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## Options for meeting the demand for international liquidity during financial crises<sup>1</sup>

*The financial crisis has heightened the awareness of the risk of a sudden shortage of foreign currencies. Governments and central banks are looking for ways to obtain “liquidity assurance”, ie the assurance of having access to international liquidity if they need it. This article discusses how such assurance might be provided, whether by multilateral means, such as reserve pooling or structures such as the IMF; by bilateral means, such as swap arrangements; or unilaterally, by building up foreign exchange reserves. All of the possible solutions have advantages and disadvantages, and a diversity of approaches therefore seems likely. If international arrangements are deemed to be inadequate, unilateral actions will continue.*

*JEL classification: E58, G01, F31.*

The demand for foreign currency liquidity increased suddenly in many countries during the financial crisis of 2008–09 as a result of large international flows of funds to the United States and Japan. Wholesale interbank markets and foreign exchange swap markets were disrupted. Much of the demand was accommodated and the resulting disruptions eased by the provision of central bank swaps, mainly by the Federal Reserve. After the financial crisis, things cannot go back to where they were, because governments and central banks, like commercial banks and non-financial companies, want greater assurance of adequate international liquidity as protection against another financial crisis.<sup>2</sup> This article considers various ways in which they could obtain such assurance.

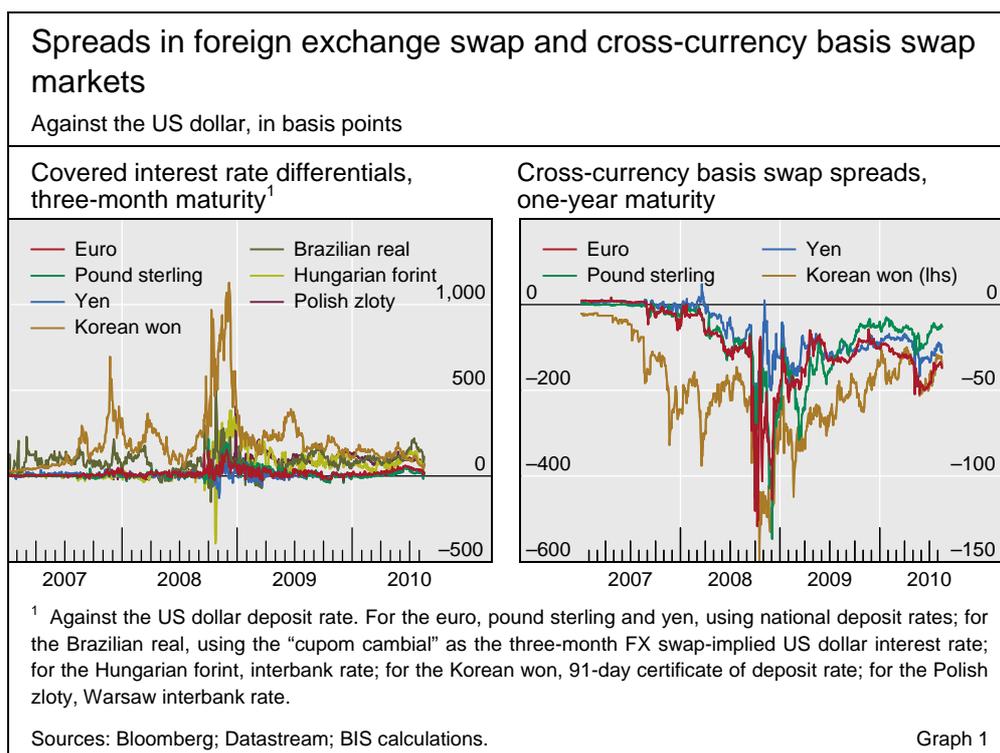
### International liquidity problems during the recent financial crisis

After the failure of Lehman Brothers in September 2008, concerns about counterparty credit risk were magnified and the demand for liquid assets

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<sup>2</sup> By “international liquidity” we mean access to means of international payment.



surged. Liquidity dried up in wholesale interbank markets, as well as in foreign exchange and cross-currency basis swap markets. The scale of the disruption is illustrated by the widening of the spreads shown in Graph 1 (Baba and Packer (2009), Baba et al (2008)).

