovation. I also agree with the authors when they acknowledge that, although this does not constitute an argument against an empirical approach to understanding risks in the financial system, it underscores the dangers of static data collection in an effort to understand a financial system which is highly dynamic. Palumbo's paper is in favour of collecting additional comprehensive and timely aggregate financial data, but argues that this approach must be complemented with a second stage of more-targeted analysis relying on less traditional sources of information, which are utilised specifically to illustrate trends and potential anomalies visible in the aggregate data.

Another important point raised by Palumbo *et al.* concerns the need to have a multi-disciplinary approach in order to help us determine more efficiently what

the possible risks associated with a financial product are. I could not agree more. We have been used to having supervisors on one side and statisticians and/or economists on the other, rather than sitting down together, looking at the financial products, pooling their efforts to understand what the risks associated with those products are and finding out the true scale of the problem. I am confident that moving from product analysis to balance sheet representation, and from there to aggregate statistics, is essential in order to determine whether there are reasons to believe that we are dealing with a problem which may have systemic implications. To put it more simply, this is akin to using an object-detecting system like radar. We need to understand what the true nature is of the dot flashing on-screen. In particular, we need to decide whether or not that small dot is an indication of a major problem. For this, a multi-disciplinary approach is commendable. It is a three-step approach that begins with the product, passes from the product to the balance sheet, and then from the balance sheet to aggregate statistics. The first two steps evolve essentially along the same lines as the approach described by Palumbo *et al.* – know the product and know the entities that are meaningful in terms of the balance sheet. When we reach the third stage, we need to adopt a different approach – as recommended by Cecchetti *et al.* – and also need to go beyond financial sector statistics, look to other sectors and try to assess how interconnected the balance sheets of these different sectors are with the financial sector. Not doing this means that we are missing out on a significant chunk of the story. It also means that we need to have national accounts, sectoral accounts and institutional accounts together with an understanding of the balance sheet and of the products. It is a broader, multi-disciplinary approach that goes beyond mere statistical work. It is important for supervisors to understand the dimension of the problem in order to understand what is in the balance sheet. Similarly, it is important for statisticians not only to understand what is in the balance sheet, but also to understand what is in the integrated financial accounts. This, in my opinion, is the main contribution derived from the two papers: in practice, even though they adopt different viewpoints, they are very complementary because, in practice, they determine this three-step approach and this multi-disciplinary approach.

Summing up, the two papers, as I said in the beginning, complete and complement each other. Together they suggest that it is important to look at three levels of analysis in order to assess systemic risk: financial instruments, financial balance sheets and aggregate data. Palumbo *et al.* emphasize the two first levels and the need for sound judgment in order to reach policy-relevant conclusions. Cecchetti *et al.* emphasize the last level and the need to explore the interface between macro and micro data sets in our efforts towards building a global risk map. All of this requires an open, multi-disciplinary approach.

I would like to conclude my discussion by congratulating the authors Stephen Cecchetti, Ingo Fender and Patrick McGuire, as well as Matthew Eichner, Donald Kohn and Michael Palumbo, on their very valuable papers, which, I believe, will contribute to shaping the way forward for central bank statistics following the recent crisis.

DISCUSSION SUMMARY

Orlando Abreu (European Commission) asked the panel what initiatives may be taken in the context of financial innovation to make information correct and complete for all financial market participants in light of the recent crisis proving this assumption wrong.

Manuel Marfán (Deputy Governor, Central Bank of Chile, and Chairman, Irving Fisher Committee on Central Bank Statistics) also made the point that everyone, including financial firms, was probably not fully aware of the peculiarities of the innovative financial instruments they were issuing before the crisis. He also stressed that there seems to be a "regulatory subsidy" to financial innovation: supervisors typically collect information on what they know and understand. In light of this, he asked the panel whether a regulatory tax on innovation would help. For instance, any new instrument would need to have an initial capital requirement for the issuers, to be reduced once they start reporting information about the business. He ended his intervention with a question on how the BIS planned to deal with discrepancies in cross-country exposures as reported by two countries vis-à-vis each other; consolidation was considered as one of the main factors for such discrepancies arising and, as such, requires rules on the correct sharing of information.

Regarding innovation and information in financial markets, **Stephen Cecchetti** (Economic Adviser, Head of the Monetary and Economic Department, Bank for International Settlements) made the general point that the biggest issue in the statistics world is the cost of financial system data to the public sector and to researchers when compared to the costs of the associated externalities. This factor restricts dramatically what can be learned in the short term. On competitive markets and information, he also stressed the importance of incentives behind economic agents' decisions, both for the issuers and for the buyers of financial instruments. In addition, he advised that licensing requirements for financial institutions to issue a specific product and instrument should only be dealt with in a standard way via central counterparty systems, not only for risk mitigation, but also for data collection purposes. Furthermore, the issuance of non-standardised products (thus excluded from central counterparty intermediation) should be the exception and not the rule as in recent years. Such a mechanism would also implicitly create a tax as opposed to the above-mentioned subsidy.

Michael Palumbo (Federal Reserve Board) expressed his strong agreement and made the further point that profitable activities are the ones that will potentially threaten financial stability: competitive dynamics had the adverse effect of forcing market participants to jump into those activities. Purely abstract macro-prudential analyses did not manage to deliver early warnings, hence the need for granular data.

Stephen Cecchetti also recognised the importance of existing mismatches in cross-country exposures as reported by countries vis-à-vis each other. He stressed that discrepancies also appear in many other statistical frameworks, such as the measurement of the balance of payments or expenditure versus production in the national accounts, and suggested that statisticians must live with such

discrepancies, in so far as they have only a minor impact in terms of trying to measure growth rates.

Ignazio Angeloni (European Central Bank) commented on future work involving existing data sources of bilateral exposures. While this would widen the dimension of data collection, these statistics offered an important perspective for understanding where the risk comes from and for tracing its transmission. He asked about the envisaged sources for the proposed expanded data collection on BIS banking statistics and whether financial intermediaries or international authorities would have to provide additional data.

Stephen Cecchetti considered that bilateral exposures would, in principle, allow network analyses to investigate transmission channels for disturbances in the system. In practice, this approach is unrealistic as the models for dealing with bilateral exposures would have to run in real time; this would be rather complicated and even the power of the computer might be insufficient. The BIS instead was engaged in a more limited, but more realistically attainable short-term exercise, based on the extension of the BIS banking statistics framework. The BIS expects to continue to rely on national central banks as data providers, rather than collecting data directly from individual (and large) financial institutions.

Bernhard Winkler (European Central Bank) noted the reference in both presentations to flow-of-funds data as a tool to construct risk maps. He stressed that every crisis is different and that catching up with financial innovation is difficult, but that there are common features in each crisis (excessive money and credit growth, leverage, financial innovation). Against this background, he then asked whether aggregate measures like money and credit growth still constitute the necessary tools for risk monitoring, or whether they should be complemented by early warning indicators and by better and more granular data.

Michael Palumbo clarified that aggregated measures could be valid policy tools, but they will never be enough to reveal and possibly prevent financial institution risk. Granular information will help to monitor the dangers not only to firms, but also to the system and, thus, to uninvolved parties. He concluded his intervention by stating that – looking ahead – tools for financial stability analysis will increasingly gain in importance in the years to come.

Aurel Schubert (Director General Statistics, European Central Bank, and Chairman, ESCB Statistics Committee) observed that the first upshot from the discussion was the importance of both macro and micro information for financial stability analysis, although there might not be full agreement on the degree of desirable data granularity. He stressed the need for standardisation across datasets, pointing out the advantage of using central counterparties for statistical purposes. Moreover, regarding the cost of financial market data, he fully shared the view that most of the available products are too expensive when compared to the disclosure practice of public statistical institutions like the ECB, which makes thousands of time series available free of charge in its statistical warehouse.

Maybe I should start by saying I have a mixed relationship with statistics. I am not one of those who think statistics can be made to say anything you want, because in my engineering research days, they did not always say what I wanted! I can also tell you that, as a politician, they do not always say what you want either!

The financial crisis, the sovereign debt aspect and economic governance have made statistics sexy – now everyone wants them – not just sexy ones (figuratively speaking) but there is an increasing demand for all kinds of data. The financial crisis has had an impact on European statistics in that it has demanded improvements in knowledge of new products and services, from housing markets to the communication of statistical information, as well as quality in terms of both reliability and speed and new regulatory procedures such as the bank stress tests. This begs the question of what are we going to do with all the data to make sure we obtain useful and practical results, which I will come to in due course.

Before that, I will summarise the statistics issues related to the crisis that have been brought to the European Parliament in the five years that I have been there and our responses to them.

First, we had a national statistics crisis in 2005 when the Council shied away from granting Eurostat greater powers, which had been proposed by the Commission and supported by the Parliament. Indeed, we did not just support the Commission on this issue, we positively encouraged them to go through with it, but we were disappointed with the outcome.

However, what did follow from that episode was the establishment of a code of conduct and a peer review process for the EU's national statistical offices. The European Statistical Governance Advisory Board was also set up, for which I was the rapporteur and negotiated with Mr Walter Radermacher during the German Presidency, although it was finalised under the Portuguese Presidency in October 2007. I did not get everything I wanted, especially with regard to a more intrusive checking of Member States' upstream data, because the Member States would not accept it – back then we delicately called it "sensitivity". Now that he is in charge at Eurostat, I think maybe he has a softer spot for my earlier endeavours towards a better statistical audit, and anyway, I have not forgotten that there is a three-year review clause.

Then in June this year, the sovereign debt crisis brought the EU back to the issue of strengthening Eurostat's powers and the Parliament was not backward in its statements on this issue: it was the first litmus test to see whether Member States would act on their words. We suggested that Eurostat should be given "dawn raid" powers like the Commission's competition services. Statistics really were getting sexier – quality was no longer a boring issue but a vital necessity.

I have checked the Economic and Monetary Affairs Committee's first exchange on this June's proposals and I said, "Accurate statistics and improved verification of the reliability of aggregate data provided to Eurostat are essential prerequisites for any improvements of economic governance in the Union. The Commission proposal is the minimum needed as a result of the lessons of the Greek case, and reporting obligations need to be enforced among all Member States. This reporting should include details of any off-balance-sheet activity." I am pretty happy to stand by that today.

This week in Strasbourg, we will take the final vote on the Feio Report, which is a legislative initiative report, and is our contribution to the pool of ideas for economic governance that was prepared in parallel with the Commission's proposals and those of the Van Rompuy Task Force.

In it, we address data in the context of economic surveillance and include the role of the European Systemic Risk Board, which was set up since the crisis for data scrutiny in order to give a clearer oversight of risk and options for management.

One of our points is that the right methodological tools and proper transparency based on harmonised economic indicators, both real and nominal, should be in place. As well as these indicator values, we also suggest that the indicators be complemented by qualitative assessments by the Commission.

We specifically call for further harmonisation of the methodologies for the calculation of budget aggregates in order to facilitate comparisons between Member States.

We also seek to include the European Systemic Risk Board's assessments as regards financial stability, stress tests, potential outward and inward spillover effects and the accumulation of private debt in the multilateral surveillance framework.

The Feio Report also includes a section on improving the reliability of EU statistics, aimed at enhancing the role of Eurostat. Again, this includes on-site inspections without notice, requiring disclosure of when there has been an independent audit and the harmonisation of public finance data based on standardised and internationally acceptable methods of accounting. We also require consistent and open disclosure of certain off-balance-sheet liabilities, in particular, in respect of future payments required for public sector pensions and for long-term contracts with the private sector for the leasing and provision of public facilities.

We will, I am sure, be carrying through our ideas to the scrutiny of the economic governance proposals made by the Commission, upon which we are also just starting to work, and for much of which we now have full co-decision power with the Council, not just consultation rights.

I have just mentioned that we see a need for standardised and internationally acceptable – or should I say consistent – methods of accounting, and in that

context the EU and the European Central Bank have been at the forefront of promoting a strong international quality framework and the use of global indicators.

From the national to the international, we must take account of the need to improve statistics from the bottom up, raising public confidence, not least when the obvious background to most of what I have said so far has been an aspect of the crisis born out of lack of transparency and accuracy.

The United Kingdom is addressing this issue by setting up an Office for Budget Responsibility and, in general, Commissioner Rehn has indicated his support for independent approaches. The UK Office for Budget Responsibility is to act objectively, transparently and impartially. It will make independent assessments of the economy, public finances and fiscal sustainability, examining the impact of decisions made by the Government.

Another way in which the issue can be addressed is simply by making it easier to access data, and again, the UK experience here is that the Freedom of Information Act and access to statistical data have raised confidence.

Earlier on, I mentioned that one of the Parliament suggestions on economic governance data was supplementation by qualitative assessments. This leads me to a very important point that market intelligence – whatever the field, but in particular for financial matters – is crucial both for a fuller understanding of what data have captured, and also for the earlier spotting of trends given that statistical collection and analysis may lag events by some time. At the start of the financial crisis and with issues of sub-prime mortgages and excessive lending, I think I expressed this in terms of, "didn't the supervisors ever take a walk down the High Street!" Of course, it is more than that, but soft data are important, and, of course, networks to collect them will be more sophisticated than my walk down the High Street.

Following on from the financial crisis, great efforts are being made to ensure that all activities in the financial sector are regulated, which, for the main part, means reporting and data collection will increase. This is well intentioned and there is no point fighting it, the current political climate is such that for a large majority safety now ranks higher than it did before, ahead of efficiency.

At the same time, we would be foolish if we thought that we could stop the movement towards different ways of doing business — some of these ways being unlit, dark, shadows or whatever you want to call them — which will be a consequence of regulation. It is the regulatory equivalent of Heisenberg's uncertainty principle — the more you watch and pin down the position, the less you know about the velocity — or the more you regulate, the more you create incentives for moves to where you do not know what is happening. If it takes 18 months to plan and achieve a statistical analysis, especially for a regulatory purpose, what chance have you got of knowing where things are instantaneously? So, a certain versatility and flexibility is essential to keep up, even though this presses on several comfort zones which favour the certainty of stability.

If I stick, for a moment, to technical analogies, wings, brakes, CD players all operate through servo motors, the basic elements of which are a high-gain amplifier and a feedback loop. It is well known that if there are long delays in the feedback loop, servo systems do not work, the brakes fail, the speed or direction goes awry. The same is true of financial servo systems. There are plenty of amplifiers in derivatives, high-frequency trading and leverage: data, which will soon be collected as a result of new regulations, provides the feedback – the trick will be to make sure it is fast enough.

In some fields, one of the standard ways of collecting data has been by survey. This has immediate downsides of time-lag, subjectivity and cost. For example, in order to establish purchasing price parities by tracking supermarket prices, much of the information should now be obtainable from supermarket-automated systems. Turning to the financial system, payment systems similarly could be used for aggregated data instead of having to survey banks, emphasising that the right kind of anonymity procedures need to be in place.

One thing is certain, in the new era of more fully regulated financial services, we will all be swimming in data, as already indicated, for example, by the additional clearing and repository reporting for derivatives. Of course, it is not the collection of data that renders markets safer and "policeable", it is the interrogation and analysis of that data. So, we do always need to question who and what exactly the data are for. How are we going to use them, are they for a real-time analysis or for ex post checking? In practice, both will be used but I would say it is the former, real-time analysis, which provides safety, which gives the sufficiently fast feedback loop; ex post, the best you can hope for is rectification and punishment. Data analysis, and yes speed, are fundamental to prevention rather than cure.

It has always puzzled me why we do not use more of the techniques of engineering in finance – at least it has puzzled me ever since I learned, with some alarm, just how comparatively unsophisticated transaction recording and tracking is. So, here too, if we want better tracking and automation, it would be a good idea to get agreed standards for reference data.

There are lots of things that flow around in pipelines and wires, water, gas, transport, communications, or my own speciality of electrons and holes in semi-conductors, and the various systemic risk boards and the US Office of Financial Research are – or should be – ultimately charged with developing a much better understanding of real-time flows and tracking in finance. As I have said, statistics now need to be quick as well as accurate.

We can track on the internet vast quantities of information, so surely we can do the same for financial flows with tools for real-time management. My thought is that these systems must be developed as part of the response to accelerating technology.

Finally, and stepping even further out of the normal financial lines, I have personally harboured a desire to apply quantum statistics to financial markets; electrons tunnel to where they should not sooner than expected, perhaps markets do the same. But maybe I have to keep that as the subject for my next thesis.

3 WHAT IS NEW IN THE DEMAND FOR ESCB STATISTICS FOR FINANCIAL STABILITY AND MACRO-PRUDENTIAL PURPOSES?

INTRODUCTORY REMARKS

LEX HOOGDUIN

The third session of this conference will consider developments in the demand for central bank statistics that relate to the developments in financial supervision following the financial crisis. As an introduction to this session, it might be useful to start with a brief look back into the past. I will reflect on data gaps that played a role in the Asian crisis, which started in 1997, and on the developments in financial statistics that then followed.

The Asian crisis revealed several data gaps. In the private sector, the corporate accounts of debtors and creditors in international financial markets lacked transparency. At the national level, economic statistics were insufficient, e.g. on external debt in foreign currencies. In addition, the available statistics on international reserves did not paint a full picture of liquidity constraints, for example due to derivatives transactions and contingent liabilities.

In response to the Asian crisis, the G22 comprising major developed and emerging economies set up a working group on transparency and accountability. On national statistics, the working group recommended improving the data coverage of foreign exchange reserves, external debt and financial sector soundness, as well as the frequency and timeliness of the publication of such data. The IMF addressed these issues in its Special Data Dissemination Standard (SDDS). This was established as a voluntary set of data dissemination norms to which countries could subscribe. Work on it was initiated in response to the Mexican peso crisis a few years earlier. 47 countries had subscribed to the SDDS by the end of 1998. In 1999, the IMF added monthly reporting requirements on financial derivatives positions and on guarantees extended by governments. As a result, some of the data gaps revealed by the Asian crisis were filled. This provides a positive starting point for this session.

However, increased data availability alone did not help to avert the current crisis. There are at least three reasons for this. First, not all data gaps that played a role in the Asian crisis have been addressed. At the time, the G22 working group also recommended disclosure of international exposures of hedge funds, but this recommendation unfortunately was not taken up. Second, some of the data gaps that contributed to the current crisis were different in nature. Examples are data gaps relating to the shadow banking system, off-balance-sheet liabilities and systemic linkages. As systemic risks change over time, it is important that we

first analyse carefully what we need to measure for macro-prudential purposes and then determine the resulting data needs. Third, better statistics alone will not stop the emergence of structural problems. Imbalances in the financial system were being observed before the Asian crisis hit, but not recognised as a major threat.

Thus, while discussing new demands for European System of Central Bank statistics, we should take the work of macro-prudential authorities as a starting point. After all, new statistics will be more effective if they focus on the most relevant vulnerability indicators and avoid measurement without theory. Furthermore, to quote Claudio Borio,[1] we should aim to strike the right balance between boldness and realism: bold in the development of better indicators for systemic risk; realistic, however, when it comes to implementation and to our own expectations. It is impossible to construct a complete picture of the complex and continuously evolving global financial system. Analysis of systemic risks is also limited by fundamental uncertainty. We cannot measure everything and the statistics will not speak for themselves. Our efforts should therefore be focused on meeting those data demands that are most relevant to strengthening macro-prudential supervision.

In this respect, let me recall a few current initiatives on new statistics. During a future crisis, policy-makers may have data needs about which they are unaware at present. More flexible data collection systems could satisfy those needs. Examples can be found in the area of *register* types of information. A number of initiatives were already under way before the outbreak of the current crisis, including:

– linking the Centralised Securities Database of the ECB to a database for securities holdings statistics;

– the use and extension of a central credit register;

– registries of large financial groups and their related entities.[2]

In addition to these *register* types of information, the Bank for International Settlements (BIS) is currently extending statistics on over-the-counter (OTC) derivatives.[3] The BIS is also discussing the possibilities for a "qualitative survey on credit terms in secured lending and OTC derivatives markets" and the

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1 Borio, C. "Implementing a macro-prudential framework: blending boldness and realism", keynote address for the BIS-HKMA research conference *Financial stability: toward a macro-prudential approach*, Hong Kong SAR, 5-6 July 2010, available at http://www.bis.org/repofficepubl/hkimr201007.12c.pdf
2 This refers to Eurostat's "Euro Groups Register" and the ECB's "RIAD" initiative.
3 Addition of statistics on central counterparties and credit default swap (CDS) indexes. A CDS index is a credit derivative used to hedge credit risk or to take a position on a basket of credit entities. Unlike a credit default swap, which is an OTC credit derivative, a CDS index is a completely standardised credit security and may therefore be more liquid and trade at a smaller bid-offer spread.

enrichment of banking statistics.[4] Furthermore, several changes are now under way that concern International Financial Reporting Standards and the Capital Requirements Directive. These will influence micro-prudential data collection in the years ahead. At our own central bank, we see a tendency to use micro information more and more for macro-prudential supervision. Thus, various initiatives are ongoing that may help to address the relevant data needs of today and enhance financial stability in the future.

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4   For example: i) currency breakdown per counterparty sector; ii) expanding the BIS reporting area; and iii) tracking exposures between consolidated banking systems.

INFORMATION REQUIREMENTS FOR MACRO-PRUDENTIAL OVERSIGHT AND THE ROLE OF CENTRAL BANKS

VÍTOR CONSTÂNCIO

I   INTRODUCTION

The macro-prudential supervision of the financial system as a whole is being significantly enhanced as a result of the lessons drawn from the global financial crisis. We are now in the process of building up a coherent macro-prudential policy framework at the domestic, European and global levels. For its part, the European Central Bank (ECB) is, in particular, entrusted with the task of providing the Secretariat and analytical, statistical and logistical support for the European Systemic Risk Board (ESRB), which will start operating in January 2011.

The main new element for the conduct of macro-prudential supervision is the determination to link risk surveillance and risk assessment to concrete policy actions. In this context, the allocation of responsibilities to macro-prudential bodies, such as the ESRB, has emphasised the need for enhancements to the information base, not only for the purpose of risk analysis but also to prepare macro-prudential policy recommendations to address any systemic risks that are identified. The latter will require, for example, the analysis of the transmission channels of macro-prudential policy measures and their potential impact on the financial system. This is largely a new field of policy analysis for most central banks and may require specific additional data.

As has been highlighted by the speakers at this conference, the statistical function provides a key underpinning for the effective implementation of macro-prudential policies. In particular, a comprehensive and granular information base is required to facilitate the timely detection of the build-up of vulnerabilities, such as financial imbalances. Furthermore, the accuracy and reliability of data largely determines the quality of the systemic risk assessments that inform macro-policy decisions.

I am using the word "information" here in a broad sense to mean not only statistical data but also market-based information and information gathered via market intelligence efforts. Systemic risk analysis and the outlook for financial stability necessarily incorporate forward-looking elements included in current market prices of assets and market expectations as well as information on incipient trends, business practices and new financial instruments that emerges from market intelligence activities.

As illustrated by the topics discussed at this conference, the new statistics required to support macro-prudential analysis and oversight constitute a challenge shared by all authorities around the globe responsible for safeguarding financial stability. Given the global nature of the financial crisis, major initiatives

have been launched at an international level, namely by the G20 supported by the International Monetary Fund (IMF) and the Financial Stability Board. These initiatives address the global agenda for improving financial statistics, in which the EU authorities and the ECB are playing an active part.

In addition, significant efforts are being invested in analysis and research with a view to enhancing and developing risk detection and risk assessment tools. They include indicators of emerging imbalances and early warning indicators, as well as tools for evaluating the severity of identified risks, including macro-stress-testing techniques, and models of contagion and spillover effects, both within the financial sector and between sectors of the economy. These analytical tools need suitable data of sufficient granularity in order to produce reliable and accurate results.

In my remarks today, however, I will focus mainly on statistical needs and the contribution that central banks can make in this regard.

Of course, macro-prudential analysis and oversight are not new tasks for central banks – or at least those with a responsibility for safeguarding financial stability. Central banks are in a favourable position to perform these tasks in view of, first, their analytical and statistical competencies, including their expertise in processing and managing data, and, second, the infrastructure that is already in place to facilitate the conduct of monetary policy and financial stability functions. Indeed, following the various regulatory reforms prompted by the lessons of the financial crisis, central banks (such as the Federal Reserve System and the Bank of England) have generally seen their role in macro-prudential supervision and policies reinforced. In addition to their key involvement in the financial sector and their analytical competencies, this enhanced role for central banks also reflects the essential features that enable them to ensure credibility in pursuing macro-prudential policies. These features comprise: (i) the fact that central banks are, by their very nature, anchors of stability; (ii) they have a medium term-oriented policy horizon; and (iii) they are independent.

