Hiroshi Nakaso: Financial crises and central banks' "Lender of Last Resort" function

Remarks by Mr Hiroshi Nakaso, Deputy Governor of the Bank of Japan, at the Executive Forum "Impact of the financial crises on central bank functions", hosted by the World Bank, Washington DC, 22 April 2013.

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I. Introduction

The financial crisis that originated in the United States spilled over into the global financial system in the summer of 2007, and its breadth and potency rapidly increased following the collapse of Lehman Brothers in the autumn of 2008. The crisis again reminded us of the inherent instability of the financial system and the vicious compounding of problems between the financial system and the real economy. In response, central banks around the world took action, including cuts in interest rates, the provision of ample liquidity, and so-called non-traditional or unconventional measures. Among these, the "lender of last resort" (LLR hereafter) function was the most critical that was carried out by central banks amidst the deepening crisis. The importance of the LLR function is underscored by history, and this time around, forceful actions by central banks contributed significantly to avoiding a meltdown of the global financial system and the collapse of real economic activity.

The concept of LLR came to be widely recognized thanks to Walter Bagehot, who was the editor of the London *Economist*.[1] According to his formulation, one of the most basic principles was that the central bank should be prepared to lend to any "solvent but illiquid" bank so as to prevent the unsettling of the financial system. This view came to be criticized in recent years by some contemporary economists. They thought that Bagehot's principle was the offspring of an age when financial markets were not as sophisticated, and that it was no longer applicable in the current market environment where market participants have considerable ability to collect and process information. This view was founded on the belief that, in an efficient market, market participants should be able to distinguish clearly between solvency and liquidity issues confronted by their counterparties, which entailed that solvent banks would never face liquidity constraints, negating the need for the central bank to provide LLR functions to individual banks.

Such an optimistic view, however, proved to be too cavalier. With the deepening of financial markets and globalization, the LLR function of central banks not only transmuted but also increased in importance. Today, in the time allotted to me, I will reflect on the experiences of the recent financial crisis, and begin by summarizing the changes in central banks' LLR function. That will be followed by a discussion of a few issues pertaining to the LLR function that have become apparent. I will then conclude by reflecting on the roles the central bank should play in order to safeguard the stability of the financial system and the real economy.

II. The transmutation of the LLR function

The purpose of the LLR function is to prevent the manifestation of systemic risk, that is, the risk that a problem in one part of the financial system spreads to the whole system in a domino-like fashion. The classic description of systemic risk focuses on contagion, where a bank run could affect other domestic banks in the system through a decline in funding liquidity. In contrast, the recent financial crisis revealed that, in the light of deepening financial markets and globalization, systemic risk can (a) be magnified through mutually

[1] Walter Bagehot ([1873] 1924), *Lombard Street: A Description of the Money Market*, London: John Murray.

reinforcing declines in funding and market liquidity; and (b) spill over across national borders and have a global dimension. Central banks' LLR function has evolved in response, encompassing the roles of "market maker of last resort" (MMLR hereafter) and "global lender of last resort" (GLLR hereafter).

MMLR

From the summer of 2007, market liquidity dried up in the U.S. and European interbank market as the problems in the sub-prime mortgage sector spilled over into other sectors, which in turn increased the precautionary demand for liquidity and heightened counterparty risk. At the same time, investors' risk appetite plunged, resulting in a decline in market liquidity not only in the securitization markets but also in markets for risky assets in general. Financial institutions that had accumulated such assets on their balance sheets were increasingly hard pressed to finance such positions even for the short term. With liquidity in the interbank market severely impaired, funding became ever more difficult, and financial institutions were forced into stepping up their sales of safe assets, whose markets remained relatively liquid. This, in turn, eroded the liquidity in the markets for relatively safe securities and prevented the functioning of repo markets that used those securities as collateral. It was a vicious cycle – a "market run" – where the decline in market liquidity impacted the funding liquidity of financial institutions, which then further eroded market liquidity (Chart 1).

When market liquidity is impaired, markets will seriously struggle to perform their role of price discovery in line with fundamentals. In such an environment, central banks in the advanced economies first provided liquidity to the interbank market as an unwavering counterparty. In addition, they provided liquidity directly to market participants who were straining to obtain funding in the severely constricted capital markets. For example, the Federal Reserve introduced measures to provide funds to issuers of commercial paper (CP) and holders of asset-backed securities (ABS).Meanwhile, the Bank of Japan purchased CPs, asset-backed commercial papers, and corporate bonds in response to the rapid deterioration of market liquidity in those markets, which funded large non-financial corporations directly impacted by the financial crisis. In the euro area, when the sovereign spread of the so-called peripheral countries against Germany widened, the European Central Bank (ECB) purchased bonds issued by the peripheral countries through the Securities Markets Programme (SMP), judging that the widening of the spreads was due not to deteriorating solvency but to impairment of market liquidity. Such provision of liquidity by central banks, which in effect turned central banks into market makers, aided the recovery of market functioning. In this regard, central banks played the role of MMLR.