There were large international flows of funds to the United States and Japan (Table 1). One important reason for the flows to the United States was that banks operating there had to meet previous explicit or implicit lending commitments which they had brought onto their balance sheets. Banks located

Flows of funds ...

### Exchange rate adjusted changes in banks' net external liabilities in the second half of 2008<sup>1</sup>

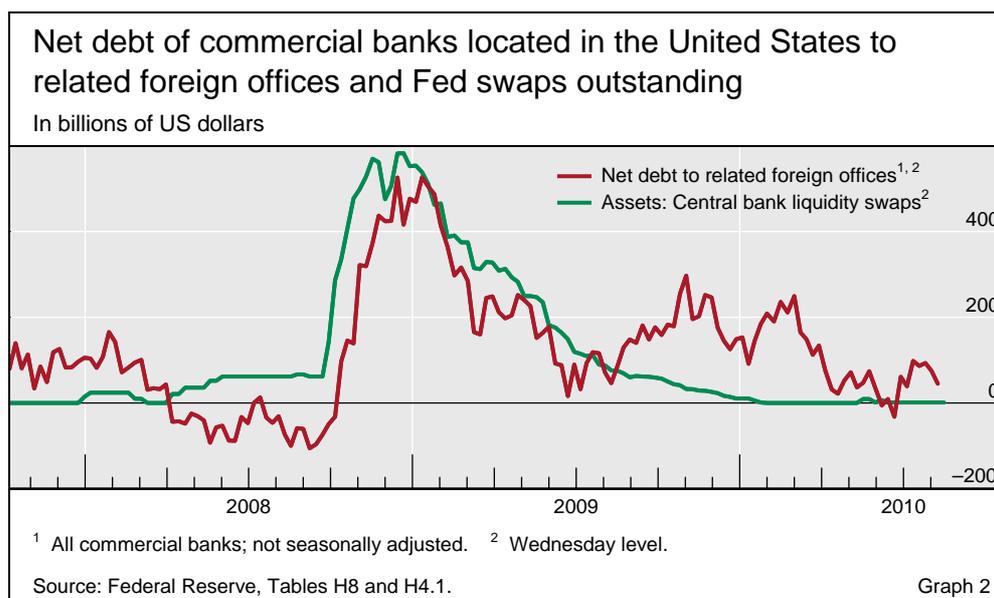
In billions of US dollars

	Total	Domestic currency	Foreign currency
Australia	-82.1	12.6	-94.6
Denmark	-29.7	-10.1	-19.7
Euro area	-311.4	88.2	-399.6
Japan	134.8	129.8	5.1
Korea	-37.8	0.0	-37.8
Sweden	-35.7	14.9	-50.5
Switzerland	73.5	28.3	45.2
United Kingdom	9.9	-47.5	57.4
United States	256.8	269.7	-12.9

An increase in the net external liabilities of the commercial banks in any country indicates an inflow of funds into that country.

<sup>1</sup> For economies where commercial banks' total net external liabilities changed by more than \$30 billion in the fourth quarter of 2008.

Source: Derived from BIS international locational banking statistics (Table 2). Table 1



in the United States, especially foreign banks, drained US dollar liquidity from their non-US affiliates in large amounts in the last four months of 2008 in order to build up their liquid assets, even though there were large shortages of dollars elsewhere (Graph 2; Allen and Moessner (2010)). A second factor was a flight of precautionary balances to the United States, where the most liquid US dollar markets are located.<sup>3</sup> The large flows to Japan probably reflected an unwinding of yen carry trades as foreign exchange volatility rose and assets which had been financed with borrowed yen fell in price.<sup>4</sup>

... led to liquidity shortages and swap lines

These international flows of funds created severe shortages of foreign currency liquidity, most notably in US dollars, and dislocation in interbank and foreign currency swap markets in many countries. Such problems had occurred previously in emerging market countries, eg during the Asian crisis of 1997–98, but this was the first time since the 1930s that they had affected western Europe, for example. The shortages were largely relieved by massive emergency liquidity assistance, including across borders through bilateral foreign exchange swap lines between central banks (Allen and Moessner (2010)). The Federal Reserve provided the largest amounts of foreign currency liquidity, peaking at \$583.1 billion on 17 December 2008 (Graph 2).

### Options for providing “liquidity assurance”

Countries want liquidity assurance ...

