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GLOBAL LIQUIDITY—CREDIT AND FUNDING INDICATORS

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GLOBAL LIQUIDITY—CREDIT AND FUNDING INDICATORS

EXECUTIVE SUMMARY

This note reviews some concepts of global liquidity and discusses measurement approaches that have been used by various interlocutors, including at the BIS, by Fund staff, and in academia. Some measures that could be regularly monitored by policy makers are presented.

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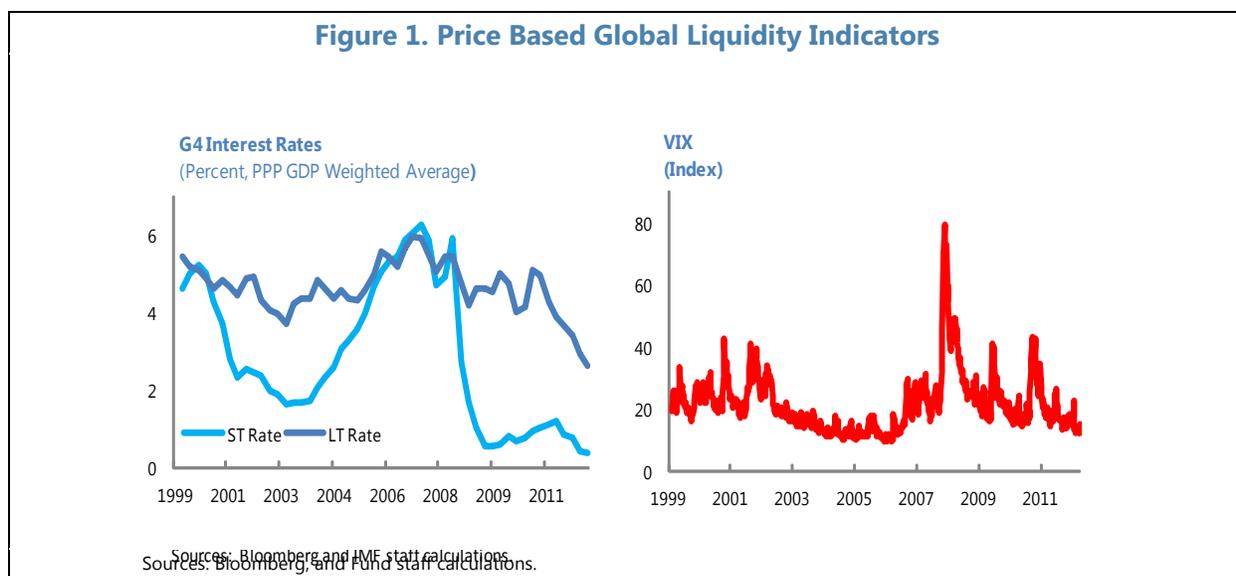
GLOBAL LIQUIDITY: THE CONCEPT

1. Interest in global liquidity has increased in recent years. In the context of the global financial crisis, excessive global liquidity has been proposed as a potential factor behind the precrisis accumulation of financial vulnerabilities. Similarly, in the wake of the crisis, liquidity has been discussed in the context of spillovers from the general monetary easing in advanced economies—focusing not only on the immediate effects from particular measures, but also on the global financial-stability implications of prolonged accommodation.

2. But there are many views on how liquidity should be defined and/or measured. In large part, this reflects the fact that the theoretical understanding of liquidity—both its causes and effects—is still at an early stage of development. Some discussions focus on market liquidity and the extent to which different market segments operate smoothly and in concert. Other discussions focus instead on the level of policy rates and the overall monetary stance. But broadly, the common element in most definitions appears to center on the “ease of financing” at a particular point in time, which in turn is shaped by the macroeconomic environment, the stance of monetary policies, financial regulation, and other factors that guide the actions of market participants, such as the pace of financial innovation and risk appetite. A key aspect of views on global liquidity appears to be the ease of financing from international sources; reflecting a combination of both the availability of funds at a national level, as well as the extent of international financial integration.

3. Price-based indicators are key to judging financing conditions and are well understood. Policy rates, as well as those from secured and unsecured money markets, swap and bond markets, are all regarded as important indicators of global liquidity conditions, as are the spreads between rates in different market segments. In addition, implied market volatility measures (such as VIX for the S&P 500) are seen as a prime proxy for investor risk appetite, and a key indirect indicator of the willingness to provide funding.¹

¹The VIX is a measure of the implied volatility of S&P 500 index options and, as such, indicates the market's expectation of stock market volatility over the next 30 day period. It is commonly treated as a simple proxy for risk appetite and is included in most composite risk-appetite indicators (Illing and Aaron, 2005).