GLLR

When the intermediation functions of financial institutions are conducted solely in their home currency, home central banks can respond to liquidity crises through their LLR function. However, with the deepening of globalization, financial institutions have increasingly broadened their intermediation activities into non-home currencies, and as a result it has become increasingly difficult for central banks to put an end to liquidity crises on their own if financial institutions are confronted with liquidity issues in non-home currencies. In such cases, troubled financial institutions may not be able to obtain liquidity directly from the issuing central bank in a timely manner, due to operational constraints.

During the recent financial crisis, U.S. dollar liquidity became an acute concern, especially among European financial institutions, which had expanded their dollar intermediation activities. Consequently, the ECB and the Swiss National Bank each entered into swap arrangements with the Federal Reserve to obtain dollars and provided dollars to financial institutions operating in the respective markets (Chart 2). After the collapse of Lehman Brothers, the scope of swap arrangements broadened, with other major central banks, including the Bank of England and the Bank of Japan, establishing swap arrangements with the Federal Reserve. In addition, when global financial markets came under heavy strain in

2011 on the back of the sovereign debt problems in Europe, six major central banks established bilateral liquidity swap arrangements, as a contingency measure, so that liquidity could be provided in each jurisdiction in any of their currencies, if needed. Such a provision of non-home currencies under central bank cooperation can be called GLLR.

III. New issues regarding the LLR function

The transmutation of the LLR function of central banks raises a set of new issues. In the following, focusing on MMLR and GLLR, I will discuss (a) the relationship between monetary and financial stability policies, (b) the limits to liquidity provision and support by governments, (c) the financial trilemma and cooperation among central banks, and (d) the relationship between foreign reserves policy and the GLLR function.

Relationship between monetary and financial stability policies

When one groups the functions of central banks into monetary policy and financial stability policy, MMLR falls under the heading of financial stability policy, if one emphasizes the aspect of mitigating systemic risk. At the same time, the function can be labeled as monetary policy, albeit of the non-traditional sort. Given that monetary policy works through the money and capital markets, the prolonged impairment of market functioning resulting from the erosion of liquidity will negatively impact the effectiveness of monetary policy. In this regard, efforts by central banks, acting as MMLR, to restore liquidity in the money and capital markets can be deemed as part of monetary policy.

Instruments deployed as MMLR by central banks are complementary. Take for example the ECB's case. In the euro area, as the area's crisis deepened beginning in 2010, increasing selling pressure from non-domestic investors in the sovereign bond markets of the peripheral countries resulted in the fragmentation of financial markets within the currency area and impeded bank financing (Chart 3). In response, the ECB, through its operations, in particular the Longer-term Refinancing Operations (LTROs), provided funds in unlimited quantities to the financial institutions of peripheral countries, which had difficulties in funding themselves in the interbank market. In the meantime, the ECB worked to alleviate the fragmentation of financial markets through its purchases of peripheral sovereign bonds under the SMP. In the peripheral countries, financial institutions increased their holdings of domestic sovereign bonds and used such bonds as collateral when obtaining funds from the ECB. In this regard, the absence of either LTROs or SMP would have been detrimental to achieving the stability of the financial system and prices – or more precisely the effective transmission of monetary easing. In the same vein, in the United States, the Federal Reserve provided funds to primary dealers secured by agency bonds and agency mortgage-backed securities under the Primary Dealer Credit Facility and at the same time purchased the same securities. In this case, LLR and MMLR functions were complementary.

These examples show that, in times of crises, the relationship between financial stability policy and monetary policy becomes more intertwined than ever. Non-traditional monetary policy measures adopted during the crisis are beneficial to the stabilization of the financial system. At the same time, measures adopted with a view to stabilizing the financial system maintain and reinforce the transmission channels of monetary policy. Given that both policies aim to influence the economy and prices through financial markets and financial institutions, not only are their effects complementary, but so are also their "inputs": information and analyses provided for one policy may be employed to increase the effectiveness of the other.

