

Global Liquidity: Public and Private

Jean-Pierre Landau

I. Introduction

We are interested in global liquidity for two reasons. First, the concept captures the overall “ease of financing” prevalent in the world economy (Caruana 2013a). If there is too much of it, either price or financial stability (or both) may be at risk. And, second, global liquidity is a vehicle for the numerous interactions and spillovers between domestic monetary and financial policies.

The idea that liquidity “spills over” is so spontaneously intuitive that it proves hard to resist. That naive vision conveys some truth. Liquidity moves around the world through banking and portfolio channels. The dynamics, however, are very complex and “the popular image of a cascade of liquidity pouring out of the United States can be highly misleading” (Caruana 2012b). Capital markets are by no means homogenous and frictionless. There are holes, amplification mechanisms and feedback loops, all of which determine how liquidity is created, how it circulates and what impact it may have.

The expansion of gross international assets and financial linkages has brought the world closer to being as “a single financial system” (Obstfeld 2009). In that system, global (cross-border) liquidity is created both by private intermediaries and official entities—the central

banks. The distinction between private and official global liquidity is therefore essential.

The paper will look at the behavior and interactions between those two components. Global interactions between private and official liquidity are both similar and different from those happening in domestic financial systems. I will argue that, depending on how they develop in the future, the shape of the international financial system could be very different: either moving toward more integration; or, following recent trends, introducing some progressive segmentation.

Private Liquidity

One function of any financial system is to provide maturity (and risk) transformation. Financial intermediaries create private liquidity by issuing safe and redeemable liabilities against long-term and risky assets. Maturity transformation is profitable, especially when the risks attached are not fully internalized. There may be built-in incentives in the system to create too much private liquidity (Stein). That generates “liquidity mismatch” (Brunnermeier et al.) and endogenous risk through, for instance, the possibility of runs. The fragility inherent to maturity transformation can be mitigated or compensated ex ante by financial regulation and supervision; and, ex post, by the provision of “outside” liquidity through the lender of last resort.

As economies become more open financially and financial markets integrated, the same process develops across borders. Global private liquidity is created through cross-border operations of banks and, increasingly, other financial institutions (such as investment funds). There is a strong continuity and complementarity between domestic and international private liquidity. Both depend on the willingness of counterparties to extend credit or take risk on each other. Both are subject to aggregate supply and demand shocks with sudden shifts in risk aversion or liquidity preference. Both result from leveraging and deleveraging by private institutions. Following the Committee on the Global Financial System (CGFS 2011), global private liquidity can be measured by the *international components* of liquidity: cross-border credit and portfolio flows or lending in foreign currencies to

residents. As compared to other definitions, based on summations of domestic money aggregates, that methodology puts emphasis on international interactions and spillovers, the topic of this conference.

Cross-border liquidity and maturity transformation involves more complexity and creates more fragilities than pure domestic ones. It often (not always) implies currency transformation. It is influenced and driven by a multiplicity of decentralized monetary and regulatory decisions. There is *de facto* one major currency of funding for most cross-border financial intermediation. So, funding shortages often have a cross-currency dimension. As there is no global collateral, most cross-border lending is unsecured. All those additional elements of fragility were visible at some stage, during the crisis. They explain why cross-border liquidity might be, naturally, more sensitive to risk than domestic liquidity. That sensitivity may generate powerful and hard to predict, amplification mechanisms and financial cycles.

Over the pre-crisis decade, global banking flows have been instrumental in transmitting and amplifying monetary and financial impulses across borders. More recently, portfolio flows have played the same role. I would argue that those flows equally have a “liquidity” character. In many cases, financial innovation allows investors to only commit for the very short term and let them expect to be able to redeem their funds immediately; so there is an explicit or implicit element of cross-border maturity transformation.

In current financial conditions—where interest rates in all three major currencies areas are very close to zero and expected to stay there for the foreseeable future—risk appetite plays even a bigger role than usual in influencing the direction and amplitude of private liquidity flows. In that context, there is a widespread perception that nonconventional monetary policies have magnified global liquidity spillovers. Looking at the system as a whole, the overall “global monetary stance” is actually the result of many interacting and changing feedback loops where monetary policy decisions by advanced economies, changes in risk appetite, building and reinvestment of foreign exchange reserves, all play a part. Overall, the system is working to amplify monetary impulses and increase the sensitivity to “news.”

From the moment countries are reacting to each other in defining their monetary and financial policy stance, there may be theoretical gains to greater cooperation. Those may not be sought, however, in the field of monetary policy as each central bank is compelled to pursue domestic objectives and uncertain cross-border policy multipliers pose intractable practical difficulties. The case for more proactive and coordinated macroprudential interventions with policy rates at zero, however, seems much stronger.

Official Liquidity

As in a domestic setting, global private liquidity is underpinned by a public—official—component. Again, following CGFS (2011), official global liquidity can be defined as “the funding that is unconditionally available to settle claims through monetary authorities.” This funding is necessarily denominated in one of the reserve currencies, which provide the totality of official liquidity. It can be accessed through various instruments, such as foreign exchange reserves and swap lines between central banks. It is important to note that, ultimately, only central banks can create official liquidity. Other international instruments, such as IMF facilities and special drawing rights, are vehicles for mobilizing and allocating official liquidity. They are not tools for liquidity creation.

Private liquidity can be converted into official liquidity through foreign exchange interventions; and more exceptionally, during the crisis, through dollar facilities implemented by non-U.S. central banks and funded through currency swaps. Such convertibility (from private to official) is essential to the stability of any financial system. Private liquidity, almost by definition, can expand and contract indefinitely, as long as financial intermediaries are prepared to fund each other. The question is whether official liquidity can substitute and/or compensate for those movements.

Here, domestic and international liquidity differ. In a domestic setting, the central bank possesses unlimited technical ability to expand public liquidity. At an international level, it is obvious that public liquidity is *ex-ante* limited for nonreserve currency countries. The only unconditional and certain sources are foreign exchange reserves.

Other sources may be either conditional (IMF) or discretionary and uncertain (central banks swaps).

Because official liquidity provision is perceived, *ex ante*, as inelastic (at least in the short run) nonreserve countries have strong incentives either to protect themselves from liquidity fluctuations or to build buffers. From that point of view, the situation is the exact opposite from the domestic setting where financial intermediaries may underestimate their liquidity needs on the expectation that the lender of last resort will bail them out if and when a shortage occurs.

It is likely therefore that the trend toward a constant increase in foreign exchange reserves will persist in the future. This may be the only rational course for emerging market economies (EMEs), once the costs of liquidity shortages are considered. Reserve accumulation may itself generate externalities and questions for financial stability, as official holdings represent an increasing share of outstanding public debt in advanced economies. The simultaneous drawing of reserves by many countries could possibly trigger widespread disruptions in the capital markets of advanced countries.