4. But price indicators may not tell the whole story, particularly when markets are not complete. Price-based measures provide information on the conditions under which liquidity is provided, including future expectations. Quantity measures, on the other hand, capture how these conditions translate into actual activity and/or potential risk.

- In a narrow sense, and in some cases, quantity indicators may better reflect the range and dynamics of prices and spreads compared to a few preselected benchmark rates.
- More broadly, however there may be a range of possible liquidity outcomes consistent with a given price—reflecting the distortions, frictions, and limits to arbitrage that shape the financial system’s ability to allocate risk and extend credit.
- The relation between outcomes and prices may be unusually volatile during periods of rapid innovation or sudden turmoil. And in such circumstances, quantity indicators may provide particularly useful additional information—in this context, the 2007 financial crisis has greatly increased attention on potential noninterest channels of monetary policy, particularly those that operate through the supply of credit (See Borio & Zhou (2008) and Adrian & Shin (2010)).
- For example, while global policy rates across most major economies rose in the run up to the global financial crisis, it was also a period of rapid financial market innovation and rising leverage, and easier, rather than tighter, liquidity. Meanwhile, following the financial crisis, although interest rates fell sharply across major economies, the quantity of financing extended to households and firms was much reduced.

5. More broadly, juxtaposing price and quantity dynamics can provide a richer analytical framework. For instance, risk (as reflected by the size of exposures) is often at its highest when risk perceptions (as reflected by the price of funding) is at its lowest. Also, analyzing price and quantity measures together can help identify supply and demand factors driving the behavior of liquidity.

6. In looking beyond price, therefore, quantity-based measures of global liquidity have focused on both the assets and the liabilities of internationally active intermediaries. In general, most attention has typically centered on the asset side, as this represents the actual extension of international credit, and is captured nicely by detailed and well-understood data. Moreover, the relationship between credit and final activity is the subject of a longstanding theoretical and academic literature, as is the link between rapid credit growth and the potential buildup of financial vulnerabilities. The liability-side approach, on the other hand, is relatively new, but reflects a growing interest in the role of financial-sector balance sheets in shaping overall lending patterns and activity. Although conceptually different, the two approaches reflect the same underlying phenomenon, and usefully complement one another.