Having said this, as we saw during the euro area crisis, when a crisis develops as a result of a loss of liquidity in the sovereign bond market reflecting concerns over the solvency of the sovereign, other problems may arise. If the central bank attaches greater weight to the stability of the financial system, it has to continue purchasing government paper as MMLR and expand its balance sheet at the expense of increased uncertainty regarding the future path of prices. On the other hand, if the central bank chooses to avoid the expansion of its

balance sheet and attaches greater weight to price stability, it may become difficult to restrain the decrease in the liquidity of the market for government paper, as the bank's purchase of such paper is reduced. Thus, if such a tradeoff is to be avoided, trust in the sustainability of government finances is a prerequisite.

Limits to liquidity provision and support by Governments

In a situation where the central bank provides funds to a "solvent but illiquid" financial institution as LLR, the funding liquidity of that institution will be ensured. On the other hand, when the central bank steps in to provide liquidity as MMLR, market liquidity will not automatically improve. As a result, the central bank will face a difficult decision as to how far it is prepared to go. Depending on its own actions as MMLR, not only will those actions affect the stability of the financial system and the effectiveness of monetary policy, but they will also endogenously influence the central bank's own financial soundness. If the central bank's actions as MMLR are able to set in motion a process of reviving market liquidity, the market prices of the assets that the central bank had purchased or accepted as collateral will stabilize, thus safeguarding its equity capital. If, in contrast, the central bank attempts to defend its balance sheet – and hence the confidence in the central bank – and limit its capital exposure by holding back on liquidity provision as MMLR, market liquidity might continue to decline, which would, in turn undermine the value of the assets that the central bank had purchased or accepted as collateral, eventually risking a hit to its equity capital.

An erosion of the central bank's financial soundness resulting in a loss of its credibility may compromise its ability to implement monetary policy and ultimately the effectiveness of such policy. In addition, losses incurred by the central bank would hurt taxpayers as transfers to the government are reduced and its actions as MMLR would inevitably impinge upon micro-level resource allocation, which implies that they are *quasi*-fiscal measures (Chart 4). At the same time, however, it is also undesirable to see the central bank not acting sufficiently forcefully as MMLR in order to minimize hits on its balance sheet. In this context, when the Federal Reserve introduced the Term Asset-Backed Securities Loan Facility so as to restore liquidity in the ABS market, it was agreed that the U.S. government would shoulder losses up to a certain level. In the case of the Asset Purchase Programme of the Bank of England, this is based on the agreement that any losses will be borne by the U.K. government. In the case of the Bank of Japan, when it decided to embark on a program of purchasing corporate financing instruments in 2009, the Japanese government noted at the Monetary Policy Meeting that it intended to consult with the Bank of Japan in the context of closing its books at the end of accounting periods if the risks had materialized.

The financial trilemma and cooperation among central banks

With regard to the stability of the financial system under deepening globalization, an important perspective is provided by Schoenmaker: the "financial trilemma" (Chart 5).[2] That view holds that it is impossible to simultaneously achieve financial stability, financial integration (capital mobility), and national financial policy. Let me apply this framework to the LLR function.

If, against the background of deepening global financial integration, the LLR function of the central bank is confined to providing liquidity in the domestic currency – that is, its role is limited to national financial policy – stability of the global financial system cannot be achieved. Under a different combination, if financial stability is to be pursued with national financial policy (i.e., domestic currency LLR), financial integration – globalization – must be curbed through the regulation of capital flows. Alternatively, in order to attain financial stability under global financial integration, some sort of *supra*-national financial policy is

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[2] Dirk Schoenmaker (2011), "The Financial Trilemma," *Economics Letters*, 111, 57–59.

necessary, including an international framework for financial regulation and supervision. GLLR realized through central bank cooperation might be regarded as an element of the safety net in the broad context of the third combination.

There are many proposals for an international safety net other than central banks acting as GLLR. For example, one suggestion calls for the establishment by national central banks of credit lines in domestic currencies to the IMF – the IMF will then manage the money and provide liquidity to, and monitor the policies of, central banks in need of liquidity. Another scheme attempts to make use of SDRs. There is also a plan to collectively manage a pool of national foreign exchange reserves. All of these will require an agreement on cost allocation before they can become a reality.

In view of the fact that liquidity and solvency tend to deteriorate in tandem during times of crisis, extending financing to troubled financial institutions, central banks, or governments carries credit risk. With regard to cost allocation when such risks materialize, given that risks to financial stability can easily cross borders and are therefore mutually dependent in a globalized financial system, there may be little disagreement on the view that some sort of international policy coordination is necessary. Nevertheless, reaching political agreement on concrete proposals for cost allocation is inherently difficult. At the same time, in order to persuade the public that the costs are appropriate, it is essential to establish mechanisms to ensure that any costs are minimized; in other words, it is essential that an effective system of regulation and supervision at a global level is put in place. The ongoing discussion over a banking union in the euro area is highly instructive in this regard.