In the light of this experience, many governments and central banks are now anxious to obtain greater “liquidity assurance”, ie the assurance of having access to international liquidity in any future crisis. Moreover, some observers are concerned that banks in emerging markets have to operate at a

<sup>3</sup> McGuire and von Peter (2009) explain why European and Japanese banks had structural US dollar funding requirements. In addition, write-offs of dollar-denominated assets by non-US banks led to outright purchases of dollars.

<sup>4</sup> See Bank of Japan (2009), pp 60–6.

disadvantage in international competition because it is relatively difficult for them to obtain emergency liquidity support in the major world currencies (Park (2010)).

### *Prevention*

The best assurance would be provided if banking problems could be prevented from occurring in the first place. Regulation is being tightened in the wake of the crisis, as regards both capital and liquidity. Regulatory responses which are particularly relevant in the context of international liquidity are the new liquidity standards proposed by the Basel Committee on Banking Supervision, self-sufficiency rules for liquidity purposes in the new liquidity regime of the UK Financial Services Authority, and proposed limits to banks' exposures in the European Commission's capital requirement directive (BCBS (2009), FSA (2009), European Commission (2008)). These rules are likely to lead to smaller currency or maturity mismatches. That said, prevention may not be fully effective, so it is important to consider how to deal with international liquidity crises if they do happen.

### *Evaluating techniques for providing liquidity assurance*

Satisfactory techniques for providing liquidity assurance should meet the following criteria (as endorsed by Cecchetti (2010)):

- They should provide the countries that need it with adequate reassurance that their international liquidity needs will be met.
- They should avoid excessive moral hazard, and in particular avoid giving countries in "fundamental disequilibrium" the means to delay necessary adjustment.
- They should avoid placing unreasonable burdens on liquidity providers.

It is possible to design multilateral or bilateral structures for providing liquidity assurance that enable countries to get credit in case of need. Such structures provide, in effect, a "lender of last resort" in international financial markets, at least up to the limit of the available credit facilities. All techniques which involve credit also involve moral hazard, however. If credit is made available automatically, then borrowers with short-term horizons have an incentive to over-borrow. In normal circumstances, the lender conducts a full credit assessment before providing funds. However, in a financial crisis, quick decisions are often essential. There may not be time for a full assessment.<sup>5</sup> The Fed's speed of reaction in 2008 was crucial to the effectiveness of its swap operations.<sup>6</sup> In the absence of adequate multilateral or bilateral structures, a country can obtain liquidity assurance by building up its own foreign exchange reserves so that it has access to the funds it thinks it might need. This is self-insurance.

... which they can arrange by themselves, or which can be arranged internationally

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<sup>5</sup> Bagehot (1892, pp 199–200) emphasises the importance of speed in responding to panics.

<sup>6</sup> See Allen and Moessner (2010).

Techniques for providing liquidity assurance				
Type	Technique	Example	Advantages	Disadvantages
Multilateral	Reserve pooling	Chiang Mai	Economy in reserve holding	Moral hazard and possible delays Not all participants can draw at the same time
	Pooling including own currency	IMF	Economy in reserve holding	Moral hazard and possible delays
Bilateral	Swap network managed by reserve currency country	Fed, 1962–98 Fed, from December 2007	Quick access to funds assured Economy in reserve holding; requires only bilateral negotiation	Moral hazard Choice of recipient countries Burden on provider of funds
	Individual country lending from own FX reserves	Denmark, Norway, Sweden lending to Iceland, 2008	Requires only bilateral negotiation	Moral hazard and possible delays Provision of funds may not be assured
	Central banks accept foreign currency collateral located outside home territory from commercial banks	Canada, Hong Kong, 2008	Requires no international negotiation	Not likely to be enough on its own
Unilateral	Reserve accumulation for self-insurance	East Asian countries after crisis of 1997–98	Requires no international negotiation Quick access to funds assured	Diversion of resources into low-yielding assets Global macroeconomic consequences of reserve accumulation

Table 2

We begin by discussing possible multilateral and bilateral techniques, before going on to the unilateral actions that countries can take, namely self-insurance by accumulating reserves. The range of possible techniques and their principal advantages and disadvantages are summarised in Table 2.

#### *Multilateral techniques*

All multilateral techniques involve a group of countries agreeing to make funds available to each other in case of need.