The risks and drawbacks associated with increased reserves have revived calls for more formalized, and organized, international arrangements for official liquidity provision despite the success of swap arrangements during the crisis. Such *ex-ante* arrangements would change incentives, limit reserve accumulation and avoid the possible proliferation of “soft” capital controls. In that sense, the regime for official liquidity provision will influence the structures and shape of global capital markets in the future.

However, such permanent liquidity arrangements (an “international lender of last resort”) appear unlikely. Well-known issues of moral hazard can be mitigated and partially solved. The main difficulty lies with the “fiscal dimension” of liquidity provision (Obstfeld 2011). It is hard to imagine that any government could bring the necessary fiscal backing to issuance of potentially unlimited liabilities to nonresidents in times of crisis. That fiscal dimension had always been there. It could easily be forgotten when public debt was low or decreasing. It cannot be so anymore in periods of high debt.

Finally, the paper will take one brief look at a longer-term, and more speculative question. Foreign exchange reserves are invested in liquid and safe assets. If reserves keep growing, will there be enough of those assets in the future, taking into account the increasing needs of the financial sector for high-quality collateral and the already high level of public debt in reserve countries? And what would be the consequences of a “shortage?” A growing literature is addressing those questions and the macroeconomics have not yet been fully sorted out. Still, the question suggests some long-term perspectives for international cooperation to produce “safe assets” not directly linked to fiscal backing by a specific sovereign.

II. Private Liquidity, Spillovers and Feedbacks

According to the canonical model, capital flows are mainly driven by differences in expected returns, i.e., leaving aside exchange rates, a mix of growth and monetary policy expectations. A dominant opinion among policymakers would attribute inflows registered by EMES in 2009-10 as motivated by better growth prospects (Bernanke 2013). By contrast, the “liquidity view” would emphasize the inner workings and dynamics of the financial system as a major driver for cross-border flows; and, consequently, privilege “push” factors. Those factors seem to have been at work in international banking over the decade prior to the crisis; and, more recently, their importance may be growing in portfolio flows.

II.i Global Liquidity and Banking Flows

The last decades have seen the rise of global banking. Many banks operate worldwide, and make decisions on funding and credit on a global basis. Globally active banks tend to fund themselves in a limited number of major currencies and use their balance sheets to intermediate and distribute global liquidity across markets and jurisdictions.

Wholesale funding is the artery of global capital markets. The diverse segments of interbank markets—secured, unsecured and foreign exchange—are closely interlinked, as was apparent during the acute phases of the crisis when tensions in “core” currency markets could spill over to other currencies (CGFS 2010).

A significant part of cross-border funding takes place through an “internal capital market between the head office and the foreign offices” (Cetorelli and Goldberg 2012) and many banks used a centralized funding model in which available funds are deployed globally through centralized portfolio allocation decisions. The United States hosted 161 branches of foreign banks that collectively raised over a trillion dollars of wholesale funding in 2003-07, of which, 65 percent was channeled to their head offices (Bruno and Shin 2012).

Global banks’ behavior is best represented by a “double-decker” model of international banking where regional banks borrow from global banks, which in turn borrow from money market funds in financial centers. In such a setting, “the leverage of the global banks is pinned down uniquely from the funding constraint applied by creditors in the wholesale funding market.” International flows of credit (both cross border and in foreign currencies) can thus play an important part in the transmission of monetary impulses. “When global banks apply more lenient conditions on local banks in supplying wholesale funding, the local banks transmit the more lenient conditions to their borrowers through greater availability of local credit” (Bruno and Shin 2012).

This model has several important implications

First, it suggests that “push” factors may have played a dominant role in driving cross-border credit, as compared to domestic financial and economic conditions. Indeed, there was a synchronized boom in cross-border lending in the decade preceding the crisis as documented by Bruno and Shin in a panel regression study of 46 countries. Second, domestic lending, in each country, is partially disconnected from monetary policy and subject to the influence of global liquidity conditions.

Finally, while local banks are submitted to the same global conditions, it does not follow those will be transmitted equally in all domestic economies. On the contrary (CGFS), the nature of this transmission is likely to depend on a variety of factors—including the health of the local banking sector—giving the impression of different “multipliers” being at work in different countries and at

different points in time. To paraphrase Borio and Disyatat (2011) there is both “excess” and “unequal” elasticity in the reaction of banking systems to a global monetary impulse. This observed heterogeneity in the response to global financing conditions has several important consequences. It may explain why a surge in global liquidity triggers credit expansion in certain countries while it credit remains depressed in others. It may also justify the use of tailored macroprudential policies when countries need differentiated policy responses to global liquidity developments.

II.ii Global Liquidity and Portfolio Flows

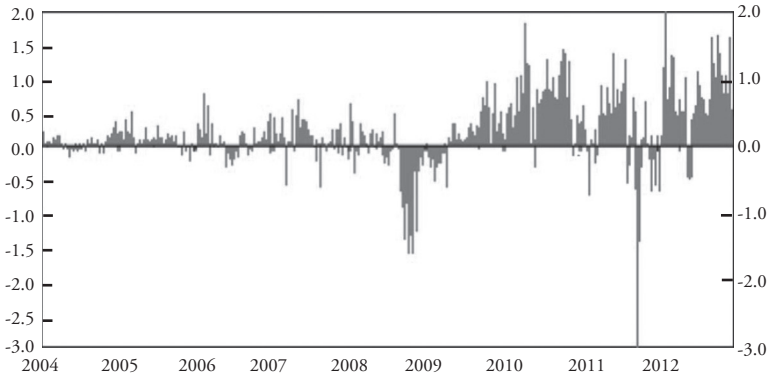
It was not always the case that portfolio flows had the character of “liquidity.” Up to recently, they appeared more stable than banking flows and more driven by fundamentals (pull factors). There is still a prominent view that growth perspectives are the main determinants behind inflows in EMEs.

The most recent experience—since the outset of the crisis—shows a change in behavior.

First, portfolio flows have become more volatile, with higher frequency and shorter cycles, as compared to banking flows. Data is only available for net flows. They turned sharply negative at the onset of the crisis. They then surged in the second half of 2009 and 2010 as strong economic recoveries took hold in these economies. Then, they dried up again in the second half of 2011 with the intensification of the European crisis and the associated rise in global risk aversion, before picking up again as the easing of financial stresses in Europe appeared to improve investor sentiment (Ahmed and Zlate). By contrast, foreign direct investment has been relatively stable over the years, with most of the volatility concentrated in portfolio flows.

