The International Monetary System: Living with Asymmetry

Maurice Obstfeld*
UC Berkeley, NBER, and CEPR

First conference draft: August 31, 2011

*I am grateful to Vladimir Asriyan for expert research assistance. The International Growth Centre (London School of Economics) and the Center for Equitable Growth (UC Berkeley) provided essential financial support.

The global economic crisis of 2007-09 generated calls to re-think the international monetary system, and indeed, the entire institutional framework within which international financial integration has advanced since the fall of the Bretton Woods regime four decades ago. Gaps in national and international structures of financial regulation were an obvious factor in causing the most severe global crisis since the Great Depression; another paper in this volume surveys that topic. Interactions between national macroeconomic policies also played a role, however, and have continued to generate rancor between countries as a geographically uneven recovery from the crisis has unfolded. The crisis and its aftermath exposed stresses in the world's monetary system that may lead to future trouble if the international community does not address them.[1]

This paper analyzes current stresses in the two key areas that concerned the architects of the original Bretton Woods system: international liquidity and exchange rate management.[2] Despite radical changes since World War II in the context for liquidity and exchange rate concerns, they remain central to discussions of international macroeconomic policy coordination. To take two prominent examples of specific (and related) coordination problems, liquidity issues are paramount in strategies of national self-insurance through foreign reserve accumulation, while recent attempts by emerging market economies (EMEs) to limit real currency appreciation have relied heavily on nominal exchange rate management. A key message of the paper – an obvious point, but

[1] The crisis brought home vividly the strong two-way interaction between macroeconomic policies and financial-sector stability, demonstrating the folly of viewing macro and prudential policy as somehow orthogonal to each other. While my discussion thus will focus on macroeconomic policies, I will inevitably touch upon financial-stability considerations at several points.

[2] In the present context, the relevant concept of "liquidity" is funding liquidity, in the sense of Brunnermeier and Pedersen (2009). For illuminating discussions of international coordination problems as seen from the perspective of the IMF's founding, look at Metzler, Triffin, and Haberler (1947).

one that nonetheless is a key starting place for predicting a range of tensions in any system of international monetary arrangements – is that a diverse set of potential asymmetries among sovereign member states provides fertile ground for a range of coordination failures.

Despite the progress of technology, financial innovation, globalization, and development, sharp international asymmetries remain and so coordination failures with recognizable analogs in earlier historical eras have emerged. Earlier efforts at international monetary reform attempted to reconcile individual nations' demands for domestic economic stability with a smooth international adjustment mechanism. Those attempts had limited success and even the most ambitious and successful of them – the Bretton Woods system – crumbled after a quarter century under the weight of its internal contradictions. The recent global crisis has highlighted once again the twenty-first century incarnations of a range of time-honored systemic strains. Some of the problems have become more severe, or problematic in new ways. The resulting pressures on international economic relations define the current reform agenda.

The plan of this paper is as follows. Section I sets out some dilemmas, old and new, relating to the supply of international liquidity in settings where the demand for safe foreign exchange reserves grows faster than the supply over the long term. The discussion emphasizes the fiscal dimension of such "Triffin dilemmas." Section II describes how financial globalization has increased countries' needs for international liquidity, and sketches a structure for liquidity provision that would avoid negative externalities inherent in self-insurance through large-scale reserve accumulation.

Section III turns to exchange rates and global imbalances, with emphasis on modern versions of older coordination problems. Section IV concludes.

1. International Liquidity and Triffin Dilemmas

Like households and firms, governments need access to liquidity – readily salable assets (including cash, of course) that may be spent on goods or (particularly in crisis situations) on other assets. In a closed economy, the government (through its central bank) is always capable, in principle, of providing for all liquidity needs. In the open economy this is no longer the case. When the need is for a foreign currency, which governments cannot print, gross holdings (reserves) and available foreign-currency credits constrain a government's powers, whether to provide liquidity to markets (as in a foreign exchange intervention) or to market participants (as in an emergency loan to a bank).

Throughout history, international reserves have been an important source of liquidity. What properties characterize an attractive international reserve asset? In the broadest terms, the asset should be widely acceptable as payment at a predictable value, even when liquidated without notice. But in what numeraire should value be measured? Merely asking the question reveals that "predictability of value" cannot be an absolute norm, unless the numeraire is a particular money – such as the international vehicle currency, which the American dollar overwhelmingly remains – or a particular commodity such as gold. In a world of significant departures from purchasing power parity, maintenance of *real* value (in terms of a comprehensive consumption basket) necessarily depends on the beholder. In a global economy, however, it may be more

relevant to refer to "liquidities" than "liquidity." If several currencies are widely used internationally as medium of exchange and/or unit of account, then it may well be desirable for a country to hold liquidity in all of those currencies, regardless of moderate changes in their relative values – a theme I explore further below.

Changes in value, moreover, can arise in different ways (again depending on the numeraire against which value is reckoned). Exchange rate and inflation risk are obvious possibilities, but so are default risk, sovereign or private, and political risk. Foreign-currency U.S. bonds issued by the Carter Administration inherited the minimal (at the time) default risk of conventional dollar-denominated Treasury obligations. On the other hand, liquid dollar liabilities of London eurobanks (typically counted in reserve measures if owned by monetary authorities) carry counterparty risk (absent an official bailout) but not currency risk vis-à-vis the dollar. Again, safety is in the eye of the beholder. Countries experiencing or contemplating political tensions with the U.S. – think of cases involving Iran, Iraq, Russia, Libya, or Syria – might prefer the counterparty risk intrinsic to a lightly regulated offshore center to the risk a retaliatory freeze on assets held in the U.S.[3]

In the early post-World War II economy, with global capital markets dormant and much of the industrial world in ruins, the main forms of international liquidity were gross holdings of gold and U.S. dollars (and, to a lesser extent, sterling). Eichengreen (2011) paints a vivid picture of this period of virtually unrivaled dollar dominance as a reserve asset in the 1950s. That dominance persisted through the demise of the Bretton

[3] The possibility of holding dollar reserves in banks outside the U.S. shows that it is not necessarily correct to assert that U.S. balance of payments deficits govern the growth rate of world dollar reserves. Of course, liquidation of such offshore reserves by the non-U.S. holder will ultimately have the same effect on the U.S. balance of payments as if the reserve assets liquidated were themselves held in the U.S.

Woods system in the early 1970s (and indeed far beyond), but not without increasing tensions.

These tensions arose from one of a class of problems to which any reserve-asset system is potentially susceptible: what may be called a *Triffin dilemma.* A Triffin dilemma arises any time increasing demand for a reserve asset strains the ability of the issuer to supply sufficient amounts while still credibly guaranteeing or stabilizing the asset's value in terms of an acceptable numeraire.[4]

The Classic Triffin Dilemma: It's Mostly Fiscal

Under the Bretton Woods arrangements, countries pegged their currencies to the U.S. dollar, while the U.S. Treasury continued a longstanding commitment (dating from January 31, 1934) to redeem dollars held by non-U.S. central banks and governments for gold "for legitimate monetary purposes" at a price of $35 per ounce.[5] While the Treasury guarantee of the dollar gold link reassured foreign official dollar holders that their reserves were "as good as gold," led to at least two potential inconsistencies.

The first inconsistency was familiar from the classical gold standard. If world output growth outpaced world gold production, the relative price of gold would likely have to rise, implying secular deflation assuming a fixed market gold price of $35 per ounce. Countries outside the U.S. could maintain their internal price levels by devaluing

[4] The clearest recent identification of a Triffin dilemma in the contemporary context comes from Farhi, Gourinchas, and Rey (2011), although the general problem had been recognized before (for example, see Henning 1994, p. 317, in connection with the internationalization of the deutsche mark and yen).
[5] This commitment followed from the Gold Reserve Act of January 30, 1934 (Yeager 1976, p. 352). The Act also gave licensed users in industry and the arts the right to buy gold at the official price. (The Treasury added a ¼ percent transaction fee to the official price, and applied an identical discount to its gold purchases.)

against the dollar, but the U.S. itself did not have this option. For a time in the 1950s and 1960s, various fortuitous developments held off the deflationary threat; for example, the development of new South African mining capacity, along with Russian gold sales (which ended in 1966). Eventually, though, the conundrum was resolved in March 1968 through the two-tier gold market, which allowed the nonofficial gold price to float. It was then that the U.S. currency, and currencies pegged to it, became fiat monies.[6]

The second inconsistency persisted even after the start of the two-tier market. The official tier (by design) left intact the U.S. obligation to redeem foreign dollar reserves for gold at the old official price. Once again, however, world output growth, and the concomitant growth in world dollar reserves, seemed likely to outpace world gold production. Were the U.S. Treasury to maintain a $35 buying price for an ounce of gold, therefore, U.S. monetary gold stocks could not possibly increase. As famously observed by Triffin (1960), the United States eventually would not have enough gold to redeem all the official dollar reserves at par, even if it used up the entirety of its holdings. The reserve currency issuer would become vulnerable to a run by central banks.