QUANTITY INDICATORS: ASSETS

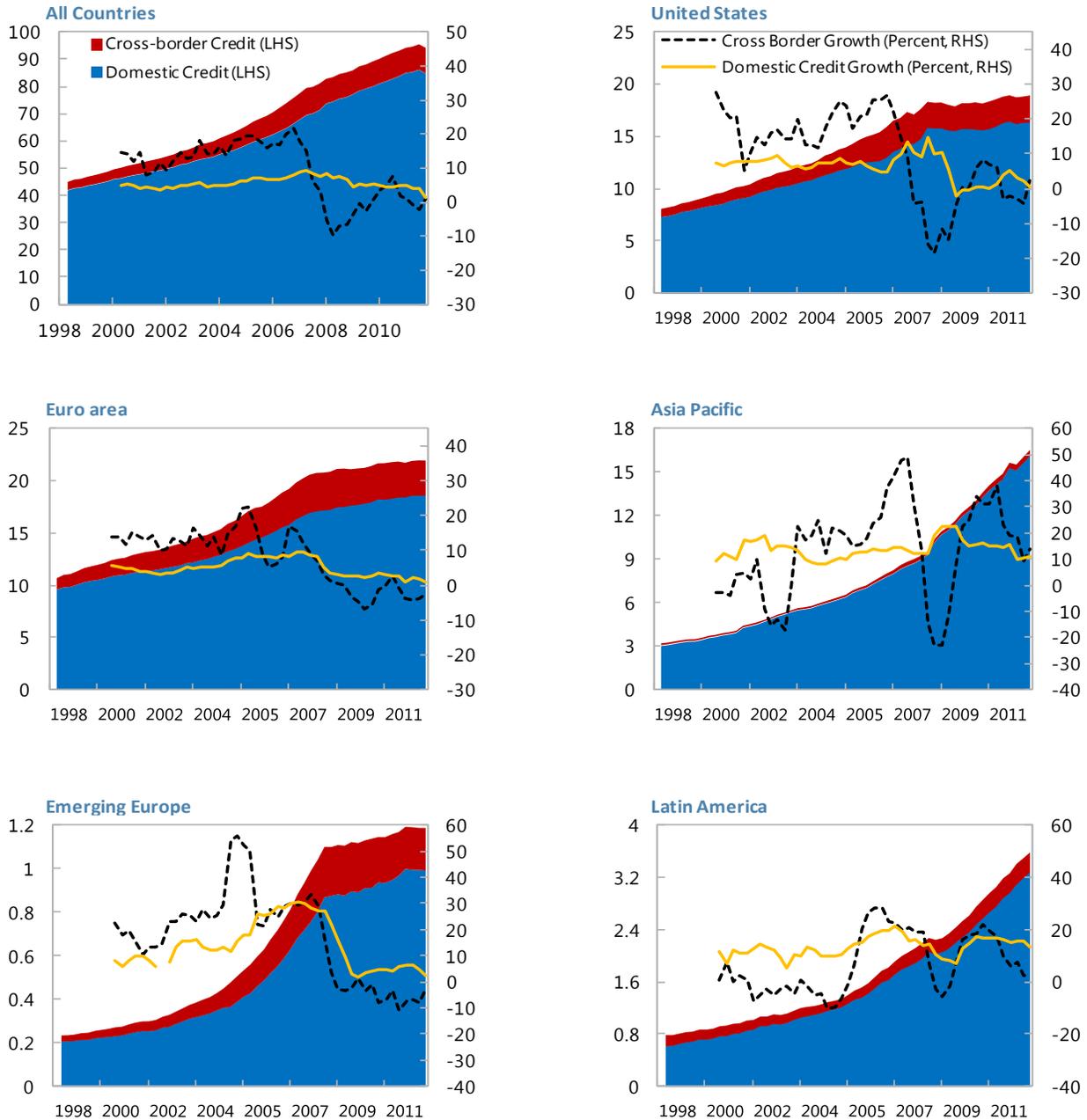
7. Asset-based indicators focus on credit aggregates. These are covered well by the various international banking statistics of the BIS, and allow us to capture the end of the financial-intermediation chain, and hence the outcome of the interaction between different sources of liquidity. A detailed treatment of the various available credit-based indicators (with indicative breakdowns by currency, by borrower, etc.) has been provided by the Committee on the Global Financial System (CGFS, 2011). But broadly, the CGFS considers global liquidity as the sum of two parts: i) official liquidity, which is created by central banks through both conventional and unconventional policies; and ii) private liquidity, which is generated instead by financial institutions through credit creation.

8. Internationally, private liquidity has tended to dominate official liquidity. Reflecting an ongoing trend of deeper financial integration and innovation, most global liquidity is created privately through international cross-border credit extension—accounting for a sizable share of overall (domestic and international) credit worldwide, especially in eastern Europe and Latin America (see Figure 2 which presents credit analytics used by the BIS).

QUANTITY INDICATORS: LIABILITIES

9. On the funding side, global liquidity has been proxied in the past by money-supply aggregates. The liquidity literature has traditionally used a pooled monetary aggregate as a proxy for global liquidity, focusing on the multiplier connecting narrow money (cash and other claims on the central bank) with broad money (deposit liabilities of the banking sector). However, intermediation has increasingly moved away from deposit-based funding to the use of other wholesale-funding methods (especially in advanced economies), including some types of securitization and collateral-based funding, so standard monetary aggregates have become less and less suited to capture liquidity movements.

Figure 2. Global Bank Credit Aggregates by Borrower Region
 (At constant end-2010 exchange rates, USD Trillions unless otherwise indicated 1/)



1/ Total bank credit to nonbank borrowers (including government), adjusted using various component of the the BIS banking statistics to produce a breakdown by currency for both cross-border credit and domestic credit.

Sources: IMF, *International Financial Statistics*; BIS locational banking statistics by residence; BIS calculations.