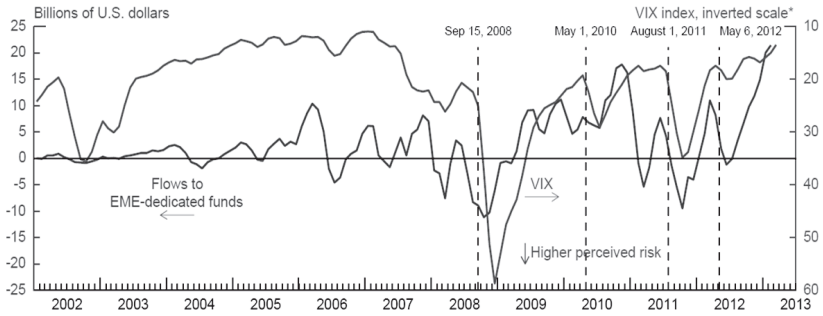
Second, the flows seem to be driven more and more by global risk appetite and, to a lesser extent, interest rate differentials. Studies show that the sensitivity of portfolio flows to policy rate differentials and to risk aversion appears to have increased during the post-crisis period whereas in the pre-crisis period growth differentials were relatively more important. Chart 2, (from Ahmed and Zlate), shows a

Chart 1
Emerging Market Bond Fund Flows
(weekly net flows in billions of U.S.\$)



Source: EPFR Global. Chart borrowed from Csonto and Ivaschenko (2013).

Chart 2
Flows to EME—Dedicated Funds and VIX



Source: Ahmed and Zlate (2013).

“regime change” in the fourth quarter of 2008 when flows become closely correlated with VIX.

The change may be partly attributed to the growing importance of EMEs dedicated funds (open ended) allowing investors to move in and out quickly. Those funds may have served as substitutes to other “liquid” investments that disappeared as a consequence of the crisis. They made it easier for retail and institutional investors to overcome information asymmetries and, therefore, arbitrage between advanced and emerging countries risky assets. Those assets have become “technically” more substitutable to advanced countries risky assets become more substitutable and this has amplified spillover effects from advanced countries’ monetary policies. Portfolio flows remain relatively modest as compared to FDI or banking flows and, within portfolio flows, those transiting through dedicated funds may be even more. However, they represent the marginal investor, the one that instantly determines the market equilibrium and its price, with huge impact in times of stress when market liquidity dries up.

Those funds offer some liquidity to investors who may expect to be able quickly to redeem their money. However, valuations may sharply fluctuate and this can create or stimulate runs when risk perceptions shift. The conjunction of risk sensitivity and “narrow exit” creates the conditions for such runs and provide, at least, a partial explanation to the sharp movement in EMEs exchange rates that followed the June 2013 FOMC announcement.

II.iii Feedback Loops ...

... between risk and liquidity

At a broad level, there is a reciprocal relationship between risk and liquidity. Risk appetite is influenced by liquidity conditions—specifically, investors’ risk appetite may depend on perceived liquidity constraints. And private liquidity depends on the ability and propensity of investors to take risk.

The cyclical behavior of risk appetite is a well-known empirical regularity. Thus, sudden shifts in risk appetite or liquidity preference and the associated changes in leverage can amplify global liquidity cycles by intensifying both liquidity surges and shortages.

The interaction between liquidity and risk occurs through the active management, by financial intermediaries, of their balance sheets.

For banks, reductions in measured risk will influence the amount of leverage. Low measured risk creates balance sheet capacity as it reduces the amount of capital needed of each unit of asset. A consequence of banks' model of balance sheet management is that, during tranquil times when measured risks are low, bank lending increases rapidly to use up the slack in lending capacity as suggested by the lower perceived risks (Bruno and Shin 2013). Available balance sheet capacity is always used. Increase in leverage is achieved by taking more exposure vis-à-vis financial and nonfinancial institutions, which, in turn, will increase liquidity in the financial system.

For global funds and long investors, risk appetite translates in "search for yield" and increased risk exposures. Reversal can be more abrupt as, contrary to credit flows, risk changes translate into asset prices swings and immediate mark to market losses.

... between reserve accumulation and long-term rates

The last decade has been truly exceptional as long-term real interest rates have been constantly at historically low levels since 2002 (Turner). Many competing explanations have been provided for this phenomenon. The most commonly accepted refers to a "real" disequilibrium ex ante between saving and investment worldwide, the so-called "global saving glut."

Borio and Disyatat (2011) argue convincingly that low real interest rates may result from the inner workings of the international financial system. As monetary policies in advanced economies lead indirectly to reserve accumulation in emerging countries, they create a worldwide shift in preferences for risk free assets. The buildup in reserves brings more investment capacity in the hands of naturally risk averse investors, which may be enough to keep real rates at low levels. This feedback loop creates a permanent disconnect between the equilibrium "market rate" and the Wicksellian natural rate of interest.

Low global equilibrium interest rates have several effects. They may be perceived as warranting and demanding, everything equal, more

accommodative monetary policies. If used to discount future cash flows, they may increase equity prices and wealth, further encouraging risk taking (McCauley).

Most recent empirical studies tend to confirm the significant impact from of foreign exchange reserves on U.S. Treasuries long-term rates. (Beltran et al.) estimate that, if foreign official inflows into U.S. Treasuries were to decrease in a given month by \$100 billion, five-year Treasury rates would rise by about 40-60 basis points in the short run. Once private investors' reaction to the yield change is taken into account, the long-run effect would be about 20 basis points.

II.iv Exchange Rates

The standard recommendation, for a country faced with external financial volatility is to absorb it by floating its exchange rate. Doing so, monetary policy is free to pursue domestic objectives. Output is also better insulated from real shocks, as the exchange rate can adjust and stabilize demand for domestic goods through expenditure switching.

Reality, however, is more complex. Leaving aside the “real” arguments underpinning the fear of floating, and taking a pure financial stability perspective, there are some reasons why the insulating properties of floating exchange rates do not always materialize. Liquidity conditions are transmitted across borders irrespective of the exchange rate regime and evolutions.

First, domestic debt is, in many emerging countries, partially denominated in foreign currency. A substantial stock of foreign currency debt directly transmits the policy of the major central banks to other countries. There is something like \$7 trillion in U.S. dollar credit to borrowers who reside outside the United States (Caruana 2012b).

Second, the insulating properties of floating are predicated in some form of efficiency in capital markets where movements in exchange rates are self-stabilizing. For instance, capital inflows would trigger an appreciation making domestic assets more expansive, reduce their attractiveness and stabilize or reverse the initial inflow. Empirical observations suggest, on the contrary, that exchange rate movements are often self-reinforcing, fueling expectations of further moves in the same direction. This is attested by numerous episodes of carry trades developing and suddenly unwinding in recent years.

Third, a strong and direct correlation can be observed between long term nominal interest rates in bond markets, independently of the exchange rate. “As policy interest rates and official bond purchases affect bond yields, their effects ripple across globally integrated bond markets. This happens even with independent setting of policy rates and floating exchange rates. ... So the integration of global bond markets makes for a global interest in policies that, intentionally or not, affect bond yields in major markets” (Caruana 2012c).

