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Research Summaries

Market Failures and Macroprudential Policy

Giovanni Favara and Lev Ratnovski



The purpose of macroprudential policy is to reduce macroeconomic risks stemming from the operations of the financial sector. However, its economic rationale is not always well articulated, and there is no consensus on optimal instruments. This article argues that macroprudential policy can be analyzed through the prism of market failures that it is supposed to address. The relevant market failures are risk externalities across financial institutions and between finance and the real economy. The article then discusses how these externalities can be corrected by existing policy tools.

The purpose of macroprudential policy is to reduce “systemic risk.” While hard to define formally, systemic risk is understood as “the risk of developments that threaten the stability of the financial system as a whole and consequently the broader economy” (Bernanke, 2009). The concept is meant to include the types of financial imbalances that led to the 2007–2008 financial crisis.

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Measurement Matters for House Price Indices

Mick Silver



A key element in understanding the global recession is the movement in house price indices (HPIs). Methodological differences in compiling HPIs plague and can undermine both within-country and cross-country analysis of house price cycles and their determinants. It is a difficult but important area of study. There are empirical questions, such as, whether measurement differences matter and, if so, how and to what extent, and second, how such differences impact on some Fund analytical work including the modeling of house price inflation and the measurement of global house price indices.

In the March 2010 issue of this *Research Bulletin*, Prakash Loungani summarized research, much of it IMF work, that compared the present housing cycle with previous ones in OECD countries. The article highlighted the broad features of house price cycles and the depth of the current trough; anchoring of house prices; factors that amplify the response of house prices to fundamentals; country coincidence of house price changes; and the effectiveness of monetary policy to

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Market Failures and Macroprudential Policy

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It is common to focus on two key aspects of systemic risk. One is the “time-series dimension”: the procyclicality of the financial system that manifests in excess risk taking in booms and excess deleveraging in busts. Another is the “cross-sectional dimension”: the risk of contagion due to the concurrent state of weakness and failure of financial institutions. Accordingly, macroprudential policy is thought of as a set of tools that help reduce these two forms of risk (Borio, 2009; Bank of England, 2011).

Yet thinking about macroprudential policy by looking solely at these two dimensions of risk is unsatisfactory. First, this view, per se, does not provide a justification for regulatory intervention. For example, is it really desirable to avoid any form of cyclicality and have zero risk of contagion in the financial system? Second, it is not a priori clear what macroprudential policy can achieve that traditional microprudential regulation cannot.

A recent IMF study (De Nicolò, Favara, and Ratnovski, 2012) aims to tackle these questions. It starts by articulating that, as for any form of regulatory intervention, the objective of macroprudential regulation must be to address market failures.

The idea that macroprudential policy is needed to correct market failures, rather than to smooth financial cycles, is important, because prudential measures that restrict credit availability (and possibly bank profits) may encounter non-trivial political challenges. The identification and correction of market failures is a clearer, uncontroversial objective for a macroprudential regulator.

The emphasis on market failures also helps clarify why microprudential regulation, which focuses on the individual stability of financial institutions, is not enough for containing systemic risk. Clearly, having strong individual institutions is necessary to minimize systemic risk—but that is not sufficient. For example, microprudential policy may not take sufficient account of correlation risks. Likewise, a focus on maintaining high capital ratios of individual institutions during a recession may result in asset fire-sales, exacerbating existing vulnerabilities.

Externalities and Policies

De Nicolò, Favara, and Ranowski (2012) argue that important sources of market failures in the financial sector are the risk externalities across financial institutions

and between the financial sector and the real economy. According to the available literature, such externalities are driven by 1) *strategic complementarities (herding)*: the strategic interactions of financial institutions causing the build-up of vulnerabilities during the expansionary phase of a financial cycle; 2) *fire sales*: the generalized sell-off of financial assets causing a decline in asset prices and a deterioration of the balance sheets of intermediaries; and 3) *interconnectedness*: the risk of contagion caused by the propagation of shocks from systemic institutions or through financial networks.