10. The current liquidity literature emphasizes the overall funding environment of globally active institutions.² Extending beyond simple monetary aggregates, this effort centers on the full range of liabilities of the (bank and nonbank) financial sector. As such, it captures the total amount of funding available to global institutions with which to finance domestic and cross-country credit. In this context, the literature divides global liquidity into two parts: i) core liquidity, which reflects traditional deposit-based funding; and ii) noncore liquidity, which captures the collateral-based funding usually associated with the shadow banking system. From a policy perspective the former component typically benefits from access to an explicit public backstop, whereas the latter does not.

11. In this context, Fund staff have constructed a preliminary estimate that focuses on the liabilities of institutions in the United States, United Kingdom, euro area, and Japan. Building a suitable cross-border aggregate, of course, remains a sizable empirical challenge; and this measure should be considered in conjunction with other indicators, such as the credit measures outlined above. Nonetheless, the four major currency areas considered in this measure account for the bulk of global funding, with the United States in particular dominating noncore liquidity. A full description of these liquidity measures can be found in Chen and others (2012), but in summary, the components of global liquidity are defined as:

- Core global liquidity, measured as the sum of total resident deposits in commercial banks and other depositary corporations—this measure corresponds roughly to the traditional monetary-aggregate approach;
- Noncore global liquidity, measured as the sum of a wide variety of debt securities³ and nonresident deposits—this measure represents the liabilities that are typically not included in traditional monetary aggregates.⁴

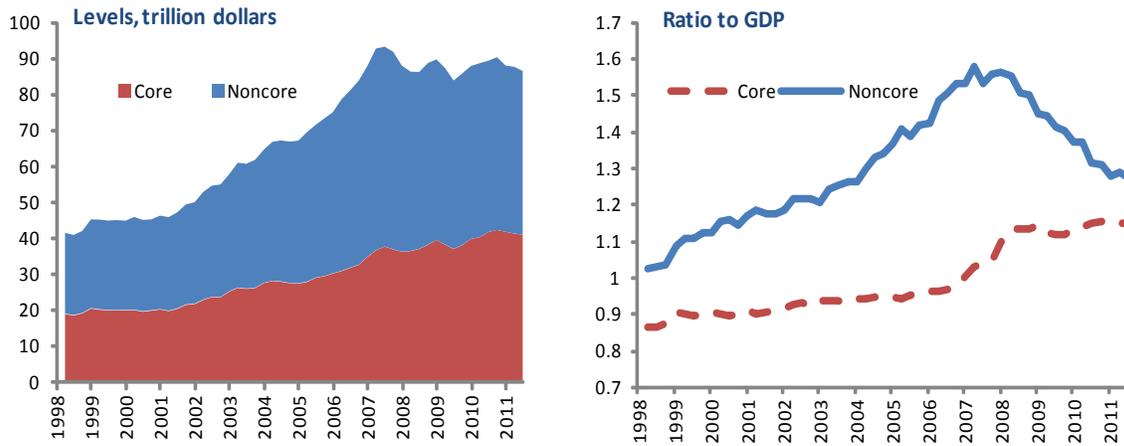
12. The differences in the behavior between core and noncore global liquidity suggest the need to monitor each component separately. Global liquidity has more than doubled since 1999 in nominal terms, and two thirds of this increase is attributable to noncore liquidity, particularly since 2004. Indeed, in the lead up to the global financial crisis, the noncore component was the key driver of the acceleration of global liquidity, with core funding (relative to GDP) increasing only gradually (Figure 3).

²See Shin and Shin (2011), Hahm and others (2012), and Bruno and Shin (2013).

³These include: money market mutual fund shares/units; deposits by nonresidents; debt securities, including asset-backed commercial paper; asset-backed securities, including agency and non-agency mortgage-backed securities; and loans.

⁴The noncore measure for the United States closely mirrors similar efforts by the New York Fed to measure the U.S. shadow banking sector. See Poszar and others, 2010.