Finally, a more subtle and powerful mechanism has recently been identified by Bruno and Shin (2012) linking capital flows, exchange rates and the risk-taking behavior of international banks. If local residents are indebted in foreign currency, appreciation of the domestic exchange rate will improve their creditworthiness (measured in local currency) creating an incentive for local banks to borrow abroad and lend more to the local residents. This, in turn, will appreciate further the exchange rate, setting in motion a powerful feedback loop.

II.v Nonconventional Monetary Policies

Greater financial integration naturally brings increased sensitivity of capital flows to differences in monetary policy variables across countries. Spillovers between monetary policies mainly occur through four channels:

- A banking channel: banks in foreign countries expand (or contract) their balance sheets in reaction to changes in their global funding conditions
- A cross-border portfolio rebalancing channel when domestic and foreign assets are close, but imperfect substitutes
- An expectation channel, where foreign asset prices move in anticipation of greater (smaller) liquidity—hence, reduced (increased) liquidity premiums
- And, finally, a “behavioral” channel when central banks react to each other decisions, notably to limit exchange rates movements

There is a widespread perception that nonconventional monetary policies have magnified and aggravated global liquidity spillovers. When looking at the issue, however, it is important to distinguish between the effects of zero policy rates and those of unconventional measures implemented further.

Zero policy rates have been in place in all major countries for more than two years. The effects on global liquidity are significant. Risk premiums have become the sole drivers of cross-border banking flows and to a lesser extent, portfolio allocation. It is not surprising that zero policy rates have coincided with increased volatility and abrupt reversals in capital flows.

“Event studies” are available to assess the international impact of large-scale asset purchases (LSAP). Most studies show a significant impact on long-term rates (term premiums) with instant transmission to other advanced and emerging countries. Both domestic and international effects manifest themselves at the time of announcement (rather than effective implementation of purchases) pointing to a dominant signaling channel through expectations of further reductions in term and liquidity premiums. Most recently, announcement by the Bank of Japan of a new policy framework implying, for the future, very large asset purchases with long duration (“quantitative and qualitative easing”) was followed by a significant decrease in interest rates in peripheral Europe. Those effects, however, were partly transitory and initial movements were reversed in the following days and weeks.

I would expect forward guidance to have a more lasting and important effect, through its incentives on risk taking. Zero interest rates make risk taking cheap; forward guidance makes it free, by eliminating all rollover risk on short-term funding positions.

This prediction seems at odds with recent events following the June FOMC announcement of a possible slowdown in the rhythm of LSAP. This announcement was followed by important spikes on long-term rates. I would conjecture those movements would not have taken place with the same magnitude had forward guidance not been

in place for some time. Forward guidance brings the cost of leverage to zero, and creates strong incentives to increase and overextend exposures. This makes financial intermediaries very sensitive to “news,” whatever they are; and the FOMC announcement could be seen as one, triggering cumulative liquidation of positions and deleveraging. The episode presents features of the “liquidity spirals” that arise in the model of Brunnermeier and Pedersen (2009): an unexpected shock that leads to losses that are amplified when investors “hit funding constraints and unwind their positions, further depressing prices, increasing the funding problems, volatility, and margins, and so on.”

II.vi Coordination?

The apparent intensity of liquidity spillovers has raised, once again, the question of monetary policy coordination or cooperation. That issue has always been very unpopular with central banks, whose exclusive mandate is to aim at domestic objectives. The regime prevailing during the two last decades—inflation targeting plus floating exchange rates—had rendered the cooperation issue largely irrelevant. Finally, the bulk of research in the 2000s had made it evident that expected gains from cooperation would be insignificant, if not negative.

The case for “coordination” to day rests on two interrelated arguments: departure from the usual rule for conducting monetary policies; and the excessive monetary accommodation that results at the global level.

The first argument has been developed by Taylor (2013), who points out that the low levels of cooperation gains were predicated on the assumption that central banks followed policies best represented by well-accepted rules. That is not the case anymore. Prior to the crisis, policy rates had been maintained well below those implied by Taylor rules, a phenomenon dubbed “the Great Deviation,” and prolonged by post-crisis rates reaching the zero lower bound (ZLB). In that new environment, gains from cooperation could be significant. This is especially so if, as modeled by Taylor and “supported by strong evidence,” central banks took foreign policy rates as inputs into their own decision process.

On the policy side, papers and statements emanating from the central banking community increasingly make a very important point, which can be summed, in common language as “the sum is greater than its parts”; specifically, monetary conditions do not only depend of individual central banks decisions; they also result from mutual interactions and the inner workings of the global financial system. And, in the current environment, those interactions push in the direction of more accommodative policies and greater risks to financial stability. There should be one main motivation for central banks to look beyond their own borders and internalize the global effects of their actions: the system itself is producing more accommodative monetary conditions than warranted by the situation. In a reverse environment, when monetary policies need tightening, the effects could be symmetrical and complicate the exit from nonconventional measures.

However, those arguments are not broadly accepted. Many policymakers would argue that greater flexibility in exchange rates would go a long way in weakening the feedback loops and reducing excess accommodation brought in by the system. When central banks are independent, they are legally obliged to conduct monetary policies that are conducted with exclusive focus on domestic objectives. This is true for all countries, whether small or large. The world has enormously benefited from two decades of monetary regimes based on central bank independence and a focus on internal price stability.

I would add one consideration. As mentioned above, interactions created by private global liquidity are, by essence, nonlinear, unpredictable and subject to abrupt changes and reversals. Supposing, ideally, that policymakers agree in principle to a joint course of action, they might be disappointed to see that global transmission mechanisms did not work as expected. Such surprises have occurred in the past. Beyond the principled opposition to monetary cooperation, the practical obstacles may prove insurmountable.

This points to different priorities for the international agenda: making the system itself more stable, robust, and apt to deal with the intrinsic volatile nature of global liquidity. That would suppose to

impede or break the feedback loops that amplify the changes in monetary policies and risk appetite. With different domestic financial systems unequally “elastic,” authorities must have the capability to manage the interface with the global capital markets, through macroprudential measures (the levy on noncore liabilities implemented by Korea is a perfect example). The direction is clear, but an optimal implementation may prove difficult. The logic of global push factors means that excess liquidity will spill in other places if prevented to come in some countries. In the current environment, more proactive macroprudential policies that prevent short-term fluctuations in leverage, including outside the banking sector, may be appropriate in advanced economies.

III. Public and Private Liquidity: Global Interactions

How should international public liquidity be provided and by whom? This question has been at the center of debates over the international monetary system for many decades. With the expansion of private liquidity, the focus has changed. Previously, official liquidity was only issued to countries facing balance of payments difficulties. The policy problem was to find the right mix between financing and adjustment. Conditionality, defined and implemented by IMF, was key.

