BANK FOR INTERNATIONAL SETTLEMENTS

BIS Working Papers

No 320

Offshore markets for the domestic currency: monetary and financial stability issues

by Dong He and Robert N McCauley

Monetary and Economic Department

September 2010

JEL classification: E51; E58; F33

Keywords: offshore markets; currency internationalisation; monetary stability; financial stability

BIS Working Papers are written by members of the Monetary and Economic Department of the Bank for International Settlements, and from time to time by other economists, and are published by the Bank. The papers are on subjects of topical interest and are technical in character. The views expressed in them are those of their authors and not necessarily the views of the BIS.

Copies of publications are available from:

Bank for International Settlements
Communications
CH-4002 Basel, Switzerland

E-mail: publications@bis.org

Fax: +41 61 280 9100 and +41 61 280 8100

This publication is available on the BIS website (www.bis.org).

ISSN 1020-0959 (print)

ISBN 1682-7678 (online)

Abstract

We show in this paper that offshore markets intermediate a large chunk of financial transactions in major reserve currencies such as the US dollar. We argue that, for emerging market economies that are interested in seeing some international use of their currencies, offshore markets can help to increase the recognition and acceptance of the currency while still allowing the authorities to retain a measure of control over the pace of capital account liberalisation. The development of offshore markets could pose risks to monetary and financial stability in the home economy which need to be prudently managed. The experience of the Federal Reserve and of the authorities of the other major reserve currency economies in dealing with the euromarkets shows that policy options are available for managing such risks.

JEL classification: E51, E58, F33.

Keywords: offshore markets; currency internationalisation; monetary stability; financial stability.

Offshore markets for the domestic currency: monetary and financial stability issues

Dong He and Robert N McCauley[1]

1. Introduction

The global financial crisis of 2007–09 highlighted a potential benefit of the internationalisation of emerging market currencies. As banks scrambled for liquidity, US dollar funding markets and foreign exchange swap markets seized up in late 2008 (Baba and Packer (2009), Hui et al (2009)). The resulting "dollar shortage" (McGuire and von Peter (2009a,b)) threatened to stifle international trade. In response, more than one emerging market central bank found itself in the unaccustomed business of providing dollar funding to domestic banks and financing exports. This experience has highlighted the danger of relying excessively on one reserve currency in international trade and payments, and the possible benefits of using a wider array of currencies, including emerging market currencies, especially in transactions between emerging markets.

For some emerging market policymakers, the policy responses to the financial crisis in the countries that supply reserve currencies have also raised concerns. Expansion of central bank balance sheets amid fiscal expansion in the world's major economies has, in some views, called into question the major currencies' reliability as stores of value. Whatever the grounds for such concerns, shifting to a situation in which emerging market countries' claims on the rest of the world are denominated in the domestic currency can offer advantages to the holders of such claims in the official, institutional investor or household sectors. Many fast-growing emerging market economies that are attractive to international investors now find their international balance sheets have large open positions in foreign currency: their liabilities (eg FDI by foreigners) tend to be denominated in domestic currencies while their claims on foreigners (eg official reserves) tend to be denominated in major reserve currencies. Allowing non-residents to borrow in the domestic currency would shift this currency exposure from domestic residents to the rest of the world (Cheung et al (2009)). Just as there are welfare gains from an earthquake-prone economy sharing that risk with the rest of the world, there can be welfare gains from sharing this currently concentrated risk.

While keen to hedge the risks of relying on a single national money and to reap the benefits of denominating their external claims in their domestic currencies, emerging market policymakers remain leery of the potential risks arising from allowing their currencies to be internationalised. However, risks to monetary and financial stability in the internationalisation of domestic currencies need to be articulated clearly. Drawing on the experience of the major currencies over the period since the inception of the euromarkets in the 1950s and 1960s, this paper identifies and analyses the challenges posed to monetary and financial stability by

[1] Hong Kong Monetary Authority (HKMA) and Bank for International Settlements (BIS). respectively. The authors thank Robert Aliber, Edward Frydl and Alexandre Swoboda for discussions, and S K Tsang and Lukas Vogel for comments on earlier versions of the paper, as well as participants of the CESifo Venice Summer Institute 2010 on "The evolving role of China in the global economy", 23–24 July, of the HKMA conference on "Financial reforms, macro policies and currency internationalization: the case of China", 19–20 October 2009, and a seminar at the BIS, without implicating them in the views expressed. The authors thank Piet Clement for help with the BIS archives and Christian Dembiermont, Magdalena Erdem, Serge Grouchko, Carlos Mallo, Denis Pêtre and Swapan-Kumar Pradhan for help with the data. Views expressed are those of the authors and not necessarily those of the HKMA or the BIS.

offshore markets in domestic currencies. It gives particular attention to the policy measures that were considered or used by policymakers in major-currency countries in their attempts to control such risks.

This paper is written for policymakers in emerging market economies who are contemplating allowing, or have begun to allow, their currencies to be used outside their economies. Currency internationalisation is not likely to be a major policy objective in itself, but it can help frame the benefits, and affect the pace and sequencing, of removing impediments to the free flow of capital. While we pose the questions and set out the main arguments in general terms, we refer to developments in the extraterritorial use of China's currency, the renminbi, owing to the several measures recently taken to allow its use outside the mainland. Since 2004, Hong Kong in particular has progressively developed into a renminbi offshore centre, with the scope of its renminbi banking business expanding from personal deposits to bonds and to trade credit.[2] This development is of particular analytical and policy interest because it has taken place notwithstanding the fact that the mainland authorities have by and large effectively maintained control over capital flows (Ma and McCauley (2008a,b, 2009)).

Can authorities promote offshore use of their currencies while maintaining a significant degree of capital account control? Do they have policy options to manage potential risks to monetary and financial stability posed by the offshore markets of their currencies? Our answers to both questions are positive. Thus, this paper argues that full capital account liberalisation is neither necessary nor sufficient for significant offshore use of a currency. To be sure, full internationalisation of a currency may require such liberalisation, but it is less obvious that it is "premature to discuss policies to promote currency internationalisation before it has been decided that restrictions on capital account transactions should be removed" (Genberg (2010)).[3] After all, it should be recalled that significant controls on capital by the US authorities from the 1960s to the early 1970s (the interest equalisation tax of 1963 and later "voluntary" restraints on capital exports) did not undo the international role of the dollar, and in some ways even gave a boost to the eurodollar market.

The rest of the paper is organised as follows. In Section 2, we briefly describe the role of offshore markets in the international use of major reserve currencies. Section 3 analyses how the offshore market affects onshore monetary stability, through its influence on the quantity of money and credit, on the yield curve and on the exchange rate. Section 4 discusses risks of lending in domestic currency by both domestic and foreign banks, and how such risks should be managed through prudential policies. Section 5 concludes.

2. The role of offshore markets

A useful observation to make at the outset of the discussion is that a significant portion of international use of major reserve currencies, such as the US dollar, takes place offshore. In particular, when non-US residents use the US dollar to settle trade and make investments, they do not transact onshore through banks and in financial markets in the United States. Rather, they concentrate their transactions in international financial centres such as the eurodollar market in London. In fact, one may argue that, without the offshore markets, the US dollar would not have attained the dominant position in international trade and payments that it occupies today.

---

[2] The development of renminbi banking in Hong Kong is described in HKMA (2005, 2006, 2009).

[3] See also Gao and Yu (2010, p 21).

We show that non-US residents reveal a strong preference for doing their dollar business outside the United States. That is, they tend to deposit US dollars in banks abroad and to buy US dollar bonds issued by non-residents outside the United States (and probably to hold them in European depositories as well).

2.1 The global dollar deposit market

The global market for dollar bank accounts shows that home is where the deposits are kept. US residents overwhelmingly favour domestic deposits, while depositors in the rest of the world somewhat less strongly favour offshore deposits. In terms of Table 1, the bulk of holdings lies on the northwest-southeast axis.

The offshore habitat for non-US residents to place dollars is nothing new and, indeed, it has been less pronounced in recent years. For the first 30 years of the eurodollar deposit market, Fed reserve requirements gave non-bank depositors an incentive to hold their dollars offshore to avoid what was in effect a tax (Aliber (1980, 2002), Kreicher (1982), McCauley and Seth (1992)). There was no immediate response to the lowering by the Federal Reserve of the reserve requirement on domestic large-denomination deposits to zero in 1990. However, BIS locational banking statistics show that, in the 2000s, non-US non-banks raised the share of their US dollar deposits with banks located in the United States to over a quarter for the first time since the 1980s (Graph 1).

Official reserve managers also prefer US dollar deposits outside the United States, although not quite so strongly. Official holders of US dollar reserves (mostly central banks) bulked large among early placers of dollars in the euromarket (BIS (1965)). Table 2 shows that, in recent years, more than 60% of official US dollar reserves that were held in banks were placed with banks located outside the United States.

There are a number of reasons why both private and public investors choose to place dollar deposits outside the United States. One motive is to separate currency risk from country risk. In other words, through offshore markets, investors can hold the currency without necessarily being exposed to the country. For a depositor, country risk refers to factors that might prevent the use of funds placed in a given jurisdiction. Historians of the eurodollar market, the market for short-term dollar deposits outside the United States, have pointed to the

Table 1

The US dollar in the global deposit market

In billions of US dollars, at end-2008

Non-bank depositor	Location of bank: United States	Location of bank: Outside the US	Total
US resident	11,743[1]	1,520	13,263
Non-US resident	809	2,580	3,389
Total	12,552	4,100	16,652

[1] US bank deposits estimated as M2 times M3/M2 in February 2006 (1.52) less outstanding currency.

Note: χ^2 statistic is 6082, indicating a rejection of the null hypothesis of independence of residence of depositor and location of the bank at the .0001 level of significance.