Figure 3. Global Liquidity: Funding-Based Measure

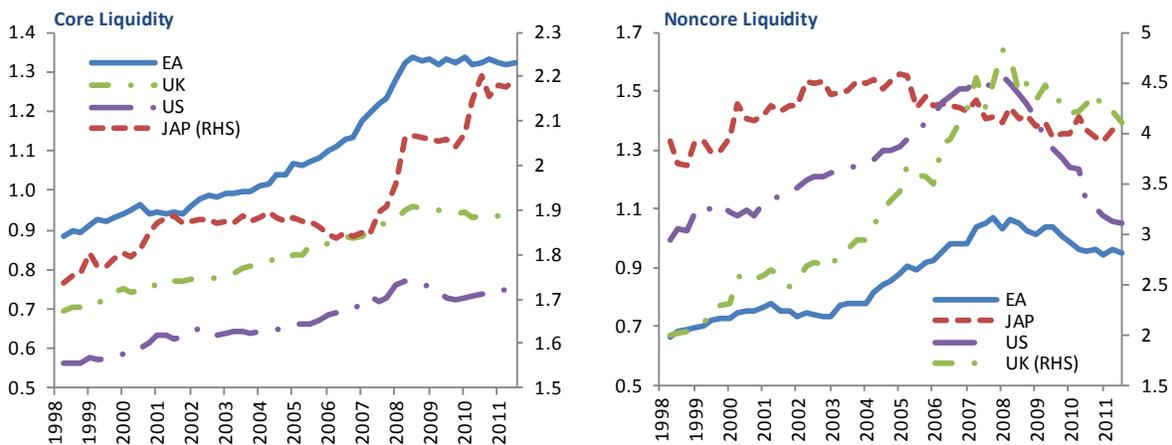


1/ The G4 aggregates are expressed in U.S. dollars (left chart) and normalized by the U.S. dollar denominated nominal GDP of the four countries (right chart)

Sources: IFS, Haver, national authorities, and Fund staff calculations.

Looking at these measures across countries provides a sense of overall liquidity conditions, whether measured in dollars or as a share of funding country output. Across countries where core liquidity measures show a generally similar pattern, noncore liquidity behaved differently, suggesting differences in financial market structures.

Figure 4. National Measures of the Quantity of Liquidity
(Ratio to national nominal GDP)



Sources: Haver and Fund staff calculations.

RECENT DEVELOPMENTS

13. Following the global financial crisis, policies have been aimed, in part, at addressing a general tightening of “private” global liquidity. From a credit viewpoint, looser “official” liquidity conditions through monetary easing have partly compensated for a dramatic tightening of “private” liquidity (Eickmeier and others, 2013). Similarly, from a funding perspective, the crisis resulted in a dramatic collapse in noncore liquidity, as elevated risk aversion and the freezing of collateral-based markets forced shadow banks to sharply scale back their balance sheets. In this context, a key role for policy appears to have been to offset this decline by boosting the funding available to traditional “core” banks. In addition, many unconventional measures were aimed directly at supporting stability in specific market segments and alleviating tail-risk fears, and may have eased the contraction of the noncore segment.

14. Although price-based indicators suggest a post-crisis environment of easy funding, the quantity indicators considered here have thus far not shown a general upturn. From the asset side, the crisis resulted in a collapse in cross-border credit flows over 2008–09, and since 2010 international claims have remained effectively stagnant through late 2013. From the funding side, noncore liquidity as measured here has continued to shrink as a proportion of GDP, and there is no sign of a rebound (see Figure 3), though the data here are only available with longer lags. These broad trends, however, mask sizable differences across countries—for example, following a sharp drop in 2009, cross-border credit growth has resumed in the Asia-Pacific region and Latin America, but has remained largely negative in Emerging Europe.

SURVEILLANCE IMPLICATIONS

15. Fund surveillance has generally emphasized price measures in assessing liquidity and funding issues. The global financial stability map highlighted in the GFSR reports a composite measure of stress in funding markets as well as liquidity conditions in secondary markets as a key input into consideration of stability risks.⁵ The WEO likewise tracks key global interest rates in assessing global financial conditions. The focus on price in part reflects the timeliness of the data needed for high frequency surveillance.

⁵To capture perceptions of funding conditions, secondary market liquidity, and counterparty risks, the following indicators are incorporated into an equally-weighted single index: the spread between major mature-market government securities yields and interbank rates, the spread between interbank rates and expected overnight interest rates, bid-ask spreads on major mature-market currencies, and daily return-to-volume ratios of equity markets (Dattels and others, 2010).