“The idea that macroprudential policy is needed to correct market failures, rather than to smooth financial cycles, is important, because prudential measures that restrict credit availability may encounter non-trivial political challenges.”

The policy debate has suggested a number of macroprudential policy tools: procyclical and systemic risk-based capital surcharges, dynamic provisioning, liquidity regulation (including dealing with the risks of wholesale funding), lending limits (loan-to-value and debt-to-income caps), restrictions on activities (Volcker and Vickers rules), and different forms of corrective taxes.

The paper analyzes how these policy tools can correct the three identified externalities. A summary of the main discussion is depicted in the following table (page 3).

One important result of the analysis is that each of the externalities can be corrected by multiple policy tools. For example, both capital requirements and limits on bank asset allocation can correct the externalities associated with strategic complementarities of banks. Capital requirements induce banks to internalize more of the cost of engaging in risky lending; restrictions on asset allocation prevent banks from taking large risk exposures.

However, since capital requirements may become less effective in booms (when capital ratios increase due to buoyant asset prices), direct quantity restrictions, such as debt-to-income (DTI) or loan-to-value (LTV) ratios, can also be useful complements. These restrictions affect directly the asset side of a bank’s balance sheet and are meant to limit the fall in lending standards during boom times.

Externalities and Macroprudential Policies				
Externalities due to:	Can be addressed by:			
	Capital Requirements (Surcharges)	Liquidity Requirements	Restrictions on activities, assets, or liabilities	Taxation
Strategic complementarities	X		X	
Fire sales	X	X		X
Interconnectedness	X		X	X

Similarly, capital and stable funding measures are complements in addressing the risk of fire sales since they focus on vulnerabilities stemming from different sides of a financial institution's balance sheet. The externalities associated with fire sales arise because banks fail to internalize the consequences of not taking precautionary measures in normal times, and thus need to adjust by shedding assets ex-post in the event of a negative aggregate shock. Capital and liquidity requirements provide buffers that reduce the risk of fire sales.

Also, capital surcharges can weaken the incentives of banks to become systemic, ensuring they dispose of a larger buffer in case of distress. Complementary restrictions on the composition of bank assets (as envisioned e.g., by the Volcker rule) serve to limit banks' exposure to excessive risk.

The second result, a corollary, is that since the alternative policy tools are often complementary, this is not a "silver bullet" policy instrument. Since each tool has different advantages and limitations, a combination is likely to provide a better solution to the problem of correcting the same externality. Goodhart and others (2012) reach similar conclusions using a theoretical model of financial instability.

The third result is that capital surcharges, more than any other tool, can be effective in dealing with any of the externalities. For this reason, and because they are closely linked to microprudential regulation and are part of the Basel III framework, capital requirements (surcharges) are likely to form the core of any macroprudential policy framework. The other instruments can be seen as complements in cases when capital surcharges are less effective.

In conclusion, even though the mapping from externalities to policy tools helps identify the pros and cons of alternative policy interventions, a major challenge in the

implementation of macroprudential policy rests on the calibration of instruments. Despite recent evidence on the effectiveness of some tools, little is known quantitatively (Dell'Ariccia and others, 2012). For example, it is far from clear how high should capital surcharges be or what should be the optimal LTV ratio. Accordingly, further fundamental and applied research on the optimal choice and calibration of macroprudential policy tools is required to justify policy intervention and avoid regulatory discretion.

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Measurement Matters for House Price Indices

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keep house prices in check. Understanding the causes and consequences of the housing cycle, and its implications for the broader economy and the appropriate policy response, have become a key focus of attention in recent years of central banks and international institutions (IMF, 2008 and 2011). Yet the underlying series largely used for these analytical studies, house price indices, are particularly prone to measurement differences both between and within countries. More than one national HPI can exist within a country—for example, there are eight national HPIs for the United Kingdom with similar trends and turning points, but the timing and amplitude of the turning points differ significantly (Silver, 2011). Such measurement problems are particularly conspicuous and problematic for IMF country surveillance.