Figure 1 illustrates the trends. In 1948, the United States held most of the world's gold reserves. Through 1960, U.S. gold stocks shrank but remained above the growing stock of dollar foreign reserves. And then the lines cross, seemingly making the U.S. vulnerable to a Triffinesque run. (That event was marked by speculation in the London gold market, causing the formation of the gold pool; see Eichengreen 2011.) The preceding trends continue as world monetary gold stocks fail to keep pace with growing

[6] This stratagem did not, by itself, resolve the (more serious) problem that the dollar itself could be devalued only through a concerted *revaluation* of foreign currencies (as occurred in August 1971, when the U.S. coincidentally suspended gold sales to foreign monetary authorities). One solution suggested for the Triffin problem before the gold window was closed was to raise the official dollar price. Apart from other drawbacks, a gold-price change would not automatically have devalued the dollar against other currencies.

global foreign exchange reserves. Figure 2 shows that in 1966 – the year that Russian gold sales ceased (Cooper 1969, p. 580) – world gold production leveled off. In retrospect, the abandonment of the single-tier gold market soon thereafter is not surprising. World dollar reserves began a steep upward ascent in 1970 as heavy speculation against the dollar set in. To defend the dollar parities of stronger currencies such as the deutsche mark and Swiss franc, the issuing central banks undertook massive dollar purchases. Global dollar reserves exploded -- without reducing U.S. reserves, absent gold redemptions.

On the surface Triffin's point seems obvious, but deeper reflection suggests that the classic form of the Triffin dilemma was really a fiscal problem. After all, why couldn't the U.S. government have purchased more gold on the market, if need be, to pay off foreign central banks? And what strain on the U.S. fiscal position would have resulted?

At the end of 1970, the year before U.S. President Richard Nixon suspended official gold convertibility (August 1971), U.S. gold reserves stood at $11 billion dollars, while world nongold reserves outside the U.S. stood at $53 billion, leaving the U.S. with $42 billion in potential official claims that it could not cover with its existing gold holdings. The sum of $42 billion, however, amounted to 4.2 percent of that year's GDP, at a time when the gross U.S. federal debt stood at 28 percent of GDP – a large, but not insuperable, fiscal cost (especially by today's standards).

The preceding calculation, however, assumes that the Treasury could have purchased the gold it needed in the world market at $35 per ounce. But this is surely not the case. World gold production in 1970 (at the $35 price) amounted to $1.8 billion,

whereas total world monetary gold stocks outside the U.S. were $29 billion. The sum, roughly $31 billion, falls far short of what the U.S. needed to cover its total $53 billion obligation (an obligation that exploded in the succeeding years). Even if the U.S. Treasury had been able to purchase all the world's monetary gold and all current production without bidding up the world price – an impossibility – it still would have been $11 billion short. It is clearly unlikely that the Treasury would have been able to buy all the necessary gold at any finite price. Any Treasury attempt to buy gold in private markets on any substantial scale would likely have resulted in a gold price so high as to make the resulting fiscal burden unbearable.

This potential fiscal insolvency was the key danger inherent in the Triffin problem. As Figure 1 shows, of course, the problem became even worse after 1970 as speculative switches out of dollars into foreign currencies accelerated, and as even some central banks exchanged dollars for U.S. gold. The result was the Nixon-Connally policy package of August 1971, leading directly to the Smithsonian realignments in December 1971.

The Modern Triffin Dilemma

After the industrial countries moved to flexible exchange rates in 1973, world reserve growth, surprisingly at the time, continued. Global nongold reserves have expanded (in nominal dollar terms) in all but three of the years after 1971. Starting in 2002, and powered by the demand and growth of emerging economies, global reserves have grown at double digit rates in every year but one (2008, when the yearly growth rate was 9.7

percent). But between 1972 and 1980, global reserves likewise grew at double-digit rates in all but one year. Motivations for this continuing global demand for international liquidity have been widely discussed in the academic literature. As I take up in the next section, one can make a strong case that the evolution of world capital markets over recent decades has made the potential need for swift and perhaps massive key currency liquidity support – whether from reserves or some other source – much more pressing today than it was even in the days of generalized fixed exchange rates.

Nor has the basic Triffin paradox disappeared. The emergence of a modern species of Triffin dilemma has been diagnosed most clearly by Farhi, Gourinchas, and Rey (2011). It is a subtler problem than the Bretton Woods version, because there is no longer a reserve-center promise to redeem liabilities at a fixed price in terms of some scarce numeraire. It is a Triffin problem nonetheless because the underlying asymmetric dynamics of global growth guarantee that eventually, the reserve system will become unsustainable. Moreover, the problem remains even in a multipolar world with several reserve currencies.

The problem is not simply that, under floating exchange rates, reserves are subject to depreciation risk: reserve holders have proved willing to tolerate exchange-rate fluctuations, provided there is not a predictable sustained trend of devaluation. Thus, for example, foreign accumulation of dollar reserve claims on the U.S. does not *inherently* require large U.S. current account deficits, which might predict significant future dollar devaluation. Dollar reserve growth may be primarily a result of capital outflows from the U.S., as was true during the mid-1960s (when the U.S. had a sizable trade surplus with trading partners and was still a net foreign creditor).

The modern-day Triffin problem resides instead in the *nature* of the securities central banks hold as reserves. A key feature of a reserve asset is that it is liquid and predictable in value. True, exchange rate fluctuations are not predictable – but for a country experiencing a localized crisis, any movement of the domestic currency against major foreign reserve currencies is likely to be downward. And the dollar, at least, has shown a safe-haven tendency to appreciate in global crises, which helps explain its attractiveness as a reserve asset (Gourinchas, Rey, and Govillot 2010).

Thus, central banks have gravitated toward the government liabilities of highly creditworthy countries – or other assets, such as U.S. agency securities, believed likely to come under the protection of a government guarantee. Such assets could include certain liabilities of systemically important financial institutions in the creditworthy advanced countries.

So global reserve growth requires the ongoing issuance of gross government debt. This requires, in turn, that the government run continuing deficits, or that it issue debt to acquire assets likely to be inherently riskier than the corresponding liabilities. Just as in the classic Triffin dilemma, global reserve growth is largely driven by deficits – not national balance of payments deficits, but government deficits.[7]

---

[7] An analogous problem confronted Federal Reserve policymakers in 2000-01 as they contemplated the possibility of a disappearing U.S. federal debt. As Greenspan (2007, p. 214) puts it:

> My colleagues at the FOMC seemed a bit disoriented too. In our late-January meeting, we spent hours trying to imagine how the Fed would operate in a brave new world of minimal federal debt. Of course, shedding the debt burden would be a happy development for our country, but it would nevertheless pose a big dilemma for the Fed. Our primary lever of monetary policy was buying and selling treasury securities -- Uncle Sam's IOUs. But as the debt was paid down, those securities would grow scarce, leaving the Fed in need of a new set of assets to effect monetary policy. For nearly a year, senior Fed economists and traders had been exploring the issue of what other assets we might buy and sell.
>
> A result was a dense 380-page study that plopped on our desks in January [of 2001]. The good news was that we weren't going out of business; the bad news was that nothing could really match the treasuries market in size, liquidity, and freedom from risk. To conduct monetary policy, the

The additional dynamic element driving the modern-day dilemma is based on two asymmetries. First, the emerging and developing world is growing more quickly than the more credit-worthy industrial world. As Figure 3 shows, in 2009 the total GDP of the emerging and developing world (measured at PPP, and including newly-industrialized Asia) overtook that of the advanced economies, and the IMF predicts that the advanced economies will fall farther behind over time. The second asymmetry is that the advanced countries remain more creditworthy, and on average control their financial accounts more tightly, than the industrial world. The traditionally rich countries have been able to borrow more easily on world capital markets, and have therefore had less need for international reserves than countries that are vulnerable to sudden stops.[8] Furthermore, they are less prone to foreign exchange intervention, with less capacity to sterilize. Together, these asymmetries imply that that the demand for rich-country government debt is likely to outstrip what can be supplied in the way of safe government debt without bringing the safety of that debt into question! Figure 4 gives a rough indication of the trend to date. How will the demand for reserves be satisfied if the richer countries actually succeed in the fiscal consolidation to which they currently aspire?[9]

> report concluded, the Fed would have to learn to manage a complex portfolio of municipal bonds, bonds issued by foreign governments, mortgage-backed securities, auctioned discount-window credits, and other debt instruments. It was a daunting prospect. "I feel kind of like Alice in Wonderland," Cathy Minehan, the president of the Federal Reserve Bank of Boston, had said when the issue first came up, and we all knew what she meant. The very fact of the discussion showed how profoundly and rapidly we thought the economic landscape might change.