The ECB's extensive statistical know-how has been developed over the past ten to 15 years predominantly to fulfil the needs of monetary policy analysis. This institutional expertise relates, in particular, to: (i) the development of harmonised requirements for quantitative statistical information derived from heterogeneous basic national sources; (ii) the codification of these requirements in legal acts and their implementation in reporting formats; and (iii) the production of large data sets in a timely fashion.

Accordingly, the expertise and infrastructure developed by the ECB and the European System of Central Banks (ESCB) can make a significant contribution to supplying the statistical information required for the macro-prudential functions of the ESRB, and can do so in the shortest possible time frame, while containing costs and limiting the reporting burden for respondents.

I will begin by briefly focusing on the existing central bank statistics that can be used for macro-prudential analysis – what we can term the "existing supply".

I will then move on to the "new demand" for information in order to be able to effectively fulfil the new central banking responsibilities in the field of macro-prudential oversight. Finally, I will try to assess how large the gap is between the existing supply and the new demand for information. However, I would acknowledge at the outset that it is impossible to ever close this gap completely – particularly since financial innovation and structural developments will always create new demands for information. Consequently, flexibility – or, if you prefer, agility – should become a standard attribute of statistical processes in the fields of both macro and micro data so that risk assessments can be produced in real time in order to capture innovation in financial markets.

2   EXISTING CENTRAL BANK STATISTICS THAT CAN BE USED FOR MACRO-PRUDENTIAL ANALYSIS

Let me start with the existing supply of statistics. The ECB and the ESCB already have a good macro-financial statistical database. It is designed primarily to serve the monetary policy function but, to some extent, it also serves the needs of macro-prudential analysis and will be of benefit to the ESRB.

To be more specific, macro-prudential analysis covers both an analysis of the financial system – comprising financial intermediaries, markets and infrastructures – as well as an analysis of the financial system's operating environment – namely the non-financial corporations, households and government sectors, as well as the global macroeconomic setting.

A wide range of existing macro-financial statistics on the operating environment that are compiled by central banks can be used for financial stability analysis. I am thinking in particular of the integrated euro area financial accounts, in which cross-sector balance sheet exposures allow the degree of interconnectedness among sectors in the economy to be gauged, and on the basis of which a framework for assessing the scope for contagion among economic sectors has already been developed. This framework combines the euro area accounts data with a market-based analysis of risks in a contingent claim flow-of-funds accounts model.[1]

Other examples of existing statistics relate to information of a more qualitative nature. In 2009 the ECB and the European Commission launched a survey on the access to finance of small and medium-sized enterprises in the euro area and the EU,[2] which will be helpful in assessing the vulnerabilities stemming from conditions in the non-financial corporate sector. To mention another initiative, the Eurosystem Household Finance and Consumption Survey will provide micro data to complement the information available from the euro area accounts.

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1   Castrén, O. and Kavonius, I.K., "Balance sheet interlinkages and macro-financial risk analysis in the euro area", *Working Paper Series*, No 1124, ECB, Frankfurt am Main, December 2009.
2   ECB and European Commission, "Survey on the access to finance of small and medium-sized enterprises in the euro area". The survey is carried out every semester (results available for 2009).

It will enrich the analysis of risks to financial stability stemming from conditions in the household sector by providing information on distributions of household income, consumption and wealth.

Turning now to the financial system, a similarly wide range of existing macro-financial statistics, compiled by central banks, can be used for macro-prudential analysis. They include, for example, statistics on financial markets, money, banking and investment funds, as well as information on insurance companies and pension funds. However, statistics on financial sectors collected for financial stability purposes tend to require different formats and features than those collected for monetary policy purposes. For example, banking statistics for financial stability analysis should be compiled on a consolidated basis to reflect risks at the group level instead of on an individual bank basis as is the case for monetary policy analysis. In addition, the assessment of risks to financial stability stemming from the activities of investment funds (e.g. hedge funds) requires a coverage on the basis of where these funds operate, rather than where they are registered or domiciled. Over the years, with the help of national central banks and supervisory authorities in the EU, acting via the ESCB's Banking Supervision Committee, consolidated banking statistics covering practically the whole of the EU banking sector have been developed and comprise the prime data source for conducting financial stability analysis.

While the financial crisis has clearly illustrated the need for micro data, it should be recognised that during the crisis signals of imbalances did emerge from aggregated macro-financial data, although they failed to attract sufficient attention. I am referring, for example, to broad-based increases in financial leverage, both in the financial and non-financial sectors of the economy, and the steady growth of banking sector balance sheets, as well as growth in off-balance-sheet items.

These sets of macro-financial statistics, combined with market-based information, e.g. prices of securities and related derivatives, market expectations derived from these prices, non-bank-based financing volumes and related maturities, and exposures to specific asset classes, as well as regular market intelligence, have proved to be essential elements in monitoring developments across sectors and markets, detecting price anomalies and assessing the markets' perception of the financial system's ability to withstand shocks.

Overall, a significant amount of information is already being collected by central banks and official statistical bodies and provides a considerable share of the data needed for macro-prudential analysis.

3   NEW DATA NEEDED FOR THE CONDUCT OF MACRO-PRUDENTIAL OVERSIGHT BY THE ESRB

Nevertheless, new data will be needed to support the conduct of reliable, effective and high quality macro-prudential analysis by the ESRB.

A useful way to organise our thinking about these data needs is by making a distinction between top-down and bottom-up analysis. A top-down analysis is mainly based on aggregate information, namely macro-financial data, and is performed in order to monitor vulnerabilities and assess conditions in specific sectors with possible implications for system-wide risks. It can be used to broadly identify areas of potential risk, indicating where further, more granular, drill-down analysis is needed. Bottom-up analysis, on the other hand, relies on firm-specific or micro-level data, either publicly available in individual financial statements or reported to supervisory authorities, that is then aggregated to produce sectoral or system-wide assessments.

For top-down macro-prudential analysis, efforts need to be made towards: (i) harmonising; (ii) increasing the frequency; and (iii) extending the coverage to the whole EU of the statistics for the banking sector and other financial sectors, such as insurance. Harmonisation efforts largely depend on the ongoing efforts to establish unified financial supervisory reporting in the EU. For the banking sector, where progress is more advanced, a considerable amount of work needs to be done in respect of consolidated banking data. Improvements are under way, but the new templates for supervisory reporting in the EU (which are based on new reporting standards) are still under discussion. The collection of similar statistics for the EU insurance sector faces the same challenges and preparations are currently ongoing at full speed.

Another critical area for improvement in the top-down analysis is the effective coverage of the non-regulated financial sectors, or the so-called shadow banking sector. Although there is no formal definition, this sector comprises institutions, vehicles, instruments and markets whose businesses largely replicate core elements of traditional banking: i.e. credit and maturity transformation. Major components of this shadow banking sector include certain money market funds, hedge funds, structured investment vehicles, off-balance-sheet vehicles (reliant on banks' credit lines), and securities lenders. They tend to be overly dependent on the liquidity of some markets and, just like banks, are vulnerable to runs. Importantly, a complicating factor in the collection of such data is that the shadow banking sector is not confined to a specific institutional group or type of business, but is spread across entities. It relates more to the way in which entities operate in certain financial markets and their use of financial instruments. Critical markets are, for example, the asset-backed securities market, the repo markets and the securities lending markets, where key players can be unregulated or non-banking regulated entities that are not captured on the macro-prudential supervision "radar screen". We need to be agile in our statistical efforts if we are to capture the bulk of the financial intermediation activity being channelled outside regulated sectors, even though such activity appears to be subdued in the aftermath of the crisis.

Without attempting to be exhaustive, let me also mention the much needed improvements to the integrated euro area financial accounts that I referred to before. There is a need to expand the coverage to the EU level, to have more granularity in balance sheet exposures and to produce additional breakdowns by types of financial instrument. These would be essential inputs for evaluating

propagation effects using contagion and spillover models, for example. This type of analysis can be used to evaluate the impact of the failure of specific components of the financial system, by assessing the transmission of instability among financial intermediaries and markets.

Overall, satisfying the above-mentioned data requirements will be crucial for developing analytical tools and methodologies for systemic risk analysis, including financial stability indicators, early warning indicators and stress-testing models, in addition to contagion analysis. The quality of the analysis will depend not only on the sophistication of the methodologies, but, to a large extent, on the quality of the data. The ability to detect financial imbalances at an early stage, to distinguish them from potential structural developments and to deliver risk assessments in real time will depend on the quality and flexibility of the information base.

Moving now to the field of micro data, it has been widely acknowledged that institution-specific information is needed for what I called bottom-up analysis. Viewing the financial system as a network, the focus of this analysis shifts to the key nodes in the network and, notably, the concentrations and linkages between them that could represent risks and vulnerabilities affecting the stability of the entire network. There is a need for information on interlinkages between the major financial system players, including counterparty credit exposures in various forms, and funding exposures of individual financial firms, as well as detailed information on their maturity mismatches and leverage. This is because vulnerabilities can stem from interlinkages such as those emerging from interbank lending, securities lending, repurchase agreements, funding interdependencies, positions in credit default swap markets and exposures in other derivatives markets, and ownership links. They can also relate to common exposures (to particular economic sectors or regions) or to holdings of assets subject to contagion via asset markets (e.g. asset fire sales). This detailed information should allow the exposures of the regulated financial sector to be linked to non-regulated entities, such as structured investment vehicles, conduits and hedge funds, via the monitoring of exposures to specific financial markets and specific asset classes (e.g. structured credit products). In this context, the development of a Global Risk Map – as a unified database picturing the network of mutual exposures that exist: (i) among large and complex financial institutions (LCFIs); and (ii) between the LCFIs and major counterparties, e.g. insurance firms, hedge funds, major corporations and central banks – should be supported, as proposed last year by the committee chaired by Otmar Issing,[3] and for which Stephen Cecchetti proposed a practical way forward yesterday.[4]

This micro information is essential in order to carry out analyses of propagation channels of systemic risk – via direct contagion or spillover effects – as well

3 Issing et al., "New Financial Order: Recommendations by the Issing Committee Part II", White Paper No II, Center for Financial Studies, Frankfurt am Main, March 2009.
4 Cecchetti, S.G., Fender, I. and McGuire, P., "Toward a global risk map", paper presented to the fifth ECB Conference on Statistics *Central bank statistics: what did the financial crisis change*?, October 2010.

as to enhance the quality of macro stress-testing exercises in the period ahead. In this respect, efforts are already under way at the ECB to enhance the coverage of firm-level information and distribution indicators for large financial institutions, including information on interconnections and common exposures, building primarily on publicly or commercially available sources.

Indeed, macro-prudential analysis assesses the collective behaviour of financial institutions and the way in which it may pose risks to the overall system. It investigates the scope for negative externalities caused by key players in the financial system, since each financial intermediary rationally manages its own risk, without considering the potential impact on others and the system as a whole. This contrasts with micro-prudential analysis which looks at institutions in isolation and produces assessments at the individual firm level.

Recent initiatives in central bank statistics attempt to address some of the issues raised by the interlinkages among financial intermediaries – for example by means of what we call "from-whom-to-whom" information on deposits and loans of financial corporations. Work is also under way on securities holdings statistics with a view to creating "from-whom-to-whom" data for sectors of the euro area economy. Furthermore, the use of dedicated ad hoc surveys is also envisaged in the near term, as a way to gather information on interlinkages and thereby enhance the granularity and quality of risk analysis.

In order to obtain the relevant micro data, not only at the sectoral level but also at the individual firm level, that are required to perform bottom-up analysis, there is a clear need for close cooperation between the ESRB and micro-prudential supervisors, and, in particular, the European Supervisory Authorities (ESAs), which are likely to collect information through supervisory reporting and may collect systematically relevant firm-specific information upon reasoned request.

To ensure that cooperation between the ESRB and the ESAs is successful, a number of practical arrangements are needed, particularly in order to develop a clear understanding of the division of tasks between the macro and micro-prudential authorities. A clear understanding is also needed as regards the quality, comparability, timeliness, punctuality, frequency and transmission formats of the data, as well as confidentiality and the legal provisions covering them. The ECB and the ESCB, in their supporting role vis-à-vis the ESRB, is already collaborating with the ESAs to ensure that data collection is both effective and efficient, preventing duplication of work.

4   CONCLUDING REMARKS

The new data requirements stemming from the need to conduct macro-prudential analyses are very challenging. Some commentators have underlined the role of the global financial crisis in identifying the new data required for macro-prudential analysis and the measurement of systemic risk.

However, we should not overlook the fact that considerable efforts have already been made with a view to improving the quality and coverage of the information. Moreover, there is a reasonable information base for the conduct of macro-prudential oversight at the EU level, which should allow the ESRB to start operating smoothly in January. At the same time, we should not be complacent: we need to acknowledge that there are considerable gaps between the existing supply and the new demand for data. Narrowing these gaps will take time and there is a need for strict prioritisation of the development work. Efforts will be further complicated by the need to ensure flexibility in statistical processes so as to more effectively capture financial innovation and other forms of structural development in the future.

The ESRB, together with the ECB and the ESCB in their supporting role, are not alone in facing challenges as regards the availability of statistics for macro-prudential analysis. The global scale of the financial crisis has clearly illustrated that close cooperation is needed at the global level. In this respect, the ECB is committed to making a significant contribution to the major global initiatives under way to narrow information gaps, led in particular by the Financial Stability Board and the IMF.

The ECB and the ESCB have recorded remarkable achievements in developing and collecting statistics which have made the common monetary policy for the euro area possible and a success. I am therefore confident that the existing knowledge and expertise, as well as the technical infrastructures of the ESCB statistics community, will ensure that the new challenging tasks that lie ahead as regards the new data for macro-prudential analysis will be met. In this context, I would reiterate that progress can also only be ensured if effective cooperation between the ESCB, the ESRB, the ESAs and national authorities is established.

THE NEW EU FRAMEWORK FOR MACRO-PRUDENTIAL OVERSIGHT: WHAT INFORMATION IS NEEDED AND HOW CAN WE ENSURE IT REACHES THE ESRB IN THE MOST EFFICIENT WAY?

ELEMÉR TERTÁK

I am grateful for the opportunity to address such a distinguished audience on the subject of information requirements for effective macro-prudential oversight by the European Systemic Risk Board (ESRB). The staging of this conference could not be timelier: a month ago the European Parliament adopted its Regulation on the ESRB, and the new body is due to start work in a little over two months from now. Today we are also marking the first ever World Statistics Day, created to recognise the achievements of the global statistics systems under the motto, "Better Data for Better Policies".

The ESRB will play a key role in the new architecture for EU financial stability and be expected to function as a sort of early warning system. Credit crises have been at the core of most financial crises and recessions for hundreds of years. As the conditions for a financial crisis are mostly in place in advance, it should be theoretically possible to detect the signs of one looming. This time, however, we failed to predict the nature, timing or severity of the crisis; and the few who did issue early warnings generally identified only isolated weaknesses in the system, but had not figured out the full set of complex linkages and mechanisms that ultimately resulted in a devastating global crisis and recession.

The ESRB's contribution to supporting financial stability will depend largely on its capacity to detect and assess the nascent imbalances at an early stage and to suggest, where apposite, adequate remedial measures. The challenge facing the ESRB is gigantic, moreover, because speed of recognition and proper analysis are paramount to success. Therefore, it is imperative to fulfil all the necessary conditions required for the efficient and effective functioning of the ESRB.

The new body's remit of course extends further than the timely detection of emerging systemic risk. However, measuring and monitoring systemic risk on an ongoing basis remains one of the highest priorities of financial regulatory reform and is a prerequisite for the ESRB to fulfil its remit.

My comments will focus on four issues relevant to fulfilling the ESRB's remit: (1) the information gaps to be closed; (2) how to measure systemic risks; (3) relations between the ESRB and the European System of Financial Supervision (ESFS); and (4) the global context of macro-prudential analysis.

The most important task now is to develop a robust international system to track the growth and sustainability of leverage in different sectors of the economy, beyond borders and over time. Today, however, the available data are limited and not always comparable across countries. A key first step therefore will be to collect better, more granular data. Let me now set out where we are in this respect.

As we analyse the roots of the recent crisis, we can draw at least three important and informed lessons.

Firstly, the identification of potential systemic risks requires a comprehensive approach under which the macroeconomic environment and the various components of the financial sectors, institutions, markets and financial infrastructure are properly analysed, and an assessment made of their interaction.

Secondly, special attention must be paid to the interplay between micro and macro dimensions of the financial sector, particularly across borders and sectors.

Finally, despite the "data deluge"[1] that characterises our everyday life, the financial crisis revealed the existence of significant data gaps involving certain key sectors and in relation to the interconnectedness of the financial system. I refer in particular to the lack of information regarding the "shadow banking" system, risk transfer instruments (including "over-the-counter" derivatives), complex structured products, and the degree of interconnectedness between large financial institutions.

These information gaps illustrate the challenge faced by the statistical and data analysis framework in keeping pace with financial innovation and the global financial system's increasing complexity, including the ever stronger interdependencies between institutions.

We had to acknowledge that better indicators are needed, in order properly to assess the potential systemic risks within unregulated or lightly regulated financial institutions and instruments as well as to monitor the impact of transferring risks across institutions and markets. This is the background against which the European Commission has adopted legislative proposals to ensure better disclosure in the field of derivatives, with the Council and Parliament agreeing to enhance the disclosure of securitisation exposures in reforms to the Capital Requirements Directive.

More is also needed in order to monitor the interconnectedness between large and complex financial institutions, particularly those with a global reach, since their rapid growth has created a dense global network of linkages with important repercussions for both EU and global financial stability. With regard to better access to information about systemically important financial institutions, substantial progress is expected from the work of the Committee of European Banking Supervisors on common reporting guidelines (COREP). The establishment of the new supervisory authorities will also enhance the flow of information between home and host authorities within the supervisory colleges.

The expansion of financial activities through non-banking financial institutions is another structural change for which the crisis revealed serious information gaps. Progress here is similarly vital, particularly as these institutions are major players

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1   *Data, data everywhere*, The Economist special report, 27 February 2010.

in European markets and their investment behaviour may greatly influence financial stability.

Further progress is indispensable in the area of macroeconomic indicators. These are critical for a proper assessment of the interplay between financial and real sectors. EU economic statistics have become increasingly comprehensive, comparable and timely, yet additional progress is needed, in particular regarding the non-euro area countries. Moreover, the quality of the principal European economic indicators should be improved further to surmount remaining deficiencies, for example in the area of services and labour markets, and to examine the feasibility of "flash estimates", i.e. GDP growth estimates 30 days after the reference period. The European Statistical System, coordinated by Eurostat, is currently working on these targets.

Let me turn now to my main topic for today: what data will the ESRB require in order to carry out effective macro-prudential risk assessments? Furthermore, what is the most effective way to collect these?

The ESRB's thorough monitoring of potential risks and vulnerabilities requires a comprehensive database to capture the broad characteristics of the entire financial system. This needs to encompass several inputs, including a wide range of financial market indicators and statistics: interest rates and asset prices; financial stocks and flows; and macroeconomic and prudential indicators. The quantitative evidence has to be complemented with qualitative information, or "soft indicators", such as surveys of investors' sentiments or lending standards. The scope of data has to cover all types of intermediaries, including large and complex ones, key markets and financial infrastructures. Furthermore, it is vital to develop appropriate methodologies for assessing interconnectedness between financial institutions, financial markets and the real economy.

Fortunately the ESRB can build on a wide range of sources – statistical offices, supervisors, central banks, market data providers – and fully exploit the potential synergies between the different providers. Apparently the European System of Central Banks, together with the European Statistical System, will play a central role in consolidating the ERSB database.

However, the ESRB cannot rely solely on data available from public disclosures, which may sometimes lack both harmonisation and adequate "granularity", and whose collection and compilation may be "resource-intensive". Let me remind you at this point that the ESRB Regulation clearly calls upon "the European supervisory authorities, the national central banks and the Member States to cooperate closely with the ESRB and provide the information necessary for the fulfilment of its tasks".

Particularly relevant will be access to a set of micro-prudential indicators, ranging from solvency ratios to data on liquidity and funding risks, leverage ratios and risk concentration ratios. Combining macro and micro data is the new framework's major innovation – a vital one for ensuring effective interplay between macro and micro-prudential supervision.

While existing reporting structures should be fully exploited, multiple reporting channels, especially those that may bypass national supervisory authorities, should be avoided. This will be critical not only to enhance the efficiency of the process, but also to limit administrative burdens on reporting institutions.

Recognising the inherent difficulty in forecasting crises and acknowledging the shortcomings of past risk monitoring efforts reminds us that both the scope and the depth of data collection and analysis must be improved. Moreover, we need to be mindful of the perpetual changes in market structures, behaviours and innovations. Analysis of these changes will also require ad hoc data collection exercises to examine specific issues not yet covered by regular reporting. Hence, the process of defining data and statistical needs should remain flexible in order to enable continuous improvement and evolution. As a result, the ESRB, together with the ESFS, should maintain a sufficient degree of flexibility in adapting the data requirements.

This brings me to the interaction between the ESRB and the ESFS, which will be at the heart of the new EU supervisory framework.

As the recent financial crisis clearly demonstrated, current EU supervisory arrangements focus mainly on individual institutions and individual risks, but pay insufficient attention to the interconnectedness between financial institutions and financial markets. Therefore, adequate arrangements for smooth cooperation and information exchange between the ESRB and the ESFS will be key to effective surveillance and assessment of systemic risks.

The European Supervisory Authorities (ESAs) and the national supervisory authorities have to provide the ESRB with their specific knowledge of EU financial sectors and with a timely flow of harmonised micro-prudential data. There must be adequate data frequency and "granularity" in order to identify systemic risks at an early stage without placing any unnecessary burden on reporting entities. In this respect the Regulation provides a process for the smooth flow of information between the ESFS and the ESRB, in line with the principles of subsidiarity.

The ESAs will act as the main counterparts in collecting and channelling micro-level data to the ESRB. To ensure more timely data collection, it is envisaged that the ESRB in certain cases may address its requests directly to the national authorities.

While information will be provided in the majority of cases in aggregate form to protect confidentiality, the ESRB will also need data at individual level for large and complex intermediaries, i.e. financial institutions which are notable for their potential impact on the stability of the financial system. Access to individual data will be subject to a "reasoned request" and accompanied by the safeguarding of specific confidentiality requirements.

National supervisors for their part will benefit from the ESRB's risk assessments, which will enable them to analyse the potential impact of identified risks on the supervised entities.

The Advisory Technical Committee will provide additional opportunities for both the national supervisors and the ESRB to gather data and exchange information.

In my view, the provisions mentioned here establish a proper balance between the interests of all parties and also create a coherent framework for the exchange of information. More importantly, they allow the ESRB to do its job effectively. As we all know, however, "the proof of the pudding is in the eating". For that reason, the Commission is prepared to consider changes if these are warranted by initial experiences in the course of reviewing the entire framework in 2014.

Before moving on to the final part of my paper, which focuses on the global context, let me share some thoughts on the role of the financial sector in the future framework. I am convinced that market intelligence, and regular and open dialogue with market participants, will play an essential role in strengthening the information base of the ESRB, and will identify trends which may be of macro-prudential relevance to business models, investment strategies, and financial innovation, etc. Moreover, the ESRB could play an important role in reducing over-reliance on ratings and contribute to finding appropriate alternatives, for example by enabling market participants to use relevant and timely information in order to conduct their own independent credit analysis. Such transparency on the part of the macro-prudential supervisor could be regarded as "preventive medicine" in the sense of informing and providing guidance to the private sector on the overall state of financial stability and the future outlook.

A globally integrated financial system calls for the international coordination of macro-prudential policies. However, due to differences in economic conditions and institutional arrangements across countries, an effective macro-prudential instrument in one country might not be as effective in another. Therefore, the ESRB on the one hand must take into account the country-specific nature of systemic risks when analysing them or developing a policy response, but also needs to establish smooth cooperation with its peers inside and outside the EU. Hence, under the G20 process the work of the ESRB needs to dovetail with the work of the Financial Stability Board (FSB) and the International Monetary Fund (IMF). Moreover, the interfaces between the ESRB and the macro-prudential institutions in major non-EU financial centres call for careful crafting. This applies particularly, but not exclusively, to the US Financial Stability Oversight Council and the Swiss banking authorities.

Fostering global coordination in this area means continuing the work aimed at enhancing international data comparability, through common references to international statistical, accounting and supervisory standards and by improving the coverage of international statistics, such as the IMF's Coordinated Portfolio Investment Survey and the Bank for International Settlements' International Banking Statistics.

We also need to multiply our efforts to align EU and international initiatives for addressing information gaps, such as the FSB Working Group on Data Gaps and Systemic Linkages and the Inter-Agency Group on Economic and Financial Statistics. This will be critical if we are to exploit all possible synergies between different work streams.

In my comments I have focused on the types of information the ESRB will require in order to go about its duties. But let us be clear: the success of the new framework will not depend exclusively on the availability of an adequate database; rather, effective macro-prudential surveillance has to build on both reliable information and sound analysis.