That framework, of course is still valid. But the problematic is broader. The objective is to avoid disruptions in the global financial system, where cross-border flows are mainly denominated in a few major currencies. Conditionality might be one element, but unconditional liquidity is needed when stresses appear, in the logic of a “global lender of last resort” (Nakaso). For most countries, official liquidity has to be provided to their domestic institutions in foreign currencies. Precautionary motives will lead to what may look like overaccumulation of foreign exchange reserves but, in fact, is a rational response to a fundamental uncertainty on the potential demand for official liquidity.

In turn, the accumulation of foreign exchange reserves, may itself generate externalities and potential threats for financial stability.

III.i The Irresistible Growth of Foreign Exchange Reserves

The Facts

Foreign exchange reserves amount to 14 percent of global GDP, double the level in 2000. Over half the worldwide reserve holdings are held by only five countries. Emerging market reserves amount to, on average, 32 percent of their GDP. It is estimated that the sum total of emerging and developing reserves plus nonreserve government foreign assets is currently about 15 percent of advanced countries GDP (Obsfeld 2009).

And reserves keep growing. Overall, they have increased by more than a third since the peak of the crisis in the fourth quarter of 2008. One of the most striking empirical regularities in international economics is the constant growth of foreign exchange reserves since 2000, irrespective of the international economic or financial environment. How much reserves are enough? Theoretical reasoning would balance the benefits of holding reserves against their cost, with some notion that there is an optimum. The standard argument is that reserves are costly, that they lead to resources misallocation and often are accumulated through exchange rate manipulation. There is a lot of truth in those assertions. But there are also limits to any quantification, let alone, normalization in the level of reserves. This kind of cost/benefit analysis seems less and less able to account for the true behavior of reserve holders and past benchmarks and models seem increasingly inadequate. A better way is to look at countries' incentives when faced with uncertainty and shocks as well as the role for reserves when the financial sector is engaged into currency transformation.

Intrinsic Incentives

In a sense, countries face the same dilemma as financial institutions when deciding on their appropriate liquidity position. There is a trade-off between the costs and benefits. For private financial institutions, there may be a tendency to underestimate liquidity needs in normal times, with the expectation that the lender of last resort will bail them out if and when a shortage occurs. For countries, the bias goes in the other direction. With no international lender of last resort, precaution motives will lead to overaccumulation of liquidity.

One characteristic of liquidity shocks is that the net demand for liquidity may become almost infinite. Ex ante, no buffer is ever big enough. No amount of reserves will fully protect a financially open economy against a systemic shock. It is noticeable that countries, which possessed very important amounts of reserves prior to the crisis and had a flexible exchange rate regime, nevertheless felt the need to enter into currency swaps with the Federal Reserve.

Lender of Last Resort in Dollars for the Domestic Financial Systems

During the crisis, foreign exchange reserves were used as a tool for *internal*—as well as external—financial stability. National central banks acted as dollar lenders of last resort to their domestic institutions. To address foreign currency shortages, there was wider use of foreign reserves to help not only banks but in some instances also nonbank corporates facing cutbacks in the financing of normal activity as a result of the sharp retrenchment of cross-border bank lending.

In Brazil, for example, the central bank supplied foreign currency through various mechanisms, such as collateralized loans to banks, sales of U.S. dollars with repo auctions, currency swap contracts and outright sales of U.S. dollars. In Korea, the central bank offered its foreign reserves in foreign exchange swap auctions. In Mexico, dollar sales were undertaken to meet the increased demand from companies and other counterparties requiring dollars for collateral or to unwind derivatives positions (CGFS 2010).

The expansion of international balance sheets will increase the potential demand for liquidity support in case of shocks. This trend should be accepted as a normal consequence of open capital markets and international banking, together with the predominance of a very limited number of currencies in international finance.

Signaling Effects on the Ability to Withstand Shocks

Reserves provide protection against any “catastrophic” evolution of the exchange rate. Their accumulation normally influences market sentiment and risk premiums on domestically issued debt. Other, less rational factors may also have a signaling effect. Reserve holders appear to be judged by investors and credit rating agencies according to their level of reserves relative to others. As a result, countries

may feel compelled to accumulate ever-higher levels of reserves, irrespective of their estimated needs (CGFS 2011). For the same reason, countries seem reluctant to use available reserves—although, as shown by McCauley, utilization during the crisis has been significant once derivatives positions are taken into account.

Systemic Effects?

From a systemic perspective, reserve accumulation raises a number of questions, first on the amplitude of outstanding stocks and their consequences on market equilibrium. Foreign official holdings of U.S. Treasuries amount to over a third of the total outstanding. “Such large players can make for substantial interactions even in a very large market. ... A world in which officials hold large portions of the largest bond markets does not strike me as an ideal one” (Caruana 2012b).

Second, reserve holders may be victims of a fallacy of composition if they come to consider and expect that reserves will protect them against any kind of liquidity shock. While using reserves can properly absorb idiosyncratic shocks, specific to one country, this is less clear for more widespread, aggregate, liquidity shocks. Reserves may not represent true “outside liquidity” in the sense that they do not protect against an aggregate (systemic) liquidity shock (Obstfeld 2009).

For advanced economies, the simultaneous drawing of reserves by many emerging countries could possibly trigger widespread disruptions in advanced countries capital markets, which would necessarily affect reserve holders. Several scenarios are possible.

Consider first the benchmark case of a frictionless world. Then there may be no consequences: the withdrawal of reserves would trigger a reallocation between holders of dollar denominated assets. Supposing that new holders have exactly the same preferences as foreign central banks, the reserve withdrawals would have no effects on interest rates nor on asset prices.

However, this is hardly the most realistic outcome. Massive redemption of reserves would likely occur in a troubled environment. Private investors benefiting from foreign exchange interventions may have different preferences from central banks selling their reserves.

Strong movements in interest rates and asset prices are possible. For instance, if the proceeds of reserve withdrawals are reinvested in private assets (rather than government bonds), then commercial banks' reserves increase, with demand for Treasuries decreasing, possibly triggering an upward shift in interest rates.

Finally, additional complications arise if some reserves are deposited in private (even foreign) banks. In 2008 and the second half of 2011, central banks (mostly from emerging economies) withdrew significant dollar deposits from U.S. and European banks. Those withdrawals amounted to about \$800 billion during 2008. The move also prompted deleveraging by the banks, and resulted in further capital outflows from emerging market economies (Nakaso).

III.ii International Liquidity Arrangements

The risks and drawbacks associated with the increased in reserves have revived calls for more formal and organized international arrangements for official liquidity provision. This is an old issue, with a lot of history. Analyzing the Great Depression, Kindleberger claimed that the gold standard malfunctioned because no country acted as a leader by lending freely to other countries, either because of its weak financial position or because isolationist attitudes prevailed (from BIS, working paper 333). After the 1998-99 emerging market crisis, the idea of an international lender of last resort was developed again, in a seminal paper by Fischer. More recently, the issue has been revived due to financial globalization, the expansion in gross international balance sheets and the amplitude of liquidity needs manifest during the crisis. The idea of a "global safety net" has been promoted by a number of large emerging countries.