Alas, "the economic landscape" did "profoundly and rapidly" change, but in a way that produced the worst of both worlds: huge U.S. deficits and debt, coupled with big holdings of exotic securities on the Fed's balance sheet.

[8] Of course, recent sovereign debt crises in some of the richer countries show the strains on even advanced-country public finances as a result of the 2007-09 crisis.

[9] Figure 4 graphs general gross government debt growth in the U.S. and euro area against world nongold reserves. General government debt likely overstates the debt available for reserve growth, since central government debt is preferred. In addition, much euro zone central government debt would be viewed as riskier than, say, German debt – especially lately – and therefore not ideal for reserve holders.

A number of developments could head off this unstable dynamic, but might not come into effect soon enough. First, countries' demand for reserves might level off, with some national wealth shunted into sovereign wealth funds willing to invest in riskier assets. To the extent that reserve demand is driven by the size of the financial system and the latter's growth rate is high, however, strong reserve growth is likely to continue. Second, growth could decelerate in the emerging and developing world or accelerate in the currently rich countries. That development seems unlikely in view of the fiscal and other burdens that currently afflict much of the industrial world. Finally, some major and swiftly growing emerging markets could graduate in terms of their creditworthiness, reducing their demand for reserves and, potentially, making them suppliers of reserve assets. China is the most likely candidate, but this very observation highlights the significant obstacles to such a development. Thus, the new incarnation of the Triffin dilemma is likely to bedevil the current system of international liquidity provision for some time, absent reforms.

The problem is still mostly fiscal. But then, so are the broader questions concerning the adequacy of international liquidity in a world without a true outside reserve asset such as gold. I now turn to those questions.

II. Reforming the Liquidity System

The demise of generalized fixed exchange rates in 1973 allowed a solution to the open-economy macro trilemma based on flexible exchange rates, domestic monetary autonomy, and financial-account liberalization (Obstfeld and Taylor 2004). The process

started in the 1970s in the industrial countries. With a lag, and with considerable individual heterogeneity, the emerging market economies have started to follow down this path. Domestic financial liberalization has gone hand in hand with the process of external opening, with strong channels of two-way causation driving the overall freeing of finance, domestic and international alike. Whether and how this process will continue in light of the recent global crisis is a major open question.

The main trend raising the level of financial fragility in the world economy, and therefore creating liquidity needs, has been financial globalization, which has brought with it a rapid expansion of gross international asset positions. The latter expansion has been driven by a range of factors, including expanded risk sharing, financial deepening, and, less benignly, regulatory and tax arbitrage. At a point in time, a country's *net* international investment position defines the gap that intertemporal solvency dictates between the present-values of expenditure and income. But it is the nature of a country's *gross* positions that determines its vulnerability to financial crisis – just as is the case for individual economic actors. Moreover, given the current magnitude of gross external asset and liability positions, asymmetric valuation changes can imply changes in net assets that overwhelm the smaller flow increments implied by the current account balance.

Figure 5 illustrates the trend in gross external assets for selected countries, plotting the ratio (*Assets* + *Liabilities*)/*GDP* through 2007 (with data from the update of Lane and Milesi-Ferretti 2007). Particularly for relatively open industrial countries that are also financial centers, the multiplication of gross external positions has been extreme. In such cases, a current account deficit may be a consequence of financial excess, but it is

not itself the prime locus of financial vulnerability. The main threat is that of a *balance-sheet crisis*. Thus, while Ireland had an external deficit in the run-up to the crisis, banks in surplus countries like Switzerland and Germany landed in trouble – dragging their governments along with them – because of toxic foreign assets on their balance sheets. Figure 6 shows that for emerging and developing countries, gross acquisitions of claims on advanced countries, whether as reserves or as nonreserve (mainly private-sector) claims, far exceed the net current account balance, a reflection of copious gross inflows from the industrial world. These flows are cumulating to economically significant shares of industrial country GDP: In 2007 alone, the annual flow amounted to 6 percent of industrial country GDP. The rapid GDP growth of the poorer countries is not matched by a commensurate importance in world financial markets, but the latter is certainly growing, and doing so relative to the shrinking relative scale of the advanced economies.[10]

Through their growing gross asset positions, emerging and developing countries, especially the EMEs, are increasingly important players in financial globalization, and their financial stability is becoming increasingly tied to that of the global financial system. Yet they remain more vulnerable to sudden stops in foreign lending than are most of the advanced countries – notwithstanding the sudden emergence of sovereign debt problems in some. All the while, financial channels of contagious transmission have expanded along with gross positions. Any attempt to restructure the international liquidity system must contend with these facts.

[10] The figure understates the trend, because the IMF definition of "advanced economies" includes Taiwan, Hong Kong, Korea, and Singapore. This labeling both reduces their measures of emerging and developing country financial flows, and inflates their measure of advanced country GDP.

The Need for Global Last Resort Lending

In the late 1970s, the United Kingdom, Italy, Spain, and Portugal all negotiated standby arrangements with the IMF. Between Portugal's last approach to the Fund in 1983 and Iceland's in 2008, no industrial country drew on Fund resources for balance of payments support – the Fund's client base came to be viewed as consisting exclusively of developing and emerging economies. By the 1990s and 2000s, the high-income countries were viewed as quite creditworthy, unlikely to need Fund resources or even to need to use large volumes of international reserves. At the same time, the central banks of high-income countries were viewed as well equipped, and willing, to act as last-resort lenders if their home financial systems got into trouble.

Events after August 2007 have changed the picture, highlighting the more complex and in some respects more dangerous landscape that financial globalization has produced. Banks throughout the world, and especially in rich Europe, faced urgent needs for foreign-currency liquidity – liquidity that their home central banks could not create by the stroke of a pen. The result was the creation of a complex network of central bank swap lines, starting with the U.S. Federal Reserve's lines to the ECB and SNB in December 2007.[11] Eventually that facility became unlimited in size. Furthermore, following Iceland's collapse, the Greek and Irish governments suffered funding crises that have been managed so far only with financial support from the EU, ECB, and IMF. These advanced-country crises reflected, respectively, garden-variety fiscal improvidence

[11] The precedent for such arrangements is the network of reciprocal central bank credits set up in the early 1960s at the urging of U.S. Treasury Secretary Douglas Dillon and Undersecretary for Monetary Affairs Robert Roosa. The Dillon-Roosa swaps, however, were intended to support foreign exchange intervention for purposes of maintaining par values against the U.S. dollar. See Hirsch (1969, Chapter 11).

(the Greek scenario) and government bailout of a collapsed banking system (the primary culprit for Ireland). But in both cases, globalized financial markets fueled easier access to large volumes of foreign credit.

What have we learned? There are at least two major lessons.

First, IMF facilities alone, even after being augmented in 2009, remain insufficient to deal with the prospective sovereign debt problems of rich countries. Furthermore, the speed and flexibility of IMF support has been inadequate to the needs of advanced countries, given their openness to high-speed global financial markets. The large gross asset liability positions of advanced countries – think of the external debts of Ireland, Iceland, or Switzerland, even though the last is a huge international creditor – have the potential to infect the government balance sheet, resulting in fiscal crisis. The assets of these countries' banking systems are in a substantial number of cases substantial multiples of GDP. While the Irish crisis has been called a crisis of the euro zone – and adherence to a fixed exchange rate is indeed problematic for Ireland – the Irish crisis is even more a crisis of globalized finance. Even in cases where sovereign debt problems arise from pure government profligacy, as in Greece, globalized finance promotes a potentially wide exposure of financial institutions to the problem.

Second, a key implication of a globalized multiple-currency world is that traditional lenders of last resort (the central banks) are ill equipped to support the needs of their swollen financial sectors, even when private-sector actors seek to maintain putative hedges on their foreign-currency exposure. For example, European banks in 2007 and 2008 were big holders of U.S. mortgage-backed securities, these assets being funded by short-term dollar borrowing. Credit market disruptions sharply raised the cost

of rolling over short-term dollar credits. At the same time, the costs of swapping euros for dollars to repay dollar credits rose far beyond what covered interest parity would imply. While the ECB, for example, could freely print euros and lend them to banks, its ability to supply dollars out of reserves was much more limited (although some national central banks did so). The ECB itself could have borrowed dollars and intervened in spot and forward exchange markets, at the risk of quasi-fiscal costs – costs that would be higher today, now that the finances of even some larger eurozone governments are being questioned by the bond markets. In the circumstances, it was much more expedient to be able to borrow dollars directly from the Fed, which in any case needed to expand its balance sheet to meet a heightened global demand for dollar liquidity.[12] Effectively, the Fed became an international last-resort lender in dollars – in the absence of which, European banks might have had to unload hard-to-sell assets, worsening fire-sale dynamics and weakening their own capital. Of course, the Fed also lent heavily, and directly, to the U.S. affiliates of foreign banks, when they had eligible collateral. At the same time, other central banks – including the ECB, SNB, BOJ, Sveriges Riksbank – eventually stepped up as global last-resort lenders in their own currencies.