16. However, some quantity measures are also closely monitored. Analysis of global lending has been common in multilateral, regional and bilateral surveillance.⁶ For the most part, this has drawn on credit-based indicators, as these are available in a timely fashion and in sufficient detail to be tailored easily to the particular issue in question. And again, the literature on the links between credit growth, real activity, and financial stability is extensive. The focus of Fund surveillance reflects a keen interest in patterns of lending by important global and regional banks, and how these have changed post-crisis with cross-border transmission of the global credit cycle. The GFSR also focuses on funding and liquidity developments affecting specific market segments and institutions as highlighted for example in the April 2013 issue's link between the search for yield and increased demand for financial leverage potentially pushing risks to the nonbank sector (IMF 2013b). Meanwhile, the WEO monitors developments in credit aggregates across the major global economic regions as part of surveillance of global macro-financial conditions and linkages. Also, staff research (IMF, 2010) suggests that rising global liquidity tends to boost emerging-market asset prices. Moreover, preliminary research suggests that the cross-country impact of noncore liquidity is somewhat larger than for core liquidity, perhaps reflecting another channel by which resources are allocated to riskier asset classes.⁷

17. From a conjunctural perspective, there is merit in monitoring carefully liquidity trends. Although quantity-based indicators are subdued at present, global interest rates remain low. There are also concerns that, as and when balance-sheet repair is complete, the previous intermediation channels could result in a rapid resumption in worldwide lending. Indeed, in an environment of low returns, there are signs of renewed interest in structured credit products, suggesting that conditions for funding with noncore liabilities may soon improve. To a certain extent, a revival of credit would be welcome, and represents an upside growth risk for the major advanced economies. However, a surge in global liquidity may complicate policy making for countries already above capacity, and may present challenges for the maintenance of financial stability in countries facing large and volatile capital inflows.

18. To deepen the use of these indicators in surveillance, further work would be needed to understand better the linkages to macroeconomic developments and financial stability. As

⁶See for example "Financing Future Growth: The Evolving Role of Banking Systems in CESEE," in Central, Eastern and Southeastern Europe—Regional Economic Issues, (IMF, 2013a); the April 2012/October 2012 GFSR treatment of EU bank deleveraging and its potential impact on cross border lending; and the April 2010 GFSR Chapter on Global Liquidity Expansion.

⁷Staff has developed a Global VAR (GVAR) framework to explore the relationship between emerging-market asset prices and the different components of liquidity (Mohaddes and Raissi, 2013). Data limitations have restricted this particular exercise to U.S. liquidity measures, but these nonetheless account for a large part of the broader global indicator, especially for shadow-bank intermediation. The framework accounts for trade and financial linkages, including through global commodity prices. Higher global liquidity is typically associated with a (modest) real appreciation in emerging market currencies, and also tends to support other EM asset prices. The impact of noncore liquidity on emerging markets, however, is significantly larger, perhaps reflecting a channel by which resources are allocated to riskier asset classes.

mentioned, our conceptual and empirical grasp on the nature of liquidity and its effects is still at a very early stage, and the practical applications for surveillance are still evolving:

- As a first step, this will require closing data gaps; in particular, better information is needed on the creation of credit and liquidity by different institutions (including nonbanks) and other asset classes across all major economies; likewise, the perimeter of regulated entities for which data is normally collected needs to be regularly updated, as financial innovation can create new forms of noncore liquidity, including in response to the changing international regulatory architecture.
- As part of the effort to provide a more solid analytical and quantitative framework for understanding global liquidity, further research is needed on the relationship between the various quantity- and price-based indicators that are available; including the extent to which these relationships change over the cycle, or during periods of turmoil, and to better identify the importance of demand and supply factors in changing observed variables. Further work on deepening the understanding of how noncore liquidity developments affect financial-stability and the real economy over the global leverage cycle could also form an important part of the surveillance agenda ahead.⁸ Moreover, further work is also needed to understand the link between monetary policy, including unconventional measures, and their impact on global liquidity measures.
- As these building blocks to analyze liquidity are better developed, it will also be important to consider how to define and measure disequilibria in global liquidity conditions which would be more indicative of potential imbalances, and more directly relevant for surveillance. However, this is a daunting task already at a national level, and much further work will be needed to consider more structured ways of approaching the issue at a global level.⁹

⁸Indeed, a key motivation for the funding-side approach is the general observation that rapid credit growth in excess of deposits—funded, by implication, through noncore channels—is typically associated with the accumulation of financial imbalances (see Hahm and others, 2012).

⁹See Ruffer and Stracca (2006) for an early conceptual and quantitative analysis of “excess” global liquidity as a disequilibrium measure.