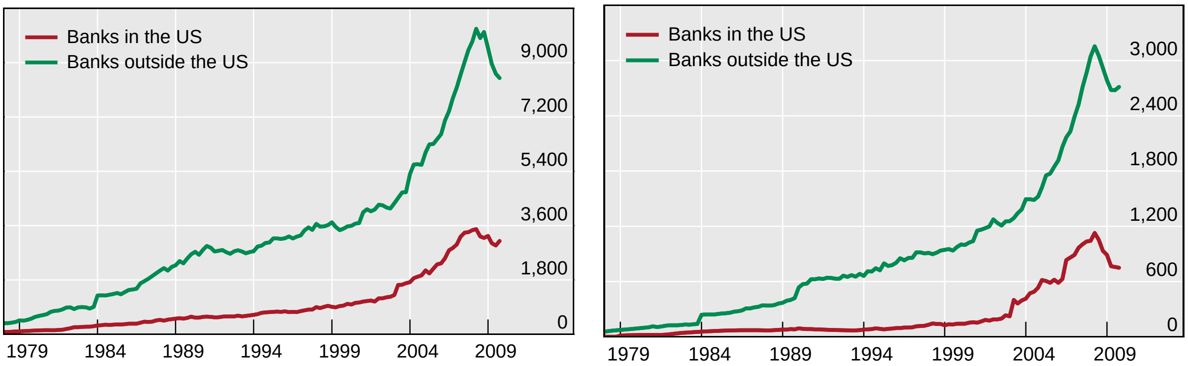
Sources: Federal Reserve; BIS international locational banking statistics by residence (deposit liabilities of reporting banks vis-à-vis non-bank sector).

Graph 1

US dollar liabilities to non-US residents by location of BIS reporting banks[1]

Amounts outstanding, in billions of US dollars

All sectors | Non-bank sector



[1] Including total cross-border liabilities in all currencies and local liabilities in foreign currencies vis-à-vis residents of reporting countries.

Source: BIS international locational banking statistics by residence.

Soviet Union's placement of dollar deposits in London as one of the origins of the market (Einzig (1970, p 30), Kindleberger (1973, p 289)). Such placements could have been intended to conceal dollar payments from the US authorities and to permit dollars to be mobilised in the event of Cold War tensions. Such considerations may have led to an association of offshore deposits with non-US banks, since holdings in these would be harder for the US authorities to freeze.

That depositors seek low-risk venues for their dollar deposits is evident from the geography of dollar deposits outside the United States. At the end of 2008, London claimed the largest share, with 20% of the offshore total. In the top 10 jurisdictions (accounting for 64% of all dollar deposits), over half were in countries with foreign currency ratings of Aaa, according to Moody's.

The choice of offshore deposits is strongly associated with the choice of non-US banks. Official investors place their onshore deposits disproportionately with US banks, but place offshore deposits disproportionately with non-US banks (Table 2). This may in part reflect differences in the term of deposits, with deposits in US banks in the United States available at call for payment services while term deposits with non-US banks outside the United States serve as short-term investments.

The demand to separate currency risk from country risk may also be due to concerns over concentration of infrastructure or operational risk in one country. As central banks have lengthened their investment portfolios, their overall access to liquidity has become more dependent on the proper functioning of securities markets, including repurchase markets. Thus, the interruption of trading of US Treasury securities in September 2001 owing to terrorist attacks reminded officials of the potential benefits of having diverse trading and custodial locations. McCauley (2005) observed that, while normal operations with Treasury securities were interrupted, central banks with dollar securities held in European depositories were still able to carry out normal operations with them, since the US payment system continued to operate and thus banks could make dollar payments.

Table 2

Official dollar deposits by location and nationality of banks

In billions of US dollars

Nationality of banks	December 2004 Location of deposits			December 2007 Location of deposits			December 2008 Location of deposits		
	US	Off-shore	Total	US	Off-shore	Total	US	Off-shore	Total
US	73.6	7.8	81.4	143.1	28.1	171.3	127.6	32.5	160.1
Others	73.0	268.2	341.2	73.1	475.0	548.1	59.7	269.4	329.1
Total	146.6	276.0	422.7	216.2	503.2	719.4	187.3	301.8	489.2

Chi-squared statistics are 138.2, 306.2 and 172.7 for 2004, 2007 and 2008, respectively, indicating a rejection of the null hypothesis of independence of nationality of banks and location of official deposits at the .0001 level of significance.

Source: BIS locational banking statistics by nationality.

It makes sense to separate country risk and currency risk, because the former need not lead to the latter. True, much country risk makes for currency risk. For instance, the US Gold Reserve Act of 1934 abrogating gold clauses in domestic contracts (a country risk) was associated with the dollar's 41% decline against gold-linked currencies. But US seizure of a given sovereign's assets in the United States or 9/11-style damage to US financial infrastructure would not necessarily be associated with dollar depreciation.

A second consideration in choosing between onshore and offshore markets is yield differentials. For most of the life of the eurodollar market, a substantial yield pickup was available to those willing to place a deposit in a bank in London or another centre outside the United States (Kreicher (1982)). This yield premium reflected in early days a sense of greater risk attached to offshore dollars. For most of the 1980s, however, higher yields on dollars deposited outside the United States approximated the cost of domestic reserve requirements and deposit insurance (McCauley and Seth (1992)). (This suggested that US depositors paid the cost of the reserve requirement and deposit insurance "taxes".) As noted, the latter regulatory reason to hold dollar deposits offshore mostly disappeared with the Federal Reserve's reduction of the reserve requirement to zero in 1990. Whatever the cost of regulation had done to spur the growth of the eurodollar deposit market, its subsequent marked reduction did not close the market down.

A further consideration is the convenience factor: to some investors and fund-raisers, the regulatory environment, accounting standards, language and time zone of the location of the offshore markets make them more convenient than the onshore markets.

2.2 The global dollar bond market

The larger global dollar bond market also shows a bias, albeit a weaker one, of non-US investors for dollar bonds issued by non-US residents and bonds issued in the offshore market. Non-US resident investors in US dollar bonds disproportionately invest in obligations of issuers resident outside the United States (Table 3).

Table 3

The US dollar in the global bond market by issuer and holder

In billions of US dollars, at end-2008

US dollar bond issuer	Residence of holder		Total
	United States	Outside the US	
US resident	18,117	5,656	23,773
Non-US resident	917	2,740	3,657
Total	19,034	8,396	27,430

Non-US resident holdings of US dollar-denominated bonds issued by US residents are from June 2008 rather than end-2008. US resident holdings of US dollar-denominated bonds issued by US residents estimated as a residual from total US dollar bonds issued by US residents as reported by the BIS and the June 2008 figure for non-resident holdings. US holdings of US dollar bonds issued by non-US residents are at market value while the total is at historical value.

Note: χ^2 statistic is 3902, indicating a rejection of the null hypothesis of independence of residence of dollar bond issuer and dollar bond holder at the .0001 level of significance.

Sources: Department of the Treasury, Federal Reserve Bank of New York and Board of Governors of the Federal Reserve System, *Report on US portfolio holdings of foreign securities as of December 31, 2008*, October 2009; ibid, *Report on foreign portfolio holdings of US securities as of June 30, 2008*, April 2009, p 23; BIS.

This bias of non-US investors to hold the bonds of non-US obligors has shaped the pattern of issuance in the primary market for dollar bonds. Obligors from outside the United States issue the overwhelming majority of their paper offshore (Table 4). Historically, the offshore dollar bond market was boosted by US capital controls in the late 1960s into the 1970s[4] and by withholding taxes into the mid-1980s. The first gave non-US obligors an incentive to issue

Table 4

The US dollar in the global bond market by issuer and primary market

In billions of US dollars, at end-2008

US dollar bond issuer	Location of primary market		Total
	United States	Offshore	
US resident	19,206	4,567	23,773
Non-US resident	466	3,191	3,657
Total	19,672	7,758	27,430

Note: χ^2 statistic is 7, indicating a rejection of the null hypothesis of independence of residence of dollar bond issuer and location of primary market issuance at the .0001 level of significance.

Sources: Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; national authorities; BIS.

[4] Kindleberger (1973, p 225) refers to the Interest Equalization Tax as a “prohibitive tax”.

Table 5

Holders and primary market of US dollar bonds issued by non-US obligors, December 2008

Investor	Bond originally sold		
	Onshore	**Offshore**	**Total**
US	...	...	917
Non-Us	...	...	2,740
Total	466	3,191	3,657

US holdings of US dollar securities are at market value while the total is at historical value. "..." = not available.

Sources: Department of the Treasury, Federal Reserve Bank of New York and Board of Governors of the Federal Reserve System, *Report on US portfolio holdings of foreign securities as of December 31, 2008*, October 2009, p 14; Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; national authorities; BIS.

dollar bonds in Europe, while the second gave non-US investors an incentive to buy dollar bonds offshore. Indeed, until the repeal of the US withholding tax on bond interest, dollar bonds issued offshore by highly rated sovereigns and companies (eg Kingdom of Sweden, IBM) yielded less than US Treasury bonds of the same maturity owing to the desire of non-resident investors to avoid the US withholding tax.

Since the mid-1980s, the onshore and offshore markets have become integrated in their pricing. Still, even given limited information on holdings of dollar bonds by primary market, it is evident that offshore investors are overrepresented among holders of bonds issued by non-residents offshore (Table 5).

Thus, judging from the US dollar, global investors prefer to transact in a particular currency through the offshore markets. Non-US residents, private and official alike, keep the bulk of their US dollar deposits outside the United States and invest disproportionately in US dollar bonds issued by non-US residents.