As of the start of the global crisis in 2007, the need for foreign-currency last-resort lending to financial institutions was familiar from the EME experience – see Jeanne and Wyplosz (2003) and Calvo (2006). But it was less obviously a first-order issue for mature economies, where the main use of foreign exchange reserves (if any) was widely considered to be in cases of foreign exchange intervention. The Fed has

[12] The Fed was conveniently able to shift any credit risk of direct last-resort lending onto the ECB. On the background for the swap network and its effects, see, for example, McGuire and von Peter (2009), Goldberg, Kennedy, and Miu (2010), and Rose and Spiegel (2011). While controversy remains, most empirical researchers have concluded that the swap arrangements were effective in reducing credit market disruptions,

maintained swap facilities throughout the eurozone debt crisis starting in the spring of 2010.

The expansion of gross currency-denominated asset positions, given the inevitable gaps in global as well as domestic prudential oversight, suggests a need for global lenders – to governments as well as central banks and, through them, to the private financial sector – that is greater than ever before.

Self-Insurance through Reserve Accumulation

Of course, growing financial vulnerability is part of the reason that the emerging and developing nations have accumulated high volumes of precautionary, hard-currency foreign exchange reserves – a trend I noted above, and which shows no sign of abating. Figure 7 illustrates that the resulting aggregate reserve stock, mostly U.S. dollars and euros, has now reached the neighborhood of one-third of the holders' collective GDP, having risen from about 10 percent in 1990, when group GDP was much smaller than it is today.

This apparent security does not come without costs, both for individual reserve-holding countries and for international monetary stability. For the holders, the great attraction of reserves is that they provide instantaneous and *unconditional* liquidity. But even at the level of the individual holder, there are downsides: reserves may come at a high quasi-fiscal cost (costs also incurred if reserves should depreciate against domestic currency), and these costs may be incurred even if the marginal liquidity value of the reserves is illusory (because the process of reserve acquisition generated an equal short-

term private foreign-currency debt as an offsetting counterpart on the national balance sheet).

Beyond these individual costs, however, national self-insurance through holdings of gross foreign reserves carries significant potential *systemic* costs. Reserve accumulation may influence interest rates in reserve centers – helping to fuel international resentments about "exorbitant privilege" that often fail to recognize the root of the problem in systemic congestion. Moreover, such interest-rate effects can complicate the task of monetary policy in the reserve-center country. Similarly, official portfolio shifts between different currencies, or between asset classes within currency areas (think of Chinese purchases of euro zone sovereign debt), alter exchange rates and bond prices, possibly in destabilizing ways.

Individual countries' reserve gains may be strategic complements, in the sense that one country's gains lower the *relative* perceived financial stability of its neighbors, in turn raising their marginal benefit from reserve accumulation. In that case, a non-cooperative equilibrium will entail excessive accumulation by all. A further coordination problem arises when countries compete to keep their currencies weak and limit domestic demand, so as to generate current account surpluses.[13] Finally, in a global crisis, a country may exacerbate problems elsewhere when it draws on its reserves. For example, withdrawals of bank deposits in a foreign center may worsen liquidity problems there.

A final negative systemic externality is related to the modern-day Triffin dilemma described above. Each country's purchase of more reserves may push other demanders

[13] Note, however, that countries need not have current account surpluses to gain reserves if they can attract private financial inflows that exceed their current account deficits.

into purchasing marginally riskier assets, or render their existing reserve holdings marginally more risky.

The basic point is that actions that enhance the apparent financial resilience of the individual country may well, at the same time, undermine that of the international financial system as a whole. The fallacy of composition applies in the domain of international liquidity, as in discussions of the macroprudential approach to domestic financial supervision.

Notwithstanding these drawbacks, emerging and developing economies are likely to continue accumulating reserves. And there is no doubt, despite the seeming ambiguity of formal econometric evidence, that these countries found reserves to be useful in the crisis (note the 2008 drop shown in Figure 7). Yet the crisis also illustrated systemic problems of reserve accumulation, as described earlier. Many countries were reluctant to run down their reserves sharply, precisely because smaller reserves might signal financial weakness compared with neighboring economies (see the related discussion of Aizenman and Sun 2009). Korea, for example, was reluctant to let its reserves to fall below $100 billion, and thus drew on its $30 billion swap line from the Fed (which itself may have had an important signaling effect) despite ample reserve holdings.

Reluctant to lose too many reserves, EMEs found creative ways to stretch them. Several engaged in nonstandard foreign exchange operations, which effectively targeted specific financial vulnerabilities implied by private foreign exchange positions, while allowing the general demand for foreign exchange by relatively nonsystemic agents to go unsatisfied (see Ishi, Stone, and Yehoue 2009 and, on Brazil, Stone, Walker, and Yasui 2009). For example, rather than injecting reserves generally into the market to counteract

domestic capital flight and the resulting currency depreciation, some authorities provided foreign exchange at bargain rates to strategic banks and corporations that needed to repay foreign-currency debts. To return to the Korean example once again, the country was able to tolerate extensive won depreciation during the global crisis without the widespread financial distress characteristic of earlier crashes.[14]

The IMF and Global Liquidity

In principle, a world central bank, as envisioned by Keynes in his original blueprint for an international "Clearing Union," would be in a position to provide liquidity on a global basis to troubled financial institutions throughout the world – as well as to troubled sovereigns, were it not bound by statutory prohibitions against such lending, as the ECB is. Indeed, there is no *logical* reason why a world central bank would be limited to the issuance and management of a single currency. In an ideal world, an omniscient and benevolent central bank could deal in a multiplicity of different national currencies, allowing exchange rates to float or managing them to whatever degree was optimal. From a political standpoint, of course, the idea is completely infeasible.

The IMF is the version of Keynes's ambitious plan that proved politically feasible, and its capacities, while quite useful and arguably essential (see Fischer 1999 and Goodhart 1999), remain severely limited. Historically, the Fund has truly been the last resort for sovereigns, typically when it is too late to fend off a crisis, and subject to

[14] The practice has an analog in the classic debate over whether lenders of last resort should lend into the market or directly to individual institutions. The collateral benefit of the latter approach in the case of foreign-currency operations is the benefit to exporters of a large depreciation. For conceptual discussions see Jeanne and Wyplosz (2003) and Calvo (2006).

conditionality that sometimes strengthens a government's hand against domestic opposition, but that also may contribute to political and social unrest. The Fund lends exclusively to governments, and not directly to central banks or financial institutions, so as currently designed, it is completely unsuitable for undertaking the type of crisis lending to banks and other financial actors that proved so important during the global crisis. Nor can it mimic the ECB's role in lending to banks during the euro zone crisis.

True, the Fund's resources increased significantly in 2009 and its flexibility to lend them quickly based on ex ante qualification, and with relaxed conditionality, was extended through the Flexible and Precautionary Credit Lines. But the FCL and PCL seem to be meeting similar fates to earlier related initiatives. Among other problems, countries seem to fear stigmatization, both from approaching the Fund to request a credit line and from the possibility that the IMF Executive Board fails to renew it down the road. Thus, the uptake on these facilities has so far been very limited: Mexico, Poland, and Colombia for the FCL, and only Macedonia for the PCL.

One promising proposal put forward by IMF staff is for a Global Stabilization Mechanism (GSM), which could allow the Fund to respond proactively with aid offers once a systemic event is identified by the Executive Board (see International Monetary Fund 2010). However, this approach remains controversial – as do related proposals for the domestic financial sphere that are based on a systemic trigger – and at this stage there are several versions of GSM on the table, the details of which differ considerably. An obvious problem area concerns the precise criteria under which the Fund would call a systemic event, and the response of markets in anticipation of such a declaration.

A prominent mode through which the IMF can augment global liquidity is through the issuance of the Special Drawing Right (SDR). But the SDR is not currently used for private transactions, and considerable obstacles impede development of a private SDR market (Eichengreen 2011). Notwithstanding the SDR's non-currency status, some (for example, Zhou 2009) have argued for an international reserve system centered primarily on the SDR rather than the U.S. dollar. Such recent calls echo the Second Amendment to the IMF's Articles of Agreement, which in 1978 set the ambitious goal of making the SDR the "principal reserve asset in the international monetary system."

The SDR was launched on January 1, 1970 after long international negotiations motivated by two main concerns. First, policymakers feared that U.S. balance of payments deficits might not, in the long run, provide sufficient international liquidity to meet the demands of a growing world economy. Second, policymakers feared that the dollar-based gold exchange standard would experience increasing instability because of the Triffin dilemma. The SDR, characterized at the time as "paper gold," was designed as a limited form of unconditional liquidity, which governments could trade to other governments in exchange for hard-currency reserves.