The relationship between foreign reserves policy and the GLLR function

The figures for cross-border financing at banks in the advanced economies during the recent financial crisis reveal some interesting trends (Chart 6). First of all, in the second quarter of 2008, cross-border liabilities to banks shrank as transactions declined in the interbank market. In the following quarter (3Q), cross-border liabilities to non-banks fell, probably reflecting the reluctance of banks to maintain credit lines in the light of the shrinking interbank market and also the draw-downs of deposits by non-financials. Then, in the fourth quarter, liabilities to official monetary authorities dropped off. The liabilities exclude the U.S. dollar funds supplied to banks by central banks under the Federal Reserve swap facilities, and consist mainly of dollar deposits taken in from overseas monetary authorities managing their foreign exchange reserves. Before the crisis, monetary authorities of emerging market and commodity producing economies had built up significant balances of dollar deposits at banks, mostly European ones. This resulted in increasing liabilities to official monetary authorities at advanced economy banks, which trend was reversed as the crisis deepened. The withdrawal of foreign exchange reserve money by overseas authorities increased markedly, especially vis-à-vis European banks, after the collapse of Lehman Brothers in the autumn of 2008, and again towards the end of 2011, when the European sovereign crisis began to spill over into the financial system. Although overseas authorities did not pull the trigger, their actions were one element that exacerbated the disruption. It can be seen that the LIBOR-OIS spread, which is a signal of risk premiums in the short-term money markets, was closely correlated with the behavior of authorities.

Looking at the ebb and flow of currency and deposits attributed to the management of foreign exchange reserves, authorities of emerging economies withdrew funds from financial institutions in 2008 and the second half of 2011, whereas the behavior of the authorities of advanced economies had not materially changed (Chart 7). The main reason for this behavior seems to be that, as international financial markets became increasingly unstable from the summer of 2007 and funds began to flow out of emerging markets, those authorities withdrew significant amounts of dollar deposits from advanced economy banks, where they had parked their foreign exchange reserves, and intervened in the foreign exchange market defending their currencies, selling dollars and purchasing domestic currency. The withdrawal by overseas authorities, mainly emerging market authorities, was massive, amounting to

about $800 billion during 2008. A significant share of this was covered by the dollars provided under the central bank swap arrangements, the outstanding amount of which increased by about $500 billion in the corresponding period (Chart 8).

It was perfectly rational for individual emerging market authorities to draw down their foreign exchange reserves in order to insulate their respective economies from the turbulence in international financial markets. Nevertheless, aggregated across emerging economies, such actions had the effect of reducing funding liquidity at banks of advanced economies. When this prompted more deleveraging by the banks, it resulted in further capital outflows from emerging market economies – the "fallacy of composition." In other words, the pursuit of national financial policies to protect against the crisis exacerbated the instability of the entire financial system, which again underscores Schoenmaker's "financial trilemma" (see previous Chart 5).

IV. Concluding remarks

Central banks' LLR function is necessary because the world we live in is full of uncertainties. While the advances in financial and information technologies of recent years have enabled us to statistically and numerically describe developments in financial markets which were only understood intuitively before, these descriptions are inevitably approximations. Events that cannot be predicted through probabilistic methods or past experience do happen. There are black swans swimming around us. There is a need for backstops to prevent the whole system from disintegrating when a black swan appears, and the LLR function is one of them.

In a financial landscape characterized by deepening globalization, where market-driven financial intermediation proliferates, it seems almost inevitable that the LLR function of central banks has to be broadened, if the stability of the financial system is to be maintained. During the recent crisis, as I have noted today, central banks have succeeded to some extent in meeting a number of challenges. Nevertheless, there are unresolved issues. While appropriate responses by individual central banks are no doubt important, it is essential to enhance the coordination and division of labor between central banks and governments as well as cooperation among central banks and fiscal authorities with a view to building an international safety net.

Furthermore, the vantage point of crisis prevention is just as important as crisis response. One difficult issue here is that the existence of an LLR, and the growing role that central banks' LLR function has come to play, could encourage excessive risk-taking by market participants; in other words, the issue of moral hazard needs to be taken into account. In this regard, one must stress the role played by regulation and supervision in order to prevent the accumulation of financial imbalances. It is also necessary to go another step forward and incorporate macroprudential perspectives in central bank actions. Given that globally relaxed monetary conditions are expected to be maintained for the near future, central banks must strive to answer how this is to be realized in the future conduct of their policy.