Filling the existing information gaps and channelling the relevant information to the ESRB would be futile if it were not complemented by a further two elements. The first is the development of appropriate analytical tools and capabilities to, for example, decipher the interconnectedness between institutions, markets and infrastructures, explore the interaction between the financial instability and performance of the whole economy, monitor and report on changes in system-wide risk, promote best practices for financial risk management, and evaluate and report on stress tests. The second involves resisting any "herding" temptation when assessing the risks by having analysts who retain an open mind, are willing to challenge basic assumptions and prepared to sail against the wind and tide.

All in all, as Janet Yellen, Vice-Chair of the Federal Reserve System, aptly remarked recently: "Systemic risk surveillance is both a science and an art: *science* in that we will analyse closely a wide range of data that research shows to be diagnostic, and *art* in that we will have to exercise judgment about when excesses become so dangerous that action is required."

Finally, let me reiterate that the other two steps following risk monitoring and assessment, namely the communication of risk warnings and the adoption of related policy recommendations, will be no less challenging.

You may remember from your student days the story of Cassandra, the daughter of the Trojan king Priam. She had the gift of prophecy, but had also been cursed so that nobody would ever believe her warnings. Will the ESRB's fate be similar to that of Cassandra? I do not think so. On the one hand, the ESRB's forecasts will not rely on divine gift, but be based on a solid database and well-founded methodologies. On the other hand, there is no curse on this new body. Right now, still under the shock of an epic financial disaster, the climate for macro-prudential policy-making is rather favourable. Nevertheless the ESRB, through its communication and in formulating its recommendations, must be very careful, credible and convincing, because its forecasts will not always match the reality as most people perceive it. The task now is to implement intelligent policies quickly in order to contain future bubbles and credit excesses, and to make sure that those which do occur inflict a lot less damage on the economy. I am confident that the ESRB will achieve everything that we expect from its foundation.

DISCUSSANT'S REMARKS

ELISABETH PAULY

As the presentations from the two previous speakers have covered the topic of the informational requirements for macro-prudential oversight in the EU framework and the role of central banks so extensively and proficiently, I will make just three additional points in order to shed some light on the most challenging issues.

In his intervention, Vice-President Constâncio highlighted the specific ability of central banks to develop macro-prudential analysis and oversight thanks to the range of their analytical and statistical skills.

I would like to point out that, beyond these competences, central banks can also bring to the European Systemic Risk Board (ESRB) a unique set of expertise due to the variety of their functions and their involvement in a vast range of operational tasks.

- They actively trade foreign exchange and financial products for their customers or for their own foreign exchange reserve management and investment portfolio operations. As part of this activity, they rely on a wide network of contacts with market participants.

- Over recent decades, they have developed considerable expertise in the analysis of financial assets, particularly those they accept as collateral for their monetary policy operations. In this regard, it is worth reiterating that this collateral is highly diversified in the case of the Eurosystem's operational framework.

- They oversee critical financial infrastructures, large-value payment systems and securities settlement systems.

- In some countries at least, they also play a role in micro-prudential surveillance.

Performing these different functions certainly places the central banks in a unique position to monitor market developments and financial innovations and also to detect early signs of systemic risk in good time.

Let me take the more specific example of one market segment which suddenly became totally illiquid when the financial crisis exploded in 2007: the asset-backed securities market. The illiquidity of this market was already well-known to the Eurosystem. Since these assets were being accepted as collateral for its monetary policy operations, the Eurosystem had developed a specific tool for the fair valuation of these assets, for which no reliable market prices were available.

My second point refers to the efforts that are still required in the area of statistics with a view to conducting comprehensive, accurate and well-founded

macro-prudential assessments. Three directions have been mentioned by Vice-President Constâncio: first, harmonising; second, increasing the frequency; third, extending the coverage of statistics for the banking sector and other financial sectors to the whole of the EU. There is no doubt in my mind that, of the three objectives, coverage of the whole of the EU should be given the highest priority. This coverage is an obvious precondition for conducting a proper financial stability analysis.

With regard to the other directions – harmonisation and frequency – these features should be at the core of the close cooperation to be developed between the three European Supervisory Authorities and the ESRB. This coordinated approach should be aimed at avoiding the duplication of data collection mentioned by previous speakers. It should be a two-way interaction between the macro-prudential authorities and the micro-prudential authorities. Elemér Terták broadly developed this point, particularly access to individual data following a reasoned request. I will not expand on this issue, but will simply mention that the Committee of European Banking Supervisors is preparing a new version of the common reporting guidelines, COREP, for the end of 2010 which will usher in significant advances in terms of harmonisation across the EU.

Now to my third point. There is consensus among the speakers in acknowledging that, whatever progress may be achievable in the area of statistics, it will be impossible ever to close the gap between supply and demand for information, since financial innovation will always create new needs in this respect.

Let me make some comments on this point.

• The impossibility for statistics to cover ex ante all potential data requirements with the appropriate granularity and timeliness reinforces the need to mix statistics and data derived from other sources, such as market-based information. As I mentioned earlier, the expertise of the central banks and their continuous dialogue with market participants allow them to develop the "flexibility" or "agility" needed for producing accurate and timely financial risk assessments.

• Among the critical areas where improvements are needed, the effective coverage of non-regulated financial sectors – the so-called "shadow banking system" – has been flagged by previous speakers. As long as these sectors remain unregulated and, as such, not subject to reporting requirements, other channels to assess the development of their business and the risks they may entail for the financial system as a whole might be contemplated. In particular, as a number of new financial products issued or bought by the vehicles are assessed by rating agencies, a flow of information should be established between the rating agencies and the European System of Central Banks (ESCB). As key players in the design of financial innovation, rating agencies could be asked to provide more detailed information on new products, such as the volume of issuance, the degree of risk involved and the type of underlying assets. This would help central banks to track financial innovation and better detect any potential vulnerabilities that may arise from this continuing process.

It would also allow a better understanding of the risk transfers between sectors and of the functioning of the financial system as a network.

Nevertheless, should this flow of information become available, it would not replace the need to develop the information collected from the financial system's players themselves, especially the banks.

Accurately defining the full set of information necessary to map all the sources of risks stemming from interconnectedness is probably the most challenging issue. This is because it should ideally encompass any exposure of an individual financial firm – or at least the most important ones – not only to EU counterparties, but also vis-à-vis counterparties worldwide. Moreover, to be adequately informative, data would probably need to be produced at a high frequency and also cover all financial instruments, including derivatives.

The complexity of this task was pointed out by the previous speakers. We can expect it to take some time to develop an appropriate methodology and an adequate analytical framework. These might then be considered as taking – at least as a first step – a more qualitative approach, consisting of the enhancement of bilateral contacts with market participants and any other relevant counterparts. This could be one way in which to try and strike the right balance between "boldness" and "realism", as Lex Hoogduin reiterated in his opening panel address.

In conclusion, ultimately it seems obvious that we need to follow a multi-dimensional approach, using both hard data and market data, qualitative information and any relevant anecdotal evidence. In my opinion, such a flexible and pragmatic approach should allow the ESCB in due course to provide the ESRB in its macro-prudential oversight functions with the most efficient support.

DISCUSSION SUMMARY

Serge Kolb (Banque Centrale du Luxembourg) commented on the importance of defining a framework and strategy before deciding on new statistics. Banks in Luxembourg fear an increase in the reporting obligations from the creation of the new European institutions. Therefore, he requested clarification on the expected gaps in order to assess the magnitude of the reporting costs arising from an extension of the existing set of statistics.

Lex Hoogduin (Executive Director, De Nederlandsche Bank) stressed that the quality and focus of macro-prudential analyses would more determine how we looked at the data, rather than the amount of data determined by the quality and the focus of the analysis. He expressed some concern that an excessive supply of statistics might reduce the effectiveness of this analysis, by scattering macro-prudential policy analysis across a very wide range of data. He then asked for information on the ECB's reference framework when discussing data gaps.

In the context of macro-prudential policies, **Vítor Constâncio** (Vice-President, European Central Bank) pointed to three possible sources of systemic risk which affected the real economy: contagion within the system; the unravelling of imbalances that accumulate over time in the system; and severe macroeconomic shocks that affect the functioning of the financial system. In his view, there are not enough data about contagion risks and this was an area where efforts should be concentrated in order to fulfil new demands for additional statistics on interlinkages and interconnections, notably cross border. The unravelling of the accumulation of imbalances over time would lead to data harmonisation in the new supervisory regulations under approval on leverage and liquidity ratios and capital requirements, while data were also needed on other macro-prudential policy instruments indexed to the economic cycle, such as counter-cyclical capital buffers. There was not enough awareness of risks, because economic models did not assess the relative importance of, or priorities attached to, risks to the economy. To assess macroeconomic shocks, economic models must be enhanced to identify the feedback between the financial sector (as the main source of the crisis) and the non-financial sector. Models had considered that financial institutions worked efficiently, rather than as possible originators of macroeconomic shocks – an assumption which was not considered in macroeconomic theory. To allow for a more effective assessment of risks in the context of macro-prudential supervision, there will be new demands for statistics from financial institutions when measuring interconnections and also two new statistical sources: the new harmonised reporting templates (to be approved by the ESAs by 2012), supporting the further harmonisation of existing statistics; and additional reports on cross-exposures and interconnectedness by large and complex financial institutions.

Elemér Terták (Director of Financial Institutions, Internal Market and Services, European Commission) stressed that the European Commission and the ESAs will follow the philosophy of asking as much as necessary and as little as possible. The first step should be to analyse what can be used from the significant amount of data currently being produced. Interconnectedness between large

financial groups is the area in which there is currently not enough information being collected. A revised COREP is expected to fill this gap. In his view, the functioning of the ESRB will not necessitate a dramatic increase in the reporting burden.

Bernhard Winkler (European Central Bank) recommended using a map and a compass to find and provide new statistics; there should be no waiting for new developments in economic theory before starting the collection of new data. Statistics will always lag behind developments in shadow banking, while for monetary analysis we needed to know what we did not know before. Integrated economic accounts and flows of funds were necessary to monitor new trends.

Manuel Marfán (Deputy Governor, Central Bank of Chile and Chairman, Irving Fisher Committee on Central Bank Statistics) asked for details of existing guidelines on the collection of further information.

Yuji Osawa (Bank of Japan) reported on the confidentiality constraints that had hampered the exchange of information among national central banks in Asia in response to the Asian crisis. He asked for clarification on whether the ESRB will have direct access to micro data or rely on the collection of such data by national central banks.

Lex Hoogduin mentioned that, although not yet as advanced as the framework in place for monetary policy, work has been progressing on the establishment of a framework for macro-prudential policy. Nevertheless, improvements can be made to better connect the design of this framework with the identification of data gaps.

Vítor Constâncio clarified that the micro data used by the ESRB will be collected by national supervisors and by the ESAs. The ESRB will have the right to ask the ESAs for these data, but will not collect them directly. He referred to the perimeter of regulated sectors which is being extended to cover non-banking institutions like hedge funds, private equity firms, etc. and thus produce more information. Moreover, the tendency of the financial system – in its reaction to increased regulation – is to find new ways to go beyond the regulated border. Thus, it will be important to have information with which to monitor the flows between the new regulated sectors and the non-regulated sectors.

Elemér Terták reiterated on the G20 agreement that no segment or player in the financial markets should be left unregulated. He concluded by drawing a parallel between the Wright brothers, who began flying without modern airplane technology, and the start of work by the ESRB when there are gaps in the information available.

4 THE ROLE OF STATISTICS IN CENTRAL BANK COMMUNICATION

INTRODUCTORY REMARKS

ATHANASIOS ORPHANIDES

The topic of the session, "The role of statistics in central bank communication", is of particular interest because effective communication is a very important policy tool. For that reason, we must always seek ways to improve central bank communication and to understand how statistics can help enhance its clarity and effectiveness.

A key challenge is how to provide better information and how to help households and businesses better understand the economic and policy environment around us, and thus to take better decisions. This requires awareness of the limited capacity humans have for processing information, an inherent limitation we all face. When confronted with voluminous and unprocessed information, people are not always able to quickly analyse it effectively, and to extract the most useful elements needed to improve decisions.

Policy-makers need to be sensitive to communicating information where the useful content dominates the unavoidable noise in the statistics being communicated or where the uncertainty associated with the statistics provided can be explained reasonably well. Care is needed in deciding what is communicated and how this is done in order to ensure that communication reduces the uncertainty faced by the intended audience and facilitates better decisions. In other words, effective communication requires clarity. More communication is not necessarily always better, especially when it may inadvertently serve to mislead, rather than to inform on concepts that may be critical for good decisions.[1]

Statisticians are well aware of the imperfections associated with the creation of statistical series. When we describe the overall economy even under the best of circumstances, some irreducible uncertainty may remain on how well a statistical series can capture the underlying concept it attempts to measure. Statistics may only provide a proxy for a concept that may be critical for decisions. And the creation of aggregate data series invariably introduces noise that is due, for example, to breaks in concepts, imputations, aggregation limitations and so forth. Effective communication of the uncertainty surrounding statistics is thus an important but challenging task.

The crisis we have been going through has given us additional examples of challenges associated with central bank communication. Let me briefly mention two examples that also serve to remind us of the need to adapt the communication of statistics as circumstances change.

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1   See Dale et al. (2008) for an example of pertinent trade-offs in central bank communication.

One example relates to the communication of the stance of monetary policy. As a result of the crisis, central banks around the world, including the European Central Bank, the Federal Reserve System and the Bank of England, have reduced their official policy rates to unprecedentedly low levels. They have also implemented a series of unconventional policy measures to engineer an additional easing of monetary policy beyond what would be reflected in those official rates. But how are we to communicate precisely what the monetary policy stance is in these circumstances? This presents a communications challenge that has not, in my view, been solved very clearly – some of the statistical series used to this end before the crisis are not necessarily as useful indicators of the monetary policy stance as they were then. For example, policy rates are no longer sufficient policy indicators. Under these circumstances, all other things being equal, an additional expansion of a central bank's balance sheet would, for instance, constitute an easing of the bank's monetary policy stance. Conversely, adjustments to unconventional measures without changing official rates could constitute a tightening of a central bank's monetary policy stance. But it may be difficult in the given circumstances to communicate the monetary policy stance as accurately as was possible before the crisis, even if the central bank is as clear as can be not only on its policy rates, but also on the size and composition of its balance sheet and on any changes to other unconventional measures. This is an example of the importance of striving to adapt and find effective ways of communicating with the public in a changing environment.

The second challenge I would like to mention concerns the measurement of incipient macroeconomic imbalances. This is particularly important in the context of the efforts that are being made at the international level to improve macro-prudential supervision. As has already been highlighted at this conference, this is one of the key areas in which we need to develop new statistics and improve the statistics we already have. As examples, let me mention a number of issues where we need to improve our measurement so as to be able to provide better answers to the questions raised. When does credit expansion become unwarranted? How should we be measuring this concept of credit in order to understand it as a macro-prudential risk? When does leverage in the financial sector become excessive? What is the most appropriate concept of leverage we ought to measure to assess aggregate risks? These are all issues that have been identified as quite important in the aftermath of the crisis, but for which we need to develop better statistical tools to guide us going forward. This is essential to help us understand and avert crises in the future.

Statistics are critical for central bank communication and effective communication is a crucial element of central bank policy-making. But a number of questions remain with respect to identifying best practices. The presentations by Andreas Ittner and Aurel Schubert, and Petra Geraats, as well as the corresponding discussions by Elga Bartsch and Frank Paul Weber, offer us different points of view and help guide us through some of the issues.

References

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CENTRAL BANKS SHOULD BE BORING – OR SHOULD THEY? COMMUNICATING CENTRAL BANK STATISTICS TO THE GENERAL PUBLIC[1]

ANDREAS ITTNER AND AUREL SCHUBERT

I   INTRODUCTION

"...our ambition at the Bank of England is to be boring."

(Mervyn King, 2000)

Recent years have been very turbulent and challenging for central banks to a degree that may well be unprecedented in the history of modern central banking. Most central banks had to resort to unconventional policy measures to deal with the symptoms of the current financial and economic crisis. We have been experiencing the deepest and most global economic and financial crisis since the 1930s, especially since the collapse of Lehman Brothers in September 2008.

This financial turmoil has also highlighted the urgent need for greater transparency in financial markets. Central banks have been confronted with an – unexpected – exponential increase in the demand for information about financial markets and the risks in those markets, especially for information with a focus on financial stability. Uncertainty and fear generate a thirst for (reliable) information. In uncertain times like these, trust in numbers stemming from trust in the institution behind those numbers is at a premium. This demand for information originates not only with the institutions responsible for supervision and financial stability, but also with market participants, researchers, as well as the general public. Given the speed at which developments unfold, now more than ever people are impatient to receive new data and new information not only on the state of the economy, but also on the state of the financial sector and its components. Effective communication becomes even more necessary in periods of heightened uncertainty when the general public is confronted with a loss of confidence and when the functioning of markets is severely impaired.[2]

2   THE ROLE OF CENTRAL BANKS IN STATISTICS

Central banks are both users and producers of statistics – mainly about financial markets, financial institutions and the financial infrastructure. They produce the data first and foremost for their own decision-making processes and bodies. Stopping there, however, would be a mistake. Statistics can – and should – play an important role in the communication activities of every modern central bank. Revealing the statistical basis for decisions not only fosters an understanding of the

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1   The authors would like to thank Patrick Thienel and Rena Mühldorf, Oesterreichische Nationalbank, for their valuable input.
2   European Central Bank (2009), p. 71.

decisions made, but also contributes strongly to the credibility and predictability of the institution. It helps to steer expectations in the direction in which the central bank wants them to move. If the audience – be it the general public or specialised sub-groups – understands the reasoning of the central bank on the basis of observable facts, it will trust the institution.[3] Therefore, for a modern central bank, good communication based on or using statistics is not a matter of "maybe", but a must. It is not simply "nice to have", but indispensable.

Statistics are not just an integral part of explaining the decisions of the central bank; they are far more a core product of a central bank in their own right, independent of their use by the decision-making bodies. Statistics are a public good – and, as such, a responsibility that central banks have to society. To live up to this responsibility, central banks have to devise adequate means of disseminating and communicating information to the very people who might need or want it. Central banks have to "speak the language of the public". The possibilities created by the internet play an important role in this respect, making it much easier for central banks to live up to this responsibility than 20 years ago or more.

Communication comes from the Latin word "communicare". According to Wikipedia, communication "… is a process of transferring information from one entity to another … or [the] interchange of thoughts, opinions, or information by speech, writing, or signs". Furthermore, "[c]ommunication is a process whereby information is enclosed in a package and is channelled and imparted by a sender to a receiver via some medium". This implies that the addressee understands the message or that the contents and presentation of the message are correctly geared to the interests and the prior knowledge of the addressee. Communication has to be "fit for the respective audience". While the traditional direct audience of central banks might comprise policy-makers, analysts, market participants or journalists, the ultimate audience will – increasingly – be the general public. Some of the current structural developments in finance strongly support this tendency. For instance, individuals increasingly have to deal with financial issues for their private pensions.

An important distinction needs to be made between regular or routine communication and "ad hoc" communication in special situations like a financial crisis. Central bank statisticians have to be flexible enough to react quickly to new information demands in situations of financial distress or crisis, as new questions and concerns might arise that require new communication approaches. Those new approaches might simply involve repackaging existing information or changing the frequency of communication, but they may also require completely new communication contents. In such situations, it becomes especially important to distinguish between the central bank's role as a monopoly producer of statistics

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3   As Alexandre Lamfalussy put it so aptly: "Statistical information is necessary to decide what policy actions to take, to explain them publicly, and to assess their effects after the event. Unless policy can be justified and explained, it will not be understood and the institution carrying it out will lack credibility." (European Monetary Institute 1996, p. 1)

that are a public good and its role as a supplier of financial analyses, which are a product that other institutions can provide just as well.

If such new developments, special events, or crises occur, fast ad hoc communication of statistical facts can be necessary and important in order to establish clarity, alleviate uncertainty and stop rumours. Central banks need to get the facts out before others start to outguess them or to create their own reality. Therefore, in such situations central bank statisticians might have to leave the usual paths of communication and become proactive. If others publish or disseminate incorrect information, central banks need to react and communicate the correct facts.

Based on their policy functions, their closeness to financial markets, their long-standing expertise as well as their credibility and – last but not least – the "public good" nature of such information, central banks are best placed to serve as the providers of such information (including statistics) about the financial economy.

Monetary as well as financial stability require good policies; good policies require good analyses; and good analyses require good statistics. Statistics are a core input into all policy decisions by central banks and essential for successful central banking. Thus, reliable and up-to-date central bank statistics form the basis for the Eurosystem's monetary policy decisions as well as for financial stability analyses.

The monthly introductory statements by the President of the European Central Bank (ECB) on the outcome of the (first monthly) Governing Council meeting and the ensuing Q&A session are good examples of the extensive use of statistics – quantitative information – to support the decisions on interest rates. Thus, there were between 12 and 16 explicit references to statistics – not all produced by central banks – during the press conferences of January and February 2010.

3   INDEPENDENCE AND CREDIBILITY – THE BASIS FOR TRUST

Central banks are well placed to provide statistical information because they are independent, which includes independence in producing and disseminating reliable statistics.

A recent example was the prominent discussion in 2009 on the existence of a "credit crunch". Banks were accused by some of restricting the supply of credit beyond the degree justified or necessary in the light of the worsening credit ratings of their debtors. In this way – it was claimed – they would worsen the economic situation unilaterally and unnecessarily. It took some effort and new statistics (new surveys) by central banks – like the Oesterreichische Nationalbank (OeNB) – to set the record straight. Within just a few weeks, such a new survey was implemented and the results were communicated to the public – replacing fiction with facts. The myth of the credit crunch was replaced by convincing evidence to the contrary. This shows how important the independence of the

central banks is in providing the public with objective information – especially in such times of turbulence and political manoeuvring. Central bank independence is not just a privilege, but a strong obligation towards the general public.

The issues of transparency and accountability are directly linked to the question of independence.

As a public institution, a central bank must be fully accountable for all its actions. As ECB President Jean-Claude Trichet highlighted in a speech two years ago, in a democracy the independence of a central bank must be accompanied by both transparency and accountability to the general public. In other words, it is the duty of independent central banks to be transparent and to communicate not only with specialised audiences, such as financial market participants, but also with the public at large.

Hence, the production and communication of statistics are important elements of the public accountability of central banks as well as a solid basis for the type of evidence-based policy-making that the public increasingly expects. People should be able to follow, understand and even anticipate decisions as a precondition for building up credibility. Transparency will also enhance central banks' accountability for the decisions they take.

4   WHO IS THE GENERAL PUBLIC?

Central banks communicate with at least five different groups:

• financial market participants;

• other institutional actors, like governments and parliaments;

• other economic actors;

• journalists and the media;

• the public at large.

However, the general public itself is a heterogeneous group, and its interests and concerns are heterogeneous as well. In order to make targeted communication possible, the public needs to be grouped into more homogeneous groups (e.g. based on education, age, attitudes towards risk, stage of the life cycle) and thus should be addressed using different communication approaches. Most people are not professional users and therefore do not have clearly defined needs or demands relating to central banks. Moreover, central banks' messages are often not communicated directly but via transmitters, mainly the media. Therefore, the media must have a special place in the central banks' communication strategy toward the general public.

The internet has given central banks new possibilities for addressing the public directly – or internet users at least. This allows central banks to control – to a certain degree – what messages are transmitted to the general public, and when. The internet also provides a channel through which the public may address the central bank directly, e.g. via e-mail or a statistics hotline, and allows for an "interchange of thoughts, opinions and information", which is one of the characteristics of communication. Addressing the general public effectively requires very wide-ranging solutions in communication – "smart communication".

5 HOW CAN CENTRAL BANKS REACH THE GENERAL PUBLIC?

Central banks face the challenge of communicating statistical content in a user-friendly, understandable and accessible manner, in order to bring statistics closer to the people. The legibility of numerical tables is an example: it does not make sense to present a somewhat confusing collection of numbers in many columns; rather, central banks have to present results in an organised and legible fashion. Good graphics and "tasty snippets of data" increase the likelihood that users will spot a relevant link between the data and their personal lives and needs. This requires customised information or – for more advanced users – the flexibility for them to organise the information in just the way they require.

Statistics also need to be adequately explained. It is more effective to tell an interesting story ("storytelling") than to present a dry, formal data analysis. However, it is a big challenge to present data in a way which makes them more understandable for users without changing the basic facts.