Until the recent big allocation of August and September 2009 following the onset of the global crisis, SDR allocations were infrequent, taking place only over 1970-72 and 1979-81. None of these allocations, not even the most recent one, has pushed the total stock of SDRs to be a large fraction of global foreign exchange reserves. Figure 8 illustrates the numbers, based on data in the IMF's *International Financial Statistics.*

The stock of SDRs has never exceeded about 6 percent of global reserves and that global figure declined steadily until 2009 following the 1979-81 allocation. On the eve of

the crisis SDRs were less than 0.5 percent of global reserves, and an even smaller percentage of emerging and developing country reserves. In April 2009 the IMF allocated USD 250 billion worth of SDRs as a response to the global crisis, and a further USD 34 billion in a September 2009 special allocation to endow members that had never received allocations. Except for such extraordinary allocations, SDR allocations are proportional to IMF quotas, so as to achieve an internationally balanced increase in world reserves. Thus, the bulk goes to the advanced economies (which also hold much lower stocks of foreign exchange reserves). Even the nominally large 2009 allocations restored the SDR share in global and poorer-country reserves only to the levels of the late 1980s (about 2 percent for the latter group).

The SDR framework is in principle a form of reserve pooling. Thus, the prospects of replacing actual reserve currencies such as the dollar and euro with SDRs are inherently limited: Because SDRs have no private use and function only as claims on the reserve pool, they cannot themselves supplant the reserve pool. [15]

While the SDR therefore could not become the world's principal reserve asset under current arrangements, proposals for a "substitution account" are designed to replace currency reserves with SDRs on a large scale. Such ideas were debated in 1979-80, ultimately to no avail, but they have resurfaced recently (for example, Kenen 2010). Figure 8 shows that substitution would have to be on a huge scale to displace a substantial portion of currency reserves.

[15] As a technical matter, SDRs can be exchanged for dollars not only with non-U.S. dollar holders, but also with the U.S. Treasury, which obtains the dollars from the Fed in exchange for dollar-denominated Treasury obligations called SDR Certificates. (The Fed will routinely sterilize such money creation, and all currency risk resides with the Treasury.) However, it is unlikely that the Treasury would be willing to undertake such exchanges in the amounts that would be required were SDRs to become the dominant international reserve asset.

Under a substitution scheme, a country such as China might transfer some of its dollar reserves to the IMF, receiving SDRs of equal current value in return. (These SDRs would have to be created outside the usual allocation process, of course.) Two portfolio shifts occur as a result. China is now long SDRS, and might (or might not) want to readjust its portfolio in private markets. Presumably, its degree of participation in the scheme will already reflect its diversification goals. More importantly, the IMF is short SDRs and long on U.S. dollars, and the substitution account's solvency is at risk if the dollar depreciates. China has passed some of its substantial currency risk to the IMF.

Which countries will compensate the IMF for portfolio losses if the dollar declines against the SDR? How will the IMF finance "exorbitant privilege" discrepancies between the interest earned on its dollars and that paid on its new SDR liabilities? In the last discussions of 1979-80, some countries involved thought the U.S. should bear the bulk of the costs, but the U.S. was unwilling and others refused to step in. Poorer countries were reluctant to see the IMF use its gold holdings to support the account – they hoped gold sales might instead subsidize borrowing by poorer countries. So the negotiations failed. It is unlikely that the U.S. would be more willing today, and even less so that the eurozone countries – which lack a centralized fiscal organ – would be willing to underwrite a euro/SDR substitution account.

Once again, the fiscal dimension is central. The absence of a fiscal authority at the global level creates a difficult coordination problem for a centralized and coordinated move to an SDR-based system, even though that system might confer some stability advantages (for example, by discouraging large official portfolio shifts).[16]

[16] For an account of the1979-80 negotiations over a substitution account, see Boughton (2001, pp. 936-43).

Globalized Last-Resort Lending

The IMF's traditional function of lending to sovereign governments leaves it ill equipped for the more direct financial-market interventions traditionally associated with domestic lenders of last resort. Even the newer more flexible lending facilities, which could channel the needed resources through governments in principle, are likely to involve time delays and informational frictions. Furthermore, the known quantitative limits of such facilities can be an obstacle to reassuring markets that the authorities arte capable of intervening with overwhelming force. It is no accident that the Federal Reserve found it useful to remove the quantitative limits on some of its swap lines as the 2007-09 crisis evolved.

A different approach would institutionalize the network of swap lines between central banks that arose in an ad hoc way during the 2007-09 crisis Operationally, national central banks could extend the swap lines to a central international institution such as the IMF or (as some central bankers might prefer) the Bank for International Settlements (BIS). Other central banks, when in need of foreign-currency to support stressed financial sectors, would then be able to draw on the swaps, just as the ECB obtained dollars from the Fed under the recent arrangements. Such a system could be based on the SDR, though it need not be. Truman (2008, 2010) has proposed modifying existing rules to allow countries directly to present SDRs to central banks in return for the currencies the banks issue. Obstfeld (2009) and Farhi, Gourinchas, and Rey (2011) suggest systems based on credit lines.

Unlike the recent improvised swap network, a permanent system would be predictable rather than ad hoc and all countries, not just a select few, would have access. But the system would avoid the externalities inherent in large-scale self-insurance through reserve accumulation. For example, there would be no scope for official switches between reserve currencies in order to manage currency risk. Nor would reserve demands depress the interest rates of reserve issuers.

The terms of access to the credit network would necessarily be conditional. For example, participating central banks would be required to satisfy criteria of independence and supervisory diligence. A variable participation fee might cover potential financial losses, in analogy to the charge Prasad (2011) has suggested for his proposed liquidity insurance pool. The fee could be structured so as to encourage sound macroeconomic and financial policies – for example, rising in the face of an unusual and apparently unjustified credit boom. Staff from the IMF, the BIS, or even from participating central banks could be deployed to carry out the necessary surveillance. Credit limits might also be structured so as to alter incentives.

Both a graduated participation terms and international surveillance offer partial brakes on moral hazard – the risk that expanded liquidity facilities encourage key actors in the financial system to behave more imprudently than they would in the absence of a safety net. But moral hazard would be limited further by complementary reforms that target government incentives.

There are two main ways in which enhanced international liquidity could encourage governments toward actions with negative global externalities: by promoting excessive fiscal deficits (even outside of currency unions) and lax prudential oversight of

domestic private-sector finance. Governments would be better motivated to limit deficits if any swap network participation fee depended on fiscal variables, as in Prasad's (2011) proposal. But more generally, and regardless of the state of international liquidity arrangements, predictable means of restructuring sovereign debts, even the debts of mature economies, can push private incentives into better alignment with society's interests. Such mechanisms can limit excessive government borrowing through rising marginal costs, but, as Charles Goodhart stresses in his paper at this conference, they also may improve the incentives of the creditor-country governments whose financial institutions may be bankrolling profligate governments (as well as those of the institutions themselves).

Mandatory subscription to a set of common regulatory standards and procedures would serve to limit individual governments' discretion in prudential oversight. These norms would more effectively limit private-sector risk seeking if they encompassed guidelines on institutional size – so as to mitigate the "too big to fail" problem – as well as predictable and credible resolution procedures for systemically important institutions, including resolutions involving multiple governments. As noted above, implementation of these undertakings would be subject to international surveillance, with transgressions resulting in higher participation fees.

A general lesson of recent experience is that a system for counteracting *illiquidity* needs to account for the possibility that the underlying cause of market panic is *insolvency*. There is no uniquely defined dividing line between the two – in no small part because market perceptions are a key driver of borrowing costs and, thus, of the ability to

service debt – but there will clearly be cases in which state or institutional bankruptcy becomes inevitable.

The possibility of insolvencies raises the potential fiscal cost any international arrangements to enhance global liquidity. As Goodhart (1999) has stressed, the ultimate backing for the lender of last resort comes from the fiscal authorities. Thus, as has been painfully evident during the eurozone's debt crisis, collective action to promote financial stability must be financed through collective action in the fiscal sphere.[17]

III. Exchange Rates and Global Imbalances

The final demise of the Bretton Woods system in 1973 took the form of a disorderly retreat to floating exchange rates among the main industrial countries. Despite the unplanned and indeed initially unintended nature of the regime change, a number of eminent economists such as Milton Friedman and Harry G. Johnson had long espoused floating rates as a means of reconciling national policy sovereignty with the benefits of global economic integration. To a considerable degree floating exchange rates have been successful, which explains why, in this century, even a growing number of EMEs have been opting for greater exchange rate flexibility. Yet, most of the Friedman-Johnson claims have not been borne out fully, and it is increasingly clear that floating rate have left ample room for politically contentious spillovers in economic policy. The complaints about these spillovers are not simply the result of faulty economic analysis or special interest pressures.

[17] See the further discussion in Obstfeld (2011).