That said, it should be clear that in the normal case the offshore market does not exist in isolation. In fact, the payment flows associated with these accounts and investments ultimately pass through bank accounts in the United States, just as payment flows associated with non-bank financial intermediaries in the United States ultimately pass through banks in the United States. While the US authorities put in place capital controls from the late 1960s until the early 1970s, they never impeded the flow of payments through US banks to allow the settlement of offshore trade and investment transactions. Offshore markets in a currency can flourish if offshore financial institutions are able to maintain and to access freely clearing balances in the currency with onshore banks (Dufey and Giddy (1978)). In other words, non-resident convertibility of the currency is allowed at least for overseas banks. Once this condition is met, both long and short positions in the currency can be built up offshore even without a wholesale liberalisation of capital account controls by the onshore country authorities. If offshore banks do not have free access to clearing banks kept with onshore banks, then offshore markets can still exist, though in a more limited fashion, through non-deliverable contracts, as argued below.

3. Monetary stability

The development of offshore markets in a given currency poses several challenges to a central bank's responsibility for maintaining monetary stability.[5] An offshore market in a given currency can increase the difficulty of defining and controlling the money supply in that currency. Equally, an offshore market in a given currency can pose a challenge to measuring and controlling bank credit. For example, domestic firms and households, perhaps through the aggregation of some non-bank financial institution (like money market funds), can substitute offshore deposits in the domestic currency for onshore ones. If these in turn are lent back into the economy (so-called round-tripping), hard-to-measure and hard-to-control offshore deposits and credit can substitute for their domestic counterparts. If monetary policy is based to some extent on the control of money or credit, then the effect of offshore use of the currency on money or credit should be factored in when setting monetary or credit targets or monitoring ranges.

Offshore activity in the currency might also affect the shape of the yield curve or the exchange rate. If the central bank sets the overnight (or some other short-term) rate with a view to targeting inflation and growth, then policymakers would have to factor these effects into their inflation forecasts and set the short-term interest rate appropriately.

In what follows, we first consider the interactions of an offshore market with the control of money or credit, with a focus on the credit multiplier and the use of reserve requirements. We conclude that, as long as capital controls are maintained, the authorities can control offshore deposits unilaterally through reserve requirements. In the absence of capital controls, experience suggests that it is possible to impose reserve requirements on banks' net funding in domestic currency from offshore, albeit at the cost of some distortions across firms and banks. Banks not incorporated in the home country can circumvent such requirements by funding and booking loans offshore that are extended to domestic firms.

We then consider the issues that arise with regard to offshore investors' influence on the onshore yield curve. Here we emphasise that an offshore domestic currency yield curve has already come into existence on the back of the non-deliverable offshore currency market and that adding offshore deliverability may not represent a large change. We sketch the longer-term implications for the yield curve of offshore activity in a currency, which depend on the impediments to foreign investment in the domestic market, and the relative size of the off- and onshore markets. If the influence of offshore money markets on the onshore interest rates is significant and warrants a response, it is possible for the home central bank to intervene in the offshore markets through private or public sector agents.

The implications of offshore activities for the exchange rate ultimately depend on how the long and short positions of the currency in offshore markets balance out. Capital controls may at present place restrictions on the ability of offshore market participants to take either long or short positions. In this context, offshore non-deliverable exchange markets already permit speculative bets on the currency that may increase pressure on the exchange rate given prevailing macroeconomic conditions. Greater integration of the onshore and offshore foreign exchange market would make these pressures more immediate. In the longer term, and under more liberalised capital account regimes, the influence on the exchange rate depends largely on the level of domestic interest rates relative to global levels. Relatively low interest rates would tend to make the currency a borrower's currency and its offshore use a net source of downward pressure on its exchange rate. Conversely, relatively high interest rates would tend to make the currency an investor's currency and its offshore use a net source of upward pressure on its exchange rate.

---

[5] For a discussion of some issues, see Gao (2010).

3.1 The definition of money

If the monetary policy strategy involves targeting or monitoring some monetary aggregate, then it is important to define that aggregate properly. Should the definition of money include offshore deposits in the domestic currency? Major central banks tended to answer this question in a manner that balanced principle with pragmatic considerations. In principle, offshore deposits held by domestic residents should be included in a monetary aggregate, because such deposits tend to have a high degree of substitutability with onshore deposits. The appropriate aggregate would tend to be M2 or M3, since these offshore accounts do not typically serve as transaction accounts.[6] Nevertheless, availability of data can be a major constraint. Comprehensive data on offshore deposits are typically available only at a quarterly frequency from sources such as the BIS. Policymakers who wish to make use of monthly or weekly data may need to rely on data that are made available by a subset of cooperating central banks.

3.2 The credit multiplier and reserve requirements on offshore deposits

When targeting or monitoring monetary aggregates, home central banks face the general question of whether credit extension in domestic currency in offshore centres significantly weakens the ability of onshore authorities to control such aggregates. The question arises because offshore banks operate in a different jurisdiction from that of onshore banks and therefore face different regulatory burdens and cost structures. This issue was extensively discussed and debated in the 1970s and the early 1980s, and Box 1 profiles the discussion. It should be remembered that the monetary strategy of not only the Deutsche Bundesbank and the Swiss National Bank but also of the Federal Reserve put emphasis on the control of monetary aggregates and that other central banks on the European continent sought to control credit aggregates. In this context, reserve requirements served a broader purpose than they generally do in advanced economies these days, ie to stabilise the demand for bank reserves, or in some places to tax the banking system[7] (Borio (1997)).

Perhaps the best formulation was that the offshore markets, like domestic non-bank financial institutions such as thrifts in the United States, decrease the effective reserve ratio, or equivalently increase the credit multiplier of a given sum of bank reserves (Aliber (1980)). So, whether they made monetary policy more difficult depended on whether the home central bank can impose unilateral reserve requirements on offshore deposits. As long as this ability is retained, even if offshore credit extension in domestic currency leads to a multiple expansion of deposits (taking into account any "leakage" to the domestic market), the home central bank would still be able to maintain control through setting the reserve requirement.

[6] So-called "sweep" accounts are borderline cases. With these accounts, amounts outstanding in a domestic transaction account as of a certain hour are swept into an offshore account.

[7] Whether control of base money given reserve requirements sufficed to control monetary or credit aggregates in a textbook fashion is a question beyond the scope of this paper. Borio (1997, p 48) notes that, during the period of non-borrowed reserve targeting (October 1979–October 1982), the Federal Reserve used semi-lagged reserve requirements where required reserves were largely predetermined, working against causation going from reserves to money. Only after this period were reserve requirements made contemporaneous. See Ho (2008, pp 12–16) for contemporary use of reserve requirements in Asia.

Box 1

The eurodollar multiplier

Working under James Tobin at Yale, Swoboda (1968) came up with the notion of a eurodollar multiplier, which was subsequently taken up by Friedman (1969). The question posed was by how much some monetary or credit aggregate would expand on the basis of another, say, million dollars deposited in London in the eurodollar market. On the basis of various proposed answers, the G10 central banks decided to cap and then gradually draw down their direct deposits in the euromarkets (Toniolo (2005, pp 465–6)).

Aliber (1980) argued that the euromarket, like non-bank financial intermediation, served to economise on needed base money. Big banks operated in both the offshore market and the onshore market, and in major onshore jurisdictions they were required to hold reserves with the central bank well in excess of operational requirements. Thus, offshore deposits could be serviced out of such required reserves. The result was that the effective reserve requirement was lower (or the effective credit multiplier was higher).

The implication is that, although the euromarkets may make control of monetary aggregates more complicated or difficult, they do not make it impossible. "If one bluntly asked whether the Euromarkets are, in themselves, a source of unbridled credit growth, the answer of most professional writers on the subject would be unambiguously in the negative" (Swoboda (1980)). As long as there is some degree of convergence of regulations and reserve requirements affecting domestic and offshore bank lending and borrowing, and a revision of appropriate monetary targets in view of the existence of offshore markets for domestic currency deposits, the offshore market would not pose a serious threat to the ability of the onshore central bank to control the money supply. This was thought to be the lesson of experience of the US Federal Reserve, even at the Federal Reserve Bank of St Louis, which then focused on the monetary base (Balbach and Resler (1980)).

In retrospect, however, it is not so clear that adequate account was taken of the credit and liquidity growth in the euromarkets. A view at the Federal Reserve Bank of New York was that inflation accelerated in the 1970s in part because the single digit growth of various measures of money in the United States seemed reassuring even as the eurodollar market expanded at rates like 20–30% per year. And two years after the above views were published, the developing country debt crisis would re-pose the question of whether the easy and excessive credit to Latin American borrowers was only incidentally raised in the euromarkets (see below).

In major currencies, the notion that reserve requirements might be placed on offshore deposits sounds strange to modern ears. Yet a generation ago, when the Federal Reserve had as an intermediate target some measure of money, the possibility was actively explored (Sub-Group Studying the Establishment of Reserve Requirements on Euro-currency Deposits (1980), Frydl (1982)).[8] An important threshold consideration was whether reserve requirements would be applied to one currency or to all currencies. If only to one currency, it was reasoned, then market participants could evade the requirements through use of forward contracts. Say, for instance, that offshore US dollars were subject to a reserve requirement, but offshore yen were not. In this case, an investor could buy a yen deposit and sell the yen forward against the dollar, in effect holding a synthetic dollar deposit not subject to the reserve requirement.[9]

This reasoning would hold as long as covered interest rate parity held, so that offshore forward foreign exchange rates just reflect interest rate differentials. This condition is the

8 A study group was formed at the Bank for International Settlements chaired by the head of the Board of Governors' Division of Monetary Affairs, Stephen Axilrod. Its report became part of the public domain in 2010.

9 Henderson and Waldo (1980) refer to this as the "redenomination incentive". US dollar deposits sold forward against Canadian dollars were already important in the Canadian dollar money market.