When addressed directly, people must have the skills and the means to understand the information they receive. Therefore, the information has to be supported by solid, easily understandable metadata as well as descriptions. In addition, central banks might have to invest in the basic statistical literacy of the target groups. Moreover, the general public's ability to read and interpret statistics, i.e. statistical literacy, must be nurtured. However, the major challenge is not how to educate users in a manner which a *central bank* thinks will make them understand statistics, but how to match the presentation of specific statistics with the *users'* need to understand. Understanding statistics and being able to assess their quality and their significance can be regarded as a basic requirement for participation in public life.

6 WHAT ARE THE RIGHT CHANNELS OF COMMUNICATION?

Central banks already use a wide variety of communication channels in order to reach many different audiences and inform them about a multitude of issues. The communication tools and measures include issuing press releases, holding press conferences, giving interviews, making speeches and providing background briefings. Furthermore, central banks operate hotlines and publish statistical articles as well as booklets. Running a stall at an economics fair or similar

event is one option for establishing direct contact with interested individuals. Organising statistical seminars is another. As television is still the most popular medium, a very large audience can potentially be reached this way – but TV is usually not suited for relaying more sophisticated information.

Of course, all central banks also now have websites with rich statistical content. The internet has become the main channel for the dissemination of statistics. It is the "age of statistical websites", as this modern flexible technology offers so many possibilities for presenting material in a structured way at different levels or on different platforms. For the user, websites are the quickest way to obtain up-to-date information which can be downloaded very easily. Furthermore, new technological developments like statistical visualisation allow new ways of communicating statistics.[4] However, the diversity of the different central bank websites is still a challenge for the non-specialised general public. A good example of how to overcome this heterogeneity and present comparable data in a comprehensive, user-friendly way is the joint dissemination framework of euro area statistics and national contributions. This framework is available on all Eurosystem websites and offers harmonised national information presented with the familiar look and feel of the national central banks.

The recent launch of principal global indicators (PGIs) for the G20 is also a good example of the effort to present comparable national data on a global level and in a user-friendly way.[5]

The crucial role of effective communication in achieving central banks' goals is increasingly evident. Therefore, external communication measures must be steadily improved by more closely aligning the information provided, the instruments used and the audiences targeted.

Central banks have to be their own transmitters and translators, as the media might not always do this job properly, especially since topics may become too sophisticated. Thus, "going the extra mile" may well be worth the effort.

If large audiences or target groups are to be reached, the information provided must be reduced to basics. We have to avoid the danger of overburdening non-expert addressees. Reducing complexity can increase understanding and thus serve the ultimate purpose of central bank communication. Being too complex might be counterproductive.

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4   The ECB's Statistical Data Warehouse is a good example.
5   The PGI website presents data for the Group of Twenty (G20) to facilitate the monitoring of economic and financial developments for these systemically important economies. Launched in response to the ongoing financial and economic crisis, and hosted by the International Monetary Fund (IMF) – it is a joint undertaking of the Inter-Agency Group on Economic and Financial Statistics; Bank for International Settlements; ECB; Eurostat; IMF; Organisation for Economic Co-operation and Development; United Nations and the World Bank.

Again, there is a need to distinguish between regular statistical releases with a pre-announced release timetable and ad hoc releases that need to be well timed in order to calm a fragile situation and not make it worse. In normal times, synchronising data dissemination across countries and regions might greatly enhance the usefulness of the data for international comparisons.

Building alliances with universities and research institutions might be an effective way to address expert users and to build up a future constituency for statistics, empirical research and evidence-based policy-making.

7   WHAT DOES THE AVERAGE CITIZEN CARE ABOUT?

The next question is: what does the general public want – and need – from central bank statistics, in normal times as well as in times of crises? What interests and concerns can central bank statisticians address?

The interests of the general public are as diverse as the public itself. Yet central banks have to be aware that many of the data they produce are of interest only to policy-makers or to very small and specialised cross-sections of the general public.

As the ultimate goal of monetary policy is to maintain price stability, the public is interested first and foremost in the rate of price inflation. However, this information is usually produced not by central banks, but by the national statistical institutes. By using the information from national statistical institutes, the independent central bank might enhance the credibility of inflation figures, something that may well turn out to be important.[6] Inflation affects personal incomes and wealth and is therefore of paramount importance for people's well-being. Interest rate levels are also contingent on inflation, and people are keenly interested in interest rates: "How much interest can I get for my savings, and how much interest do I have to pay for my loan?" Moreover, when people travel abroad, they want to know what the exchange rate is. Their most fundamental concern of all involves the safety and soundness of their savings and other financial investments.

As a consequence of the current troubled times, we have also seen that a crisis requires central banks to emphasise selected aspects of their data. In times of financial crisis, both the man or woman in the street and professionals alike demand data on the stability of the banking system as a whole and about individual banks where they hold deposits. This means that they wish to have data about individual banks' exposure, equity capital, securities and deposits. In times of currency crises, i.e. balance of payments problems, people want to hear about exchange rates as well as balance of payments and related developments.

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6   The divergence between measured inflation and perceived inflation following the introduction of the euro is a case in point.

Sometimes, the data the public are most interested in are data about individual institutions – data which are confidential and cannot be disseminated by central banks. Explaining the need (and the obligation) for confidentiality might be a communication challenge, especially in relation to investigative journalists.

The conclusion is that central banks have to be prepared to respond quickly and flexibly to changing needs for data. Obsolete data that are no longer needed should no longer be actively published.

8   QUALITY

Credibility is crucial for any statistics producer, especially in the case of central banks. An important aspect of ensuring this credibility is to comply with international quality standards in data production and to make these standards transparent. Quality approaches, like those of the ECB Statistics Quality Framework (SQF) and the IMF Data Quality Assessment Framework, set ambitious standards for the production as well as communication of statistics. According to the SQF, statistical output is deemed to be fit for purpose if it is relevant and complete, accurate and reliable, consistent, timely and accessible. Of course, the SQF also outlines the fact that statistics must meet stated or implied user needs. These needs may – as stated earlier – alter over time as a result of changes in the economic environment.

The quality dimension of "clarity" also covers accompanying material. In this context, clarity means that up-to-date and pertinent information on data and metadata must be presented in a clear and understandable manner as well as be easily and freely accessible to all users.

It is also indispensable to provide assistance to users. Prompt and knowledgeable support services should be available to help users access and understand data. Assistance also means the availability of unpublished details upon request.

There should be no doubt that the communication of statistics represents an important aspect of statistical activity and should be considered an integral part of high-quality data production and dissemination.

9   COMMUNICATION OF STATISTICS TO THE GENERAL PUBLIC BY THE OESTERREICHISCHE NATIONALBANK

The channels and forms which the OeNB uses to communicate statistics have evolved with the needs of users and advances in information technology. The internet, via the OeNB's website, is the prime distribution channel for OeNB statistics. Not only are data presented in standard tables, but a dynamic search tool allows users to compile tables tailored to their information needs.

The "good old" paper publication of tables and graphs in the form of a statistical bulletin still has its place, but it has taken on a new guise. Given the vast amount of data already available on the internet, paper formats can only focus on a small sub-set of the most recent data. It is a good conduit for explaining (new) statistical concepts and results and for placing them in a broader context. In this way, paper complements the database on the OeNB's website and is by no means redundant. It is a special service provided by statisticians for the general public that consists of pre-selecting relevant information. This may be especially important for non-expert audiences, which might otherwise "not see the wood for the trees". It goes without saying that this publication is also (mostly) made available electronically.

The OeNB also publishes more than 50 statistical press releases per year, including releases on monetary statistics, interest rate statistics, securities, financial accounts and balance of payments statistics, as well as supervisory data on the banking sector and on the use of credit cards in Austria.

Some six statistical press conferences a year represent a suitable avenue for explaining statistical results and the underlying concepts in more detail to journalists and, via them, to the general public. It is an avenue for entering into discussions or for putting a special focus on the data. These press events usually receive a lot of media attention – not just the next day but often later on again whenever the context fits a story. By making all the presentations and press statements available to the general public via the OeNB's website, the public can be reached directly.

More detailed statistics are also made available on the OeNB's website and provided more frequently than press information. To make its statistics more accessible, the OeNB launched a dynamic data search tool, the Dynamic Statistical Database, in 2008. One in three visitors to the OeNB's website peruses the Statistics section.[7] In 2009, the OeNB counted 2.6 million visits and 12.1 million page views.

Feedback is also important to see how the target audience responds to statistical information and messages. The OeNB tracks the media response to statistical releases through permanent media monitoring and logs page views of its website. It uses this regular feedback to adjust its communication strategy if required.

A special product of OeNB statistical communication is called "Die aktuelle Zahl," which is available to German-speaking users. Twice a month, the OeNB's statisticians highlight one (recent) figure out of the thousands produced by the OeNB and explain it to the public in a few simple sentences. The idea behind this initiative is to create interest in OeNB statistics and to attract people to the information material on the OeNB's website.

The OeNB's Statistics Hotline fields around 1,700 calls or e-mail requests a year. Growing numbers of journalists also use this avenue to procure information.

7   One in five visitors to the IMF website are searching for statistics.

Whenever a question arises in the international press, the hotline team soon receives calls, asking for information about the situation in Austria and requesting data.

Most citizens receive their information from non-specialised media, while expert groups read media which are specialised in financial affairs. Therefore, the OeNB organises seminars to inform journalists who work for the non-specialised media about what statistics are available on economic issues.

As a strategic goal, central banks, the Eurosystem and the European System of Central Banks (ESCB) should strive to be the leading providers of financial statistics for their countries, the euro area and, ultimately, the European Union. Statisticians may also pursue the goal of contributing to the creation of a "European Union identity" by establishing quantitative knowledge about different aspects of the EU in close cooperation with the national statistical institutes and Eurostat. This would make European facts and figures "countable" and "tangible", depicting Europe's diversity and unity through a statistical lens.

Giving the specific target groups customised feedback may be a challenge for central banks, but it has the potential to improve the willingness to report.

10   CONCLUSIONS

The communication strategy of central banks is work in progress. It has been evolving in line with new trends in financial markets and has availed itself of new tools in communication technology. However, we can – and should – do more. Many people are "hungry for statistics", reflecting the fast development of capital markets and the speed and force with which they respond to economic developments.

Especially in the turbulent times we live in, the general public insists on reliable information. Its concerns oscillate between fear of inflation and deflation, between governments defaulting and the lure of gold, or between the fear of financial meltdown and the lure of new, lucrative investment opportunities. Although (most) central banks are not in charge of consumer protection, they are ideally placed to provide the public with relevant, reliable statistics. Central banks have to live up to that challenge.

Additional steps are necessary to ensure a wider distribution of central bank statistics. We also need statisticians with the skills of a good storyteller. There is a need for more user-friendly, understandable and accessible means of communicating statistics. We have to contribute to improving financial literacy in order to help people understand our statistics better. We also have to react more flexibly to the changing demands for information. The first "World Statistics Day" on 20 October 2010 provided a good opportunity to raise the visibility of central banks' statistics and to make the general public more aware of their usefulness. This successful initiative should become a regular feature of the communication efforts of official statisticians, including central bankers.

Central banks can indeed go further in enhancing their communication strategy, and doing so has the potential to improve economic performance and democratic accountability. This important task must not be crowded out by other, seemingly more urgent tasks.

Communication is not just an add-on to the core business of data production, but far more a core task of modern central banks. Central bank communication with the general public does not have to be boring; indeed, it can and should be very dynamic and modern.

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TALKING NUMBERS: CENTRAL BANK COMMUNICATIONS ON MONETARY POLICY AND FINANCIAL STABILITY[1]

PETRA M. GERAATS

ABSTRACT

During the last two decades, central banks have increasingly provided quantitative information about monetary policy-making, including their primary objective, macroeconomic prospects, and, to a lesser extent, the decision-making process. Nevertheless, the recent financial turmoil shows there is room for improvement by concentrating more on conveying uncertainty and incorporating higher moments. This is illustrated by assessing measures of central bank credibility, with a special focus on the European Central Bank (ECB). It is shown that ECB credibility hit a historic low when the financial crisis was at its most severe. More recently, the ECB appears to have conducted monetary policy by stealth through liquidity operations, and its main policy rate no longer provides an appropriate measure of the monetary policy stance. Some other challenges related to financial stability are discussed, including the issue that communications may be harmful ex post but beneficial ex ante. As a result, it is important that central banks commit to regular information releases.

I   INTRODUCTION

During the last two decades, central banks have greatly enhanced their communications on monetary policy. The financial turmoil starting in the summer of 2007 led to some serious challenges for this regime of transparency. Some central banks were still trying to ward off high inflation expectations when they suddenly had to embark on extensive expansionary liquidity operations. Financial markets were so volatile that any bad news could spark off a crash or trigger a bank run. At the same time, it is believed that the financial crisis may have been mitigated if there had been greater transparency. Furthermore, the turbulence in financial markets has underscored the importance of communicating uncertainty more effectively in the context of monetary policy and financial stability.

This paper argues that central banks could improve the way in which they provide quantitative information about monetary policy-making and financial stability by focusing more on conveying underlying uncertainty and using measures that incorporate higher moments. After a brief overview in Section 2 of the potentially conflicting information and incentive effects of transparency, Section 3 explains how central banks throughout the world have increasingly been talking numbers about their monetary policy-making. Section 4 discusses

measures of central bank credibility, focusing on the ECB. Issues involving financial stability communications are considered in Section 5. The concluding section summarises the main findings of this paper.

2   EFFECTS OF TRANSPARENCY

Central bank communications contribute to transparency when they reduce information asymmetries between the central bank and the private sector. In a world without any other market imperfections, the elimination of asymmetric information would always be beneficial (by virtue of the first fundamental welfare theorem). One straightforward benefit is that the communication of information by the central bank reduces uncertainty for the private sector. This presumes that central bank communications are correctly understood. In practice, transparency requires openness, honesty, clarity and common understanding (Winkler 2002). A useful method for promoting clarity is to provide quantitative information, which has been done increasingly by central banks to facilitate communication on monetary policy-making, as is further discussed in Section 3.

It is useful to distinguish two types of effects of transparency (Geraats 2002 and 2009): information and incentive effects. Information effects are the direct (ex post) consequences of removing an information asymmetry. This could be beneficial, such as a reduction in uncertainty, but it may also be harmful as the adjustment of private sector expectations in response to communications could cause fluctuations in macroeconomic outcomes. The latter are worsened by misinterpretations and imperfect common knowledge (Geraats 2007). Incentive effects are the indirect (ex ante) influences of changing the information structure. For example, when the central bank publishes its macroeconomic forecasts, it becomes easier for the private sector to infer the central bank's intentions from its policy actions, which gives the central bank an incentive to refrain from inflationary policy (Geraats 2005). In addition, it is likely to coax the central bank into producing high-quality macroeconomic forecasts, thereby promoting better monetary policy-making. However, there could also be undesirable incentive effects, for instance when agents in financial markets respond disproportionately to central bank communications to coordinate their actions and pay less attention to their private signals, making market expectations less informative (Morris and Shin, 2002 and 2005).

Although these effects have been analysed in the literature on monetary policy transparency, information and incentive effects are equally relevant to understanding the consequences of communications pertaining to financial stability. For instance, the reliance on "constructive ambiguity" as lender of last resort to prevent moral hazard is an example of an incentive effect. In addition, a central bank that publicly reveals the liquidity problems of a commercial bank could trigger a bank run (as suffered by Northern Rock in September 2007), constituting a detrimental information effect. However, if the liquidity positions of banks are regularly disclosed in data releases, it is likely to engender a beneficial incentive effect that encourages prudent behaviour and reduces financial fragility. The crucial difference is that the former is the disclosure of an

accomplished fact, but the latter leads to anticipatory behaviour that changes the facts. Thus, "ex post discretionary disclosures" may imperil financial stability, whereas "ex ante communications" could enhance it (Gai and Shin 2003). As a result, central bank communications that may be very harmful during times of financial turmoil could actually contribute to financial stability when routinely performed well in advance. Thus, greater transparency ex ante could be beneficial for financial stability, but performed ex post it may be detrimental.

3 TALKING NUMBERS ABOUT MONETARY POLICY-MAKING

The objective of monetary policy generally is to stabilise the internal or external value of the currency. Many central banks nowadays clarify their monetary policy objectives by providing a numerical target for their primary goal. This is ubiquitous among inflation targeters, which focus on an explicit inflation target, but it is also common for other monetary policy frameworks.[2] For instance, the ECB announced in October 1998 that its primary objective of price stability is "a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%", to be maintained over the medium term.[3] Overall, the proportion of central banks with a quantified primary objective has risen from 43% in 1998 to 62% in 2006. Table 1 shows how the disclosure of key numerical information about monetary policy-making has evolved during the last decade.[4]

The publication of numerical macroeconomic forecasts has undergone a dramatic increase from less than one-fifth of central banks in 1998 to over half in 2006. These forecasts could be considered as predictive statistics that help to reduce uncertainty about macroeconomic prospects. Furthermore, they provide a powerful tool for determining and explaining the appropriate policy stance for forward-looking monetary policy frameworks such as inflation targeting. Theoretically, the deviation of the inflation forecast from the inflation target could even serve as a sufficient statistic for setting the policy rate, while the inflation forecast could act as an intermediate target for inflation targeters (Svensson 1997). This helps to explain why the release of quantitative macroeconomic forecasts is nearly universal among inflation targeters, but less common for monetary and exchange rate targeters.[5]

Whether macroeconomic forecasts are used as predictive or sufficient statistics, it is important that they be timely and informative. Macroeconomic data are generally available at quarterly intervals (especially national accounts

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2 Using 2006 data for 98 central banks, 53%, 56% and 44% of exchange rate targeters, monetary targeters and non-targeters respectively have a quantified primary objective (Geraats 2009).
3 Despite its quantification, the ECB's definition of price stability is not very precise, even after the clarification in May 2003 that the ECB aims for euro area HICP inflation of "below, but close to 2%".
4 For a more comprehensive analysis of trends in monetary policy transparency, see Geraats (2009).
5 For the latter, the relative frequency is 44% and 38% respectively, and 69% for central banks without an explicit targeting framework, based on a 2006 sample of 98 central banks (Geraats 2009).

Table I Trends in talking numbers on monetary policy-making

Information disclosure about monetary policy-making	1998	2006	Change
Quantified primary objective	43	62	19**
Numerical macroeconomic forecasts	18	56	38**
Quarterly, medium-term for inflation and output	4	17	13**
Voting records	5	10	5*
Observations	98	98	

Source: Dincer and Eichengreen (2009) dataset.
Note: Asterisks indicate that change from 1998 to 2006 is significant at * 5% or ** 1%.

data, although inflation data are often released monthly). So, for the sake of transparency central banks should provide up-to-date forecasts for inflation and output every quarter. In addition, considering the lags in monetary policy transmission, these forecasts should cover a medium-term horizon of about two years ahead in order to serve as a useful guide to monetary policy-making. The number of central banks that publish quarterly medium-term forecasts for inflation and output has been quite small, although it has increased significantly to reach nearly one-fifth of central banks in 2006 (see Table 1). However, more than half of inflation targeters have adopted this practice, which indicates its usefulness for this forward-looking monetary policy framework. A large majority of inflation targeters present their macroeconomic projections in the form of fan charts, which show the development over the forecast horizon and illustrate the underlying uncertainty, including potential skewness. Another way to indicate the uncertainty and conditionality of projections is to show their paths under different scenarios. These are sophisticated communication tools that are particularly useful during heightened uncertainty. Sweden's Riksbank is a good example and has used both methods very effectively. Other central banks, including the ECB, would also benefit from incorporating these methods of communicating uncertainty.

Since the effects of monetary policy crucially depend on expectations, transparency in relation to the monetary policy stance also involves publication of the projected policy path, as is done by a few central banks, including those in the Czech Republic, New Zealand, Norway and Sweden. Although a majority of central banks nowadays promptly announce adjustments in the levels of their policy instruments, far less information is disclosed about the decision-making process itself. Only a small fraction of central banks provide voting records of their monetary policy decisions, although this practice has significantly increased during the last decade (see Table 1) and is more common among inflation targeters, where one-third of central banks release voting records (Geraats 2009).

The balance of votes provides a key descriptive statistic about the procedure of monetary policy decision-making. It indicates the uncertainty surrounding the decision (assuming that all monetary policy-makers share the same objectives). For instance, a close vote suggests that the appropriate monetary policy stance was hard to establish from macroeconomic indicators, whereas a unanimous vote shows much less ambiguity. As a result, the private sector could use the number of dissenting votes to estimate the monetary policy reaction function more

efficiently, enhancing medium-term predictability. In addition, the direction of dissenting votes gives an indication of the policy inclination and provides a predictive statistic for upcoming policy decisions, thereby improving the short-term predictability of monetary policy (as shown for the United Kingdom by Gerlach-Kristen 2004). Some central banks (including the ECB) decide "by consensus", potentially violating statutory requirements that decisions be made by a simple majority, but also depriving the private sector of useful descriptive and predictive statistics about monetary policy-making.[6]

To sum up, Table 1 shows that central banks have increasingly been talking numbers on monetary policy-making. This is in marked contrast to the past practice of providing statements that required central bank watchers to exhibit exquisite skills in the art of reading tea leaves.

4   MEASURING CENTRAL BANK CREDIBILITY

The achievement of monetary policy objectives could be evaluated ex post through macroeconomic outcomes. However, considering the long lags in monetary policy transmission, it is important to have real-time indicators of a central bank's success. In particular, to assess the central bank's ability to maintain price stability, medium to long-term private sector inflation expectations provide a key statistic. A popular measure is the "break-even" inflation rate implied by the yield differential between nominal and inflation-indexed government bonds. It is available at very high frequency and backed by the (often high) stakes of financial market participants. However, it also incorporates inflation risk premia and liquidity premia, so it is an imperfect proxy for market expectations of inflation, especially during financial market upheaval, when financial market efficiency is likely to break down due to limits on arbitrage. In addition, over short horizons the break-even inflation rate also reflects upcoming "unavoidable" inflation (e.g. due to unexpected food and energy price developments) that is beyond the control of the central bank due to the length of the monetary policy transmission process.[7] To overcome this, the five-year forward break-even inflation rate five years ahead is often used, capturing the average from five to ten years into the future.

Chart 1 shows the five-year forward break-even inflation rate five years ahead for the euro area from February 2004 to September 2010. Although the break-even inflation rate exhibits significant short-run fluctuations, it declined from over 2.4% in mid-2004 to around 2.15% in mid-2005, then remained relatively stable until early 2007. It rose gradually starting in mid-2007 during the financial turmoil until a sharp drop from September to November 2008 during the financial market crash following the collapse of Lehman Brothers. Long-term

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6   For a further discussion of this issue, see Geraats, Giavazzi and Wyplosz (2008).
7   In the euro area, inflation-indexed bonds have an indexation lag of three months, so break-even inflation also reflects inflation realised in the past quarter. In addition, the bonds are linked to euro area HICP, excluding tobacco. Therefore, they do not completely compensate for euro area HICP inflation.

Chart 1 Long-term euro area break-even inflation

(percentages)

Source: ECB Statistics.
Note: Five-year forward rate five years ahead of euro area zero coupon break-even inflation; seasonally adjusted. Sample: 02/02/2004-21/09/2010.

forward break-even inflation has since been quite volatile in the euro area and it exhibited an upward trend to well over 2.5% in April 2010 before subsiding to around 2%.

However, it is important to be cautious when interpreting break-even inflation rates. This is because movements may not be due to changing inflation expectations, but to shifting risk premia, especially during financial market turbulence. For instance, the large drop in long-term forward break-even inflation during the fourth quarter of 2008 could be attributed to the decline in nominal yields due to flight-to-safety demand for bonds, and a rise in real rates stemming from the lower liquidity of index-linked bonds.[8] Interestingly, an alternative measure, the five-year inflation-linked swap rate five years ahead, which is usually pretty close to the corresponding break-even inflation rate, did not experience such a large drop during the fourth quarter of 2008. Whereas the long-term forward inflation-linked swap rate appeared to be more reliable than break-even inflation, it has also been quite volatile since mid-2008, suggesting it is not immune to financial market turmoil either.[9]

This problem of market-based inflation expectations is avoided by using survey expectations of inflation. Chart 2 shows the mean point estimate of euro area HICP inflation in two and five years' time according to the ECB Survey of Professional Forecasters (SPF) from 1999Q1 to 2010Q3. Five-year ahead inflation expectations have increased from around 1.8% in 2000 to over 1.9% in 2010, briefly reaching 2.03% in 2008Q3, above the 2% limit of the ECB

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8   See also European Central Bank (2008), "Recent increases in real yields and their implications for the analysis of inflation expectations", *Monthly Bulletin*, November.
9   See European Central Bank (2009), "An assessment of recent developments in long-term forward break-even inflation rates", *Monthly Bulletin*, December.