Predictions that floating rates would remove the need for international liquidity have clearly proven wrong, and the earlier part of this paper discussed the reasons why. As a group, the EMEs conducted massive foreign reserve accumulation even as many of them were moving to more flexible exchange rate regimes.

Also problematic, in light of experience, have been the claims that floating or flexible exchange rates would painlessly facilitate the adjustment to real (output-market) shocks or ensure the rapid adjustment of current account imbalances. Most fundamentally, two countries share every bilateral exchange rate, and there is no guarantee in general that both will take the same view of its optimal level. Due to asymmetries in economic structure, the difficulties of adjusting to exchange rate changes have proven greater for emerging and developing countries, igniting talk of "currency wars" and renewed policy attention to capital controls as a means of exchange-rate management.

Exchange Rates and Resource Allocation in the Short Run

Sharp exchange rate movements driven by financial-market changes can have unwelcome effects on resource allocation, effects that are especially painful for poorer countries. These effects lead to "fear of floating" behavior in the mode of Calvo and Reinhart (2002), and lie behind the recent attacks of some EME governments on the Federal Reserve's accommodative monetary stance.

Figure 9 illustrates a configuration typical of many EMEs in the post-crisis period. Assume that domestic nominal wages and nontraded goods prices are sticky,

whereas traded goods' prices show a full pass-through to the exchange rate. Assume also that traded goods are priced in world markets, and that the tradables sector is competitive. Finally, imagine that capital and labor are sector-specific in the short run, that is, unable to migrate between traded and nontraded goods industries.

In the figure, the downward-sloping locus *NN* shows combinations of the nominal exchange rate *E* (price of foreign currency) and overall domestic spending *Z* such that labor in the nontradable sector is fully (but not overly) employed. (A rise in *Z* at a constant exchange rate would cause excess demand for nontradables, but an appreciation lowers tradables prices and shifts demand toward the latter goods.) The horizontal schedule *TT* gives the exchange rate at which, given nominal wages, the tradable sector's labor supply is fully employed. The upward-sloping schedule *XX* shows combinations of spending and the exchange rate at which the current account is in balance (however defined).

The economy is initially at point *A*, with output above potential in nontradables and a current account surplus. Because product wages are low in tradables, output is also above potential there. There is upward cost pressure in both sectors and upward price pressure in nontradables.

Consider the impact, at a constant spending level, of a sharp nominal appreciation that moves the economy to point *B*. Perhaps a large foreign country has loosened monetary policy; perhaps markets are looking forward to and speculating on tighter domestic monetary policy. In either case, output falls in both sectors and the tradables sector experiences a particularly sharp decline in capital income. In the case

shown, inflationary pressures subside but at the cost of underemployment in both sectors. The current account surplus shrinks as the economy moves closer to *XX*.

These impacts are painful, so much so that many EMEs in positions like point *A* have preferred to resist appreciation, accumulating substantial additional foreign reserves in the process and sterilizing them in an attempt to avoid feeding domestic inflation. Figure 10 illustrates the experience of a sample of EMEs with respect to real appreciation (bilateral, against the U.S. dollar) and reserve accumulation in 2010. As exchange market pressure rises, countries generally have allowed more appreciation but also intervened more heavily, and in some cases massively.

When EMEs as a group face an expansionary global monetary shock emanating from the industrial countries, the result is a massive coordination failure reminiscent of the competitive depreciation of old – or at least, it is competitive nonappreciation. But unlike the currency competition of the Great Depression, more recent rounds have been adding fuel to inflationary fires. The problem has gained quantitative importance through the growth of intra-EME trade. How does the coordination failure come about?

The Chinese yuan's relative weakness against the U.S. dollar, for example, makes Brazil even less willing to appreciate the real (and vice versa); so both countries intervene more, and accumulate more dollar reserve claims, the latter being feasible in unlimited amounts. To the extent that sterilization is imperfect, the latter process fuels asset-price appreciation and inflation, in a manner reminiscent of the Bretton Woods system's collapse in the early 1970s. (Figure 1 showed the explosive growth in foreign exchange reserves during those few years.)

The costs of allowing currency appreciation (and larger currency fluctuations in general) appear somewhat lower for the mature industrial economies (with Japan a possible exception). These economies have larger domestic markets for their tradable goods and are able to price to market so as to cushion exchange-rate effects on domestic prices.

Capital Controls

In the example just discussed, countries face a tradeoff: appreciation would lower domestic inflation pressure, but at the cost of employment. Domestic monetary tightening would dampen inflation, but at the cost of even sharper currency appreciation. This is a classic instance of the trilemma.

Some EMEs have turned increasingly to capital controls as a way out, with apparently limited success. (For the moment no mature economy – not even the ultimate safe haven, Switzerland – appears likely to embrace controls.) The IMF has moved increasingly to acceptance that capital controls are a legitimate policy tool in some circumstances, turning from what once was fairly monolithic opposition to discussions of the appropriate use of controls (see Ostry and others, 2010, 2011).

In principle there are two (often correlated in practice but conceptually distinct) motivations for controls. First, there is the macro*economic* motivation of reducing exchange market pressure in the form of the volume of capital inflows – basically, escape from the trilemma. Second, there is the macro*prudential* motivation, which certainly includes changing the *composition* of capital flows but might also target

the volume if the capacity of the financial sector safely to intermediate funds is limited. Available evidence suggests that controls have been more successful in influencing the composition of flows – for example, inducing a lengthening of debt maturities – than in moderating volumes or real appreciation pressures.

From a macroprudential standpoint, however, capital controls would appear to be a second-best tool, the first best being a response that more directly targets the relevant financial distortion. For example, a country concerned about banks' currency mismatch should restrict or tax all foreign-currency liabilities, not just those contracted with nonresidents. Some countries, of course, have used putative macroprudential tools in attempts to escape he trilemma.

If capital controls were to become generally accepted as part of the policy toolkit, however, it would be useful for the international community to develop guidelines as to which instruments are admissible and the circumstances in which they will be used. A regime based on rules, rather than discretion, seems more likely to enhance predictability and avoid financial-market volatility. It should also be recognized that controls entail possible negative international spillovers. A country imposing them unilaterally may simply divert financial inflows to neighboring economies. Capital inflow controls, as in China's case, give a country more latitude to maintain an artificially competitive exchange rate and thereby contribute to larger global imbalances. Thus, internationally coordinated surveillance over controls, most plausibly conducted by the IMF, is likely to be helpful in reducing global externalities from the use of controls.

Global Imbalances

Current account imbalances have not become smaller and less persistent in the era of floating exchange rates. Instead, increasing financial capital mobility (in part supported by floating rates, as suggested by Obstfeld and Taylor 2004) has eased the financing of deficits and allowed easier disposition of excess national savings. Moreover, the "long run" in which the real exchange rate should reflect the requirement of external balance has become considerably more distant. The time-honored problem of asymmetric adjustment pressure on surplus and deficit countries remains as intractable as ever, as Charles Goodhart describes in his paper.

In the mid-2000s, Dooley, Folkerts-Landau, and Garber (2008) advanced a "Bretton Woods II" paradigm according to which the big global imbalances of the period, driven in large measure by the Chinese authorities' desire and capacity to industrialize on the back of exports, would be sustainable for a decade or more. That hypothesis led to a lively debate. For examples of the critiques see Roubini (2006), Obstfeld and Rogoff (2007), Wolf (2008), and Hall and Tavlas (2011).

The global imbalance configuration of the mid-2000s appears in retrospect to have been problematic, though it bears a resemblance to several other episodes that ended in tears (and also, perhaps, to the current configuration of imbalances). Asia in general (outside of Japan) was growing at a rate exceeding that of the mature economies, with China in particular pusuing a "vent for surplus" growth model (Caves 1965).[18] Several mature economies, but most notably the United States, were absorbing Asian exports

[18] There are analogies in the early postwar experiences in Western Europe and Japan. On Europe, see Kindleberger (1967).

through growing consumption and indebtedness (not through growing productive investment, much of which was taking place anyway in residential housing).

While a soft landing is theoretically possible in this scenario, the rapid increase in U.S. household debt that made America the world's spending locomotive relied on the collateral of rising and inflated home values, which were bound to collapse and did starting in 2006. Given actual and prospective U.S. income growth in the middle 2000s, there was no way that China could maintain its own more rapid export-led growth for much longer on the back of growing U.S. household debt, without U.S. households becoming insolvent. The virulence of the resulting financial meltdown, of course, reflected the *gross* positions financial actors in the U.S. and Europe had assumed prior to the start of the U.S. housing collapse.

In analyzing potential perils due to global imbalances, it is important to ask how the pieces fit together. When large surplus countries grow more rapidly than deficit countries, consumption growth in the latter is necessarily increasing faster than income, a process that must end in crisis unless the debtor's income growth catches up. Indeed, just this problem underlies the sovereign debt crisis within the euro zone; see the insightful analysis by Giavazzi and Spaventa (2010). Similarly, the current account deficit of the U.S., while diminished compared to 2006, is underpinned by large fiscal deficits that are unsustainable over the longer term.