We must also pay attention to the fallacy of composition in the global financial system. In the context of ever-growing global financial integration with free capital flows, individual central banks, in their pursuit of maintaining the stability of their domestic economies, have the choice of either conducting an independent monetary policy or focusing on the exchange rate (i.e., maintaining a fixed exchange rate). Whatever choice individual central banks make for themselves, the effects of their policies do not necessarily add up globally to guarantee the stability of the global economy (Chart 9). For example, if there are externalities to stabilization policies, such policies are likely to be synchronized across countries, which may amplify fluctuations in the world economy and destabilize the global financial system. The policy issues confronting central banks in this problem of "fallacy of composition" are probably more intractable than the trilemma described by Robert Mundell. Monetary policy in a globalized economy may also be affected by feedback loops in unexpected ways, since nationally granular foreign reserves policies (accumulation of precautionary reserves against

capital flight) or national financial policies could amplify international capital flows or concentrate capital flows into economies with the laxest regulations. Such interactions between Mundell's and Schoenmaker's trilemmas would complicate the policy conundrum.

"This time is different" has become synonymous with our follies. Nevertheless, we should not fall into the trap of defeatism. There are many things we can do to reduce the chances of another crisis. Although the bar is high for central banks in building up ideal and foolproof arrangements, we know that "even the longest journey begins with a single step" – a Japanese proverb equivalent to "Rome was not built in one day." It is important to enhance coordination and cooperation among central banks and governments wherever possible, and such steps taken, however small, will enable us to eventually reach a goal that seems to be far away.

Thank you for your attention.

日本銀行 BANK OF JAPAN

Financial Crises and Central Banks' "Lender of Last Resort" Function

April 22, 2013

Remarks at the Executive Forum Hosted by the World Bank
"Impact of the financial crises on central bank functions"

Hiroshi Nakaso
Deputy Governor of the Bank of Japan

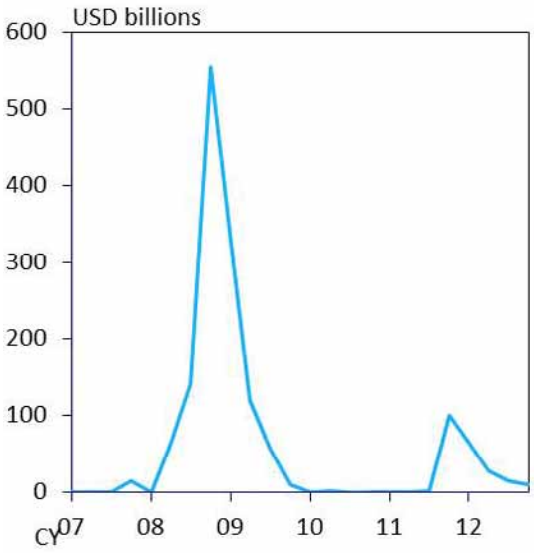
Chart 1 Market Maker of Last Resort

Transmission Channels of Systemic Risk and the Role of the Central Bank

	Bank run	Market run
Contraction of liquidity	Contraction of funding liquidity at banks caused by coordination failures among depositors	Contraction of market liquidity caused by coordination failures among market participants
Transmission mechanism	Psychological contagion due to homogeneity of deposits Contagion through interbank transactions	Contagion to all participants in money and capital markets due to synergistic contraction of market and funding liquidity
Identification of problems	Relatively easy to identify which bank has a liquidity problem	Difficult to identify who has a liquidity problem given a wide range of market participants
Role of the central bank	LLR	MMLR

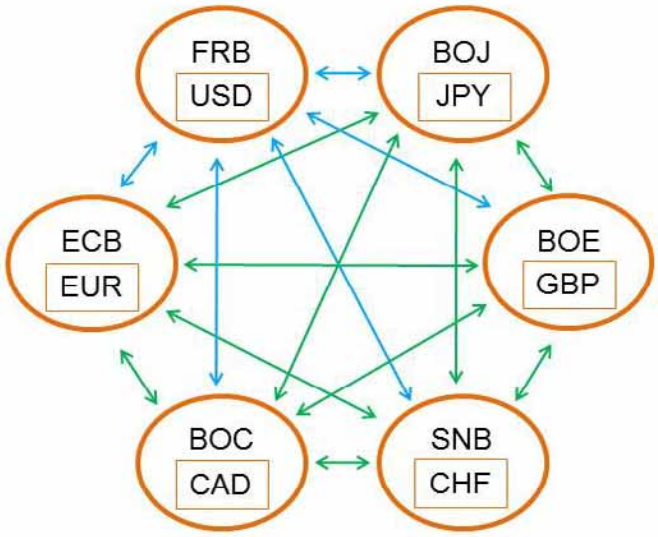
Chart 2 Global Lender of Last Resort

Provision of U.S. Dollars via Swap Arrangements between FRB and Other Central Banks



Source: FRB.