Table 6

Reserve requirements on offshore deposits: a typology of possibilities

Rate of remuneration paid on reserves	Central bank where reserves held		Comment
	Home	Host	
Market rate			No "tax" on intermediation
Positive, below market			
Zero			

Source: Based on Sub-Group Studying the Establishment of Reserve Requirements on Euro-currency Deposits (1980).

same as the absence of effective controls on capital flows between the domestic and offshore money markets. It has generally been fulfilled, for example, for the yen/dollar ever since the early 1980s. An important result, therefore, is that effective reserve requirements on a single currency offshore ultimately depend on capital controls that succeed in splitting the onshore and offshore money markets. In other words, reserve requirements can be used unilaterally with some expectation of effectiveness *if* offshore investors are not able to deal in forward foreign exchange contracts that embody the difference between domestic and dollar money rates.

Such is the case for the Chinese renminbi and the Indian rupee. Thus, there is, at least in a transition period, scope for the extension of monetary control to offshore deposits in these currencies. Given that, there are two dimensions to the technical choice of reserve requirement implementation. First, the required reserve can be payable to the host central bank or to the home central bank of the currency. Second, the required reserve can be remunerated at zero (or a fixed rate below market rates) or at a market rate (Table 6).

In Hong Kong, renminbi deposits are not subject to any *de jure* reserve requirements. However, until recently, the *de facto* reserve requirement had been set at 100%, because all deposits had to be redeposited at the People's Bank of China (PBoC) through the clearing bank. This means that renminbi deposits in Hong Kong have been feeding a "narrow" banking system in which assets consist solely of government liabilities (PBoC reserves in this case). With the introduction of trade credit in July 2009, the reserve requirement has been effectively lowered, but for practical purposes will remain above 25% given that the HKMA imposes a 25% liquidity ratio requirement on such deposits.

In London, owing to the absence of reserve requirements, banks could and did pay a premium on time deposits over yields on large-denomination certificates of deposits in New York. (The same absence of reserve requirements allowed Libor-based loan pricing to be competitive versus prime-based loan pricing in the United States.) By contrast, renminbi deposit rates, constrained by the de facto high reserve requirement and the rate of remuneration thereon, have been lower in Hong Kong than on the mainland (Box 2).

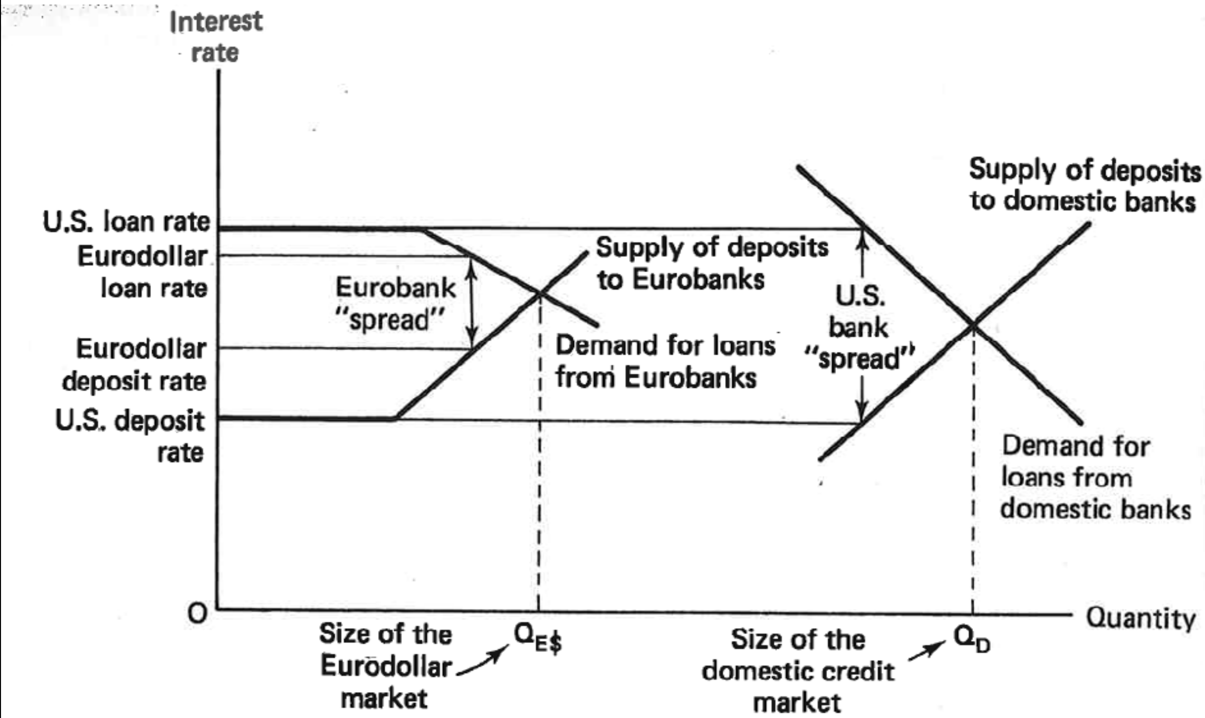
Box 2

Offshore and onshore interest rates and the renminbi deposits in Hong Kong

Owing to the absence of reserve requirements, deposit insurance fees and the like, offshore banking can operate with narrower intermediation margins. Thus offshore wholesale deposits typically yield more than their onshore counterparts, while offshore loans can be priced below their onshore counterparts (if the markets are segmented; see Graph A). In view of this regularity, the pricing of renminbi deposits in Hong Kong below comparable rates on the mainland is at variance with euromarket experience.

Graph A

The relationship of on- and offshore deposit and lending rates



Source: Dufey and Giddy (1978, p 52).

Building on Aliber (1980), Kreicher (1982) conceived of the linkage of domestic and euromarket deposit rates in terms of an arbitrage tunnel. This tunnel was based on the arbitrage between the all-in cost of domestic certificates of deposit compared with Libor.

$r_t^{eurodollar} = (r_t^{domestic\ certificate\ of\ deposit} + FDIC_t) / (1 - RR_t)$, where

$r_t^{eurodollar}$ is Libid or Libor at time t;

$r_t^{domestic\ certificate\ of\ deposit}$ is the US domestic wholesale certificate of deposit rate at time t;

$FDIC_t$ is the premium for Federal Deposit Insurance at time t; and

RR_t is the reserve requirement on large, non-personal deposits at time t.

The arbitrage takes place in a tunnel as a result of bid-ask spreads (eg Libor vs Libid, placing costs for the US certificate of deposit). It follows that the eurodollar market is more competitive at higher rates of (unremunerated) required reserves, at higher premia for deposit insurance and at higher interest rates overall.

Such pricing, of course, induces borrowers and placers of funds to move to the offshore market. Historically, sovereign borrowers and large firms found it easy to shift to US dollar loans syndicated largely or exclusively with offshore banks and priced off the offshore reference rate, Libor. Both classes of borrower were quick to insist on their large bank loans being priced off Libor in addition to (or instead of) the domestic benchmarks of prime or US certificates of deposit shortly after Libor gained ground against the latter (McCauley (2001)). By the end of the 1980s, Libor was the pricing reference for most corporate loans and prime had been relegated to the status of benchmark for consumer loans.

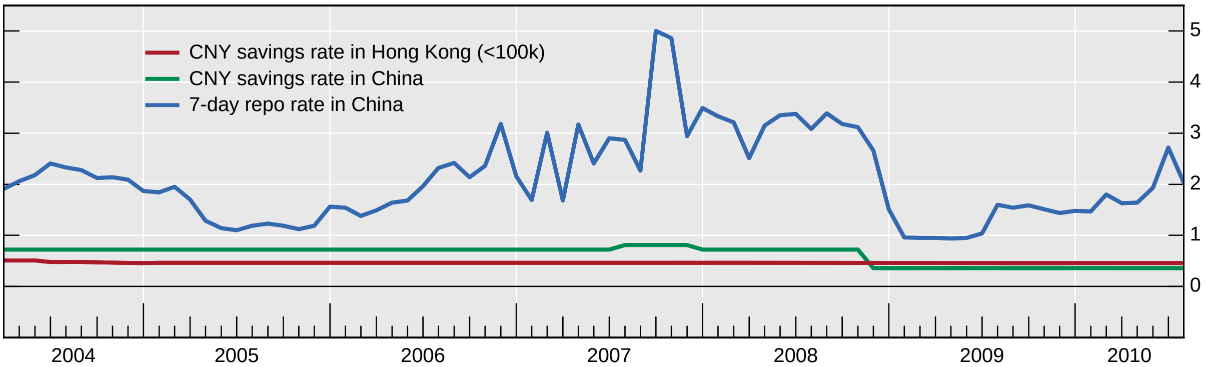
US depositors showed greater stickiness in their holding of domestic wholesale deposits. One can call it home bias, or perceived country risk or inertia, but institutional investors took their time in the 1980s to switch to more remunerative deposits in the Caribbean or London. Money market funds, which compete fiercely on the basis of yield, were among the first to give a substantial weight to offshore deposits among their bank paper. By mid-2008, about half of prime money market funds were invested in foreign bank paper, including eurodollar deposits (Baba et al (2009)).

Yields on offer on renminbi deposits in Hong Kong, by contrast, have not been very tempting when seen from the mainland. The savings rate on renminbi deposits in Hong Kong lies well below wholesale rates as represented by the seven-day repo rate in China in the graph below. Admittedly, the renminbi accounts in Hong Kong have not been structured for large-denomination time deposits that would be more comparable to money market yields on the mainland. But the Hong Kong renminbi savings yield has even, until late 2008, lain below the regulated renminbi savings rate in China (Graph B). Nevertheless, the yields of renminbi bonds issued in Hong Kong, which were priced by the market, were closer to those on the mainland (Table A).

Graph B

Offshore and onshore renminbi interest rates

In per cent



Sources: Hong Kong Monetary Authority; Bloomberg.