Experience With the Crisis: Swaps and Central Banks' Cooperation

The cooperation between central banks during the crisis was extremely successful overall. As early as December 2007, a joint announcement by seven central banks introduced swap lines allowing funding of U.S. dollar auctions, notably by the ECB and the Swiss National Bank. Initially, those swaps were limited in amount.

In October 2008, following the Lehman bankruptcy, those limits were removed between major central banks (the Fed, the ECB, the Bank of Japan, the Bank of England and the Swiss National Bank). In addition, U.S. dollar swap lines provided by the Federal Reserve were expanded in number covering a total of 14 countries. “With this step, the U.S. dollar swap lines evolved from mainly being a liquidity backstop to a more direct means of intermediation in funding markets” (CGFS). Non-U.S. central banks could supply financial markets with potentially unlimited quantities of dollars.

Swap lines were also established between the Swiss National Bank and the central banks of Poland and Hungary. The ECB established a swap line with the National Bank of Denmark and provided euros to the Hungarian and Polish central banks through repo agreements.

Overall, the effects were very significant: tensions, as measured by usual indicators (OIS-Libor spread and forex basis swap spreads) decreased significantly after the agreements were put in place (although markets did not return to their pre-crisis levels).

Permanent Arrangements

Given that cooperation was so successful, what is the argument for more formal arrangements? The answer is about incentives. Only the certainty of accessing official liquidity, if needed, in unlimited quantities, could discourage reserve accumulation or soft capital controls. In principle, providing that certainty would bring huge benefits in terms of world welfare by reducing the demand for foreign exchange reserves.

Reserve accumulation can only occur through a conjunction of balance of payment surplus and some degree of exchange rate intervention. Therefore, precautionary reserve accumulation unavoidably creates side effects on domestic macro policies as well as spillover effects on other countries.

All countries have a common interest in finding ways to disconnect reserve accumulation from exchange rate management and, more generally, from balance of payment situations and monetary policies. The need for national reserves could be reduced if credible

mechanisms exist to provide for the supply of official liquidity on a multilateral basis.

Moral Hazard, Constructive Ambiguity and Contingent Liquidity

Moral hazard problems are pervasive in international financial cooperation. They are “something to be lived with and controlled, rather than fully eliminated” (Fischer). I believe, taking into account the lessons of the crisis, that they could be somehow overcome and that some form of “contingent liquidity,” made available between central banks in times of acute stress could be agreed *ex ante*. At the very least, moral hazard is not the main difficulty that a multilateral system of liquidity provision would have to solve.

On one hand, to be equivalent to reserves going forward, multilateral liquidity must be available *ex ante* and without condition. On the other, there is a danger that fully unconditional liquidity be used to deal with fundamental “solvency” imbalances. In real life, this is not an easy distinction to make. This is the rationale for conditionality. But, of course, conditionality creates an uncertainty that is incompatible with the purpose of instant supply of liquidity. A conditional facility will never be a perfect substitute for reserves. Many countries fully eligible to the Flexible Credit Line (FCL) have used foreign currency swaps instead. Anecdotal evidence suggests that swaps are often perceived as carrying less of a stigma effect.

One way to deal with moral hazard would be to distinguish explicitly between two different risks facing each country: on the one hand, idiosyncratic risk created by national policies and country specific shocks; on the other, “systemic” risk stemming from aggregate liquidity shocks occurring on a broader—global or regional—scale. At the moment, foreign exchange reserves are meant to cover both risks. Since systemic risk is not related to a country size or GDP level there is potentially no limit to the demand for self-insurance. If systemic risk is defined in such a way that it is truly independent from individual countries behavior or policies, protection through a multilateral mechanism would not create any moral hazard problem.

It may therefore be possible to define and build a framework around the following principles: countries should self-insure against idiosyncratic risk by holding a sufficient amount of reserves. Protection against systemic risk would come from a multilateral mechanism for international liquidity provision.

Of course, the distinction between idiosyncratic and systemic risk may be difficult and involves a broad degree of judgment. But two basic rules should be guiding future work on a multilateral safety net: (1) conditions for activation should be specified *ex ante*; and (2) those conditions should be fully delinked from the situation of individual economies. Rather, they should depend on the state of the global economy and international financial markets.

How would countries access to this new source of liquidity? Taking inspiration from the contingent capital literature, one could imagine that countries could “buy” the access to contingent liquidity in crisis times by paying, in normal times, a premium to the issuer. This could prove less costly than accumulating excess reserves and creates incentives to preserve good fundamentals.

IV. Global Liquidity with High Public Debt

IV.i The Fiscal Dimension of Liquidity Provision

We like to think of the lender of last resort (LLR) as an independent function, separate from other policies, both monetary and fiscal. And, if well managed, it should be costless. By lending against “good collateral,” the LLR should avoid taking losses. That benign vision makes it difficult to understand the true challenges facing an international provider of official liquidity. Those challenges are fiscal in nature: liquidity provision is seldom riskless; and, ultimately, the integrity of the LLR depends on backing provided by the government.

Liquidity Provision and Risk

During the first phase of the crisis, most of the questions raised about liquidity provision by central banks related to its potential interference with monetary policy. Beyond the inflation risk popularized in the media, there was some concern that liquidity provision could not be fully separated from interest rate setting. Those

concerns were quickly assuaged, in particular when the Federal Reserve got the authority to pay interest on banks' reserves.

Fiscal implications surfaced only later, when central banks started accepting some credit risk either (in the euro area) by softening collateral requirements, or, in the United States, through specially designed facilities. An old truth resurfaced: because "the line between solvency and liquidity is not determinate during a crisis" (Fischer), last-resort lending necessarily involves some ex-ante risk taking. Indeed, one can argue that it is the essence of a LLR to step in, take risk, and leverage its balance sheet when all other financial intermediaries would not do so. That risk may, or may not materialize when markets go back to normal conditions. Singh and Stella go as far as arguing that a true LLR must be willing to take on "bad quality collateral." Since "good quality" is a perfect substitute to banks' reserves, exchange of one against the other does not effectively increase outside liquidity. Only taking on bad collateral would do so.

The existence of LLR risk makes a powerful case for having central banks involved in banking supervision. And, if the risk finally were to materialize, fiscal authorities would have to step in as well. When the Fed introduced the Term Asset-Backed Securities Loan Facility, the U.S. government agreed to shoulder losses up to a certain level. Efficient crisis management necessitates a robust framework to organize the "tripolar" relationship between the LLR, the supervisor and the fiscal authorities.

The risks are magnified in an international setting, as most liquidity provision between central banks (whether they transit or not through the IMF balance sheet) is unsecured. There is no collateral. Nor is there yet a full-fledged operational cross-border supervision which would give ex-ante protection.