Swap Network by Six Central Banks

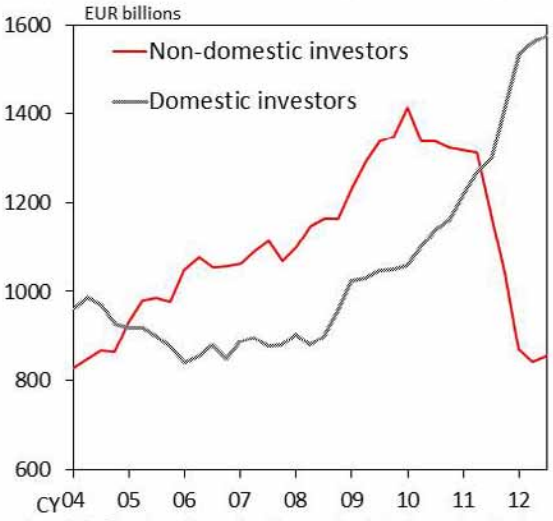


The six major central banks established bilateral liquidity swap arrangements in 2011, so that liquidity could be provided in any of their currencies.

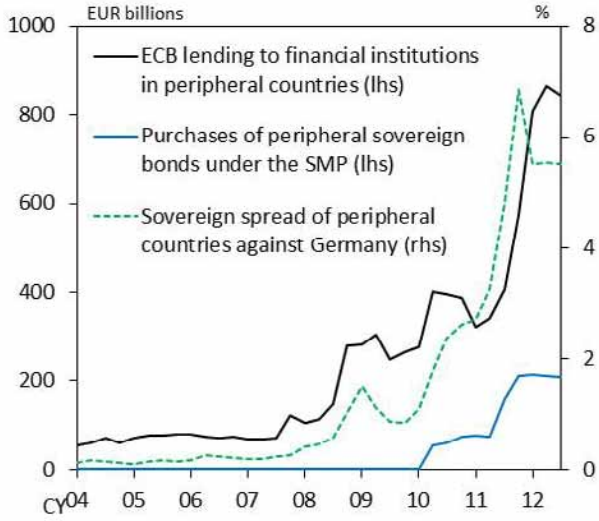
Chart 3 Relationship between Monetary and Financial Stability Policies

Sovereign Bond Markets in Peripheral European Countries and ECB's Liquidity Provision

Holdings of Peripheral Countries' Government Bond by Investor Type



ECB's Liquidity Provision and Government Bond Yields



Notes: 1. Peripheral countries consist of Greece, Ireland, Italy, Portugal, and Spain.
2. Holdings of peripheral countries' government bond by investor type are based on the estimates reported in Arslanalp and Tsuda (2012).
3. The sovereign spread of peripheral countries against Germany is calculated as the weighted average of 10-year peripheral government bond yields, with the outstanding government debt of each country used as weight, minus the 10-year German government bond yield.
4. ECB lending to financial institutions in peripheral countries excludes the purchases of peripheral sovereign bonds under the SMP.

Sources: ECB; NCBs; Haver Analytics;
Serkan Arslanalp and Takahiro Tsuda, "Tracking Global Demand for Advanced Economy Sovereign Debt," IMF Working Paper, December 2012.

Chart 4 Limits to Liquidity Provision and Support by Governments

- How far the central bank is prepared to go as MMLR

  Not only will the central bank's actions affect the stability of the financial system and the effectiveness of monetary policy, but they will also endogenously influence the bank's own financial soundness

- MMLR and *quasi*-fiscal measures
  - -- Impinging upon micro-level resource allocation
  - -- Losses incurred by the central bank would hurt taxpayers as transfers to the government are reduced