There are country-specific studies as to why national HPIs differ, including Leventis (2008) for the United States and Carless (2011) for the United Kingdom. Measurement issues are not always ignored in studies of house price inflation (Igan and Loungani, 2012, Appendix). However, such studies are the exception. Often HPIs are produced by private sector organizations and metadata on their compilation practices can be quite limited.

HPIs are not easily measured. Transactions on the same property are infrequent and the transactions taking place in any period are for heterogeneous properties. Comparisons of the average price of like-with-like properties on a monthly or quarterly basis require a quality-mix adjustment, the nature and effectiveness of which varies between data source and country. Secondary source data are generally used for HPIs and include appraisal/completion prices from mortgagees or tax offices, transaction prices from land registry records, and asking prices from realtors. The coverage, reliability, and timeliness of such price data depend on the institutional arrangements in a country for selling, financing, taxing, and registering the sale of a residential property.

HPI measurement differences may arise from: (i) the method of enabling constant quality measures for average price changes (repeat sales pricing, hedonic approach, mix-adjustment through stratification, sale price appraisal ratio (SPAR)); (ii) type of price (asking, transaction, appraisal); (iii) use of stocks or flows (transactions) for weights; (iv) use of values or quantities for weights; (v) use of fixed or chained weights; (vi) aggregation procedure; (vii) geographical coverage (capital city, urban, etc.); (viii) coverage by type of housing (single fam-

ily house, apartment, etc.); and (ix) vintage (new or existing property). Details of research on HPI measurement methods and international standards as to good compilation practices are given in a draft *Handbook on Residential Property Price Indices* near completion.¹ The Handbook contains particularly detailed accounts of methods of aggregation and quality-mix adjustment, though readers are further referred to Bourassa and others (2006) and Vries and others (2009) on SPAR, Hill (2011) on hedonic regression based quality-mix adjustment, and Mason and Pryce (2011) on the repeat sales approach.

Given the potential for major differences in HPIs due to measurement practices, Silver (2012), in a recent paper, considered: whether measurement mattered and, if so, how and to what extent and, further, how measurement differences

“Understanding the causes and consequences of the housing cycle, and its implications for the broader economy and the appropriate policy responses, have become a key focus of attention in recent years.”

impact on some Fund analytical work including models of house price inflation and the measurement of global average HPIs. To explore these issues, a panel data set was compiled that comprised five years of quarterly data (2005:Q1 to 2010:Q1) for 150 HPIs from 24 major countries, along with explanatory variables on each of the methodological and coverage descriptors associated with each HPI.

To determine the effects of measurement on HPIs a regression was estimated of house price inflation (quarterly annual rates) on measurement-related variables and fixed-country effects. We found measurement matters for house price inflation, particularly when it really matters, in a recession. Prior to the recession measurement variables had little explanatory effect on house price inflation. By mid-2009 the regressions with only fixed country effects and measurement variables included—no market structural/financing variables—had substantial explanatory power, \bar{R}^2 at about 0.50 (Silver, 2012, Table 3). The parameter estimates were allowed to vary over

¹Eurostat is acting as the lead agency for developing the *Handbook on Residential Property Price Indices*. The current draft is available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/methodology/owner_occupied_housing_hpi/HPI_handbook.

time and were shown to have quite distinct patterns during the recession compared with prior time periods.

Estimates of *country* house price inflation controlled for measurement differences were derived by including in the regression dummy time variables that interact with each of the 23 country dummies. By re-estimating the model without the measurement variables, counterpart unadjusted national HPI change series were also derived. The econometric model of house price inflation in Igan and Loungani (2012) was taken to illustrate the impact of measurement differences on models of house price inflation.

Igan and Loungani (2012) regressed (real) house price inflation on disposable income, affordability, working-age population, equity prices, credit, and the level of short- and long-term interest rates using quarterly data for 22 advanced economies. Implicit in such analysis is the assumption that measurement-related differences in HPIs within and across countries are not of a nature/sufficient magnitude to adversely affect the analysis.