Chart 2 Medium-term survey expectations of euro area inflation

(percentages)

— five years ahead
······ two years ahead
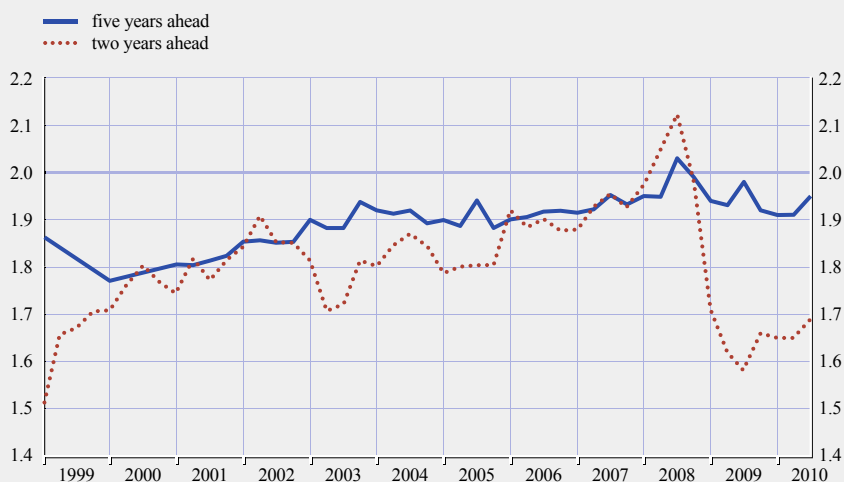
Source: ECB Survey of Professional Forecasters.
Note: Average two and five-year ahead point estimates for euro area HICP inflation.
Sample: 1999Q1-2010Q3 for two years ahead; 1999Q1, 2000Q1 and 2001Q1-2010Q3 for
five years ahead.

definition of price stability. Two-year ahead inflation expectations have mostly
been lower but much more volatile,[10] with a notable spike above 2% in 2008,
when average euro area inflation was 3.3%, before a big drop in 2009, when
euro area inflation sank to 0.3%. In fact, there is a significant positive correlation
between two/five-year ahead SPF inflation expectations and past euro area HICP
inflation, as is shown and further discussed by Geraats (2010). The sensitivity of
medium-term SPF inflation expectations to past inflation outcomes suggests that
euro area inflation expectations are not well anchored.

A disadvantage of using the SPF mean point estimate for inflation is that it only
captures the first moment of inflation beliefs, but ignores higher moments.[11]
Fortunately, this problem can be overcome, because the ECB Survey of
Professional Forecasters also asks its participants to assign probabilities to ranges
of inflation outcomes. The aggregate SPF probability distribution for inflation
can be used to compute the likelihood which SPF respondents collectively attach
to an outcome of euro area HICP inflation of between 0% and 2%, consistent
with the ECB's quantitative definition of price stability. Following Geraats et al.
(2008) and Geraats (2010), this SPF inflation probability for two and five years
ahead provides a quantitative measure of the credibility of the ECB in meeting
its primary objective in the medium term.

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10 The average has been 1.8% and 1.9%, with a standard deviation of 0.12 and 0.05, for
two-year and five-year ahead SPF inflation expectations respectively.
11 In addition, it ignores the dispersion of inflation estimates among SPF respondents. The
standard deviation declined gradually until 2008, indicating increasing consensus, while
medium-term SPF inflation expectations rose to over 2%, making it even more worrisome
(see Geraats 2010).

Chart 3   ECB credibility

(percentages)

— five years ahead
····· two years ahead
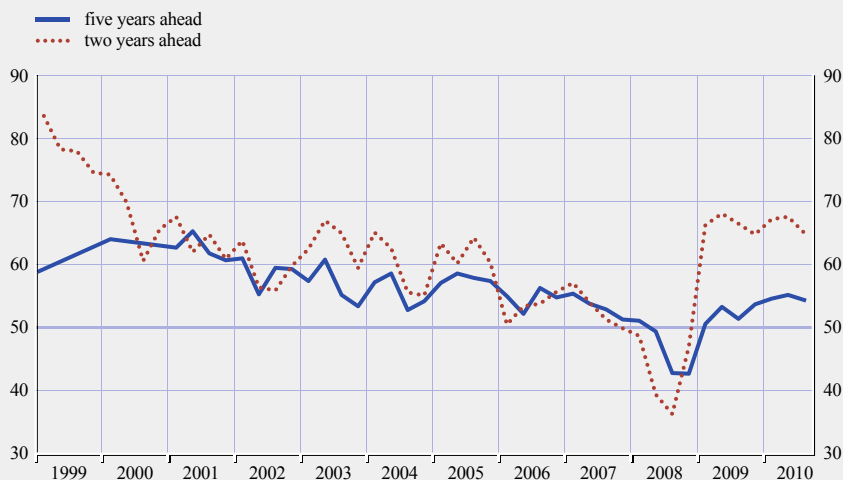
Sources: ECB Survey of Professional Forecasters and author's calculations.
Note: SPF probability of euro area HICP inflation of at least 0% and less than 2%.
Sample: 1999Q1-2010Q3 for two years ahead; 1999Q1, 2000Q1 and 2001Q1-2010Q3 for five years ahead.

Chart 3 shows that there has been a downward trend in ECB credibility during the last decade. The SPF probability of 0-2% euro area HICP inflation in five years has declined from over 60% in 1999 to around 55% in 2010, with an all-time low in the fourth quarter of 2008 of 42.7%. The latter means that, according to the collective judgement of SPF respondents, there was a less than even chance of the ECB delivering price stability in the medium term. The two-year SPF probability of 0-2% inflation has fallen even further, from more than 80% at the start of 1999 to 36.3% in the third quarter of 2008, before picking up markedly to around 65% in 2010.[12]

The SPF inflation expectations and inflation probabilities are clearly inversely related, with a correlation coefficient of 0.92 and 0.89 for the two-year and five-year ahead measures respectively. Nevertheless, the credibility measure based on the inflation probabilities reveals valuable information not captured by inflation expectations. For instance, during 2008 there was just a small blip in five-year ahead SPF inflation expectations above 2%, but the drop below 50% in the five-year ahead SPF probability of 0-2% inflation was more persistent and pronounced, signalling a more worrisome loss of ECB credibility. The credibility measure based on SPF inflation probabilities has the advantage of capturing not just the first moment but also higher moments, thereby providing a richer indicator of inflationary beliefs.

12 Note that the 2008Q3 SPF was conducted in mid-July, so its outcome was not affected by the acute financial crisis that erupted in mid-September 2008 after the collapse of Lehman Brothers.

In principle, higher-order moments are also captured by the inflation risk premium that is part of break-even inflation. Thus, it would be expected that the credibility measure based on five-year ahead SPF inflation probabilities is more strongly correlated with the five-year forward break-even inflation rate five years ahead than five-year ahead SPF inflation expectations, as is shown to be the case by Geraats (2010). However, break-even inflation is also affected by market risk premia unrelated to inflation which could give misleading signals. For instance, during the fourth quarter of 2008 (in the aftermath of the collapse of Lehman Brothers), the five-year forward break-even inflation rate five years ahead was clearly below average,[13] suggesting that inflationary fears had subsided, while the five-year ahead SPF probability of 0-2% inflation was well below 50%, indicating that ECB credibility was worryingly low. In addition, break-even inflation can exhibit sharp fluctuations that may be completely unrelated to inflationary beliefs (e.g. from 2.2% to 1.7% during the last two weeks of November 2008, before bouncing back to 2.4% in mid-December 2008). Although the break-even inflation rate (and inflation-linked swap rate) is available more promptly and more frequently, the credibility measure based on SPF inflation probabilities has the advantage of being immune to unrelated risk premia or financial market disruptions, therefore providing a more reliable signal, especially during times of financial turmoil.

Our discussion has also shown that the ECB's credibility in terms of achieving its objective of price stability over the medium term was at its lowest at the height of the financial crisis in the second half of 2008. In fact, despite the continued financial turbulence during the first half of 2008, the ECB had increased its policy rate from 4% to 4.25% in July 2008, before starting to reduce it in October 2008 (a few weeks after the collapse of Lehman Brothers), reaching a level of 1% in May 2009.

It is interesting to compare this with the Bank of England, which started cutting its policy rate in December 2007 from 5.75% to a level of 0.5% in March 2009. Although the United Kingdom also experienced a sharp rise in inflation to 3.6% in 2008, the Bank of England did not suffer from an increase in medium-term inflation expectations, as measured by its quarterly survey of external forecasters, which provides two-year ahead and, since 2006, also three-year ahead inflation expectations. These have remained quite stable around the Bank of England's inflation target of 2% HICP inflation, with the exception of 2009 when they dropped to their lowest levels, at 1.5% and 1.8% respectively, in the second quarter.
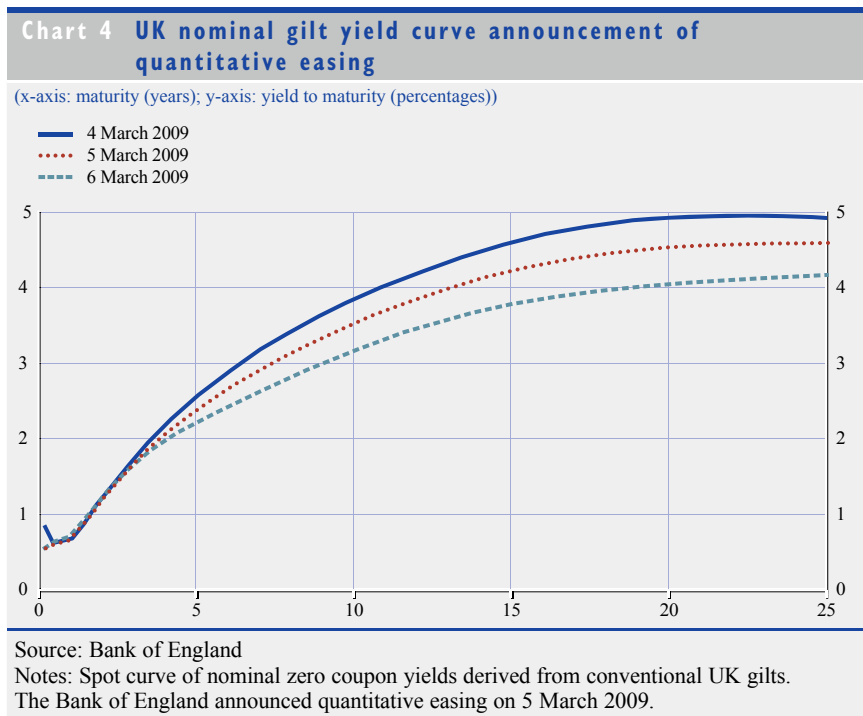
To construct credibility measures for the Bank of England, the survey's inflation probabilities of 1-3% HICP inflation two and three years ahead are used.[14]

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13 This also holds for mid-October 2008, when the 2008Q4 SPF was conducted.
14 Although the Bank of England has a point target for inflation, it is natural to choose the 1-3% range, since the Bank is required to write an open letter to the Chancellor of the Exchequer if HICP inflation deviates by more than one percentage point from its target of 2%.

These measures had stood at around 87% and 86% respectively until they suddenly dropped in 2009 to 62% and 72% respectively in the second quarter, after which both returned to around 80%. Using the two-year inflation probabilities for comparison, credibility has been both higher and more stable for the Bank of England than for the ECB over the last decade.[15] This may be attributable to the lower level of monetary policy transparency of the ECB, as argued by Geraats (2010).

Despite the large reduction in the policy rate to 0.5%, survey inflation expectations and the Bank of England's own inflation forecasts fell below its inflation target, which prompted the adoption of unconventional monetary policy measures. The unexpected announcement of quantitative easing by the Bank of England on 5 March 2009 had an impressive effect on financial markets. It involved purchasing up to £75 billion in conventional gilts (later expanded to £200 billion) with a residual maturity of between five and 25 years (later over three years), financed by the issuance of central bank reserves. As shown in Chart 4, the yield curve shifted down significantly over this maturity range when quantitative easing was announced. In just two days, long-term nominal gilt yields fell by about 70 and 90 basis points at a maturity of ten and 20 years respectively. This

Chart 4 UK nominal gilt yield curve announcement of quantitative easing

(x-axis: maturity (years); y-axis: yield to maturity (percentages))

— 4 March 2009
····· 5 March 2009
---- 6 March 2009

Source: Bank of England
Notes: Spot curve of nominal zero coupon yields derived from conventional UK gilts.
The Bank of England announced quantitative easing on 5 March 2009.

15 To be precise, the mean and standard deviation are 85.0% and 6.0 for the Bank of England, and 61.3% and 9.2 for the ECB, using the two-year inflation probabilities from 1999Q1 to 2010Q3.

was purely an announcement effect since the first gilt purchases were not made until 11 March.[16] Clearly, central bank communications can be very effective.

Interestingly, from 4 to 6 March real yields dropped by about 30 and 50 basis points for ten and 20-year maturities respectively and break-even inflation declined by about 40 basis points for both maturities.[17] So, while politicians and the popular press in the UK were decrying that "printing money" would lead to hyperinflation, statistics derived from financial markets judged quantitative easing more favourably and as conducive to price stability.

5   FINANCIAL STABILITY COMMUNICATION ISSUES

When the sub-prime mortgage crisis spread to the interbank market in August 2007, the ECB responded swiftly to mitigate money market distress by conducting a series of liquidity interventions. The ECB has emphasised that such liquidity operations are conducted to preserve the proper functioning of money markets, but that they do not influence the determination of the monetary policy stance.[18] It is important for the effective implementation of monetary policy that interbank rates remain close to the ECB's main policy rate, the main refinancing rate (or "refi rate"). To be more precise:

> "[T]he Governing Council sets the level of the minimum bid rate in the Eurosystem's weekly MROs [main refinancing operations], which constitutes the main signal of the monetary policy stance. In the MROs, the ECB aims to supply the liquidity necessary for the banking system to operate smoothly, in such a way that very short-term market interest rates remain appropriately aligned with the policy stance signalled by the Governing Council. [...] [A]n excessively wide or volatile spread would undermine the clarity of the signal provided by the minimum bid rate and, ultimately, the credibility of the operational framework in its implementation of Governing Council decisions." (ECB 2008a, p. 69)

However, since October 2008, when the ECB started reducing the refi rate, the euro area overnight interbank rate (EONIA) has been persistently below the refi rate, as shown in Chart 5. It has been hovering between the refi rate and the interest rate on the ECB's standing deposit facility, often much closer to the latter. This gives rise to the pertinent question whether the refi rate still appropriately reflects the ECB's monetary policy stance.

Although there has been no change in the ECB's key interest rates (consisting of the refi rate and the interest rates on the deposit and marginal lending facilities)

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16 The Bank of England also reduced its Bank Rate from 1% to 0.5% on 5 March 2009, but this had largely been anticipated by the financial markets.
17 This is based on real zero coupon yields derived from UK index-linked gilts. In contrast to the ECB, the Bank of England conveniently provides daily UK data for the real interest rate and inflation term structure on its website.
18 ECB President Trichet, in his introductory speech at the hearing of the Economic and Monetary Affairs Committee of the European Parliament in Brussels on 26 March 2008.

Chart 5 Euro area money market turbulence

(percentages)

—— EONIA
······ refi rate
----- three-month EURIBOR
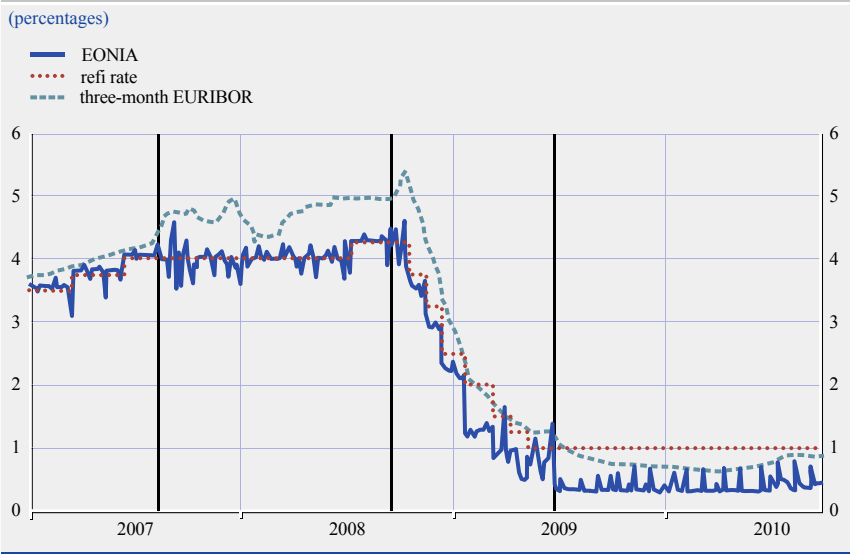
Sources: ECB and www.euribor.org.
Notes: Refi rate refers to minimum bid or fixed rate for ECB main refinancing operations.
Vertical lines shown at 09/08/2007, 15/09/2008 and 25/06/2009.
Sample: 02/01/2007 - 20/09/2010.

since May 2009, euro area money market rates indicate that there has been an effective policy easing. There has been a significant decrease in EONIA, which settled at around 0.35% (quite close to the deposit facility rate of 0.25%) from July 2009 until July 2010, when it started rising to around 0.45%, still well below the 1% refi rate (see Chart 5). It looks like the ECB has conducted monetary policy by stealth through liquidity operations.

Table 2 provides some basic statistics showing the inaccuracy of the ECB's monetary policy signal for very short-term market interest rates. Before the money market turmoil, there was on average a small positive spread between EONIA and the refi rate of about 6 basis points, with a standard deviation of roughly equal size, which implies that the refi rate was an unbiased estimate of EONIA. During the initial period of money market turbulence starting on

Table 2 Inaccuracy of ECB monetary policy signal

Difference between EONIA and ECB refi rate (in percentage points)	Mean	Standard deviation
Pre-turmoil (02/01/2007-08/08/2007)	0.058	0.063
Initial money market turmoil (09/08/2007-12/09/2008)	0.008	0.124
Post-Lehman policy easing (15/09/2008-24/06/2009)	-0.367	0.272
Monetary policy by stealth (25/06/2009-20/09/2010)	-0.629	0.076

Sources: www.euribor.org, ECB and author's calculations.
Note: ECB refi rate refers to minimum bid or fixed rate for main refinancing operations.
Sample: 02/01/2007-20/09/2010.

9 August 2007, the ECB conducted extensive liquidity operations to stabilise EONIA close to the policy rate (see ECB 2008b). It was remarkably successful in keeping EONIA centred around the refi rate, with an average difference of less than 1 basis point, which is considerably smaller than during the pre-turmoil period, although volatility nearly doubled.

In response to the financial crisis that erupted after the collapse of Lehman Brothers on 15 September 2008, the ECB started to cut its policy rate and carry out its main refinancing operations through a fixed-tender procedure with full allotment at the refi rate (as of 15 October 2008), providing unlimited liquidity on demand. The ECB also introduced fixed-rate full-allotment longer-term refinancing operations with a maturity of one to six months at the refi rate. These "enhanced credit support" measures ensured abundant liquidity supply during the post-Lehman policy easing. This pushed EONIA on average 37 basis points below the refi rate, although it was highly volatile with a standard deviation of 27 basis points.

After the official policy rate cuts had come to a halt with the refi rate at 1%, the ECB expanded its enhanced credit support using one-year longer-term refinancing operations with full allotment at the refi rate, the first of which led to a large liquidity injection on 24 June 2009 of €442 billion, which was partly hoarded by banks in the ECB's standing deposit facility at a rate of 0.25%. EONIA has been relatively stable since then, with its volatility close to the pre-turmoil period, but its level on average 63 basis points below the refi rate.[19] Therefore, EONIA has been systematically and significantly below the official policy rate since July 2009, amounting to a stealthy policy rate cut. Clearly, the ECB has failed to achieve its "fundamental goal of ensuring that the very short-term interbank money market rates are close to the policy rate decided by the ECB's Governing Council" (ECB 2008b, p. 89). Although the ECB has acknowledged the large discrepancy between EONIA and the refi rate (e.g. ECB 2010, p. 69), it has not addressed the credibility problem which this creates for its framework of monetary policy implementation.

It is not only the overnight interbank rate that has been persistently below the official policy rate, but also the three-month interbank rate (EURIBOR), which banks use as an important benchmark for short-term retail rates affecting households and businesses. The three-month EURIBOR gradually declined to around 0.65%, before inching up to about 0.90% during the European sovereign debt turmoil that erupted in the spring of 2010 (see Chart 5). Therefore, the furtive rate cut has provided greater stimulus than the official policy rate of

19 The mean and standard deviation are -0.646 and 0.062 when excluding the more volatile period since 01/07/2010, which featured -0.551 and 0.085 respectively.

1% suggests.[20] The ECB's "enhanced credit support" has clearly influenced its de facto monetary policy stance, which is no longer adequately described by the refi rate. The ECB should clarify which interest rate now provides the best descriptive statistic for its monetary policy stance.[21]

Again, it is useful to compare this with the Bank of England. The UK overnight interbank rate (SONIA) had also been persistently below the Bank Rate during the post-Lehman policy easing, but since March 2009 it has remained very close to the Bank Rate of 0.5%.[22] The three-month interbank rate (LIBOR) gradually declined during the implementation of quantitative easing from about 2% to 0.6% in September 2009 and remained close to the Bank Rate until it moved to around 0.75% in May 2010 during the European sovereign debt turmoil. Therefore, the Bank of England has largely succeeded in stabilising short-term money market rates at around its policy rate.

Another financial stability communication issue is the ECB's Securities Markets Programme, which was announced on 10 May 2010 and involves sterilised purchases of euro area public and private debt securities to alleviate the European sovereign debt turmoil. The ECB provided no operational details in advance, leaving financial markets in the dark about the amount or the range of debt securities to be purchased. In fact, the only data which the ECB has released about its Securities Markets Programme is the amount purchased each week and the value of its holdings (about €60 billion as of mid-September 2010). This dearth of information contrasts with the ECB's Covered Bond Purchase Programme, which operated from July 2009 until June 2010 and involved the purchase of €60 billion of euro-denominated covered bonds issued in the euro area. Key technical details, including the total purchase amount and eligibility, were telegraphed to financial markets well in advance,[23] and a short monthly report was published. The secrecy surrounding the Securities Markets Programme is particularly glaring, because the purchase of distressed debt securities exposes the ECB to much greater credit risks than high-quality covered bonds. Despite the potential for large losses, the lack of transparency makes it hard to hold the ECB accountable for its running of the Securities Markets Programme.

It is interesting to compare this with the Asset Purchase Facility of the Bank of England, which was set up initially in January 2009 to make sterilised purchases of high-quality private sector assets to foster financial stability, but subsequently

20 President Trichet argued in response to a question at the ECB press conference on 8 July 2010 that money market rates are "not signalling monetary policy intentions at this stage" because of the unlimited supply of liquidity. However, this ignores the fact that fixed-rate full-allotment main/longer-term refinancing operations effectively put a ceiling on average interbank rates (similar to a standing lending facility), meaning that the choice of the fixed rate affects *average* interbank rates, which are central to the monetary policy transmission mechanism and therefore determine the monetary policy stance.

21 An interesting option is the practice of the Swiss National Bank, which specifies its monetary policy stance in terms of three-month LIBOR.

22 The mean and standard deviation of the difference between SONIA and the Bank Rate are: -0.29 and 0.29 from 15/09/2008 until 04/03/2009; and -0.05 and 0.03 since quantitative easing (up until 20/09/2010).

23 See the ECB press release, "Purchase programme for covered bonds", 4 June 2009.

modified for monetary policy purposes in March 2009 to implement the Bank's quantitative easing. The Asset Purchase Facility features exemplary transparency, including advance announcements of operational details, the publication of a quarterly report and the release of detailed data on completed purchases.[24] The Bank of England is clearly talking numbers, unlike the ECB.

Nevertheless, the Bank of England has experienced its own communication issues related to financial stability. The Bank's announcement (jointly with HM Treasury and the Financial Services Authority) on 14 September 2007 that liquidity support would be provided to Northern Rock promptly triggered a bank run. The latter only ended after the government had guaranteed all existing deposits at Northern Rock.[25]

The financial turbulence festering from the summer of 2007 and the acute financial crisis in September 2008 after the collapse of Lehman Brothers have shown the desirability of greater transparency in relation to financial instruments, financial institutions and financial interconnections. I shall discuss some challenges for each of these aspects of financial stability in turn.

A key problem is that many consumers and investors unwittingly relied on very risky financial instruments. Consumers deciding on a mortgage need to have clarity about the costs and risks involved. Although this is relatively straightforward for fixed-rate mortgages, the uncertainties involving the payments for adjustable-rate mortgages may be effectively communicated using scenarios that cover a wide range of plausible interest rate paths, with a baseline scenario based on market expectations. Another issue is that many investors mistakenly believed that AAA-rated securities carried low credit and liquidity risks. To convey the underlying uncertainties more clearly it would be useful to have separate ratings for each or to provide regularly updated value-at-risk measures to differentiate AAA-rated sub-prime collateralised debt obligations (CDOs) from US Treasury Bills. In general, transparency in relation to financial instruments and their risks is essential so that consumers and investors can make well-informed decisions.