Table A

Renminbi-denominated bond issues in Hong Kong

Issuers	Issuance date	Issuance size	Maturity	Interest rate
China Development Bank	July 2007	CNY 5bn	2 years	3.00%
Export and Import Bank of China	July 2007	CNY 2bn	2 and 3 years	3.05% and 3.2%
Bank of China	September 2007	CNY 3bn	2 and 3 years	3.15% and 3.35%
Bank of Communication	July 2008	CNY 3bn	2 years	3.25%
Export and Import Bank of China	September 2008	CNY 3bn	3 years	3.4%
China Construction Bank	September 2008	CNY 3bn	2 years	3.24%
Bank of China	September 2008	CNY 3bn	2 and 3 years	3.25% and 3.4%
Bank of East Asia (China)	July 2009	CNY 4bn	2 years	2.8%
HSBC (China)	July 2009	CNY 1bn	2 years	38 bp over 3-m Shibor

Table A (continued)				
Issuers	**Issuance date**	**Issuance size**	**Maturity**	**Interest rate**
China Development Bank	August 2009	CNY 1bn	2 years	38 bp over 3-m Shibor
China Development Bank	August 2009	CNY 2bn	2 years	2.45%
HSBC (China)	September 2009	CNY 2bn	2 years	2.6%
Ministry of Finance	October 2009	CNY 6bn	2, 3 and 5 years	2.25%, 2.7% and 3.3%
Hopewell Infrastructure	July 2010	CNY 1.38bn	3 years	2.98%
McDonalds	August 2010	CNY 200mn	3 years	3%
Source: Hong Kong Monetary Authority.				

3.3 Reserve requirements on net funding from offshore markets

Even if the home authorities cannot control the growth of offshore deposits with reserve requirements, they may still be able to use this tool to control domestic bank credit, if not all credit extended from offshore. US precedents show that the absence of reserve requirements on eurodollars led to the adaptation of the monetary management tool to cover net funding from the eurodollar market. In this manner, domestic credit extension that depended on net funding from the eurodollar market was not able to circumvent this tool of monetary control.

Under Federal Reserve Regulation D, which governs reserve requirements, banks had to hold a non-interest bearing account when they sold a large certificate of deposit in the United States. In addition, once a bank's US offices had collectively run up a net obligation to its branches outside the United States, the bank had to hold a non-interest bearing account against additional eurodollar liabilities funding US assets. US-chartered banks' eurodollar reserve requirements were assessed against not only their borrowing from their foreign branches, but also their lending to US non-bank customers booked at their foreign branches. Obviously, this required the collection of detailed data on the branches outside the United States. But as a result, US-chartered banks could not get around the eurodollar reserve requirement by booking loans to domestic customers offshore.

However, foreign banks operating in the United States did not provide such information on their offshore operations and were assessed the eurodollar reserve requirement on a less inclusive base. As a result, foreign banks operating in the United States could, and did (McCauley and Seth (1992)), engage in regulatory arbitrage by booking loans to US firms offshore in financial centres that did not impose reserve requirements. In the hotly contested US corporate loan market in the 1980s, foreign banks claimed a market share of half or more.

Thus, a measure of monetary control was achieved by the US authorities at the cost of the competitive position of US-chartered banks in their home corporate loan market. And the distortion did not stop there. US multinationals could borrow dollars from US or other banks offshore and funnel the funds into their US operations. So both US banks and strictly US-based firms without banking relationships with non-US offshore banks could be placed at a competitive disadvantage by the working of the eurodollar reserve requirement. However, the distortion of competition should not be overstated. At an interest rate of 4% and a reserve requirement of 3%, the cost is only about 12 basis points. The distortion can also be reduced by remunerating required reserves.

The conclusion to be drawn from the US experience is that the monetary control that could not be unilaterally extended to offshore deposits could be imposed on credit to domestic borrowers funded offshore. Such a policy left a loophole, namely non-US banks' lending to US firms from offshore. The policy thus entailed distortions in competition in the banking market owing to the uneven application of rules on foreign and domestic banks. But these distortions can be mitigated by a non-zero rate of remuneration on reserves.

3.4 Offshore markets and the yield curve

For central banks that implement monetary policy by targeting some short-term interest rate, the influence of offshore markets on onshore interest rates needs to be factored in. If such influence is significant and undesired, they can choose to intervene in the offshore markets, through private or public sector agents in such markets. Below, we discuss the effect of the development of an offshore market on domestic interest rates under two headings: with and without capital controls. Experience to date with the offshore market in non-deliverable renminbi or rupees suggests little feedback to domestic money or fixed income markets. Under more liberalised conditions, however, the effect is likely to depend negatively on the size of the economy and on the level of domestic interest rates relative to global levels.

3.4.1 Offshore markets with capital controls

For a number of emerging market currencies, offshore non-deliverable money and fixed income markets already trade quite actively. The non-deliverable forward exchange market serves as a money market and the non-deliverable interest rate swap markets serve as the fixed income market. For the Brazilian real, Chinese renminbi and Indian rupee, these "virtual" markets had, by April 2007, become quite sizeable in relation to their onshore counterparts (Table 7). In other words, more or less well developed yield curves for these currencies offshore are already traded offshore. In such cases, adding an offshore deliverable money and bond market may not represent a large change.

But because of capital controls, these offshore yield curves are quite distinct from their domestic, onshore counterparts. No doubt there are opportunities for arbitrage between them, but such transactions do not carry sufficient weight to force these yield curves into line. Making the currency deliverable offshore would not necessarily alter this state of affairs appreciably. After all, Chinese equities can be delivered offshore, ie H shares in Hong Kong, but the price gap between otherwise identical onshore (A shares in Shanghai) and offshore shares (H shares in Hong Kong) can be very substantial indeed (Peng et al (2007), Ma and McCauley (2009)).

In particular, when these currencies are under upward pressure, the offshore yield curves tend to be below their onshore counterparts. Perhaps of greater possible concern to the domestic authorities would be the opposite configuration: if the offshore yield curve trades above the domestic yield curve, it provides incentives for domestic residents to shift bank deposits offshore. Such a situation could emerge owing to downward pressure on the currency, and become destabilising.

Table 7

Onshore and offshore money and fixed income markets for Brazil, China and India

Daily turnover, in billions of US dollars

	Foreign exchange												**Interest rate swaps, forward rate agreements, interest rate options**					
	Forwards and forex swaps						**Currency swap**											
	Total		Domestic		Offshore		Total		Domestic		Offshore		Total		Domestic		Offshore	
	2007	2010	2007	2010	2007	2010	2007	2010	2007	2010	2007	2010	2007	2010	2007	2010	2007	2010
BRL	5.5	14.1	0.3	2.5	5.3	11.6	0.31	0.39	0.27	0.36	0.04	0.03	1.749	3.3	0.071	1.2	1.678	2.02
CNY	5.6	22.1	0.9	8.0	4.7	14.0	0.13	0.07	…	0.00	…	0.07	0.185	2.0	…	1.5	…	0.51
INR	12.1	20.8	8.5	10.0	3.6	10.8	0.41	0.05	0.40	0.02	0.01	0.03	3.494	2.3	3.080	1.5	0.414	0.78

In addition to the BRL forwards and swaps, BRL/USD futures traded $16.1 billion per day in 2007 and $24.6 billion per day in 2010. Offshore amounts in 2010 are to some extent higher than those in 2007 because these currencies graduated from voluntary to required reporting in the 2010 survey. "..." = not available.

Source: BIS, Triennial Central Bank Survey, 2007, 2010.

Under these circumstances, the home central bank may have concerns. There are precedents for the home central bank to do liquidity operations in the offshore markets. Toniolo (2005, p 461) reports:

> "[C]entral banks and the BIS were already intervening, if quietly, in the market to try to keep the differential between interests paid on Eurocurrency and on domestic currency deposits within desirable limits. From 1965 onward the BIS itself, together with the Swiss National Bank, intervened in the market in order to moderate interest rate differentials caused by seasonal movements in and out of the Eurocurrency market. In December 1966, for instance, the Federal Reserve Bank of New York and the Swiss National Bank made available to the BIS, through swaps, close to $500 million, which the BIS then channelled in to the Eurodollar market. Such operations […] became more frequent and more important in size as the market grew larger."

During the global financial crisis of 2007–09, under conditions of widespread disruption to markets, the Federal Reserve partnered with central banks all over the world to try to manage Libor, the benchmark (and offshore) US dollar rate. In the case of emerging market currencies such as the renminbi, one could easily imagine the home central bank carrying out such operations through public or private sector agents in the offshore market were circumstances to warrant interventions. Such policy options should help alleviate concerns for instability that may arise because of interest rate differentials between the onshore and offshore markets.

3.4.2 Offshore markets without capital controls

With liberalised capital flows between onshore and offshore markets, it is possible for offshore markets to dominate onshore markets in the determination of interest rates, especially when the onshore market is small as compared with the offshore markets. The recent case of New Zealand sounds a warning regarding the interaction between monetary policy and a thoroughly internationalised currency. At the outset, it should be recognised that this is an extreme case in that the New Zealand bond market is among the most internationalised in the world. Most of it is offshore: only about a quarter of New Zealand dollar bonds are domestic issues in the domestic market, vs 50% for euro-denominated bonds or 75% for US dollar bonds (McCauley (2010), Munro and Wooldridge (2010)).

As the Reserve Bank of New Zealand tightened in 2005–07, heavy Japanese purchases of offshore kiwi bonds kept important private sector term yields from rising in step. In particular, heavy purchases in Japan of two- to three-year kiwi notes meant that only about half of the 300 basis point tightening of the overnight rate was communicated to the three-year interest rate swap yields. Since historically the New Zealand mortgage market financed houses with floating rate loans, this inverted yield curve might have tempted only a few more firms to sell bonds to replace bank debt. However, mortgage borrowing shifted out of floating based on 90-day rates to fixed off three-year rates. The combination of the weight of Japanese money on term yields and the responsiveness of the mortgage market in taking advantage of these low-term yields illustrates strikingly how an internationalised bond market can pose a challenge to monetary policy.