Fiscal Backing

There is a broader aspect to the fiscal dimension. It relates to the size of the central bank's balance sheet. A global safety net would mean that the issuers of reserve assets accept potentially unlimited expansion of their balance sheet for the benefit of other central banks. Quantitatively, the issue is not trivial. At its peak, although

for a brief period, outstanding swaps extended by the Fed amounted to 35 percent of its balance sheet; they stayed over 15 percent or approximately six months (Chart 3).

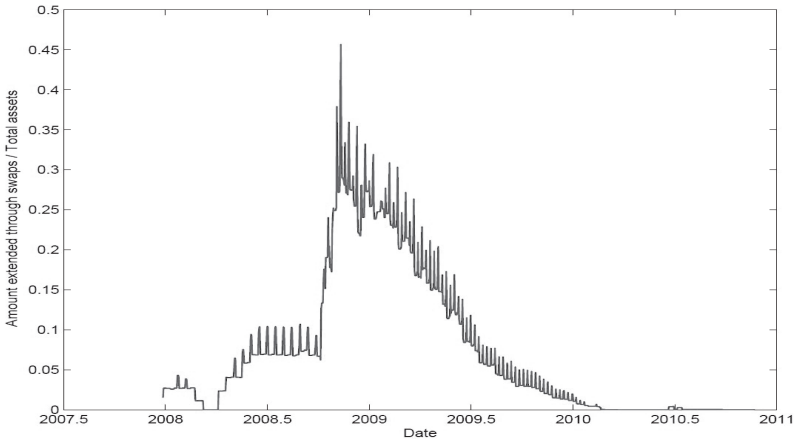
Under the gold standard, the impossibility to expand central banks' balance sheets may have been a major impediment for an international LLR. There is no such limit today. But free creation of base money has other implications. The issue is not monetary but mainly fiscal. Public liquidity provision basically transforms private debt into claims on the consolidated government. "Although usually emitted notionally by the central bank, fiat money depended not on the (capital) strength of the central bank, but on the strength and taxing power of the government behind it" (Goodhart).

This raises the question of the balance sheet capacity of central banks. It is not limited, as for commercial banks, by the level of risk or equity. The real issue is fiscal capacity. How much commitment can a government take, directly, or through the central bank's balance sheet?

Looking at central banks' liabilities, they can be analytically split in three parts: first, those backed by collateral—here fiscal commitment is limited to potential losses. Second, some liabilities are directly backed by government debt. Those liabilities are in fact government debt themselves, for example claims on future tax revenues. And third, those backed by unsecured claims on nonresidents, which may result from international lender of last resort activities. Being unsecured, they should also be considered as involving some degree of risk. Now, consider a potential international liquidity arrangement allowing foreign central banks to get unconditional access to domestic base money in the reserve currency. Leaving aside political acceptability, is it sustainable, even on a temporary basis, and for a short period?

Ultimately, what matters is the consolidated balance sheet of the government and the central bank. That consolidated balance sheet must be perceived as sustainable, and compatible with the inflation objective, whatever the amount of liquidity issued, whether in the form of government debt or liabilities of the central bank. The

Chart 3
U.S. Dollar Swaps Extended/Fed Total Assets



Sources: Board of Governors and FRED.

consolidated government must therefore credibly satisfy its intertemporal budget constraint for all possible states of the world.

That constraint cannot easily be quantified, as it is dependent on a great number of assumptions and subject to multiple equilibriums. The only statement that can be made with certainty is that higher existing public debt makes it more likely that the constraint may be binding and that “some fiscal capacity limit” would be hit if a sudden increase in the central bank’s liabilities toward nonresidents was to be accepted.

The fiscal dimension of liquidity provision finds naturally its way into the political process. The U.S. Congress and public opinion has shown great interest in identifying the foreign institutions benefiting from the Federal Reserve’s liquidity programs. In most countries, constitutional arrangements require that increases in IMF quotas and SDRs allocations be formally approved by parliaments.

On the short run, fiscal limits will prevent extended arrangements. On the long run, they create tensions between the demand for safe assets and capability to issue or manufacture them.

IV.ii Global Liquidity and Safe Assets

Foreign Exchange Reserves and Asset Shortage

The dominant requirement for foreign exchange reserves is to be invested in liquid and safe assets. A reminder was brought when doubts appeared in 2008 on the creditworthiness of GSEs' debt—which account for a significant part of global reserves—and the U.S. authorities extended an explicit guarantee, in fact transforming them into (risk-free) government debt.

Foreign exchange reserves are heavily invested into debt instruments (or very safe banks deposits) and most likely will continue to do so in the future. Debt is the natural vehicle for liquidity as long as it remains information insensitive (Dang et al.). Sovereign debt in major countries is liquid because it is information insensitive in most states of the world. The ability of any country or financial system to provide liquidity ultimately rests on its capacity to issue information insensitive financial instruments. This would be my definition of “safe assets.”

In principle, information insensitive instruments can be issued either by the public or private sector. Indeed, one function of financial intermediaries is to issue safe debt against risky assets. This is one reason why they should be backed by strong capital. In the past, public and private issuers have complemented each other very well in producing safe assets. Recent research has highlighted two striking empirical regularities over long periods: first, safe assets amount to a constant share of total financial assets held in the economy (Gorton et al.); and, second, financial and government liabilities are substitutes (Krishnamurthy and Vissing-Jorgensen): fluctuations in the stock of public debt crowd in or crowd out money and debt issued by financial intermediary. Over the long run, the financial system seems to adjust so that the “constant share” law is respected. Will this trend persist?

The crisis had two effects on this process. First, doubts have been cast on the safety of most of “privately produced” safe assets. Attempts to manufacture such assets through financial innovation have

ended in failure and have been a major cause of the crisis. Indeed, this is the nature of a crisis that safe assets disappear, creating major contraction in credit. Second, regulatory reforms implemented (or to be implemented) following the crisis will permanently increase the demand for safe assets from the private sector. Additional needs for high-quality collateral will come from prudential regulations—the liquidity coverage ratio—increased initial margins requirements on OTC derivatives cleared in CCPs, and the limits put on re-hypothecation (which will reduce the velocity on existing collateral). Those could total between \$2.6 trillion to \$5.7 trillion from now to 2020, in normal times and significantly more in times of stress if margins get higher (U.S. Department of Treasury).

This additional demand will not necessarily create an absolute shortage of safe assets, although the estimates do not include potential increases in foreign exchange reserves. Total issuance by sovereigns is estimated at around \$12 trillion during the same period (U.S. Department of Treasury). These estimates make clear that, however, that under current arrangements, the private sector will be negative supplier of safe assets. For the foreseeable future, only public debt will provide additional supply of safe assets, as it is backed by the power of taxing future generations. This is also a situation where holders of foreign exchange reserves may be “competing” with the private sector for use of AAA/AA government debt as the base for their operations.

This has been presented as creating a new “Triffin dilemma” (Obstfeld 2009, 2011): the world needs a constant expansion of the stock of public debt as a reliable store of value; but that expansion itself threatens the ability of debt to serve as a safe asset.