In reserve pooling schemes, participating countries can draw on the pool when they need funds, and can thereby have access to more funds than if there were no pooling. It is in the nature of reserve pooling that the reserves in question are not the liability of any of the participating countries. Pooled reserves could be used in a crisis to provide foreign currencies to banks in any of the participating countries. However, the advantage of pooling might be lost in a general liquidity crisis if most or all of the participating countries wanted to draw funds at the same time.

The Chiang Mai structure is a reserve pooling scheme in East Asia. It was set up in the aftermath of the Asian financial crisis of 1997–98 to enable East Asian central banks to provide mutual financial support in the event of a future

crisis (Kawai (2007)). In May 2009 the ASEAN+3 countries<sup>7</sup> agreed to bring forward the timetable for multilateralising the Chiang Mai Initiative, which had until that time been a network of bilateral swap agreements, none of which had ever been drawn on. The new multilateral facility has created a pool of \$120 billion of reserves, from which each participating country can draw up to a predetermined country-specific amount. However, only the first 20% of the committed amount is available unless the country meets conditions specified by the IMF. With the two largest reserve-holding countries, China and Japan, among the participants, there is not much risk of all the participants wanting to draw at the same time.

The IMF is a financial pooling scheme of a broader kind, in that member countries contribute their quota subscriptions mainly in their own currencies, but also partly in foreign exchange. Its lending is in part financed by quota subscriptions, and its resources have been augmented by the General Arrangements to Borrow and the New Arrangements to Borrow. These resources can then be drawn on by member countries as foreign currency loans. Therefore the IMF can potentially recycle very large sums from creditor to debtor countries. IMF lending has been used in the past (eg during the Asian crisis of 1997–98) to help countries overcome the consequences of banking crises.

Reactions to a financial crisis can be accelerated if credit lines which can be drawn on in case of need have been pre-agreed. The IMF's Flexible Credit Lines were set up in March 2009 to provide timely lending to economies with good economic fundamentals and policies, and without the conditionality (and associated stigma) associated with other forms of lending by the IMF. They are of finite (one-year) duration, to reduce moral hazard. Colombia, Mexico and Poland received credit lines in 2009, none of which, however, had been drawn on by June 2010.

### *Bilateral techniques*

Bilateral techniques involve one institution accepting a commitment to provide funds on demand to foreign central banks. One possible bilateral solution would be the institutionalisation of swap lines provided by individual central banks in their own currency.<sup>8</sup>

The Federal Reserve used swap lines extensively in the recent crisis, but they are not new. The Fed maintained a structure of bilateral swap lines for many years. The network was established in 1962 (Toniolo (2005)). The swap arrangements were usually for three months, and could be renewed or maintained on standby if both parties agreed (Coombs (1976)). They could be drawn at the borrower's option. The network grew rapidly from around \$2 billion at the end of 1963 (involving 11 foreign central banks, including the Bank of

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<sup>7</sup> The ASEAN member countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam) plus China, Japan and Korea.

<sup>8</sup> Aizenman et al (2010) discuss many of the issues discussed in this paper and conclude that "there are clear limits to substitutability between swaps and reserves".

England and the Bundesbank, and the BIS at end-November 1963) to \$10 billion and \$30 billion at the end of 1969 and 1978, respectively. It survived the breakdown of the Bretton Woods system, even though its main initial purpose had been to help defend the Bretton Woods parities of the dollar and the official dollar price of gold. It was also intended to aid the provision of international liquidity in the longer term: "In the long run, to provide a means whereby reciprocal holdings of foreign currencies may contribute to meeting needs for international liquidity as required in terms of an expanding world economy." (FOMC (1962)). These swap lines were maintained until the late 1990s, when the Federal Reserve allowed all its swap lines except those with the central banks of Canada and Mexico to lapse, in the light of the introduction of the euro and their disuse for the preceding 15 years.<sup>9</sup>

Bilateral central bank swap lines have the advantage that they can provide adequate liquidity assurance. However, in addition to moral hazard, there is the problem of how the recipient countries are chosen. Clearly, the liquidity provider would make this decision, since the provider runs the associated risks, such as exposure to sovereign risk of the recipient country (Allen and Moessner (2010)). But political issues might prevent economically desirable outcomes in the choice of recipient countries.<sup>10</sup> More generally, the liquidity-providing central bank would need to be able to argue convincingly to its own legislature that taking on a commitment of this kind was consistent with its mandate and in the national interest. While it may be possible to make a compelling case for providing swap lines in an economic emergency on national interest grounds, a permanent commitment would be harder to justify.