For larger economies, the offshore markets are less likely to play a crucial role if there are no impediments to investment in the domestic bond market. For New Zealand and Australia, given their relatively small government debt, there was a shortage of high-quality bonds issued by domestic obligors. The offshore markets in effect recruit opportunistic high-quality global issuers (such as European agencies or supranational organisations) to supplement the scarce supply of quality domestic issuers. For a big country, there is less likely to be such a constraint and the marginal contribution of the offshore market to the investment menu in the domestic bond market is likely to be smaller.

For the United States in recent years, the argument is made that foreign investment in domestically issued bonds of the Treasury and agencies has lowered bond yields (see, for example, Warnock and Warnock (2006), accounting for the so-called conundrum) and stimulated such interest-sensitive sectors as residential housing. Whatever the truth of this claim,[10] for present purposes it is worth noting that the argument makes no reference to the offshore US dollar bond market. For big economies, the onshore bond markets have offered better secondary market liquidity, and dominated offshore markets in determining the yield curve.

3.5 Offshore markets and the exchange rate

Again it is useful to discuss the effect of the development of an offshore market on the exchange rate under two headings: with and without capital controls. Under capital controls, the offshore use of a currency has in general an ambiguous effect on the exchange rate. While experience to date with the offshore market in renminbi suggests that it has tended to put upward pressure on the renminbi's exchange rate, this should be seen as a result of the prevailing foreign exchange, macroeconomic and political circumstances, such as increasing movements of other currencies, current account surpluses and international pressures for a faster pace of appreciation. Under more liberalised conditions, however, the overall effect of offshore use of a currency is likely to depend on whether it is used as both an investment and a borrowing currency or mostly one or the other. And this in turn is likely to depend on the level of domestic interest rates relative to global levels.

3.5.1 Offshore markets with capital controls

Offshore trading in non-deliverable contracts can already affect the exchange rate. Existing non-deliverable forward markets might at first seem to have no effect on the spot exchange rate, since non-deliverable contracts can be considered nothing but side bets by offshore players with no net effect. But market participants with operations both outside and inside the country can take one side of the offshore market and the other in the domestic market and thereby transmit selling or buying pressure from the offshore non-deliverable market to the onshore cash market. For instance, if foreign investors want to take long positions in the currency, multinational firms can accommodate them by retaining local currency earnings within the country that would otherwise have been paid out in foreign currency as dividends. Such long cash positions in the domestic currency can be profitably hedged through the short sale of the currency in the non-deliverable market. As a result, demand for dollars on the part of the multinational firm would be lower than it would have been otherwise, and the onshore spot market would feel the effect.[11]

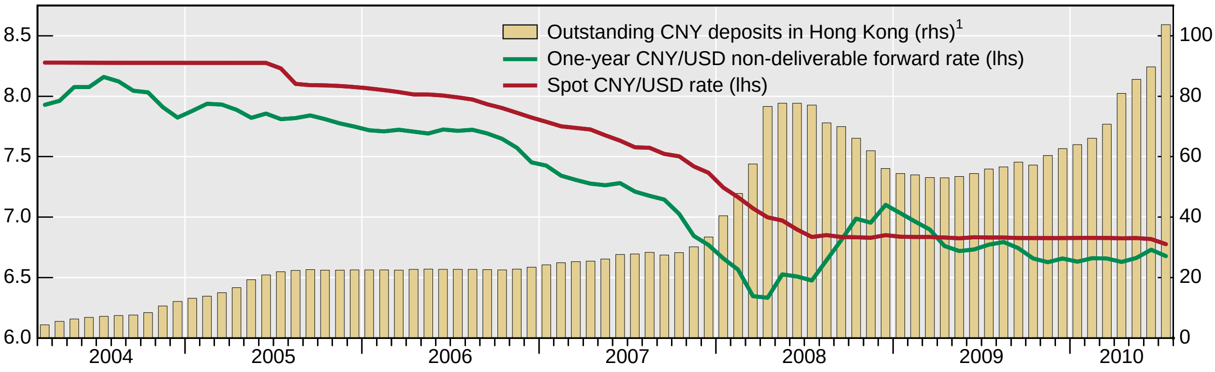
When offshore markets develop under capital controls, the sequencing of permissible activities can determine the direction of effect on the exchange rate. In the case of Hong Kong, until the recent introduction of trade credit, renminbi banking had favoured the creation of deposits over the creation of loans, or the accumulation of long over short positions. To the extent that Hong Kong residents end up holding more long positions in renminbi than they would otherwise have held, the mainland ends up with a larger domestic currency liability, and larger foreign currency claims on the rest of the world, than it would otherwise

[10] Rudebusch et al (2006) found that foreign official purchases of US Treasuries played little or no role in the "conundrum". See also Genberg et al (2005). Ben Bernanke stated in a speech in March 2006 that "[a] reasonable conclusion is that the accumulation of dollar reserves abroad has influenced US yields, but reserve accumulation abroad is not the only, or even the dominant, explanation for their recent behavior".

[11] To the extent that the central bank aims at stabilising the exchange rate, it may need to accumulate larger international reserves.

Graph 2

Renminbi deposits in Hong Kong and the renminbi exchange rate



[1] In billions of renminbi.

Sources: Hong Kong Monetary Authority; Bloomberg.

have had. In flow terms, the sale of Hong Kong or US dollars by a Hong Kong resident to purchase the renminbi account could put upward pressure on the renminbi's exchange rate and lead ceteris paribus to a larger purchase of foreign exchange by the PBoC (which forms the counterpart to the reserve liability), although in practice the scale of such flows was insignificant as compared with the overall inflows that the mainland experienced. It is also interesting that the demand for the renminbi balances has not been a one-way bet and has had a speculative element, increasing when the non-deliverable forward pointed to appreciation but decreasing in the absence of such a signal (Graph 2). We can expect that developments to allow non-residents to issue liabilities in renminbi would help balance out the pressures on the exchange rate from long-only positions.

3.5.2 Offshore markets without capital controls

It is useful to distinguish symmetrical use of a currency offshore from asymmetrical use. In the first case, non-residents both invest in a currency and borrow in it. The net of the two may vary over time, but, as a broad observation, both take place. In the asymmetrical case, non-residents mostly borrow or mostly invest in a currency. This distinction was introduced by Sakakibara and Kondoh (1984), who feared that the yen would attract foreign investment but not foreign borrowing. Of course, it has turned out the opposite: the yen has served international investors more as a funding currency than as a vehicle in which to invest.

The yen is not the only case of what Sakakibara and Kondoh called "lopsided" internationalisation. The Australian and New Zealand dollars do not seem to attract any consistent borrowers from outside their economies. If one considers these cases, and contrasts them with the euro and the dollar as instances of balanced internationalisation, interest rate levels seem to be key. Investors have been drawn to the Antipodean currencies by their high coupons; borrowers (and shorts) have been drawn to the yen by its low interest rate; and the euro and the dollar have tended to be in the middle.

So that poses the question of whether an emerging market contemplating the offshore use of its currency sees itself as a high or low interest rate economy. The authorities in Brazil or India probably would not pause before answering "high", though noting that interest rates have come down with inflation and that further progress can be anticipated. The authorities in China, by contrast, with its high savings, large current account surpluses and low inflation, might look forward to theirs being a low interest rate economy. That would make the renminbi a borrower's currency and its offshore use a net source of downward pressure on its exchange rate. The case of Japan suggests that this outcome does not exclude a tilt towards appreciation against major currencies like the dollar.

4. Financial stability

The internationalisation of a currency raises not only monetary policy issues but also financial stability issues. In what follows, we highlight those that bear on a bank-dominated financial system, such as that in China and India. We organise the discussion in three parts. First, we outline the risks arising from the international operation of domestic banks in foreign currency. These precede, logically and in practice, the risks created by the internationalisation of the domestic currency, and serve as a baseline. Then we consider the risks that arise when domestic banks are able to swap domestic currency for foreign currency, thereby lowering the credit standing required of domestic banks to engage in foreign currency lending. Finally, we highlight the risks that arise from the lending of both domestic and foreign banks in domestic currency.

4.1 International operation of domestic banks in foreign currency

It is important to recognise that the domestic banking system runs risks in participating in international banking operations even on the basis of established international currencies. These risks arise before the domestic authorities permit the domestic currency to be internationalised to any substantial extent and need to be appreciated in order to focus on the risks that are proper to the internationalisation of the domestic currency. When domestic banks operate branches abroad, and these borrow and lend in foreign currency, the banks' domestic capital buffers must absorb any losses on foreign currency assets. The position is much the same if domestic banks open subsidiaries abroad. Unless these are substantially overcapitalised, unanticipated losses on foreign currency assets require the injection of capital in foreign currency.

Examples of such risks can readily be provided. In 2007–08, European banks reported substantial losses on holdings of asset-backed securities based on US assets. These securities were generally denominated in US dollars. As write-offs were taken on these dollar assets, the European banks found themselves with more liabilities than assets denominated in the dollar, and had to buy dollars to square their position. In this manner, European banks' losses on dollar assets reduced not only their share prices but also the value of the euro against the US dollar (McCauley and McGuire (2009)).

European banks were not alone in realising such risks. Chinese commercial banks reported significant exposures to troubled US-based asset-backed securities. These sums, however, was not large relative to the banks' capital or relative to China's net assets in foreign exchange. Nevertheless, this case highlights that the internationalisation of a country's banks poses financial stability risks, quite apart from the internationalisation of the same country's currency.