Financial institutions have long been subject to supervision and regulation. Traditionally, a distinction has been made between liquidity and solvency risks that are inherent to the business of banking due to maturity and rate mismatches of assets and liabilities. However, the recent financial turmoil has shown that with mark-to-market accounting, the liquidity problems of a financial institution may turn into solvency problems due to fire sales of risky assets in illiquid markets. Therefore, more attention should be paid to liquidity. It would be sensible to have counter-cyclical capital requirements that are based on both credit and liquidity risks. Limits on leverage to curb excessive risk-taking are also vital. Another issue is that some financial institutions have (purposely) hidden risks through off-balance-sheet activities and the shadow banking system. Transparency is key

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24 All available at http://www.bankofengland.co.uk/markets/apf/index.htm.
25 Although the United Kingdom has deposit insurance, at the time it covered just 100% of £2,000 and 90% of £33,000 with a delay in funds availability of many months, making it rational for many customers to withdraw their deposits from Northern Rock.

in this respect, but by no means easy to achieve, because private information is rife and incentives remain (e.g. through bonus structures and limited liability) to seek out loopholes for risky activities. This poses a huge challenge for the construction of adequate statistics on financial stability.

Although financial supervision and regulation have largely focused on financial stability at the micro level, this is not sufficient to guarantee financial stability at the macro level due to financial interconnections. The liquidity problems of one financial institution could trigger fire sales into illiquid markets that affect many other institutions, leading to cascading and contagion effects. Another issue is that there may be frictions between financial stability at the micro and macro level. For instance, mortgage-backed securities allow banks to reduce their risk exposure and thus improve micro-financial stability. Yet, by transferring risks to others, banks become prone to adverse selection and moral hazard problems, seeking out risky mortgages with high returns and neglecting to monitor mortgages they issued, thereby undermining macro-financial stability. Similarly, at the micro level credit default swaps are useful hedging instruments to insure against the default risk of bond holdings, but when they are held "naked" without owning the underlying bonds, they could become potentially destabilising speculative instruments at the macro level. In addition, bailing out a financial institution is likely to induce moral hazard and encourage others to engage in riskier behaviour. Although it has been suggested that "constructive ambiguity" overcomes this problem, this is not a credible solution for institutions that are considered too big or too interconnected to fail. Clearly, there is a need for macro-prudential regulation and supervision to limit systemic risks. This requires better information about the complex web of interconnections that characterises our global financial system, and the development of effective real-time indicators and predictive statistics for systemic risks is likely to be challenging.

Whether considering transparency in relation to financial instruments, institutions or interconnections, the ex post disclosure of negative information could be harmful. For instance, revealing that AAA-rated sub-prime CDOs are not entirely gilt-edged is likely to worsen their liquidity risk. Proclaiming that a bank has liquidity problems could become self-fulfilling by triggering a bank run. Furthermore, highlighting fragilities in the financial system may reduce market trust and liquidity, thereby raising systemic risk. Instead, it is important not to delay communicating until problems arise, but to develop a framework of regular data releases that allows investors and institutions to make better-informed decisions and gives them an incentive to refrain from risky activities that could imperil financial stability.

6   CONCLUSIONS

Central banks have increasingly been talking numbers on monetary policy-making. In particular, this has taken the form of a quantification of the primary objective, numerical macroeconomic forecasts, and to a lesser extent voting records. To convey uncertainty about the macroeconomic projections, fan charts and scenario analysis are very effective communication tools. In addition,

the publication of the balance of votes provides a concise way to communicate uncertainty about the monetary policy stance.

To assess the central bank's success in achieving price stability, medium-term private sector inflation expectations provide an important real-time indicator. Although the "break-even inflation" implied by the yield on nominal and index-linked bonds gives a high-frequency measure of market perceptions, it is also affected by financial market disruptions and risk premia unrelated to inflation. Survey expectations of inflation do not have this drawback, but they fail to capture higher moments of inflationary beliefs that may provide important signals during heightened uncertainty. This problem can be overcome by constructing a measure of central bank credibility using survey probabilities for inflation outcomes consistent with price stability. This reveals that ECB credibility was worryingly low at the height of the financial crisis in the second half of 2008.

The announcement of quantitative easing by the Bank of England in March 2009 illustrates that central bank communications can be highly effective and that unconventional monetary policy measures need not harm the credibility of the central bank.

The liquidity operations of the ECB appear to have been monetary policy by stealth since the second half of 2009, as short-term interbank rates have been well below the ECB's official policy rate, which therefore no longer provides a sound statistic for describing the de facto monetary policy stance.

Financial stability communication should cover both financial instruments, institutions and interconnections, and highlight the risks. Furthermore, the release of financial information may be detrimental ex post but beneficial ex ante. Therefore, it is important to commit to regular communication relevant for financial stability.

Last but not least, this paper has argued that central banks should not just be talking numbers, but focus more on numbers that talk in no uncertain terms about uncertainty.

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FRANK PAUL WEBER

Petra Geraats delivered such a rich and stimulating contribution to this conference that it is quite a challenge to single out any one point over the others she made. All the same I was most impressed by part four of her contribution, which clearly illustrated the correlation between the credibility of a central bank and its transparency.

However, let me take her interesting presentation of macroeconomic forecasting as a tool for increasing transparency and, above all, "for determining and explaining the appropriate policy stance for forward-looking monetary frameworks such as inflation targeting."

These macroeconomic forecasts are not only important for central bank "watchers", i.e. the market participants who are likely to infer from these figures – the inflation forecast especially – when the central bank will probably act.

In the current situation, when nobody, not even some international economic organisations, seems to know or be able to forecast when the first economy in the world will get out of trouble and emerge from the financial crisis, the assessments of central banks, in particular the major ones like the European Central Bank (ECB) and the Federal Reserve System, are of the utmost importance.

Macroeconomic forecasts or assessments, like the one which the President of the ECB delivers in his introductory remarks at the monthly press conference, are not only of interest for telling us what the central bank will do next.

These macroeconomic data are a solid rock in the current sea of uncertainty.

Many other (research) institutions which have no say in monetary policy deliver their own forecasts. It could even be argued that a country like Germany, with its numerous economic research institutes, regards forecasting the economy as a national sport.

By comparison, in countries like France and Italy, for example, this is much less the case.

Perhaps this is because the Germans are eager to know how the economy and inflation will pan out in the near future; for many of them, inflation remains a point of concern.

Conversely, public policies in Germany also probably rely more on these forecasts than equivalent ones in France do. With the end of the almost automatic link between wages policy and inflation in Italy (the famous *scala mobile*), the inflation forecast also declined in importance there.

Beyond the actual figures for growth, inflation and output, the main concern is probably not that the ECB or other central banks would say that GDP is decreasing by 1, 2 or 3%, but that even central bankers might not know what lies ahead in the medium term.

Central bankers are asked to deliver not only inflation-free growth, but also, and above all, certainty.

Individuals want to know if their purchases or homes are at risk because of the possibility of higher inflation.

They want to make the right choices based on what the best-informed people, i.e. the central bankers, are saying.

As Petra Geraats explains, it would be beneficial in this respect if some central banks, like the ECB, could include or detail their macroeconomic forecasts under different scenarios.

What she wrote about the disclosure of the monetary policy decision-making process is also a major issue.

The choice not to publish minutes or voting details from ECB Governing Council meetings has been discussed, I think, for as long as the ECB has been in existence.

The main drawback with this non-disclosure strategy is that it allows us – the press and some other observers – to speculate wildly about who has contradicted, and when, the main line being communicated by the President of the ECB at his monthly press conference.

Therefore, if one central banker, let us say a "neighbour" of the ECB, publicly declares that he does not agree with the official strategy, this is important news for reporters and will be highlighted, as any tension or discussion would be.

Sometimes it is not even a public statement that produces this speculation, but rumours picked up by reporters and market participants.

Strangely enough, it is then the role of the President to decide whether or not to reveal details of the Governing Council meetings.

Because of this "secrecy", central banks like the ECB not only deprive "the private sector of useful descriptive and predictive statistics about monetary policy-making", as Petra Geraats explains, but they fuel a degree of uncertainty among the public about how united the institution actually is.

Certainly, publication of the minutes or voting details from ECB monetary meetings would help to "normalise" the way people and market participants see the decision-making process: different views are expressed, but for most of the time there is probably a common assessment and agreement on what to decide.

Dissent and debate would then be "normal" and soon become less newsworthy, as the Federal Reserve System and Bank of England examples show.

Central banks are doing much to be transparent, and more so than in the past: the ECB, for instance, only introduced macroeconomic forecasts some years after its foundation.

However, they could do more to reduce uncertainty and, therefore, fear about the future among the general public, thereby reducing any unwanted, fear-based reactions.

COMMUNICATING CENTRAL BANK STATISTICS TO THE GENERAL PUBLIC

ELGA BARTSCH

"The best a central bank can do is to 'teach' the markets its way of thinking"
Alan Blinder – The Quiet Revolution – Central Banking Goes Modern, 2004.

I   THE COMMUNICATION CONUNDRUM

Communication is an important instrument in almost any central bank's policy toolkit. In the context of the European Central Bank (ECB), you could even call it the "third pillar" of its monetary policy strategy. The reasons for central bank communication are obvious: credibility and predictability. Communication allows a central bank to affect market expectations and hence steer the whole yield curve rather than just the overnight rate. However, there does not seem to be a consensus as yet in the central banking community or among academics on what actually constitutes communication best practice. Empirical evidence suggests though that communication is vital for anchoring inflation expectations.

Over time, thanks to improved communication, the predictability of monetary policy decision-making has improved almost everywhere. Yet the puzzle of central bank predictability persists (see J. Fels, A Tale of Three Central Banks, July 21, 2003). We find that the most opaque central bank (the Federal Reserve System) is the most predictable, whereas the most transparent central bank (the Bank of England) remains the least predictable. The ECB, initially somewhere between the two, is clearly catching up with the Federal Reserve System. As a market economist, you still have a one in four chance of beating the consensus in the euro area, compared to a one in three chance in the case of the UK.

This predictability puzzle also applies to the quantitative information which these three central banks make available to the public. In her paper, Petra Geraats rightly praises the Bank of England for the extent of the quantitative information it publishes both on the baseline forecast and the uncertainty around it, yet it still remains the least predictable central bank of the three included in our example.

How predictable are the central banks?

January 1999 – September 2008	US Fed	ECB	Bank of England
Total rate changes	45	24	32
of which			
Expected	42	18	21
% of total changes	*93*	*75*	*66*
Unexpected	3	6	11
% of total changes	*7*	*25*	*34*

Sources: Bloomberg and Morgan Stanley Research.
Note: A rate change is classified as expected (unexpected) if a majority of economists surveyed by Reuters ahead of interest rate decisions had forecast (not forecast) a change, irrespective of the size of the change.

2   COMMUNICATION STRATEGIES

Essentially there are two communication strategies for a central bank: first, you can regularly outline your current thoughts (*induction*); second, you can systematically share your thought process (*deduction*). The ECB clearly focused on the latter from the outset with its two-pillar strategy, its price stability norm – and its strategy review in 2003.

More recently, notably in the last tightening cycle, it also started to signal its policy intentions using code words in what has become known as the "traffic light system" (monitoring closely, monitoring very closely, strong vigilance). In the context of this systematic approach to communicating its reaction function, statistics play a crucial role. Yet compared to some other central banks the ECB's communication on statistics has been relatively sparse. To some extent this is understandable and can partially be explained by the need to create and/or harmonise euro area statistics. Alongside this, the structural break forged by the arrival of the euro itself made it more difficult to interpret the available empirical evidence.

3   STATISTICS AS A COMMUNICATION TOOL

How a central bank utilises and produces statistics and data should be an integral part of its communication strategy. A central bank uses the empirical evidence to convince financial markets, media representatives and the general public that its assessment of the economic outlook is correct. As such, supplying this empirical evidence is key to a central bank's transparency and, as importantly, to its accountability. The financial crisis created massive demand for macroeconomic information, including data. Economists have never been so busy since the start of Economic and Monetary Union. As the global economy entered unchartered territory, financial markets also needed more guidance. ECB-produced money and credit data became a focus for financial market participants, who fretted about a credit crunch. Money and credit data are also more difficult to interpret (e.g. impact of bad banks).

When financial markets are nervous and trading volumes thin, it is also high season for market rumours. An example would be the "toxic" collateral that the ECB allegedly holds or which banks themselves supposedly are exclusively funding at the ECB at the moment. In my view, it is important to debunk popular myths and/or incorrect assertions. Yet at the same time you do not want to get into a position either where the central bank is forced to deny every crazy story out there. However, making statistics available will help to nip some "conspiracy theories" in the bud right from the start. Here, the independence of the European System of Central Banks (ESCB) in collecting the data is key to the credibility and integrity of the statistical data. It is vital that markets can trust data on, for example, Greek bank deposits at the present juncture, or for that matter on German deposits at the height of the crisis.

4   LET MARKETS WORK FOR YOU

Communication is never just a one-way street. Especially when it comes to financial markets, I believe it is important for any central bank not to regard the "echo effect" merely as a nuisance. While one obvious aim for the central banks is to get their message across, to my mind it is equally important to use the oncoming traffic emanating from financial markets to your advantage by making conscious use of your intermediaries. Obviously, different user groups have different needs in terms of both communication and statistics.

I will focus on the market economist's perspective: we regard statistics as key. Producing evidence and interpreting it is part of our day-to-day job. Here, market economists can be multipliers, but they also act as sounding boards. Many of us have reasonable quant skills. Our day-to-day job is to generate information advantages for our clients – internal and external – using macroeconomic analysis. Hence, we are always eager to find interesting and, importantly, new stories in the data. We are far less interested in confirming established views.

The fact that market economists are always on the lookout for new evidence – new hypotheses not yet fully priced into the market – can and should be used consciously by the central banks. In my view, competition for the best macro ideas in the financial markets is an important counterbalance to a central bank's quasi-monopoly position in producing and interpreting statistics in a more hierarchical set-up. Karl Popper taught us that it is important to put one's own working hypothesis constantly to the test, as data can only falsify a theory, reject a hypothesis, but never prove it. Hence, the more probing minds there are, the better.

More than policy-makers, financial markets are interested in turning points (cyclical, secular) and in how the tail risks change. To put it another way: financial markets focus more on the second derivative and are less concerned about the second decimal point in the base case scenario. Hence, in addition to being a conduit for communicating monetary policy, financial markets can complement the central banks' in-house analysis via their information processing capabilities.

5   STATISTICS IN PRACTICE

As statistical information is a public good, it should be disseminated as quickly and as widely as possible. Here, an e-mail alert once the data have been made available on the website, as some of the national central banks (NCBs) do already, is very useful. In general, financial markets require fixed release dates and periods with no leaks prior to the official release. In addition, big ex post revisions of the data are problematical from the financial market's standpoint. As a picture tells more than a thousand words, a fast update of the database itself (particularly to data vendors) is key to our ability to produce meaningful charts.

With regard to the press releases accompanying the data, financial markets probably have less interest in a verbal description of the data. Instead, there will be much more focus on any qualifying caveats that help to interpret the data correctly. In this respect, the sections of the ECB Monthly Bulletin dealing with the interpretation of various statistics (e.g. the impact of bad banks on M3 lending in one recent edition) provide valuable information. For many of its statistics, the ECB also offers extensive cross-country tables (e.g. MFI balance sheets, although it would be great if the same were true for NCB balance sheets). In Europe, we are still lagging behind in terms of transparency regarding the methods behind the statistics (e.g. in estimating GDP).

From a purely practical point of view, it would be great to be presented with the data underlying the charts in the Monthly Bulletin, especially where the data (e.g. money gap or charts from thematic pieces) are not available from the Statistical Data Warehouse in the same Excel format that the Swedish Riksbank uses for its Monetary Policy Report, for instance.

My statistical wish list also includes more timely data on the collateral pledged to the ECB and the use of the ESCB refinancing operation by country (or the NCB balance sheets). Last but not least, I would love to attend launch seminars for any new statistics that are being published and for statistics which the ECB thinks we should utilise more (e.g. flow of funds).

6   DO YOU SPEAK "STATISTICS"? TALKING NUMBERS

In their paper, Ittner and Schubert ponder the question of whether central banks should be boring. In my view, they certainly should not aim to be boring with their statistics and their analyses of these. However, they do need to reduce the "noise" and, if possible, increase the "news".

What better way to do this than by focusing on statistics? In order to make the statistics even more relevant, it might make sense to use visual aids to support the press conference. In my view, it is the same with statistics as it is with foreign languages: use it or lose it. Since the ECB has successfully communicated in 16 countries using ten different languages during the first decade of its existence, it might be time to focus on a language that should be spoken uniformly across financial markets inside and outside the euro area: that of "statistics".

DISCUSSION SUMMARY

Klaus Reeh (formerly Eurostat) asked whether communication efforts could be justified if the public did not use official statistics and whether more statistics led to more complexity and to less transparency.

Andreas Ittner (Executive Director, Financial Stability, Banking Supervision and Statistics, Oesterreichische Nationalbank) said that statisticians must not keep information "in small circles". The real world is complex and the data should be presented transparently. Aggregate statistics used by central banks for decision-making are a public good and should be presented to the public.

Bernard Delbecque (European Fund and Asset Management Association) discussed the success of ECB monetary policy over the last decade as measured by statistics on the average inflation rate (1.97%) of close to, but below, 2%; hence, the value of this figure was a good indicator of ECB success in achieving price stability and credibility.

Manuel Marfán (Deputy Governor, Central Bank of Chile and Chairman, Irving Fisher Committee on Central Bank Statistics) asked if private databases should also be treated as a public good.

Andreas Ittner questioned this: data providers should be able to earn money on these datasets.

Manuel Marfán stressed that it was difficult, in unstable economic conditions, to judge the credibility of monetary authorities, particularly when testing against both counterfactuals and different policy options. Predictability of a central bank is either good or bad, but what really matters is credibility: a credible central bank can be ahead of the curve, allowing the market to adjust to the signals from a central bank.

Lex Hoogduin (Executive Director, De Nederlandsche Bank) referred to the wide range of demands for new central bank statistics: from academics, from the markets, and from the general public. The focus should be more on the effectiveness of central banks in the supply of statistics to achieve monetary policy objectives. What kind of statistics should central banks publish if they concentrated more on the supply side, rather than following user demands?

José Marín Arcas (European Central Bank) disagreed with the conclusion that euro area inflation expectations were not well anchored, referring to the lack of correlation between the HICP and five-year-ahead inflation expectations. In addition, comparing the credibility of different institutions required a common sample. The survey conducted by JP Morgan had contained one such common sample, and in this the conclusions were opposite to the one presented in the conference paper.

Athanasios Orphanides (Governor, Central Bank of Cyprus) commented on the need for a broader view of the information in the ECB Survey of Professional Forecasters (SPF) in order to demonstrate the credibility of the ECB. He recalled a paper by Tsenova[1] in which a cross-sectional distribution of participants in SPF was presented and in which the dispersion among forecasters regarding five-year-ahead inflation in the euro area had diminished dramatically in the last few years.

Petra Geraats (Faculty of Economics, University of Cambridge) provided some explanations for the puzzle of central bank predictability. First, the United Kingdom is a small, open economy, so more prone to volatility which makes predicting economic developments and monetary policy more difficult. Second, the Bank of England Monetary Policy Committee is more individualistic and its members go very open-mindedly into the meetings, which allows the Bank of England to respond quickly; but, on the other hand, it may reduce predictability. Comparing central bank performance, UK inflation has risen well above the inflation target, yet long-term inflation expectations for the United Kingdom have remained remarkably stable. She said the United Kingdom has shown it is possible to maintain strong central bank credibility, even with inflation persistently above target or when facing a deep financial crisis.

A central bank's credibility depends on current inflation expectations. Her research showed it was not easy to support the claim that euro area inflation expectations were well-anchored. In particular, her research presented in "The Euro: The First Decade"[2] shows that the credibility measure and medium-term inflation expectations are correlated with inflation. Moreover, using a simple measure of inflation memory (weighted average of past inflation), there is also a strong correlation between five-year-ahead inflation expectations and the five-year credibility measure.

Furthermore, referring to the same research, she pointed out that the decline in dispersion among professional forecasters occurred while inflation expectations were rising, so there was more consensus about higher euro area inflation.

Athanasios Orphanides observed that the average five-year inflation expectations recorded in the SPF had risen somewhat over the past decade, but at the same time more survey participants were replying that five-year-ahead inflation will be very close to, but below, 2%. This may conflict with specific indicators of credibility presented in the paper and, in his opinion, confirms an increase in credibility. The ultimate conclusions were that communicating statistics is a very hard job: analysing statistics and choosing the wording on how you communicate are very important in shaping expectations.

1   See Tsenova, T (2009), "Are long-term inflation expectations well-anchored? Evidence from the euro area's survey of professional forecasters", Bulgarian National Bank Working Paper.
2   See Geraats, P. M. (2010), "ECB credibility and transparency", in Buti M., Deroose S., Gaspar V. and Nogueira Martins J. (eds.), *The Euro: The First Decade*, Cambridge University Press, Chapter 6.

Jürgen Stark (Member of the Executive Board, European Central Bank) added that what counts is the appropriate interpretation of the data; the world is too complex to look at one indicator or just a single set of data. He recalled that the ECB acted very quickly at the start of the crisis, in a period of high uncertainty and when others did not fully appreciate the severity of the emerging crisis. He confirmed that the average annual euro area inflation rate had been 1.97% over the first 11¾ years of the euro. In terms of credibility and transparency, his view was that the ECB has performed well in its monetary policy and in achieving its objectives. Regarding statistics, the ECB remained open to all new and good ideas.

CENTRAL BANK STATISTICS: WHAT DID THE FINANCIAL CRISIS CHANGE?

JÜRGEN STARK

The focus of this conference has been on the changes that have been brought about by the financial crisis in terms of central bank statistics. It has been pointed out, correctly, that our analysis of the data available prior to the emergence of the crisis highlighted vulnerabilities in the financial system. However, those data were not sufficient to foresee the scale and *severity* of the crisis.

In the meantime, some progress has been made, particularly in terms of closing the most urgent gaps in the statistics (for example, on loan securitisation by banks and the activities of the securitisation vehicles), but more information will be needed, especially on the extent of the interlinkages within the financial system. Thus, central bank statistics will need to cover a wider range of financial sub-sectors, instruments, markets and geographical areas. However, it is not just changes to central bank statistics that are required. The most recent phase of the financial crisis has also exposed gaps in government finance statistics. To support the Stability and Growth Pact and maintain credible budgetary surveillance, we need more reliable and timely data.

Let me elaborate on these points.

The European System of Central Banks (ESCB) was greatly aware of the growing financial imbalances in the years preceding the crisis.[1] A number of risks and vulnerabilities had been highlighted in various official reports. For example, the European Central Bank (ECB) Financial Stability Review drew particular attention to:

– the situation of the sub-prime segment of the US mortgage market (and the risk of contagion to other markets);

– the key role of hedge funds in fuelling liquidity growth in financial markets (and, again, the risk of contagion to other markets);

– the difficulties in identifying risk concentrations, owing to the proliferation of structured finance products and other credit risk transfer instruments.

Nevertheless, both the scale and severity of the financial crisis came as a surprise to most, not least because macro-prudential risk was not sufficiently taken into account. So, the question arises as to which tools and information are needed for macro-prudential oversight?

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1   See, for example, European Central Bank (2007), *Financial Stability Review*.

The effective conduct of macro-prudential oversight requires a large set of tools that are supported by a comprehensive information base. These tools need to be revised and updated regularly. Consequently, the information base needs to be sufficiently flexible to adjust swiftly to changing needs, as well as to better capture innovation in financial markets.

Macro-prudential indicators, as well as early warning indicators and models, are important risk surveillance tools. They should indicate when a financial system, market or intermediary enters a "danger zone", which usually suggests a risk of a crisis. In the past, most central banks have used a number of forward-looking risk indicators, but these have not necessarily been comprehensive enough to cover the entire financial system.

The establishment of the European Systemic Risk Board (ESRB) and the ECB's involvement therein will require a wide range of initiatives and responses in the field of statistics. The data available prior to the crisis were not sufficient to grasp the full extent of the vulnerabilities in the financial system and to better comprehend at least two phenomena.

First, the *wide usage of risk-based instruments*: the years leading up to the crisis saw considerable growth in the securitisation and credit risk transfer market. Through these instruments, risks were being passed on from the originators to various investors, not only outside the banking sector, but also within it. The structuring of collateralised debt obligations was also a very profitable business for banks in the years before the crisis, with many accumulating sizeable amounts of risk-based instruments that later on became impaired assets.