A second bilateral technique is for an individual country to provide foreign currency liquidity to another country out of its own foreign exchange reserves. For example, in the recent crisis, the central banks of Denmark, Norway and Sweden provided euros to the Central Bank of Iceland by means of swap lines. However, they had made no prior commitment to provide funds. Countries with large foreign exchange reserves could be in a position to provide foreign currencies to several countries, and might even make commitments to provide funds in case of future need, provided they were persuaded that such commitments were in their own interests and that the problem of moral hazard could be managed.

Cross-border collateral arrangements can also help to provide foreign currency liquidity. These involve the central bank in one jurisdiction providing domestic currency liquidity to eligible financial institutions against collateral placed by their offices in another jurisdiction into the liquidity-providing central bank's account at the local central bank.<sup>11</sup> Strictly speaking, such

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<sup>9</sup> See FOMC (1998). The swap lines with Canada and Mexico were retained because they were associated with the North American Framework Agreement, in which the Federal Reserve participated.

<sup>10</sup> A historical example of such political difficulties is provided by the 1931 negotiations about an international loan to Austria after the collapse of Creditanstalt. See Toniolo (2005, pp 88–97).

<sup>11</sup> See CGFS (2010).

arrangements do not increase the amount of foreign currency available to governments and central banks, but they do reduce the amounts of foreign currency that governments and central banks might need to provide in a crisis to banks located in their territory. Some central banks already accepted cross-border collateral in their normal operations or on an emergency-only basis before the recent crisis, including the central banks of Sweden, Switzerland, the United Kingdom and the United States (CPSS (2006)). Other central banks started accepting cross-border collateral during the crisis, as part of the widening of collateral accepted. For example, in June 2008 the Bank of Canada started accepting US Treasury securities held in the United States as collateral for its Standing Liquidity Facility; and from October 2008 until March 2009, the Hong Kong Monetary Authority expanded the range of securities eligible as collateral for its Discount Window lending to include US dollar assets of credit quality acceptable to the HKMA.

### *Unilateral actions*

If multilateral or bilateral structures do not provide countries with as much liquidity assurance as they desire, then they are likely to resort to unilateral actions. They can hold foreign exchange reserves which they can use in a crisis to provide foreign currency liquidity to domestic banks.

If international arrangements are not sufficient, countries will self-insure

In the recent crisis, Korea, among other countries, provided US dollars to domestic banks out of its foreign exchange reserves in FX swap auctions, in addition to disbursing funds drawn on the Fed's US dollar swap line. Although it provided large amounts, market tensions persisted. There are grounds for thinking that there was some market anxiety about the adequacy of Korea's international reserves, even though they were the sixth largest in the world in mid-2008. The swap facility augmented these reserves and thus contributed to stabilising the market.<sup>12</sup> This may help to explain Baba and Shim's (2010) empirical finding that liquidity provided out of Korea's foreign exchange reserves was not as effective as liquidity drawn from the Fed swap line in reducing tensions in won/dollar foreign exchange swap markets, as measured by won/dollar foreign exchange swap spreads.

In Brazil, the central bank provided US dollars to domestic banks using instruments (derivatives such as FX swaps) that allowed it to limit the impact on reserves, and without drawing on its Fed swap line. Foreign currency liquidity was also provided via collateralised loans to banks (specifically for export financing), sales of US dollars with repo auctions, currency swap contracts (with the central bank short in US dollars) and outright sales of US dollars.<sup>13</sup> These measures seem to have reduced the relative onshore cost