In such situations, a main brake on the behavior of surplus countries is the fear that the assets they are accumulating (whether held by the public sector – Chinese dollar reserves – or the private sector – German banks' holdings of Greek sovereign debt) might be devalued. (Another is the threat of protection.) It is important that the international

financial system be structured so as to make such fears rational, as Goodhart stresses in his paper. The IMF has the standing to speak out when, in its view, large and persistent external imbalances threaten to result in a solvency crisis, whether in the public or private sectors. The IMF also is in a position to urge cooperative policy scenarios that can make the process of reducing global imbalances easier for all participants. Reforms of IMF governance that made such pronouncements politically feasible regardless of the countries involved would be welcome.

A system of liquidity credit lines, as described in the last section, could discourage precautionary reserve accumulation, although the latter can occur even in the absence of current account surpluses.[19] Proposals to formally tax large reserve holders, either in an SDR-based reserve system or one based on currencies, are unlikely to gain any traction, just as Keynes's similar proposal failed in the 1940s.

IV. Conclusion

Problems of international liquidity and exchange rate management – staple fare in the international monetary reform literature over many decades – remain painfully relevant today, but in forms that sometimes differ from past incarnations. At bottom, many of the coordination problems that arise stem from differences in the structures, growth rates, and cyclical positions of the mature economies and the developing world. These two segments of the global economy are fast approaching (and on some measures have reached) equality.

[19] Recall the much discussed "capital inflows problem" of disinflating developing countries. See Borio and Disyatat (2011) for a reminder on the potential decoupling of the current account and balance of payments.

Many years ago, Richard Cooper (1969, p. 600) drew an intriguing connection between the extent of policy cooperation over macroeconomic policies and the need for international liquidity. I believe that his point remains valid:

> The degree of … international cooperation … influences the amount of liquidity needed to finance imbalances in the face of temporarily divergent and conflicting national policies. The more cooperation, the more carefully coordinated national policies are in timing and nature, the lower the need for international liquidity to finance imbalances.

I have argued that, in addition, there is considerable scope for a cooperative approach to global liquidity provision today. A collateral benefit of such cooperation is that it can mitigate other coordination failures in national economic policies. Unfortunately, these continue to cause tensions between governments, and there are no easy solutions in a world of sovereign nations. Reforms that enhanced the IMF's freedom from political pressures would allow it to identify and critique global coordination failures with greater impartiality and credibility.

References

Aizenman, Joshua and Yi Sun. "The Financial Crisis and Sizable International Reserves Depletion: From 'Fear of Floating' to the 'Fear of Losing International Reserves'?" Working Paper 15308, National Bureau of Economic Research (October 2009).

Borio, Claudio and Piti Disyatat (2010). "Global Imbalances and the Financial Crisis: Link or No Link?" BIS Working Papers No. 346, Bank for International Settlements (May 2011).

Boughton, James M. *Silent Revolution: The International Monetary Fund, 1979-1989* (Washington, D.C.: International Monetary Fund, 2001).

Brunnermeier, Markus K. and Lasse Heje Pedersen. "Market Liquidity and Funding Liquidity." *Review of Financial Studies* 22 (June 2009): 2201-2238.

Calvo, Guillermo A. "Monetary Policy Challenges in Emerging Markets: Sudden Stop, Liability Dollarization, and Lender of Last Resort." Working Paper 12788, National Bureau of Economic Research (December 2006).

Calvo, Guillermo A. and Carmen M. Reinhart. "Fear of Floating." *Quarterly Journal of Economics* 107 (May 2002): 397-408.

Caves, Richard E. "'Vent for Surplus' Models of Trade and Growth." In Richard E. Caves, Harry G. Johnson, and Peter B. Kenen, eds., *Trade, Growth, and the Balance of Payments: Essays in Honor of Gottfried Haberler* (Chcago: Rand McNally & Company, 1965).

Cooper, Richard N. "Postscript: Updating International Money." In Fred Hirsch, *Money International* (Harmondsworth, UK: Penguin Books, 1969).

Dooley, Michael, David Folkerts-Landau, and Peter Garber. *Asia, Interest Rates, and the Dollar*, 2nd edition (New York: Deutsche Bank Securities, 2008).

Eichengreen, Barry. *Exorbitant Privilege: The Rise and Fall of the Dollar and the Future of the International Monetary System* (New York: Oxford University Press, 2011)

Farhi, Emmanuel, Pierre-Olivier Gourinchas, and Hélène Rey. "Reforming the International Monetary System." Typescript (March 2011). Available at: http://socrates.berkeley.edu/~pog/academic/FGR_march2011.pdf

Fischer, Stanley. "On the Need for an International Lender of Last Resort." *Journal of Economic Perspectives* 13 (Fall 1999): 85-104

Giavazzi, Francesco and Luigi Spaventa. "Why the Current Account May Matter in a Monetary Union: Lessons from the Financial Crisis in the Euro Area," Discussion Paper 8008, Centre for Economic Policy Research (September 2010).

Goldberg, Linda S., Craig Kennedy, and Jason Miu. "Central Bank Dollar Swap Lines and Overseas Dollar Funding Costs." Working Paper 15763, National Bureau of Economic Research (February 2010).

Goodhart, Charles A. E. "Myths about the Lender of Last Resort." *International Finance* 2 (November 1999): 339-360.

Greenspan, Alan. *The Age of Turbulence* (New York: Penguin Press, 2007).

Gourinchas, Pierre-Olivier, Hélène Rey, and Nicolas Govillot. "Exorbitant Privilege and Exorbitant Duty." Typescript, UC Berkeley, LBS, and École des Mines (May 210).

Hall, Stephen G. and George S. Tavlas. "The Debate about the Revived Bretton Woods Regime: A Survey and Extension of the Literature." Typescript, Bank of Greece (August 2011).

Henning, C. Randall. *Currencies and Politics in the United States, Germany, and Japan* (Washington, D.C.: Institute for International Economics, 1994).

Hirsch, Fred. *Money International* (Harmondsworth, UK: Penguin Books, 1969).

International Monetary Fund. "The Fund's Mandate – The Future Financing Role: Reform Proposals." Finance, Legal, and Strategy, Policy, and Review Departments, International Monetary Fund (June 2010).

Ishi, Kotaro, Mark Stone, and Etienne B. Yehoue. "Unconventional Central Bank Measures for Emerging Economies." IMF Working Paper WP/09/226 (October 2009).

Jeanne, Olivier and Charles Wyplosz. "The International Lender of Last Resort: How Big Is Big Enough?" In Michael P. Dooley and Jeffrey A. Frankel, eds., *Managing Currency Crises in Emerging Markets* (Chicago: University of Chicago Press, 2003).

Kenen, Peter. "An SDR Based Reserve System." *Journal of Globalization and Development* 1(2, 2010), Article 13. Available at: http://www.bepress.com/jgd/vol1/iss2/art13

Kindleberger, Charles P. *Europe's Postwar Growth: The Role of Labor Supply.* Cambridge, MA: Harvard University Press, 1967.

Lane, Philip R. and Gian Maria Milesi-Ferretti. "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004." *Journal of International Economics* 73 (November 2007): 223-250.

McGuire, Patrick and Götz von Peter. "The US Dollar Shortage in Global Banking and the International Policy Response." BIS Working Papers No. 291, Bank for International Settlements (October 2009).

Metzler, Lloyd A., Robert Triffin, and Gottfried Haberler. *International Monetary Policies.* Postwar Economic Studies No. 7 (Washington, D.C.: Board of Governors of the Federal Reserve System, 1947).

Obstfeld, Maurice. "Lenders of Last Resort in a Globalized World." *Monetary and Economic Studies* (Bank of Japan) 27 (November 2009): 35-52. Available at: http://www.imes.boj.or.jp/english/publication/mes/fmes.html

Obstfeld, Maurice. "International Liquidity: The Fiscal Dimension." Working Paper 17379, National Bureau of Economic Research (August 2011).

Obstfeld, Maurice and Alan M. Taylor. *Global Capital Markets: Integration Crisis and Growth* (Cambridge, UK: Cambridge University Press, 2004).

Obstfeld, Maurice and Kenneth Rogoff. "The Unsustainable U.S. Current Account Position Revisited." In Richard H. Clarida, ed., *G7 Current Account Imbalances* (Chicago: University of Chicago Press, 2007).

Ostry, Jonathan D. and others. "Capital Inflows: The Role of Controls." IMF Staff Position Note SPN/10/04 (February 2010).

Ostry, Jonathan D. and others. "Managing Capital Inflows: What Tools to Use?" IMF Staff Discussion Note SDN/11/06 (April 2011).