Second, the *large degree of interconnectedness and interdependence* among financial intermediaries (in particular those operating outside the regulated financial markets). The ECB had looked into the interdependencies in the financial sector for the purposes of its monetary analysis. For example, it had analysed the growing number of interlinkages between the euro area banking sector and the rest of the world. However, it did not have the full set of information that would have enabled it to identify how much of this activity was being conducted by special purpose vehicles and offshore auxiliaries.

This conference has highlighted a number of gaps in statistical reporting, such as the two I have just mentioned. It has also discussed some work streams that had been initiated by the ESCB *before* the outbreak of the financial crisis. At least three new avenues were pursued and these have proved to be very effective in addressing needs for both monetary policy and financial stability purposes.

First, there is the **greater integration of various sets of information**. One example of this is that, since 2007, the ECB and Eurostat have been publishing integrated quarterly euro area financial and non-financial accounts by institutional sector. Over the coming years, priority will continue to be given to improving the completeness, geographical coverage, consistency and timeliness of the quarterly sector accounts. It will also be important to complement these sector accounts with distributional information on indebtedness, wealth and

consumption in the household sector. The forthcoming Eurosystem Household Finance and Consumption Survey will certainly help to fill this gap.

Second, there are the efforts that have been made to achieve **greater granularity and flexibility in datasets based on micro-databases and registers**, so that data need only be reported once and the reporting burden is kept to a minimum. This is important because the same source data can be used more flexibly to derive various (micro and macro) statistics in order to meet new data needs, for example for financial stability analysis. I attach particular importance to the ongoing work to gather statistics on the holdings of securities.

Third, there is the **wide range of new ESCB statistics** that have been published recently (or are soon to be published) in order to close the most urgent gaps. Here, I refer to statistics on investment funds, insurance corporations and pension funds, loan securitisation by banks and the activities of securitisation vehicles.

These initiatives notwithstanding, further progress is needed not only in the field of central bank statistics, but also in other fields.

Particular attention needs to be given to the preparation of a comprehensive statistical basis for macro-prudential oversight. This will necessitate the collection of *additional data* in terms of central bank statistics.

First, there will be a need for more **timely, harmonised and frequent – at least quarterly – data for the EU consolidated banking sector**. The same requirements will apply to individual EU countries and to certain major non-EU economies. The data should include firm-level information on a set of large financial institutions. In this respect, I should underline that the objective is no longer to cover only the euro area, but the EU as a whole. For some types of analysis, for example those to gain a picture of global developments, we may even need to cover countries outside the EU. The statistics need to focus much more strongly on new risk-based instruments and exposures to certain asset classes and geographical areas.

Second, there will be a need for more detailed statistics on **financial institutions outside the banking sector**. Here, I refer mainly to insurance corporations and pensions funds, but also to institutions, such as hedge funds and securitisation vehicles. Some of these statistics either already exist or are soon to be released. As far as possible, these statistics should follow the same format as the information collected from the banking sector.

Third, the major gaps in statistics on the **interlinkages within the financial system (including exposures between institutions in the banking sector and institutions in non-regulated markets)** need to be filled. The collapse of Lehman Brothers two years ago illustrated the relevance of such interlinkages. In particular, it highlighted that such interlinkages may be more relevant than the absolute size of the balance sheet of the institutions.

It will take some time for these enhancements to materialise. Hence, we can expect to receive ad hoc requests from the ESRB relatively frequently in its first few years. Such ad hoc requests will often translate into ad hoc surveys because they are able to capture financial innovation and changing exposures, and accommodate more swiftly new data requests from the ESRB. Later on, we may have to improve the quality of the data and I would expect these data requirements to be met with regular supervisory and statistical data that are comparable across countries and across institutions.

Further improvements are also needed in other statistical fields.

As the sovereign debt crisis in May this year has further underlined, reliable and timely government finance statistics are key to the implementation of the Stability and Growth Pact and the credibility of its budgetary surveillance. Budgetary forecasts also need to improve in parallel. To this end, the principle of the professional independence of statistical authorities needs to be fully adhered to by all Member States, in order to avoid any potential political interference in the compilation of the data for an excessive deficit procedure.

I would like to conclude my remarks today by assuring you that the ESCB will further develop its statistics so as to better align them with the data needed for ECB monetary policy and financial stability purposes. In particular, they need to focus much more strongly on new risk-based instruments and the exposure of banks and other financial institutions outside the banking sector to certain asset classes and geographical areas. Moreover, we need to address the gaps in the information on interlinkages within the financial system. However, these changes to central bank statistics will not be enough. In particular, the importance of timely and reliable government finance statistics cannot be overestimated. If the credibility of one specific set of European statistics is damaged, there may be spillover effects on other sets of data in Europe. Most importantly, damaged credibility may expose unexpected vulnerabilities, which could lead to a general loss of confidence in the markets. As today is World Statistics Day, it would also be a very fitting occasion to call for joint efforts to further build trust in statistics.

At the same time, we also have to accept that we will not be in a position to measure everything we would like to measure. This relates in particular to those entities that are located outside the EU, but may nevertheless have a significant impact on EU financial markets and institutions. Hedge funds are a case in point. International initiatives, for example under the auspices of the G20, are very welcome but are likely to find solutions only in the longer term.

Ladies and gentlemen, let me finish by congratulating the chairs, the speakers, the discussants and the many distinguished participants in this conference. You have provided excellent contributions and reflections on strategic issues for the future development of statistics. This conference has no doubt been a very good opportunity to enhance our cooperation, to identify user requirements

and to remove obstacles to the supply of financial stability statistics. It has also provided useful insights into the ESRB. I hope that our fruitful cooperation will continue in the future and thank you very much for your attention.

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Wednesday, 20 October 2010

World Statistics Day: "Central bank statistics in a global context"

14.15 – 14.20	Introduction:
	Aurel Schubert, Director General Statistics, European Central Bank and Chairman of the ESCB Statistics Committee
14.20 – 14.45	**Contributions of central bank statistics in a global context**
	Jürgen Stark, Member of the Executive Board, European Central Bank
14.45 – 15.30	Recorded video statements by the following guest speakers:
	The financial crisis and information gaps
	Murilo Portugal, Deputy Managing Director, International Monetary Fund
	Responding to the financial crisis: the role of statistics in the assessment of domestic and international policy
	Rebecca Blank, Under Secretary for Economic Affairs, United States Department of Commerce
	The G20 response: statistical challenges facing central banks
	Tao Zhang, Director General Statistics and International Affairs, People's Bank of China
	The G20 response from an institutional perspective: comparable world economic and social statistics
	Martine Durand, Chief Statistician and Director of the Statistics Directorate, Organisation for Economic Co-operation and Development
15. 30 – 16.25	**Panel discussion and Q&A.**
	Chair: **Aurel Schubert**
	XXI century crises and data gaps
	Manuel Marfán, Deputy Governor, Central Bank of Chile and Chair, Irving Fisher Committee on Central Bank Statistics
	The usefulness of micro data and the development of micro databases: a panacea for transparent financial statistics
	Chihiro Sakuraba, Deputy Director General, Research and Statistics Department, Bank of Japan

How to maintain trust in and the credibility of European statistics

João Cadete de Matos, Director General Statistics,
Banco de Portugal

Discussant: Philippe Moutot, Deputy Director General
Economics and Director Monetary Policy, European Central Bank

Concluding remarks

Aurel Schubert

16.25 – 16.30   **ECB statistics video, "Statistics: News you can use"**
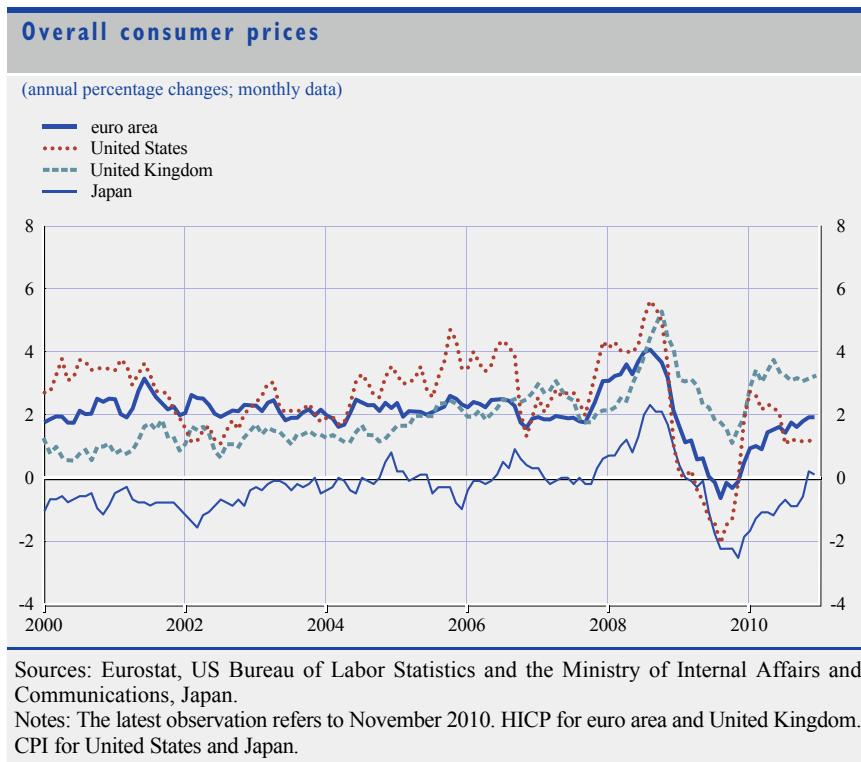
16.30   End of World Statistics Day

CONTRIBUTIONS OF CENTRAL BANK STATISTICS IN A GLOBAL CONTEXT

JÜRGEN STARK

The global crisis has demonstrated that high quality statistics are essential. The crisis underscored the need for statistics to keep pace with changes in the financial landscape. These changes can transform the nature of financial intermediation and the transmission of macro-financial shocks in the economy. Let me give you a few flashlights of how the global harmonisation of statistical concepts would support higher quality analysis.

Global inflation rates have rebounded from their bottom, but they have remained subdued. However, these measures of inflation are not fully comparable. Data for the euro area and the United Kingdom (as for the whole EU) refer to the Harmonised Indices of Consumer Prices (HICPs) calculated according to a harmonised methodology and a single set of definitions. The US and Japan headline rates of inflation refer to their national ways of compiling consumer price inflation (CPI).[1] Both countries also compile a price index that comes closer to the European HICPs.

Overall consumer prices

(annual percentage changes; monthly data)

Sources: Eurostat, US Bureau of Labor Statistics and the Ministry of Internal Affairs and Communications, Japan.
Notes: The latest observation refers to November 2010. HICP for euro area and United Kingdom. CPI for United States and Japan.

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1 For the United States, the headline figure is the "All Items Consumer Price Index for All Urban Consumers (CPI-U)" reported by the Bureau of Labor Statistics, whereas the "General Consumer Price Index" in Japan is defined by the Japan Statistics Bureau.

One of the main differences between the two types of indice is the treatment of owner occupied housing costs.[2] The HICP does not cover the expenditure for buying a house or a flat, as it is methodologically very demanding to agree on one method given the different national circumstances. Data collection is complex and some argue that buying a house is an investment rather than consumption. Both the headline inflation measure in the United States, as well as in Japan, do include a measure of owner occupied housing. Comparing the euro area HICP (1.6% for August 2010) with the US CPI (1.1%), it appears that inflation is lower in the United States. Taking the harmonised measure, the HICP, US inflation was higher (1.9%). I emphasis here that harmonisation for international comparability needs to be weighed against the specific needs for policy makers. The HICP provides the best measure for comparisons of consumer price inflation and for assessing price convergence and stability for the purpose of monetary policy. The HICP is hence used to measure the success of the European Central Bank (ECB) in its aim to achieve price stability.

Inflation for United States and Japan, different definitions

(annual percentage changes; monthly data)

- US CPI
- US HICP
- Japan General CPI
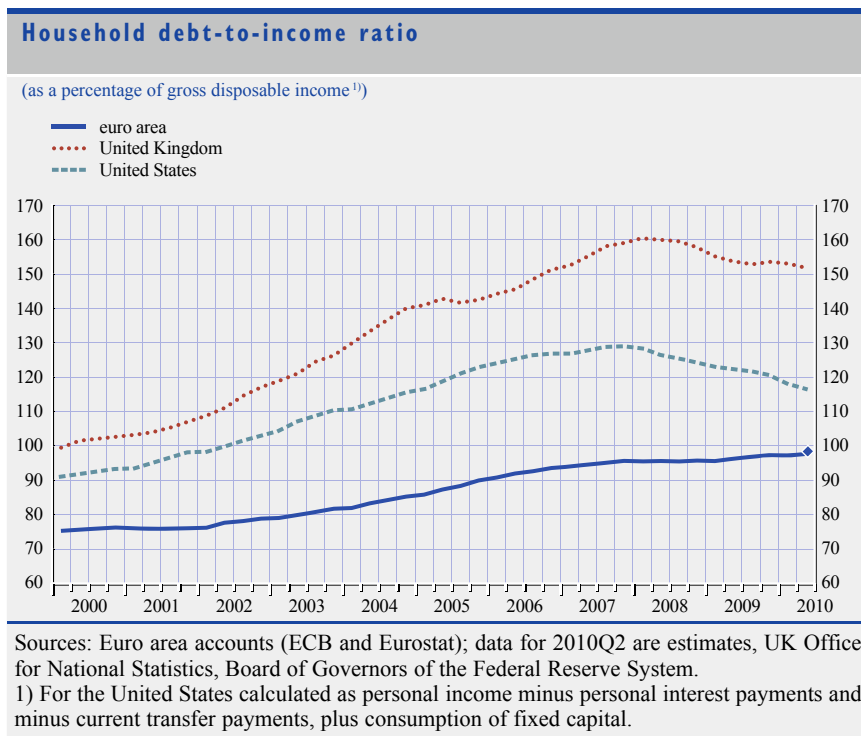- Japan General CPI, excluding imputed rent
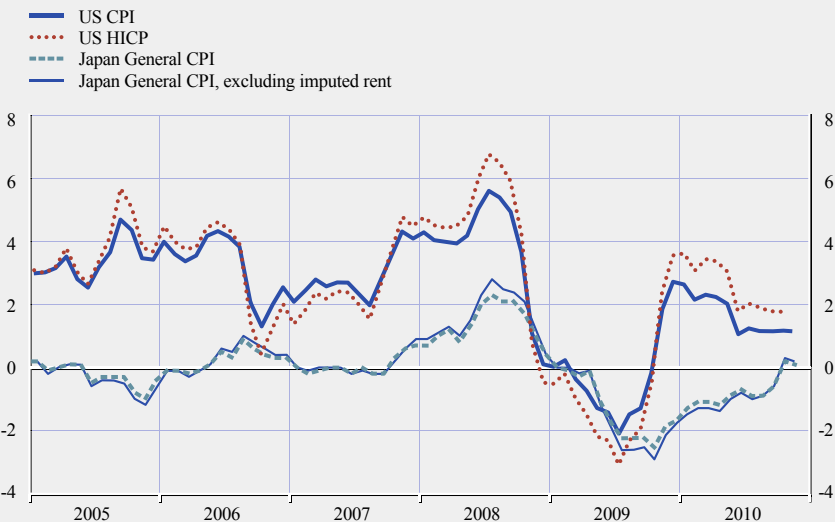
Sources: US Bureau of Labor Statistics and the Ministry of Internal Affairs and Communications, Japan.
Note: The latest observation refers to November 2010, to October 2010 for US HICP.

2   Other differences include, for instance, the coverage of households: whereas the HICP includes the rural population in its scope, the US CPI only covers urban population.
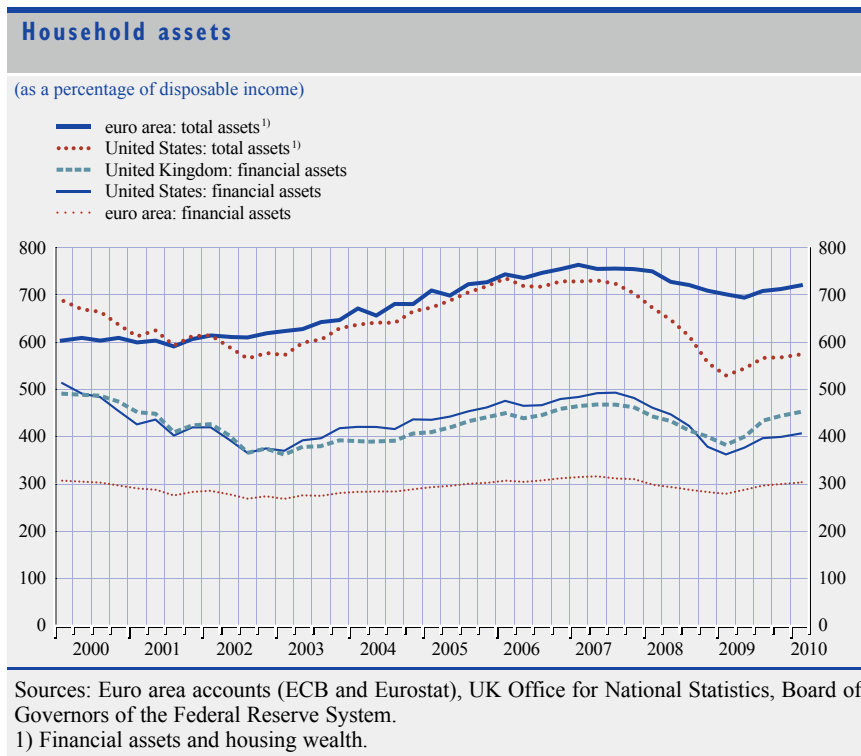
Excessive debt and leverage have been at the core of the financial crisis.
This slide shows household debt levels in the United States, the United Kingdom
and the euro area, taken from financial accounts statistics. These statistics are
part of the national accounts and provide, in principle, a good framework for
international comparison of financial data. However, US data depart from the
national accounts standards in some areas which makes them not fully comparable;
for instance, the US household sector is narrower than in the other economies.[3]
To some extent, the data can be adapted to make them more comparable:
in the slide, the US data on income have been adjusted to better conform to the
other two economies' income data.[4] These caveats notwithstanding, there is a
remarkable difference in household debt levels. The greater home ownership in
the United States and the United Kingdom compared with the euro area owing to
a more developed mortgage market has certainly contributed significantly to the
higher levels of household debt in these countries.

Household debt-to-income ratio

(as a percentage of gross disposable income [1))

Sources: Euro area accounts (ECB and Eurostat); data for 2010Q2 are estimates, UK Office
for National Statistics, Board of Governors of the Federal Reserve System.
1) For the United States calculated as personal income minus personal interest payments and
minus current transfer payments, plus consumption of fixed capital.

3   In the euro area and the United Kingdom, sole proprietorship and partnership without
    independent legal status are included in the household sector, but they are included in the
    non-financial corporations (NFCs) in the United States.
4   Subtracting interest paid from the US measure of income, inter alia.

This chart illustrates a comparison of total household wealth. In this context, it is my pleasure to announce that the ECB will publish for the first time quarterly data on household wealth in the next statistical press release "Euro area financial and non-financial developments" to be issued on 28 October 2010. The proportion of financial wealth to total wealth is much higher in the United States, mainly because of the higher weight of private pension schemes, and it is also more volatile, owing to the higher weight of equity assets in total wealth. The large drop in equity prices and house prices in some countries and in residential investment is reflected in a pronounced decline in the ratio of wealth to disposable income, particularly so in the United States. Moreover, in the United States, the gap between total wealth and financial wealth has narrowed substantially.

Household assets

(as a percentage of disposable income)

    euro area: total assets[1]
    United States: total assets[1]
    United Kingdom: financial assets
    United States: financial assets
    euro area: financial assets

Sources: Euro area accounts (ECB and Eurostat), UK Office for National Statistics, Board of Governors of the Federal Reserve System.
1) Financial assets and housing wealth.

I will turn now from a typical lender, the household sector, to the typical borrower, the non-financial corporations sector. The main difference between the euro area and the United States is the weight of bank financing. In the United States, the recourse to equity, debt securities and loans channelled outside the banking sector is much more widespread than in the euro area. One can assume that during times of robust economic growth, the relative weight of market financing decreases, while in the most recent period of financial distress it has increased and substituted for bank financing.[5]

Bank versus non-bank financing of non-financial corporations: euro area [1)]

(as a percentage of GDP; four-quarter cumulated transactions)
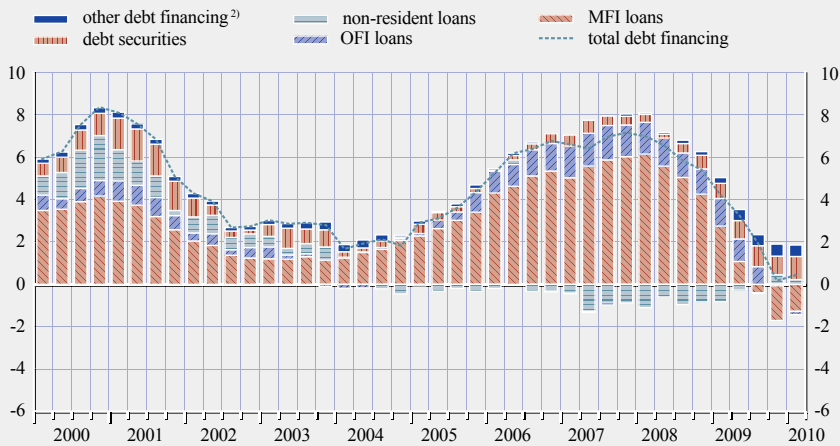
Sources: Euro area accounts (ECB and Eurostat).
1) Consolidated using the new counterpart sector information on loans granted by NFCs to resident NFCs.
2) Mostly loans granted by insurance corporations and pension funds and loans granted by government.

5   One explanation may be that in periods of uncertainty the large well-known enterprises with good ratings continue to attract funds at favourable conditions and may then channel funds to smaller enterprises via inter-company loans or via trade credits.

(as a percentage of GDP; four-quarter cumulated transactions)

- other debt financing
- debt securities
- non-resident loans
- OFI loans[3]
- MFI loans[2]
- ----- total debt financing

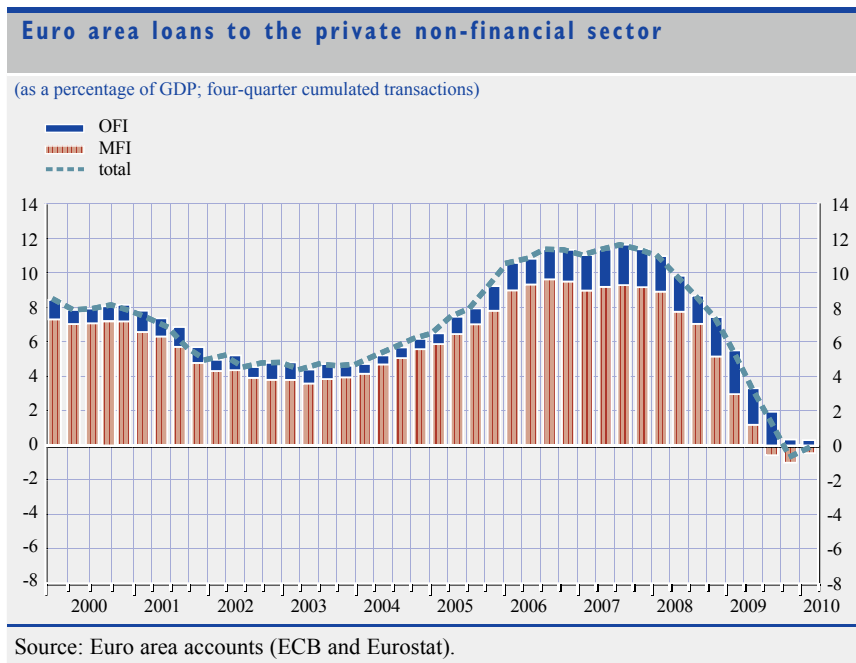Sources: Board of Governors of the Federal Reserve System.
1) US data for NFCs loans are consolidated.
2) Commercial banking, savings institutions and credit unions.
3) Private and government-sponsored enterprises (GSEs), asset-backed securities (ABS) issuers, finance companies, mutual funds, brokers and dealers and funding corporations.

This slide provides a picture of the development of bank loans and the most important part of loans by other financial intermediaries (OFIs): securitised loans. The slide for the euro area only provides an approximation to securitised lending, assuming that all OFI loans are securitised loans. In the near future, ESCB statistics on loan securitisation vehicles will enable a more detailed breakdown and thus a better comparison with the United States. In terms of funding sources, securitised lending was an alternative source of financing to deposits collected from the public: banks obtained the funds for new lending through bonds issued by securitisation vehicles. While there is a significant drop in lending in both the euro area and the United States and financing by banks has now turned negative, it is striking that a dramatic drop of securitised lending by ABS issuers started at the end of 2007.