It is sometimes argued (Obstfeld 2009) that problems can be overcome by reducing the demand for reserves and looking for “new sources” of international liquidity. The most frequent possibilities involve an expansion in the size of the IMF size or new SDR allocations. However, both IMF facilities and SDRs are vehicles to create or circulate central banks liabilities. New sources are just that: new ways of creating or distributing claims on central banks. They still

raise the question about how far is it possible to go in expanding central banks' balance sheets and claims on future tax revenues.

Another argument is that the potential scarcity of reserve assets can be circumvented by pooling reserves, for instance through regional arrangements. Asian countries, especially, are working on and implementing progressively such schemes through the Chiang Mai initiative. It should be noted that regional pooling is efficient only when countries are facing asymmetric liquidity shocks *within* the region. Pooling brings no additional benefits when shocks occur on a global scale and all countries are hit simultaneously. Regional arrangements, however, can serve a fundamental purpose: to underpin the emergence and growth of regional financial markets. With deeper financial integration, the probability of significant portfolio shifts inside one region increases markedly, creating the potential for asymmetric liquidity shocks. Pooling of reserves would strongly help in smoothly managing those shocks.

Adjustments

If the law of “constant safe asset share” is still valid in the future, if foreign exchange reserves keep growing and if the private sector has increasing net demand, there might be, given the trend toward fiscal consolidation, some ex-ante imbalances between supply and demand of safe assets. How can they be resolved? The adjustment can occur through three main mechanisms.

First, by moving the definition of a safe asset: lower quality assets can be substituted to higher ones in some cases. Most central banks have adjusted their collateral requirements during the crisis (notably the ECB). This proved a very efficient—sometimes controversial—countercyclical tool to bring around some liquidity accommodation. Obviously, it carries some risks and can be envisaged on a temporary basis in a situation of high public debt.

Second, by price adjustments: in the model by Gourinchas and Jeanne, the *real* risk-free rate adjusts so as to ensure equilibrium between demand and supply of safe assets.

Third, by deleveraging in the financial system and reduction in the volume of private liquidity. Safe assets serve as a “base asset” for the financial system, both domestic and international. “The implications ... is that monetary conditions are effectively tightened as the supply contract of what is effectively accepted as a reserve asset and good collateral” (Fisher). Transactions underpinned by safe assets would adjust downward, private intermediaries would deleverage, creating the possibility of cumulative deflation (Brunnermeier and Sannikov). In an international setting, this could create significant volatility in exchange rates. One way through which the mechanism would unfold would be, for nonreserve countries to increasingly limit or control cross border liquidity flows to keep them commensurate with their perceived access to reserve currencies.

Which mechanism prevails will of course have a very different impact on the world economy. The probability attached to one scenario or the other depends on the ultimate definition of safe assets that is still “elusive and shifting” (Gourinchas and Jeanne). A wide variety of views can be found in the literature and amongst market participants, depending mainly on two distinctions.

Safety can be seen as “relative” of “absolute.” In the first case, there is a continuum of assets that are mutually substitutable, with increasing level of risk and spreads adjusting to changes in perceptions. Most market participants would take such a view and show some skepticism toward the “asset shortage” theory. That approach would strongly support an optimistic vision of the equilibrium mechanism, where relative prices of assets would adjust so as to satisfy the equally relative aspiration to safety. In a second view, safety is “absolute,” safe assets are not substitutes to any other category. Imbalances between supply and demand cannot be solved through price movements, and adjustments must occur in other (assets and good) markets. I would conjecture that the distinction depends on the overall environment. In tranquil times, the relative view may be valid. In periods of increased financial frictions, there is “flight to quality,” asset substitutability diminishes, arbitrage is constrained and safety becomes more absolute: the distinction between safe and unsafe assets becomes starker.

A second distinction can be made on whether safety is an intrinsic character of assets, or whether it results from perceptions, a coordination of beliefs or may be the product of institutional arrangements. In the latter case, public authorities can influence the supply of safe assets by putting in place the necessary institutions, incentives and arrangements. Gourinchas and Jeanne insist that “the authorities should commit themselves to a clear definition of safe assets and back it with a policy regime that makes those assets credibly safe.” They mention liquidity support by the central banks to the government debt markets in order to eliminate pure rollover risks and the associated multiple equilibriums. This presupposes, obviously, that the fiscal capacity to do so exists, and that the potential shocks are temporary. Permanent liquefaction of government debt would permanently expand the central bank’s balance sheet, hence the consolidated claims on future government revenues.

Other possibilities would be, for the authorities to try and engineer the production of safe assets without fiscal backing. Regulatory guidance and cooperation would be essential. For instance, the creation of a new class of AAA sovereign has been advocated by “tranching,” under strict public supervision, diversified portfolios of government debt (Brunnermeier et al.). Great progress could be achieved through central banks’ cooperation in the definition of a pool of cross-border collateral that could be used to underpin and secure the expansion of private liquidity.

V. Concluding Remarks

Global liquidity is a cyclical problem in search of a structural solution. In the period to come, obviously, the main challenge will be to manage the consequences of monetary policies, and their evolutions, on cross-border liquidity movements. Amplifications, feedback loops and sensitivity to risk perceptions will complicate the task of exit and necessitate very close and constant dialogue and cooperation between central banks. They may also justify much more proactive macroprudential policies that would go beyond dampening long-term credit cycles. The gains from formal coordination should be sought in the regulatory and financial structures areas rather than monetary policies.

In the longer run, policy choices on global liquidity will determine the shape of global capital market, as they will orient countries' incentives in opening and deepening (or not) their financial systems. In 1999, Fischer wrote "the vision that underlies most proposals for reform of the international financial system is that international capital markets should operate as well as the better domestic capital markets?" Is it still the objective? If yes, market infrastructures and arrangements will have to adapt to the, expansion of gross international positions. It will demand further global liquidity creation, both private and public, as well as better control of its cyclical fluctuations.

Faced with increased volatility, there is some trade-off between ex-ante arrangements for liquidity provision and capital flows management measures. Countries have a choice between protection, that implies some form of capital flows, or buffer, which lead the buildup of foreign reserves, together stronger capital and liquidity requirements for local banks. The danger is that those choices will be made by default or under the pressure of circumstances.

In that case, the most likely scenario is that of progressive fragmentation of the international financial system. It may be natural that, after a period of opening and increase in gross asset positions, there would be some retrenchment, as signaled by the shift toward a more "local" model of banking in many countries and the acceptance of capital controls as part of overall macroprudential toolkit. There may be no other choices in the short run as consequences of explosive dynamics of global liquidity are very apparent.

On a longer horizon, however, segmentation may be harmful. Important asymmetries will subsist between countries in saving investment balances, levels of public debt and financial deepening. They may be better managed in an open financial environment. Public policy can help and make it safer.

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