Next we consider the intermediate case in which domestic banks continue to lend in foreign currency. But now, instead of having to borrow outright in foreign currency, domestic banks can swap domestic currency for foreign currency and thereby fund foreign currency assets. From the standpoint of the counterparty, the exposure to the domestic bank is much reduced. Instead of risking the entire amount, as in an uncollateralised deposit, the foreign counterparty is now exposed to the domestic bank only insofar as the domestic currency received in the swap depreciates against the foreign currency. The implication can be the decline in credit exposure by an order of magnitude and a corresponding increase in the access of domestic banks to foreign currency funding.

The implication of this from the standpoint of the domestic authorities is not entirely benign, however. The internationalisation of the domestic currency permits previously strictly domestic banks to enter into foreign currency operations on the basis of domestic liquidity. As a result, smaller, less internationally known and less creditworthy domestic banks can now more readily participate in the risks of lending in major currencies. In principle, this should allow them to diversify away from domestic risks and thereby to build a more robust portfolio of credits. In practice, inexperienced domestic banks can sail into deep water in foreign currency lending and take new risks.

4.2 Cross-border lending in domestic currency

The discussion on the risks of lending in domestic currency can be divided into those posed by domestic banks' international lending in domestic currency and those posed by foreign banks' international lending in domestic currency.

If a wide range of domestic banks can more readily participate in foreign currency lending funded by swaps against domestic currency, an even wider range can participate in international lending that is denominated in domestic currency. An example is the distribution of loans to developing countries in Latin America across US banks by size in June 1982.[12] These were overwhelmingly dollar-denominated, so any US bank could readily join a syndicated loan on the basis of nothing other than domestic deposits. The top nine banks had $47.7 billion in exposure – for many of them a life-threatening multiple of capital that led to extraordinary official efforts to keep these loans from becoming non-performing. For the present purpose, however, of more significance is the $16.0 billion in exposure to the same borrowers held by the next 15 banks and the $16.6 billion held by the rest of the surveyed banks. Most of the last group did not have foreign branches or much involvement with foreign exchange, so if the loans had not been denominated in the US dollar, their participation in these loans would presumably have been less.

The financial stability implication of this broader participation in home currency lending is two-edged. For a given exposure on the part of US banks to developing countries, the wider syndication of dollar-denominated loans reduced the concentration of holdings in the largest banks and thereby systemic risk. However, the exposure was not given, and arguably the build-up of the stock of risky claims went further because the big banks were able to sell down their exposures to their correspondent banks around the country. On this view, spreading the foreign loans around the banking system only allowed the emerging markets to borrow more in relation to their underlying cash flows, increasing systemic risk.

Foreign banks' international lending in domestic currency can also raise financial stability issues. In this case, the host central bank that issues the currency may look to the home authorities to deal with any credit losses that threaten the survival of the foreign bank. But the interaction of credit and liquidity difficulties of foreign banks using the home currency may not be so neatly handled by foreign banks' home authorities. In particular, events during the global financial crisis of 2007–09 showed that the Federal Reserve, as issuer of the US dollar and the host central bank, was called upon to provide dollar liquidity to foreign banks, both directly through operations with foreign bank affiliates in the Unites States and indirectly through partner central banks.

The backdrop of these operations to provide dollar funding to non-US banks was a large build-up of dollar assets by foreign banks, especially European banks. While some European banks built up retail deposit bases in the United States, most depended on more wholesale sources of dollar funding, including money market funds in the United States (Baba et al (2009)). Through these aggregators of funds, companies and individuals provided funds through both uncollateralised funding, such as certificates of deposit and commercial paper purchases, and collateralised funding in the form of reverse repurchase agreements. Added

[12] Federal Financial Institutions Examination Council (1982), summing "non-oil developing countries of Latin America and Caribbean" and Venezuela.

to these non-bank sources of funds were outright interbank placements as well as collateralised placements in the form of foreign exchange swaps.

Overall, European banks had built up net claims on non-banks of very large proportions (McGuire and von Peter (2009a,b)). Net dollar claims on non-banks that needed to be funded, much at short maturities, reached an estimated \$1–1.2 trillion in mid-2007. If one adds the wholesale funding from money market funds, the amount reached \$2–2.2 trillion. When the banks suffered large losses on their dollar claims after the crisis broke out, they faced great difficulty in rolling over their dollar funding, and had to resort to central bank liquidity support facilities.

As noted, the Federal Reserve used both direct operations with foreign banks and indirect operations involving partner central banks. The New York Second District auction of term funding reached a maximum of \$240 billion in mid-April 2009, much of which was said to have been extended to foreign bank affiliates in New York. In addition, swaps with central banks reached a maximum of \$580 billion in mid-December 2008.

To be sure, these are extreme events in the history of the euromarket, but they were not without precedents. A generation ago, European central bankers considered that any liquidity needs of their banks' operations in US dollars represented a call on their own official reserves. And this was the way various crises played out. For instance, in the Nordic banking crises, the Norwegian and Swedish central banks in effect advanced dollars to their respective banks when these had a hard time rolling over their dollar deposits. And the Japanese authorities were said to have advanced dollars to the Japanese banks in the late 1990s, thereby limiting the "Japan premium" paid by Japanese banks in the international interbank market. Also, when such support for Korean banks overwhelmed the Korean authorities' capacity in 1997, the Korean authorities resorted to IMF and associated credit. In 2007–08, the need was so large and pervasive that the Federal Reserve, as the dollar's bank of issue, provided funding liquidity to foreign banks as it never had previously.

4.3 Policy lessons

What are the financial stability lessons for a central bank standing at the very beginning of the process of internationalisation of its currency? Following the discussion above, three can be identified.

First, to the extent that its domestic banks are already actively engaged in intermediation in dollars (and euros, etc), the domestic banking system is already exposed to important credit and cross-currency liquidity risks. It would be a mistake to overstate the additional risks entailed in the internationalisation of the home currency.

Second, the opening of a deep and liquid foreign exchange swap in the domestic currency will by itself widen these risks to domestic banks that do not possess a deposit base in foreign currency or the credit standing or name recognition to attract wholesale foreign currency deposits. Domestic banking supervision needs to be alive to the potential risks. At a minimum, supervision needs to consolidate risks. Country risk exposures need to be defined and monitored to prevent undue concentrations in relation to domestic banks' capital.

Third, when borrowing in the domestic currency by the rest of the world becomes possible, it will become even easier for domestic banks to expose themselves to the risks of foreign borrowers. Again, consolidation and, in particular, the measuring and monitoring of country exposures become critical.

Fourth, in the event that the domestic currency becomes very widely used, it might be necessary to have contingency arrangements to provide funding to foreign banks. These arrangements can take the form of operations directly with them, or facilities to provide the funding to partner central banks. But until such time as the domestic currency is widely used by third parties, such arrangements are probably not a high priority.

Box 3

Macroprudential policy and the rapid growth of euromarket lending in the 1970s[1]

Macroprudential regulation is a term that has been in use at the BIS since the late 1970s. It was used in connection with possible policies to respond to concerns over the excessively rapid growth of international lending in the mid- to late 1970s. The Governors of the G10 central banks gave the Eurocurrency Standing Committee (ECSC, now known as the Committee on the Global Financial System (CGFS)) the task of monitoring the broad risks originating in the offshore markets. At their September 1978 meeting, the Governors considered a report from this Committee and agreed that a "joint group of representatives from the Euro-currency Standing Committee and the Cooke Committee [as the Basel Committee on Banking Supervision (BCBS) was then known] […] should consider whether there were ways in which the use of prudential measures might be extended into the macroeconomic field for the purpose of controlling the expansion of international bank credit".

The background note for this milestone meeting in November 1978 (BIS (1978)) considered the following measures, any one of which could have served to slow the growth of international lending:

- Limiting the international element in banks' balance sheets, either to a maximum percentage of the balance sheet or to a maximum growth rate in relation to the total balance sheet.
- Limiting exposure by country – for instance, to some percentage of bank capital (eg 10%).
- Limiting maturity transformation in foreign currency.

There was little support at the meeting for such limits. Instead, there was a consensus for accelerating a supervisory development already in train in the Cooke Committee: consolidation of banks' accounts on a global basis. At their November 1978 meeting, the Governors had already endorsed this effort as an instrument of banking supervision, but it was seen as important from the macroeconomic viewpoint as well.

The consensus of the meeting did suggest that more data be collected and published, as a means of informing market participants of the risks that they were collectively running (Larre (1978)). Thus, Governors were also urged to support the gathering and publishing of statistics on country risk and maturity transformation. More controversial was the suggestion that Governors make a joint statement drawing attention to the risks of the narrowing of spreads of syndicated eurocurrency loans.

Unfortunately, we know that this story did not turn out well. This international lending boom ended in tears for Latin America in August 1982. Consolidated supervision, mandated processes of country risk analysis, publication of data showing a build-up of short-term debt, even a certain amount of jawboning, proved unequal to the task. In the 1980s, heavy infusions of public funds through the IMF and multilateral banks allowed major banks to grow out of their claims on developing countries.

Still, a global trend towards more and looser international lending had been identified four years before the onset of the crisis, and the central bankers charged with understanding such broad trends in credit and the risk therein (the ECSC) sought to enlist the aid of the bank supervisors in doing something about it. For present purposes, it is worth noting that, a generation ago, supervisory tools were being sought at the international level in order to address a recognised excess of credit.

[1] This box draws on McCauley (forthcoming).

In addition to the prudential measures just outlined (consolidation, country risk definition and monitoring in relation to bank capital), there are precedents for the consideration of macroprudential regulation to check the growth of international lending. Box 3 recalls discussions along these lines in 1978 in Basel that brought together banking supervisors and those charged with following the broad implications of international banking.