Euro area loans to the private non-financial sector

(as a percentage of GDP; four-quarter cumulated transactions)

Source: Euro area accounts (ECB and Eurostat).

US loans to the private non-financial sector

(as a percentage of GDP; four-quarter cumulated transactions)

- GSE-backed securities
- ABS issuers
- MFI
- total
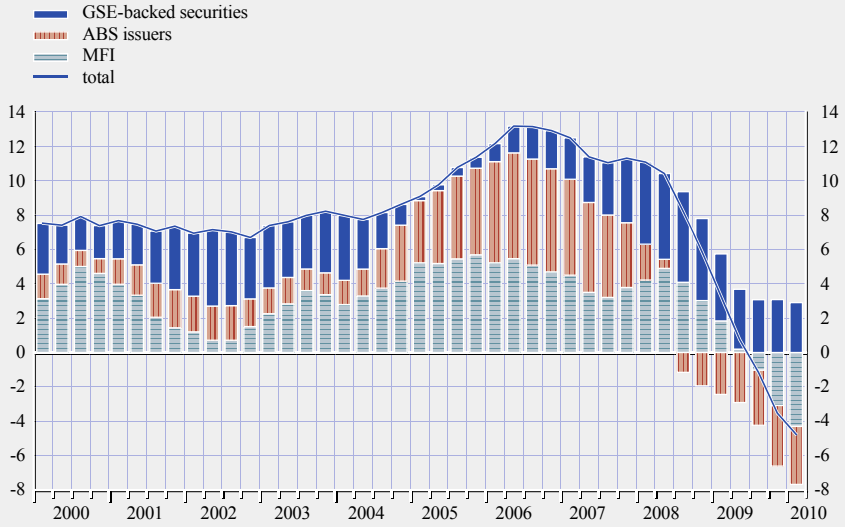
Source: Board of Governors of the Federal Reserve System.

Let me now move to a subject which is a key determinant of the euro area's international competitiveness – productivity. Productivity growth impinges on the monetary policy of the ECB: it has an influence on potential output, unit labour costs and potential risks to price stability. In response to the crisis, the gap in labour productivity (per person) between the United States and the euro area has widened significantly. As evident from slide 8, this is partly due to the use of shortened hours schemes in a number of euro area countries, which had a significant impact on developments in productivity per head.

Labour productivity growth per person employed

(annual percentage changes)
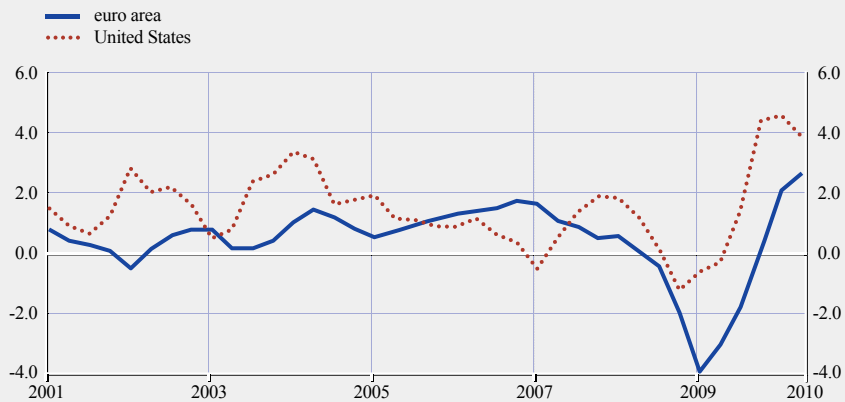
— euro area
······ United States

Sources: Eurostat, OECD, US Bureau of Labor Statistics and ECB staff calculations.
Note: The latest observation refers to 2010Q2.

Hourly labour productivity growth

(annual percentage changes)
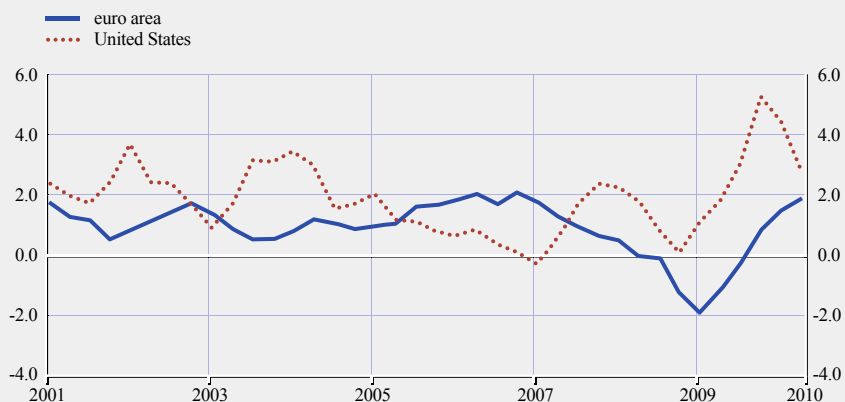
— euro area
······ United States

Sources: Eurostat, OECD, US Bureau of Labor Statistics and ECB staff calculations.
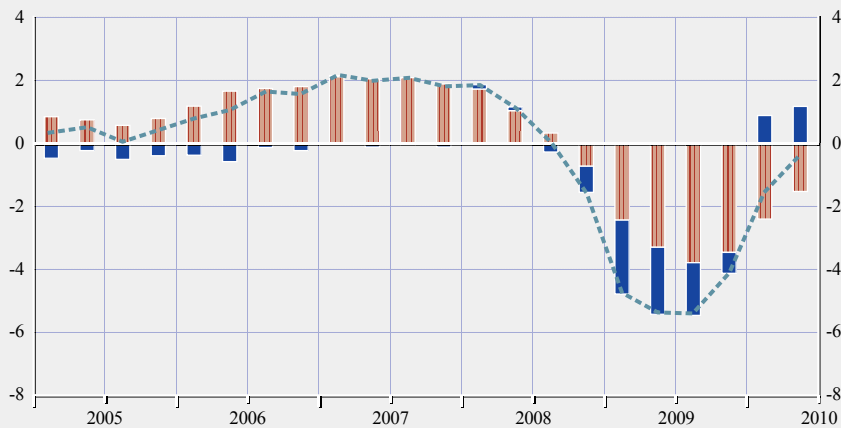Note: The latest observation refers to 2010Q2.

While shortened working hours were also used extensively in the United States over the course of the crisis, US firms were also much more likely to lay off workers. Along with the relatively larger contraction in economic activity seen in the euro area, this helps to explain the more significant fall in productivity growth per person employed in the euro area than in the United States, over the course of the recession.

Evolution of employment, average weekly working hours and total hours worked in the business sector

(annual percentage changes and percentage point contributions)

- average weekly hours/employed person
- employment
- total hours worked
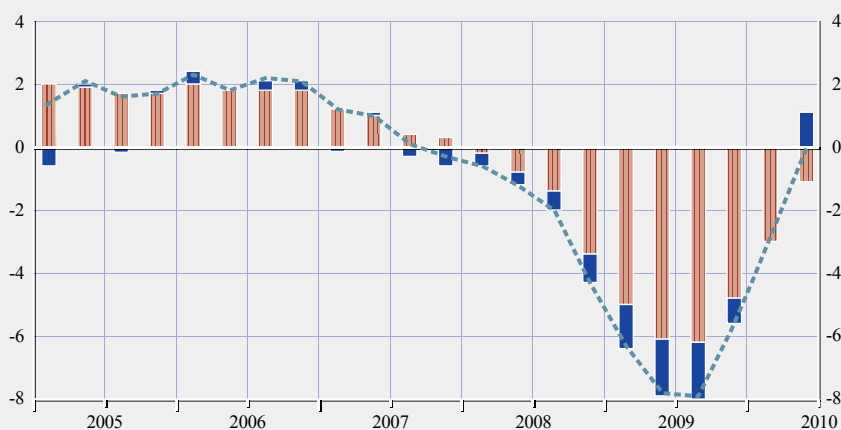
Sources: Eurostat, US Bureau of Labor Statistics and ECB staff calculations.
Notes: The latest observation refers to 2010Q2. The business sector excludes non-market services (including the public sector). US employment data refer to the total number of jobs held (and this may include a small proportion of people with more than one job).

At a sectoral level, the euro area's recent favourable labour productivity performance has been mainly driven by positive cyclical developments in "industry excluding construction". In contrast, productivity growth in services has not improved much, despite a few modest, but nevertheless encouraging, signs in the financial and business services sector.

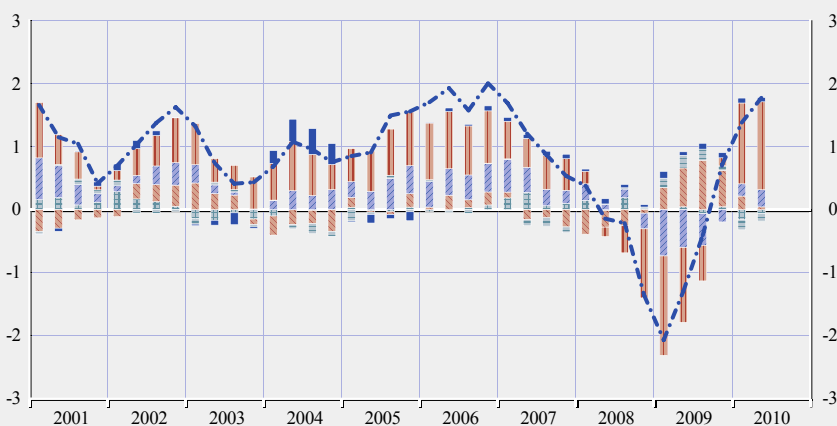## Labour productivity in the euro area: sectors

(annual percentage changes and percentage point contributions)

- agriculture and forestry
- industry excluding construction
- construction
- trade and transport
- financial and real estate services
- public administration, health and education
- total economy

Per person employed
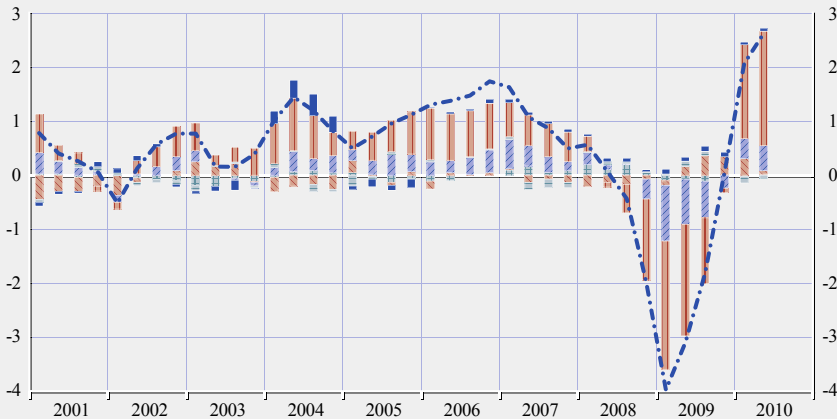
Per hour

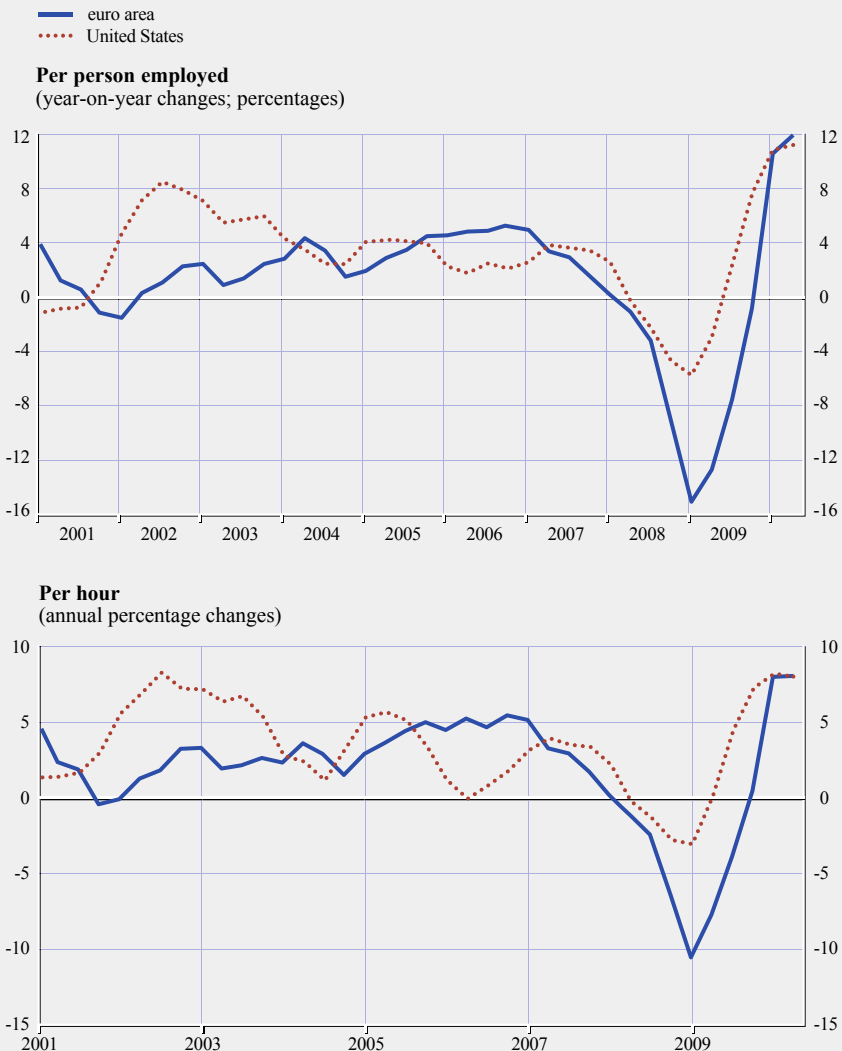Sources: Eurostat and ECB staff calculations.
Note: The latest observation refers to 2010Q2.

It would, of course, be useful to compare productivity developments in a wider range of sectors in the euro area with those of the United States. But this is not yet possible, as quarterly productivity developments are not produced at the same sectoral breakdown in the United States. (The United States disaggregates only to the non-farm business sector and the manufacturing sector.)
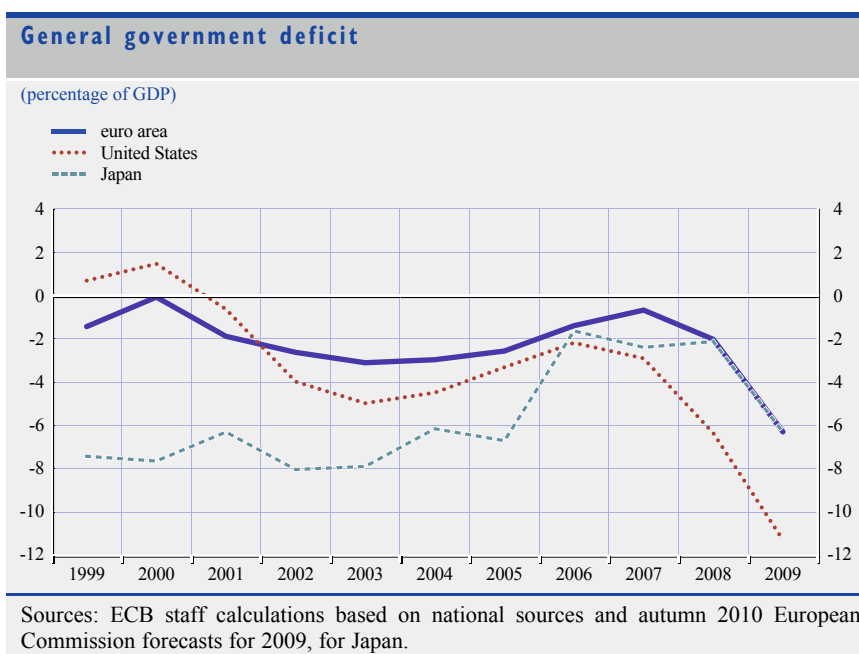
Labour productivity in manufacturing

Sources: Eurostat, US Bureau of Labor Statistics, US Bureau of Economic Analysis and ECB staff calculations.
Notes: The latest observation refers to 2010Q2. US data are based on jobs, euro area data are per person employed.

The main comparable indicators used for fiscal policy analysis are the general government deficit, expenditure and debt. Harmonised deficit figures show strong deficit deterioration in the euro area and in the United States for the last two years. These were driven by sharp declines in tax revenues as well as expansionary fiscal policies. Japan[6] displayed a deficit between 6% and 8% of GDP for most of the early 2000s as a consequence of the Japanese crises in the 1990s, with some improvement for the period 2006-08. In 2009 the fiscal outlook deteriorated again with an estimated deficit of slightly above 6% of GDP.[7] Again, a direct comparison is not possible without adjustments,[8] due to methodological differences in their compilation.[9]

General government deficit

(percentage of GDP)

Sources: ECB staff calculations based on national sources and autumn 2010 European Commission forecasts for 2009, for Japan.

6   It is straightforward to compile government data for Japan according to the European definition on the basis of the Japanese national accounts as they are based on the international System of National Accounts (SNA), which is compatible with the European System of Accounts (ESA 95).

7   According to the European Commission forecasts (autumn 2010), the deficit-to-GDP ratio for 2009 is projected to be 6.3%. It is important to highlight that no comparable deficit figures for Japan are available for 2009 yet. This is due to the fact that Japan releases national accounts data of the year t-2 in the year t (2009 data will be available only by the beginning of 2011).

8   In terms of deficit, the main methodological discrepancies between the US methodology and the European standards are mainly related to the sector delineation (public corporations are included in the US government sector), the recording of some military expenditures and the inventories held by governments.

9   The euro area deficit and debt indicators are based on the ESA 95 and on the Excessive Deficit Procedure (EDP) concepts. In Japan, the deficit and debt indicators are compiled according to the SNA 2008 concepts. The US deficit data are based on the National Income and Products Accounts methodology, which deviates to some extent from the SNA 2008, while the US debt data are based on the Flow of Funds methodology used by the Federal Reserve System.

The expenditure-to-GDP ratio[10] indicates the size of the government sector. Comparable figures show a convergence of expenditure levels in the United States and Japan, at around 37% of GDP. The relative importance of the government sector in the euro area is much higher, with a current expenditure ratio just above 50% of GDP. When interpreting these figures, an important caveat concerns the institutional differences between the social security provision. Mandatory private insurance schemes for pensions, unemployment or health care reduce the headline figures for government expenditure in the United States. State contributions to compensate for households' voluntary payments into social security funds increase government expenditure in the euro area.

General government expenditure

Sources: ECB staff calculations based on national sources.
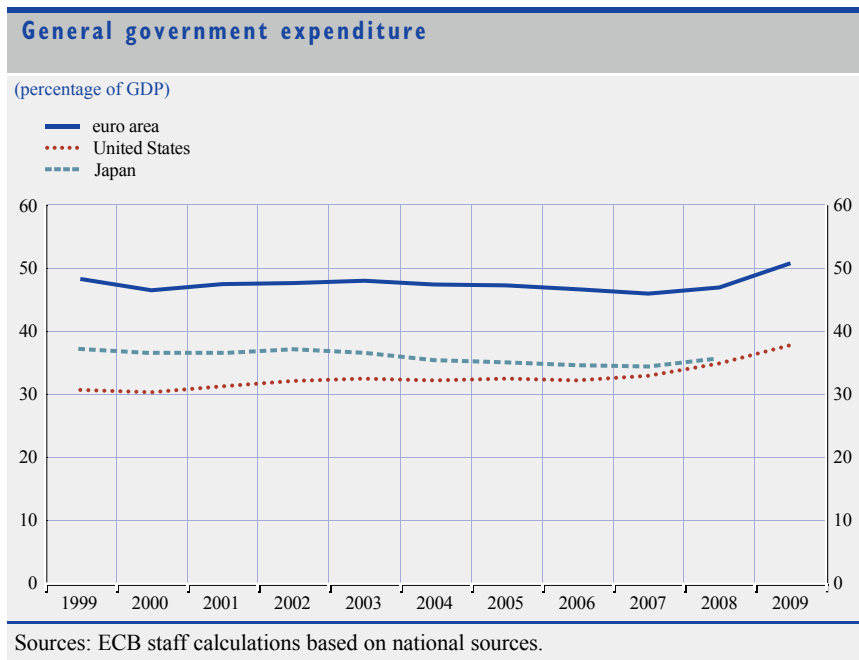
10 Government expenditure covers social payments, subsidies, other current transfers, interest, compensation of employees, intermediate consumption and capital expenditure.

Comparable figures show an increase in the debt-to-GDP ratio[11] between 2007 and 2009 in the euro area and the United States, amounting to 13.0 percentage points and 20.2 percentage points respectively. In Japan, the government debt ratio stood at 162.2%[12] of GDP in 2008 after rising more than 40 percentage points in the last decade. This is due to the accumulation of high deficits and low GDP growth.

General government debt

(percentage of GDP)

Sources: ECB staff calculations based on national sources.
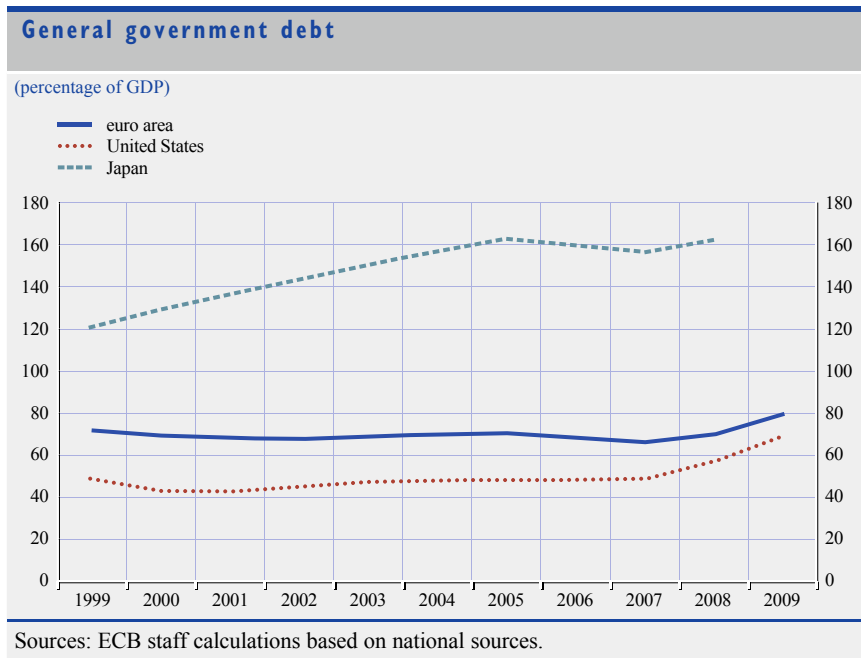
11 Government debt for EDP purposes.
12 One should highlight that the Japanese government holds financial assets worth around 90% of GDP (2008) (with a high percentage held by its social security system – around 40% of the total), which represent a buffer from a solvency perspective. This yields a net government debt-to-GDP ratio in Japan of around 86% (2008). Net debt is calculated from the Japanese balance sheet data, as the difference between the government liabilities (177.4% of GDP in 2008) and the financial assets (90.9% of GDP in 2008).

PROGRESS AND PLANS TO FILL GAPS

These examples illustrate the importance of internationally comparable statistics. The statistics should only reflect differences in economic developments and the impact of the underlying phenomena. They should not be clouded by differences in statistical methodology. In close cooperation with statisticians globally, the ECB is contributing to the G20 initiatives [13] to provide harmonised and transparent global financial statistics in real time. These initiatives have had significant input from the ECB and were also welcomed recently by the International Monetary and Financial Committee of the International Monetary Fund Board of Governors. [14]

"Statistics may be defined as a body of methods for making wise decisions in the face of uncertainty." W.A. Wallis. [15]

Globalisation has increased this uncertainty. Globalisation continues to impact decisively on statistics and there is no doubt of the merits of comparable statistics. We need globally comparable statistics. And there must be investment in closing gaps and enhancing comparability of statistics at the global level. There is a global momentum and we must all be part. The World Statistics Day is an excellent occasion to give a new impetus to this momentum.

13 Progress report on the "The Financial Crisis and Information Gaps" prepared by the International Monetary Fund Staff and the Financial Stability Board Secretariat, May 2010, available at http://www.financialstabilityboard.org/publications/r_100510.pdf
14 See http://www.imf.org/external/np/sec/pr/2010/pr10379.htm
15 President of the University of Rochester, 1962-1970; United States Under Secretary of State for Economic Affairs, 1982-89.