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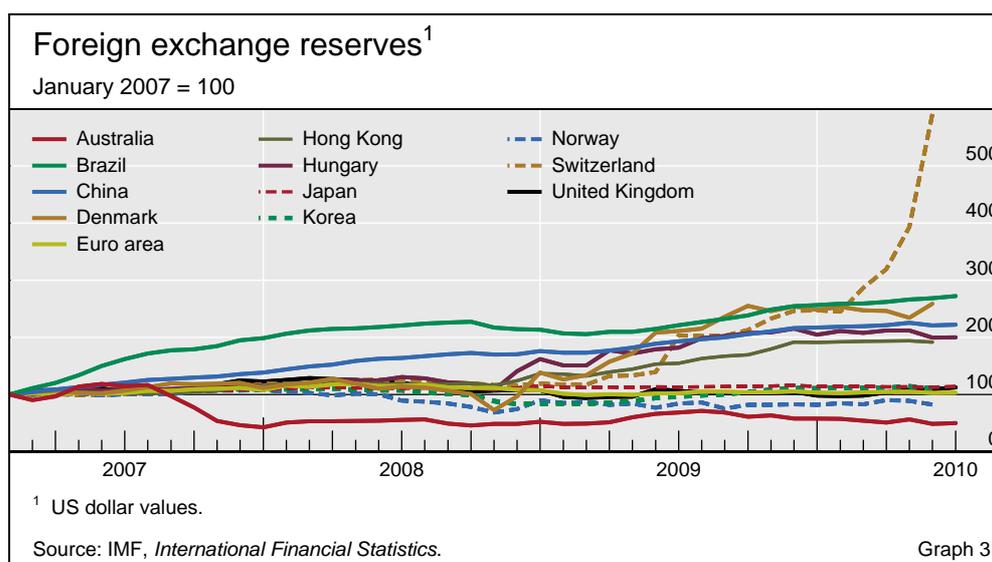
<sup>12</sup> See Kim (2010, page 9). The Bank of Korea commented that "The establishments of the currency swap themselves actually had a positive announcement effect in stabilizing the financial market unrest, as price variables have shown rapid recoveries" (Bank of Korea (2009)). Aizenman et al (2010) comment that "in the case of Korea, declining reserves themselves intensified market fears and concerns, forming a vicious cycle in which adverse market sentiment drives down reserves via FX market intervention and the decline in reserves, in turn, further dampens market sentiment".

<sup>13</sup> See CGFS (2010).

of dollar liquidity, with the effects of announcements being larger than the effects of the actual interventions.<sup>14</sup>

Some countries which experienced severe shortages of foreign currency liquidity during the crisis seem already to be accumulating reserves for self-insurance purposes. For example, the dollar value of foreign exchange reserves increased by 85% in Denmark from the start of 2009 up to April 2010, by 60% in Sweden, by 41% in Hungary, and by 29% in Brazil (Graph 3). Not all of the recent build-up of foreign exchange reserves has been due to self-insurance motives, however. China's foreign exchange reserves were already \$1.9 trillion at the start of 2009, amply sufficient to provide self-insurance, and it is therefore unlikely that any of the 30% increase between then and April 2010 can be attributed to any desire for additional self-insurance. And the very large increase in foreign exchange reserves in Switzerland (by 234%) has been the result of foreign exchange intervention by the Swiss National Bank, whose declared objective has been to prevent a further appreciation of the Swiss franc against the euro. Nevertheless, the SNB provided dollar liquidity drawn on the Fed swap line to commercial banks during the crisis, and the insurance that the recently acquired additional reserves provide may be welcome.<sup>15</sup> Not all economies that relied on swap lines during the crisis have increased their reserves: for example Australia, the euro area and the United Kingdom have not done so materially.

Advantages of self-insurance are that a country has certainty of access to foreign currency liquidity, and that there is no need for coordination. Drawbacks of this option include the costs of holding foreign exchange reserves to the economy, as the funds held as reserves must be invested in liquid assets. Moreover, it may turn out that the amount of foreign currency liquidity provided by the FX reserves is not sufficient. And a coincident effort by a large number of countries to build up reserves, whether by selling their domestic currencies



<sup>14</sup> See Stone et al (2009).

<sup>15</sup> See Allen and Moessner (2010).

in the foreign exchange market or by official long-term borrowing, is likely to affect the global macroeconomic situation. For example, outright purchases of foreign exchange might cause the currencies of the reserve-building countries to depreciate so that global expenditure switches to their domestic products, perhaps generating current account imbalances. And borrowing of foreign currencies would add to the pressure to raise long-term funding in global capital markets. Such effects might be comparable in nature to the effects of the build-up of foreign exchange reserves in East Asia after the 1997–98 crisis.<sup>16</sup>

## Conclusion

After the recent financial crisis, some countries want greater assurance of access to international liquidity in any future crisis. There are several possible multilateral or bilateral arrangements which could provide more liquidity assurance. Each has advantages and disadvantages; no single option seems optimal and a diversity of approaches therefore seems likely. If the range of internationally agreed multilateral and bilateral facilities does not provide adequate liquidity assurance to the countries that wish to have it, then self-insurance by countries building up foreign exchange reserves is likely to continue.