Chart 5 The Financial Trilemma and Cooperation among Central Banks

Schoenmaker's Financial Trilemma

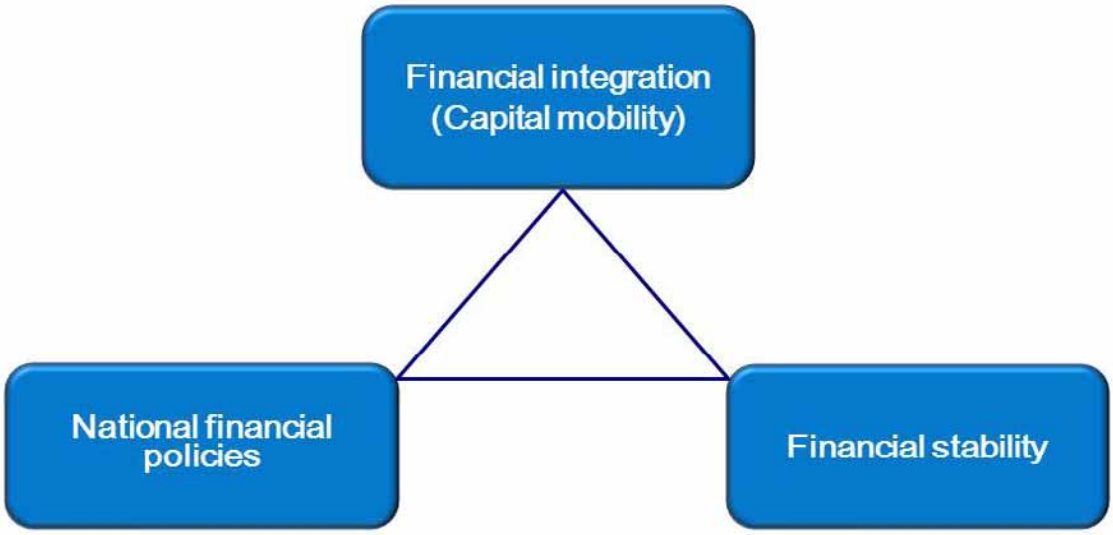
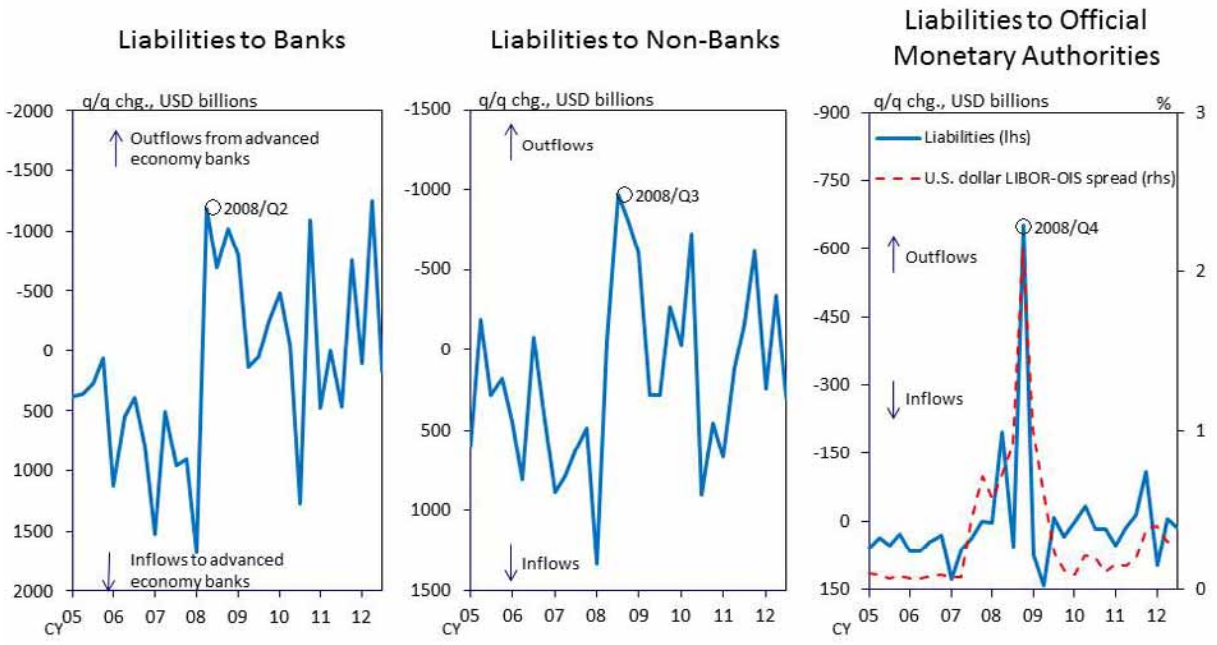
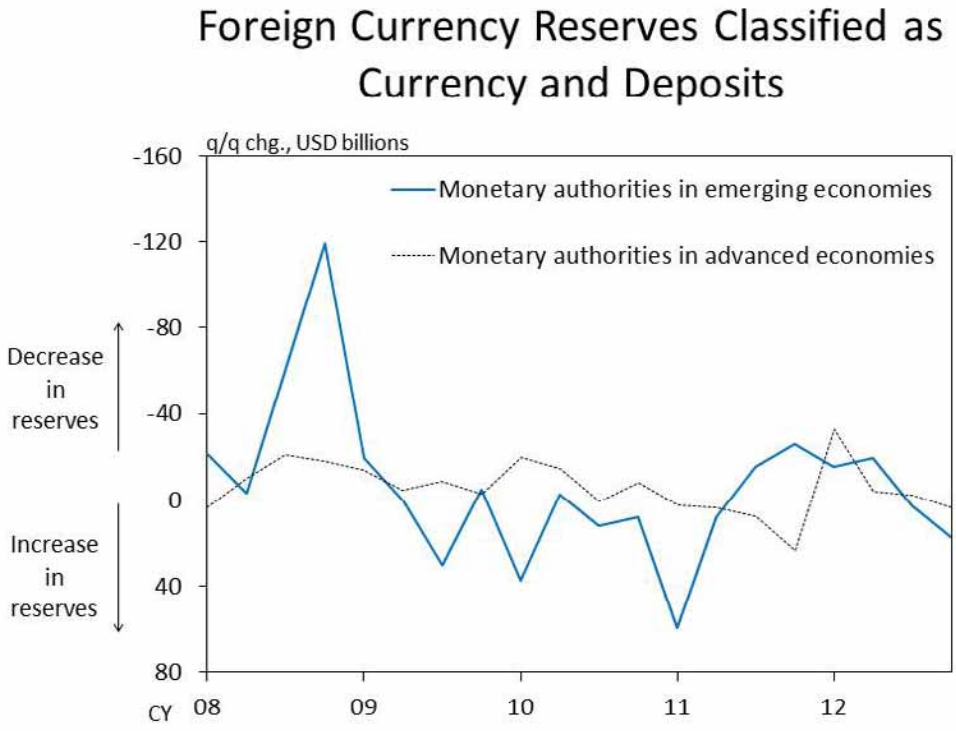