Box 1. Data Gaps

Adequately measuring liquidity—particularly noncore liquidity—is difficult and suggests caveats for any analysis. There are cross-country differences in the definition of quantity indicator components, which could be explained by different business models in the financial sectors. For example, it is not feasible to compute core and noncore liabilities for all G-20 countries. Even for the G-4 countries under analysis, there are large cross-country differences in the reporting of noncore liabilities, with detailed information disseminated for the United States and to a lesser extent the United Kingdom, and only limited information in the Euro area and Japan. Meanwhile, many of the instruments counted as “noncore liquidity” are used in repo transactions while some others are used as collateral in securitized instruments. As a result, the changes in the volume of liquidity could be exaggerated both in times of increasing leverage as well as deleveraging.

Going forward, much work needs to be done to improve data on noncore liabilities, both on a domestic and cross-border basis. A number of important data initiatives are underway as a result of the IMF/FSB report “The Financial Crisis and information Gaps”. In particular, the G-20 Data Gaps Initiative (DGI) seeks to improve data reporting on globally significant financial institutions and the linkages among them. In this context, the Standardized Reporting Forms (SRF) database has also been launched that measures claims to various sectors, including nonresidents, private corporations, and other claims on private residents. This is done separately for deposit corporations (banks, or core liquidity) and other financial corporations (noncore liquidity). The benefits of the SRFs include: (i) improvement in cross-country comparability of monetary data; (ii) higher quality of monetary data based on the *Monetary and Financial Statistics Manual* and its accompanying *Compilation Guide*; (iii) improvement in the timeliness of monetary data; and (iv) fewer discrepancies in the data in the various Fund reports and publications.

References

- Adrian, T., and H. S. Shin, 2010, "Prices and Quantities in the Monetary Policy Transmission Mechanism," Federal Reserve Bank of New York Staff Report No. 396.
- Borio, C., and H. Zhou, 2008, "Capital Regulation, Risk Taking and Monetary Policy: A Missing Link in the Transmission Mechanism?" BIS Working Paper 268 (Basel: Bank for International Settlements).
- Bruno, V., and H. S. Shin, 2013, "Capital Flows, Cross-Border Banking and Global Liquidity," *mimeo*.
- Chen, S., P. Liu, A. Maechler, C. Marsh, S. Saksonovs, and H. S. Shin, 2012, "Exploring the Dynamics of Global Liquidity," IMF Working Paper 12/246 (Washington: International Monetary Fund).
- Committee on the Global Financial System (CGFS), 2011, "Global Liquidity—Concept, Measurement and Policy Implications," CGFS Papers 45.
- Dattels, P., R. McCaughrin, K. Miyajima, and J. Puig, 2010, "Can You Map Global Financial Stability?" IMF Working Paper 10/145 (Washington: International Monetary Fund).
- Eickmeier, S., L. Gambacorta, and B. Hofman, 2013, "Understanding Global Liquidity," BIS Working Paper 402 (Basel: Bank for International Settlements).
- Hahn, J. H., H. S. Shin, and K. S. Shin, 2012, "Noncore Bank Liabilities and Financial Vulnerability," NBER Working Paper No. 18428.
- Illing, M., and M. Aaron, 2005, "A Brief Survey of Risk Appetite Indexes," Financial Stability Review (June) (Bank of Canada).
- International Monetary Fund, 2010, *Global Financial Stability Report, April 2010: "Global Liquidity Expansion: Effects on 'Receiving' Economies and Policy Response Options,"* (Washington).
- International Monetary Fund, 2013a, *Central Eastern and Southeastern Europe—Regional Economic Issues, April 2013: "Financing Future Growth: The Evolving Role of Banking Systems in CESEE,"* (Washington).
- International Monetary Fund, 2013b, *Global Financial Stability Report, April 2013: "Acute Risks Reduced: Actions Needed to Entrench Financial Stability,"* (Washington).
- Mohaddes, K., and M. Raissi, "The Global Macroeconomic Implications of Shadow Banking in the United States," (forthcoming).
- Poszar, Z., A. Tobias, A. Ashcraft, and H. Boesky, 2010, "Shadow Banking," Federal Reserve Bank of New York, Staff Report No. 458.

Rüffer, R. and L. Stracca, 2006, "What is Global Excess Liquidity, and Does it Matter?" ECB Working Paper No. 696 (Frankfurt: European Central Bank).

Shin, H. S., and K. Shin, 2011, "Procyclicality and Monetary Aggregates," NBER Working Paper No. 16836.