## References

- Aizenman, J, Y Jinjark and D Park (2010): “International reserves and swap lines: the recent experience”, *NBER Working Paper*, no 15804, March.
- Allen, W and R Moessner (2010): “Central bank co-operation and international liquidity in the financial crisis of 2008–9”, *BIS Working Papers*, no 310, May.
- Baba, N and F Packer (2009): “From turmoil to crisis: dislocations in the FX swap market before and after the failure of Lehman Brothers”, *BIS Working Papers*, no 285, July.
- Baba, N and I Shim (2010): “Policy responses to dislocations in the FX swap market: the experience of Korea”, *BIS Quarterly Review*, June.
- Baba, N, F Packer and T Nagano (2008): “The spillover of money market turbulence to FX swap and cross-currency swap markets”, *BIS Quarterly Review*, March.
- Bagehot, W (1892): *Lombard Street: a description of the money market*, 10th edition, Kegan Paul, French, Trübner & Co Ltd, London.
- Bank of Japan (2009), *Financial Markets Report*, March, available at [www.boj.or.jp/en/type/ronbun/mkr/mkr0903.htm](http://www.boj.or.jp/en/type/ronbun/mkr/mkr0903.htm).
- Bank of Korea (2009): “Policy response to the financial turmoil”, available at <http://eng.bok.or.kr/>.

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<sup>16</sup> See Bernanke (2005) for an analysis of the effects.

Basel Committee on Banking Supervision (2009): "International framework for liquidity risk measurement, standards and monitoring", consultative document.

Bernanke, B (2005): "The global savings glut and the US current account deficit", Sandridge Lecture, Virginia Association of Economics, available at [www.federalreserve.gov/boarddocs/speeches/2005/200503102/default.htm](http://www.federalreserve.gov/boarddocs/speeches/2005/200503102/default.htm).

Cecchetti, S (2010): "Alternatives to self-insurance", remarks prepared for the Swiss National Bank, International Monetary Fund High-Level Conference on the International Monetary System, Zurich, 11 May.

Committee on the Global Financial System (2010): "The functioning and resilience of cross-border funding markets", *CGFS Papers*, no 37, March.

Coombs, C (1976): *The arena of international finance*, New York, Wiley.

European Commission (2008): "Proposal for a directive of the European Parliament and of the Council amending directives 2006/48/EC and 2006/49/EC as regards banks affiliated to central institutions, certain own funds items, large exposures, supervisory arrangements, and crisis management".

Committee on Payment and Settlement Systems (2006): *Cross-border collateral arrangements*, January.

Federal Open Market Committee (1962): Transcript of 13 February meeting, [www.federalreserve.gov/monetarypolicy/files/fomchistmin19620213.pdf](http://www.federalreserve.gov/monetarypolicy/files/fomchistmin19620213.pdf).

——— (1998): Minutes of FOMC meeting on 17 November 1998, [www.federalreserve.gov/fomc/minutes/19981117.htm](http://www.federalreserve.gov/fomc/minutes/19981117.htm).

Financial Services Authority (2009): "Strengthening liquidity standards", Policy Statement 09/16, October.

Kawai, M (2007): "Evolving economic architecture in East Asia", *ADB Institute Discussion Paper*, no 84, December.

Kim, C (2010): "Time for a new central banking paradigm", lecture to 2010 Annual Bank of Korea International Conference.

McGuire, P and G von Peter (2009): "The US dollar shortage in global banking", *BIS Quarterly Review*, March.

Park, Y C (2010): "The role of macroprudential policy for financial stability in East Asia's emerging economies", based on a paper presented to the conference on "The banking regulation and financial stability in Asian emerging markets" organised by the ADBI, CBRC and IMF, Beijing, 26 May.

Stone, M, W Walker and Y Yasui (2009): "From Lombard Street to Avenida Paulista: foreign exchange liquidity easing in Brazil in response to the global shock of 2008–09", *IMF Working Papers*, 09/259.

Toniolo, G (2005): "Central bank cooperation at the Bank for International Settlements, 1930–1973", Cambridge University Press.