Chart 6 The Relationship between Foreign Reserves Policy and the GLLR Function (1)



Note: Liabilities are the sum of cross-border liabilities in all currencies and local liabilities in foreign currencies. Liabilities to official monetary authorities exclude U.S. dollar funds under the FRB dollar swap arrangements.
Sources: BIS; FRB; Bloomberg.

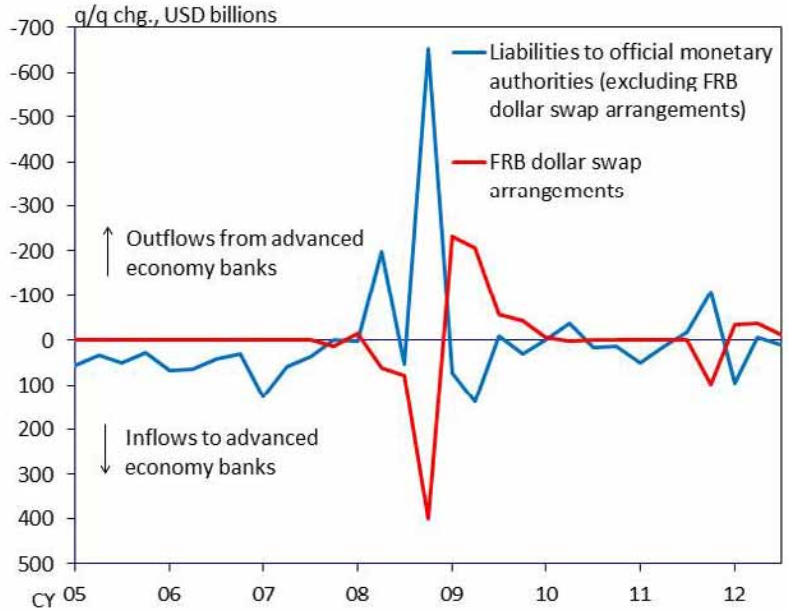
Chart 7 The Relationship between Foreign Reserves Policy and the GLLR Function (2)



Notes: 1. Currency and deposits are those in foreign currencies parked in commercial banks, foreign central banks, the BIS, etc.
2. Monetary authorities in emerging economies consist of 26 countries. Those in advanced economies consist of 14 countries and the ECB.
Source: Haver Analytics.

Chart 8 The Relationship between Foreign Reserves Policy and the GLLR Function (3)

Change in Liabilities of Advanced Economy Banks to Official Monetary Authorities



Note: Liabilities to official monetary authorities (excluding FRB dollar swap arrangements) are the sum of cross-border liabilities in all currencies and local liabilities in foreign currencies.
Sources: BIS; FRB.

Chart 9 Concluding Remarks

Monetary Authorities Face Double Trilemmas