The Igan and Loungani (2012) model was estimated using our measurement-adjusted and unadjusted estimates of house price inflation. Measurement-adjusted HPIs were found to out-perform unadjusted ones in the modelling. Both stock price changes and long-term interest rates had no (statistically significant at a 5 percent level) effect on HPI changes for both the Igan and Loungani model and unadjusted estimates, but did so with the appropriate sign for the measurement-adjusted estimates. Some parameter estimates for measurement-adjusted price changes had larger falls and smaller increases than their unadjusted counterparts. For example, measurement-adjusted and unadjusted house price inflation were estimated to *fall* by 8.5 and 7.7 percent respectively as (lagged) affordability increased by 1 percent; to *increase* by 0.40 and 0.52 percent respectively as the change in income per capita increased by 1 percent; and to *increase* by 0.156 and 0.186 percent respectively as the change in credit increased by 1 percent (Silver, 2012, Table 1).

The adverse effect of using unadjusted HPIs in modelling was mitigated by allowing parameter estimates to vary by country (Silver, 2012, Figure 3). This gives some credence to the Igan and Loungani (2012) model as fairly robust to such measurement differences as long as variable country explanatory effects are specified. It also calls into question simple bivariate analysis of the determinants of house price inflation based on cross-country scatter diagrams.

Measurement-adjusted and unadjusted house price inflation series were also used to compile indices of (GDP-PPP weighted)

global house price inflation to determine the distinctive effect of these measurement variables on such global measures.

HPI measurement problems carry over to estimates of global house price inflation, such as Loungani (2012). The evidence is that unadjusted global inflation rates were substantially over-estimated in specific quarters at the start of the recession (Silver, 2012, Figure 4). Given the quite different national country methodologies for and coverage of HPIs, the nature and extent of errors/bias in summary averages is difficult to determine but may be substantial.

A need to improve and harmonize HPIs is recognized by the international organizations responsible for setting standards in economic measurement. The setting of standards on real estate price indicators and the dissemination of these indicators are key elements of Recommendation 19 of the report *The Financial Crisis and Information Gaps*, endorsed at the meeting of the G-20 Finance Ministers and Central Bank Governors on November 7, 2009. The IMF's Statistics Department is working as members of the Interagency Group on Economic and Financial Statistics (IAG) and the Inter-Secretariat Working Group on Price Statistics (IWGPS) to set standards for the measurement of HPIs (recently completed) and commercial property price indices (CPPIs). The implementation of such standards for HPIs is more problematic though a notable program is that undertaken by Eurostat to attempt to harmonize HPI measurement across European member states.

The focus on measurement issues for price statistics in this article is part of a continuing IMF research program as outlined by the author in the September 2006 and March 2011 issues of the *Research Bulletin*. Future research may look at commercial property price indices, for which the underlying transaction data refer to particularly heterogeneous properties whose transaction prices dry up in times of recession, just when it really matters—an altogether harder problem.

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Seven Questions on Turning Points of the Global Business Cycle

M. Ayhan Kose, Prakash Loungani, and Marco E. Terrones



The depth and breadth of the worldwide recession that followed the 2007–09 financial crisis have led to

intensive discussions about the phases of the global business cycle—global recessions and global recoveries. The fragile nature of the ensuing global recovery has added a new twist to these discussions because of widespread concerns about the possibility of a double-dip global recession. This article provides brief answers to seven commonly asked questions about the global recessions and recoveries.

Question 1: Why do we care about global recessions and recoveries?

Answer: There are at least three main reasons. First, when a country experiences an isolated recession, this means it is subject to an idiosyncratic shock. The country can then implement a range of countercyclical policies, if it has the policy space, to cope with this shock. However, when a global recession takes place, it means national economies are experiencing a global shock. Such a worldwide shock requires the coordination of national policies to dampen its impact. Having a good understanding of the main features of global recessions can provide a wealth of lessons for the effective coordination of national policies during these episodes.

Second, for surveillance purposes, it is critical to have a good understanding of the nature and intensity of events surrounding global economic fluctuations because national cycles are tightly linked to global cycles in a highly integrated world economy. This is an especially important issue for the IMF to study since multilateral surveillance is one of its main tasks. Third, in light of the highly synchronized and costly nature of global recessions, we obviously need to have a disciplined approach to identify these episodes.