5. Conclusions

We have observed in this paper that offshore markets intermediate a large chunk of financial transactions in major reserve currencies such as the US dollar. This was not a historical accident, but reflected the fact that offshore markets perform essential economic functions, including a separation of currency risk from country risk and diversification of operational risks associated with the financial infrastructure that provides vital clearing and settlement services for the currency. For emerging market economies that are interested in seeing a larger share of their international balance sheets denominated in their own currencies, offshore markets can help to increase the recognition and acceptance of the currency among exporters, importers, investors and borrowers outside the country. This process can begin (but not end) while substantial capital controls are still in place, allowing the authorities to retain a measure of control over the pace of capital account liberalisation.

The development of offshore markets could pose risks to monetary and financial stability in the home economy which need to be prudently managed. The experience of the Federal Reserve and of the authorities of the other major reserve currency economies in dealing with the euromarkets shows that policy options are available for managing such risks. The lesson to be learnt is that the home authorities need to be alert to such risks, and factor in the additional influence of offshore markets on domestic monetary conditions and financial risks when making monetary and financial policies.

Would the global financial system benefit from a wider array of internationalised currencies with offshore markets? The offshore dollar markets described in the first part of this paper, dominated by non-US banks, issuers and investors, have limited the rents flowing to the United States from the global use of the dollar, at least by comparison with the heyday of sterling (DeCecco (1975)). So the issue may be less distributional and more whether greater pluralism in international finance is conducive to global financial stability. The long-standing arguments regarding the stability of leadership/hegemony, on the one hand, and pluralism, on the other, need to be revisited in the light of the experience with the dollar shortage during the financial crisis (BIS (2010, pp 55–8)).

References

Aliber, R (1980): “The integration of the offshore and domestic banking system”, *Journal of Monetary Economics*, vol 6(4), October, pp 509–26.

——— (2002): *The new international money game*, 6th edition, Chicago: University of Chicago Press.

Baba, N, R McCauley and S Ramaswamy (2009): “US dollar money market funds and non-US banks”, *BIS Quarterly Review*, March, pp 65–81.

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.

Balbach, A and D Resler (1980): “Eurodollars and the US money supply”, Federal Reserve Bank of St Louis, *Review*, June–July, pp 2–12.

Bank for International Settlements (1965): *34th Annual Report*, June.

——— (1978): “Possible uses of banking supervisory instruments for controlling the expansion of international banking credit”, background note for a meeting of a joint group of representatives of the Eurocurrency Standing Committee and the Cooke Committee, Basel, 15 November 1978, in BIS Archives, 7.18(15) – Papers Alexandre Lamfalussy, box LAM20, f56: Eurocurrency Standing Committee.

——— (2010): *80th Annual Report*, June.

Borio, C (1997): “Implementation of monetary policy in industrial economies: a survey”, *BIS Economic Papers*, no 47, August.

Cheung, Y-W, G Ma and R McCauley (2009): “Renminbisation des actifs internationaux de la Chine”, in “Les pays émergents: mondialisation et crise financière”, *Revue d’économie financière*, no 95, November, pp 135–56.

DeCecco, M (1975): *Money and empire; the international gold standard, 1890–1914*, Totowa, NJ: Rowman and Littlefield.

Dufey, G and I Giddy (1978): *The international money market*, Englewood Cliffs, NJ: Prentice Hall.

Einzig, P (1970): *The eurodollar system*, 5th edition, New York: St Martin’s Press.

Federal Financial Institutions Examination Council (1982): *Country Exposure Lending Survey, June 1982*, 6 December.

Friedman, M (1969): “The Eurodollar market: some first principles”, *The Morgan Guaranty Survey*, October.

Frydl, E (1982): “The Eurodollar conundrum”, Federal Reserve Bank of New York, *Quarterly Review*, vol 7, no 1 (Spring), pp 11–19.

Gao, H (2010): “Internationalization of the renminbi and its implications for monetary policy”, in C Shu and W Peng (eds), *Currency internationalization: international experiences and implications for the renminbi*, Basingstoke: Palgrave Macmillan, pp 209–20.

Gao, H and Y Yu (2010): “Internationalisation of the renminbi”, in “*Currency internationalisation: lessons from the global financial crisis and prospects for the future in Asia and the Pacific”*, *BIS Papers*, forthcoming.

Genberg, H (2010): “Currency internationalisation: analytical and policy issues”, in “*Currency internationalization: lessons from the global financial crisis and prospects for the future in Asia and the Pacific*”, *BIS Papers*, forthcoming.

Genberg, H, R McCauley, Y-C Park and A Persaud (2005): “Official reserves and currency management in Asia: myth, reality and the future”, *Geneva Reports on the World Economy*, no 7, Geneva & London: International Center for Monetary and Banking Studies and Centre for Economic Policy Research, September.

Henderson, D and D Waldo (1980): “Reserve requirements on Eurocurrency deposits: implications for Eurodeposit multipliers, control of a monetary aggregate, and avoidance of redenomination incentives”, Board of Governors of the Federal Reserve System, *International Finance Discussion Papers*, no 164, July.

Ho, C (2008): “Implementing monetary policy in the 2000s: operating procedures in Asia and beyond”, *BIS Working Papers*, no 253, June.

Hong Kong Monetary Authority (2005): “Renminbi banking business in Hong Kong”, Hong Kong Monetary Authority, *Quarterly Bulletin*, no 42, March.

——— (2006): “Hong Kong’s renminbi business two years on”, Hong Kong Monetary Authority, *Quarterly Bulletin*, no 46, March.

——— (2009): “Renminbi trade settlement pilot scheme”, Hong Kong Monetary Authority, *Quarterly Bulletin*, no 60, September.

Hui, C-H, H Genberg and T-K Chung (2009): “Funding liquidity risk and deviations from interest-rate parity during the financial crisis of 2007–2009”, Hong Kong Monetary Authority, *Working Papers*, 13/2009, July.

Kindleberger, C (1973): *International economics*, 5th edition, Homewood, IL: Irwin.

Kreicher, L (1982): “Eurodollar arbitrage”, Federal Reserve Bank of New York, *Quarterly Review*, vol 7, no 2 (Summer), pp 10–22.

Larre, R (1978): Telex to A Lamb, S Ogata, H Wallich and D Willey, 24 November, in BIS Archives, 7.18(15) – Papers Alexandre Lamfalussy, box LAM20, f56: Eurocurrency Standing Committee.

Ma, G and R McCauley (2008a): “Do China’s capital controls still bind?”, in B Eichengreen, Y-C Park and C Wyplosz (eds), *China, Asia, and the new world economy*, Oxford: Oxford University Press, pp 312–40.

——— (2008b): “The efficacy of China’s capital controls: evidence from price and flow data”, *Pacific Economic Review*, vol 13, no 1, February, pp 104–23.

McCauley, R (2001): “Benchmark tipping in the money and bond markets”, *BIS Quarterly Review*, March, pp 39–45.

——— (2005): “Distinguishing global dollar reserves from official holdings in the United States”, *BIS Quarterly Review*, September, pp 57–72.

——— (2010): “Internationalizing the Australian dollar”, in C Shu and W Peng (eds), *Currency internationalisation: international experiences and implications for the renminbi*, Basingstoke: Palgrave Macmillan, pp 56–77.

——— (forthcoming): “Macroprudential policy in emerging markets”, in *Central banking, financial system stability and growth*, proceedings of the Central Bank of Nigeria’s 50th Anniversary International Conference, Abuja, 4–9 May 2009.

McCauley, R and G Ma (2009): “Resisting financial globalisation in Asia”, in *Financial globalization and emerging market economies*, proceedings of an international symposium organised by the Bank of Thailand, Bangkok, 7–8 November 2008, pp 177–222.

McCauley, R and P McGuire (2009): “Dollar appreciation in 2008: safe haven, carry trades, dollar shortage and overhedging”, *BIS Quarterly Review*, December, pp 85–93.

McCauley, R and R Seth (1992): “Foreign bank credit to US corporations: the implications of offshore loans”, Federal Reserve Bank of New York, *Quarterly Review,* vol 17, no 1 (Spring), pp 52–65.

McGuire, P and G von Peter (2009a): “The US dollar shortage in global banking”, *BIS Quarterly Review*, March, pp 47–63.

——— (2009b): “The US dollar shortage in global banking and the international policy response”, *BIS Working Papers*, no 291, October.

Munro, A and P Wooldridge (2010): “Motivations for swap-covered foreign currency borrowing” in “*Currency internationalization: lessons from the global financial crisis and prospects for the future in Asia and the Pacific*”, *BIS Papers*, forthcoming.

Peng, W, H Miao and N Chow (2007): “Price convergence between dual-listed A and H shares”, Hong Kong Monetary Authority, *China Economic Issues*, no 6/07, July.

Rudebusch, G, E Swanson, and T Wu (2006): “The bond yield ‘conundrum’ from a macro-finance perspective”, Federal Reserve Bank of San Francisco, *Working Papers*, 2006-16.

Sakakibara, E and A Kondoh (1984): “Study on the internationalisation of Tokyo’s money markets”, *Japan Center for International Finance Policy Study Series*, no 1, June.

Sub-Group Studying the Establishment of Reserve Requirements on Euro-currency Deposits (1980): *Reserve requirements on euro-currency deposits*, 20 February, in BIS Archives, 1.3a(3)j – *Working Party on Constraining Growth of International Bank Lendin*g, vol 2.

Swoboda, A (1968): “The eurodollar market: an interpretation”, *Essays in International Finance*, no 64, Princeton, NJ: Princeton University Press.

——— (1980): "Credit creation in the Euromarket: alternative theories and implications for control", *Occasional Papers*, 2, Group of Thirty, New York, NY.

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

Warnock, F and V Warnock (2006): "International capital flows and US interest rates", *NBER Working Papers*, no 125.