Question 2: Despite their importance, there has been a lot of confusion about the definitions of global recessions and recoveries. What are the main reasons for this confusion?

Answer: First, it is not easy to map the simple rules of identifying national recessions, such as two consecutive quarters of decline in national GDP, to a global context

simply because most countries do not have reliable quarterly GDP series. Second, a recession, by definition, implies a contraction in national GDP, but the global economy rarely registers a contraction because countries hardly experience synchronized recessions that translate into an outright decline in world GDP. Given that it is difficult to describe a global recession, it is also a challenging task to have a concrete definition of a global recovery.

Question 3: Before getting into the definitions of these concepts, one obviously needs to identify the turning points of the global business cycle. What are the best methods to do that?

Answer: We employ the two standard identification methods of peaks and troughs of national business cycles. The first one is a statistical method that identifies local maximum and minimum values of the per capita global GDP series over a given period of time. This method implies that a global recession takes place when the growth rate of the per capita global GDP is negative. This is obviously a mechanical rule based on a single indicator of global activity. It is useful to go beyond this mechanical rule and consider a broader definition as it is done at the national level. This brings us to our second method, a judgmental one.

The judgmental method we employ follows the spirit of the approach used by the National Bureau of Economic Research (NBER) and the Center for Economic Policy Research (CEPR) for the United States and the euro area, respectively. In particular, these institutions date business cycle peaks and troughs by looking at a broad set of macroeconomic indicators and reaching a judgment on whether a preponderance of the evidence points to a recession. We apply the judgmental approach at the global level by looking at several indicators of global activity—real GDP per capita, industrial production, trade, capital flows, oil consumption, and unemployment.

Question 4: So, how do you define a global recession and a global recovery?

Answer: The two complementary approaches we described provide an intuitively appealing characterization of turning points of the global business cycle and translate

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Seven Questions on Turning Points of the Global Business Cycle

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into a concrete definition of a global recession. Specifically, a global recession is defined as a contraction in world real per capita GDP accompanied by a broad decline in various other measures of global economic activity. Since we use annual data, a global recession lasts at least one year. Our definition of a global recovery also closely follows the standard practice in the business cycle literature. The recovery phase is often associated with the first year following the trough of the global business cycle.

Question 5: So, what are the turning points of the global business cycle over the past five decades? And what were the major events that happened during the global recessions you identified?

Answer: Both methods we employ point to the same turning points in the global business cycle. The statistical algorithm picks out four troughs in global economic activity over the past 50 years—1975, 1982, 1991, and 2009—which correspond to declines in world real GDP per capita. The judgmental approach is applied at the global level by looking at several indicators of global activity—real GDP per capita, industrial production, trade, capital flows, oil consumption, and unemployment. The behavior of most of these indicators around the global recessions point to an obvious contraction in global economic activity after it reached a peak in the preceding year.

Specifically, the four turning points we identified coincide with severe economic and financial disruptions in many countries around the world. For example, the global recession of 1975 followed the first oil price shock the world economy experienced. It marked the beginning of a prolonged period of stagflation, with low output growth and high inflation in the United States. The global recession in 1982 was associated with a variety of events, including the rapid increase in oil prices, tight monetary policies in several advanced economies, and the Latin American debt crisis. The 1991 global recession also reflected a host of problems in various corners of the world: difficulties in the U.S. credit markets; banking and currency crises in Europe and challenges faced by the east European transition economies; burst of the asset price bubble in Japan; and the uncertainty stemming from the Gulf War and the subsequent increase in the price of oil. The 2009 global recession followed the worst financial crisis since the Great Depression of the 1930s.

Question 6: What are the main features of global recessions and recoveries?

Answer: The evolution of the main indicators of global economic activity points to a number of similarities across the four global recession episodes. For example, around the global recessions, world output, industrial production, trade, capital flows, and oil consumption often start to slow down two years before the trough. The unemployment rate registers its sharpest increase in the year of the recession. Asset prices and credit on average begin decelerating about two years ahead of the global recessions. Inflation and nominal interest rates fall especially during the year of the global recession.

The latest recession followed a pattern similar to that observed in past recessions, though the contractions in most indicators were much sharper. In fact, the 2009 global recession is by far the deepest recession in five decades. If total (rather than per capita) real GDP is used as the main metric, the year 2009 witnessed the only contraction the global economy experienced since 1960. The severity of the 2009 recession is also indicated by the sharp declines in investment and industrial production.

The global recoveries of the postwar period display the following features. First, a typical global recovery is accompanied by a rebound in activity, which is generally driven by a pickup in consumption, investment, and international trade flows. Second, the global recovery from the 1975 recession was the strongest one in terms of the average output growth in the first three years of the recovery. The global recovery following the 1991 recession was the weakest episode, reflecting in part the sluggish growth in consumption, investment, industrial production, and trade flows. Third, similar to its behavior in national recessions, unemployment remains high in the year after the trough and tends to be more persistent than most other indicators. The weak recovery following the 1991 recession witnessed two years of increase in the unemployment rate.

The first year of the ongoing recovery was the strongest (measured in per capita GDP in PPP terms) among the four episodes. Although the current global recovery exhibits some similarities with the previous three episodes, it is significantly different from the earlier ones in several dimensions. For example, one of the distinguishing features of the ongoing global recovery has been its uneven nature as there have been major differences in the performance of advanced countries and emerging market economies. In particular, emerging economies as a group have enjoyed their strongest recovery

to date following the 2009 global recession whereas advanced countries have been experiencing their weakest one.

Question 7: How synchronized are national recessions around episodes of global recessions? And how do national cycles interact with the global cycle during these periods?

Not surprisingly, the fraction of countries in recession went up sharply during the four global recessions. The fraction of countries in recession was about 50 percent in the first three global recessions, but went up to more than 75 percent in the latest episode. Although the period 2006–07 stands out as one in which the number of countries in recession was at a historical low, it has been followed by a sharp reversal in fortune. In 2009, all the advanced economies,

except Australia, and roughly half the emerging market and developing countries were in recession. This degree of synchronicity of the last recession to date has been the highest over the past half century.

National business cycles are tightly linked to the global business cycle. They become more sensitive to developments in the global economy during global recessions. There are, however, significant differences across countries; advanced countries appear to be more sensitive to global recessions than developing economies. Countries tend to be more sensitive to the global cycle the more integrated they are to the global economy.

This article is based on the authors' forthcoming IMF Working Paper, "Global Recessions and Global Recoveries."

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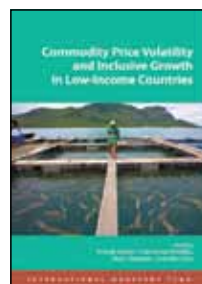
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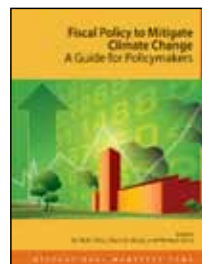
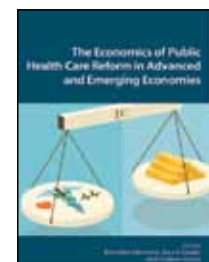
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Asia: Challenges of Stability and Growth

September 26–27, 2013

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The conference will provide a forum to discuss innovative research on challenges of stability and growth that Asia is facing and to facilitate the exchange of views among researchers and policymakers. The Program Committee welcomes papers addressing the following issues in the context of Asia:

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- Exchange rate determination
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- Macroeconomic fluctuations
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Please submit your proposals by Friday, April 12, 2013 (e-mail to resasia@imf.org). Please use the contact author's name as the name of the file. The Program Committee will evaluate all proposals in terms of originality, analytical rigor, and policy relevance and will contact the authors whose papers have been selected by late April, 2013. A 20-page work-in-progress draft will be required by Friday, June 7, 2013. Further information on the conference program will be posted on the IMF website (www.imf.org).



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