Prasad, Eswar S. "Role Reversal in Global Finance." Paper presented at the 2011 Economic Policy Symposium of the Federal Reserve Bank of Kansas City (August 2011). Available at: http://www.kansascityfed.org/publications/research/escp/escp-2011.cfm

Rose, Andrew K. and Mark. M. Spiegel. "Dollar Illiquidity and Central Bank Swap Arrangements during the Global Financial Crisis." Typescript, UC Berkeley and Federal Reserve Bank of San Francisco (August 2011).

Roubini, Nouriel. "The BW2 Regime: An Unstable Equilibrium Bound to Unravel." *International Economics and Economic Policy* 3 (December 2006): 303-332.

Stone, Mark R., W. Christopher Walker, and Yosuke Yasui. "From Lombard Street to Avenida Paulista: Foreign Exchange Liquidity Easing in Brazil in Response to the Global Shock of 2008-09." IMF Working Paper WP/09/259 (November 2009).

Triffin, Robert. *Gold and the Dollar Crisis.* New Haven. Yale University Press, 1960.

Truman, Edwin M. "On What Terms Is the IMF Worth Funding?" Working Paper Series WP 08-11, Peterson Institute for International Economics, December 2008.

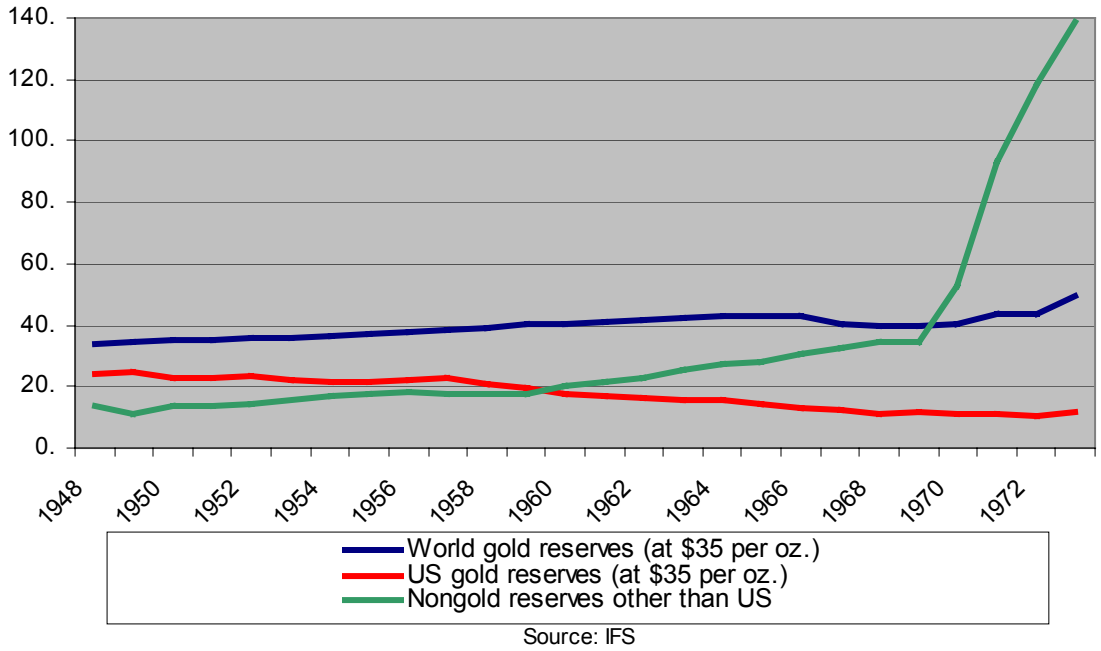
Truman, Edwin M. "The IMF as an International Lender of Last Resort." Real Time Economic Issues Watch, Peterson Institute for International Economics, October 12, 2010. Available at: http://www.piie.com/realtime/?p=1767

Wolf, Martin. *Fixing Global Finance* (Baltimore, MD: Johns Hopkins University Press, 2008).

Yeager, Leland B. *International Monetary Relations: Theory, History, and Policy*, 2nd edition (New York: Harper & Row, 1976).

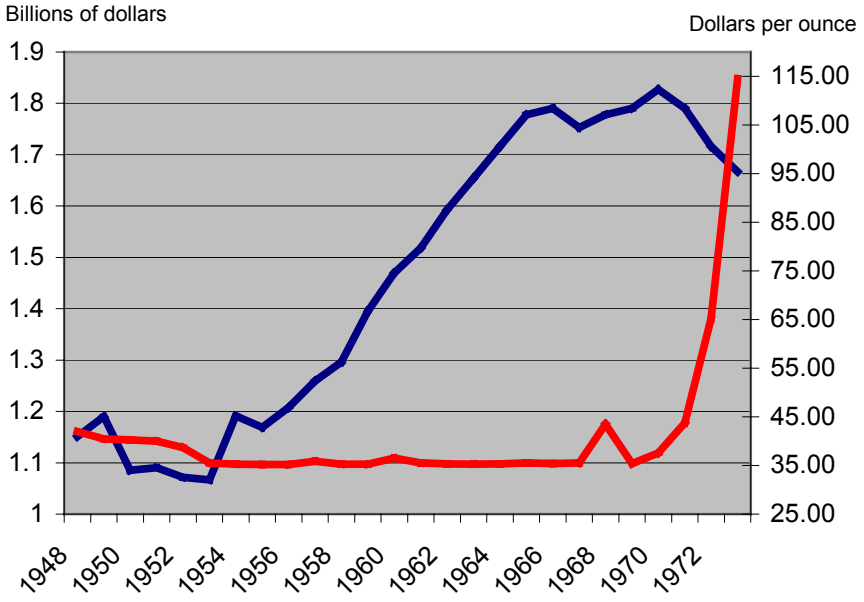
Zhou, Xiaochuan. "Reform the International Monetary System." Typescript (March 2009). Available at: http://www.pbc.gov.cn/publish/english/956/2009/20091229104425550619706/20091229104425550619706_.html

Figure 1: Gold reserves and nongold reserves held by non-US governments (billions of USD)



Source: IFS

Figure 2: Value of world gold production and dollar gold price



Sources: U.S. Geological Survey and Global Financial Data

Value of world gold production (at $35 per oz., left axis) Dollar gold price (right axis)

Figure 3: Output shares of advanced and emerging/developing economies (at PPP)

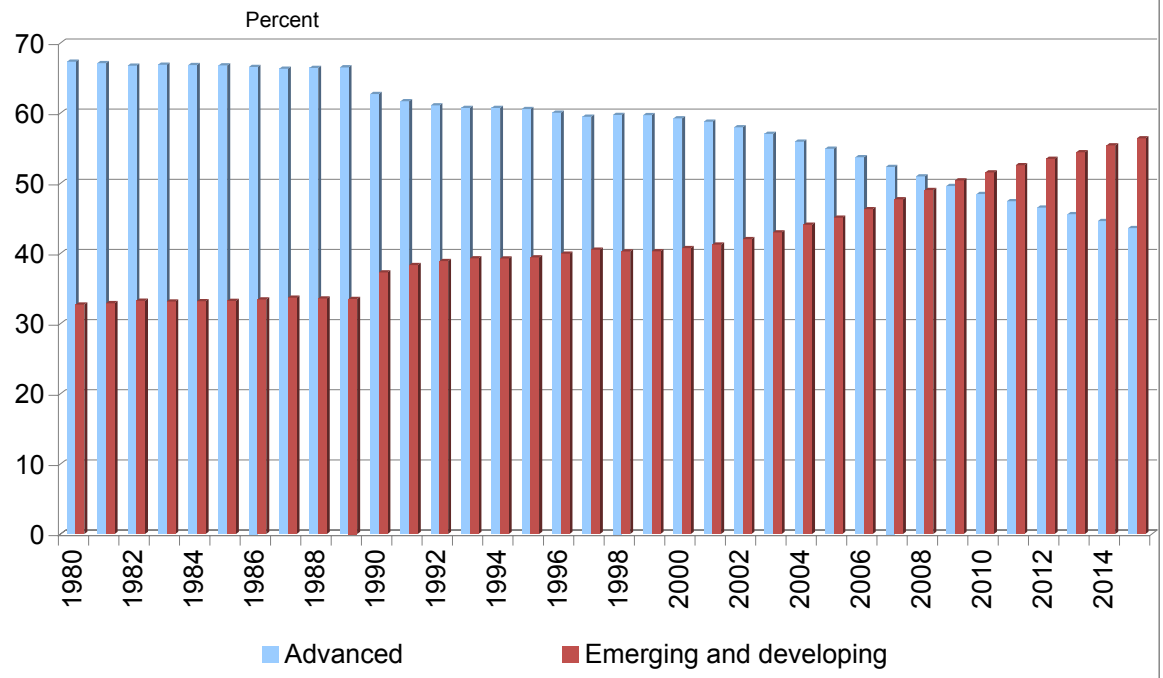


Figure 4: Global nongold reserves compared with gross general government debt

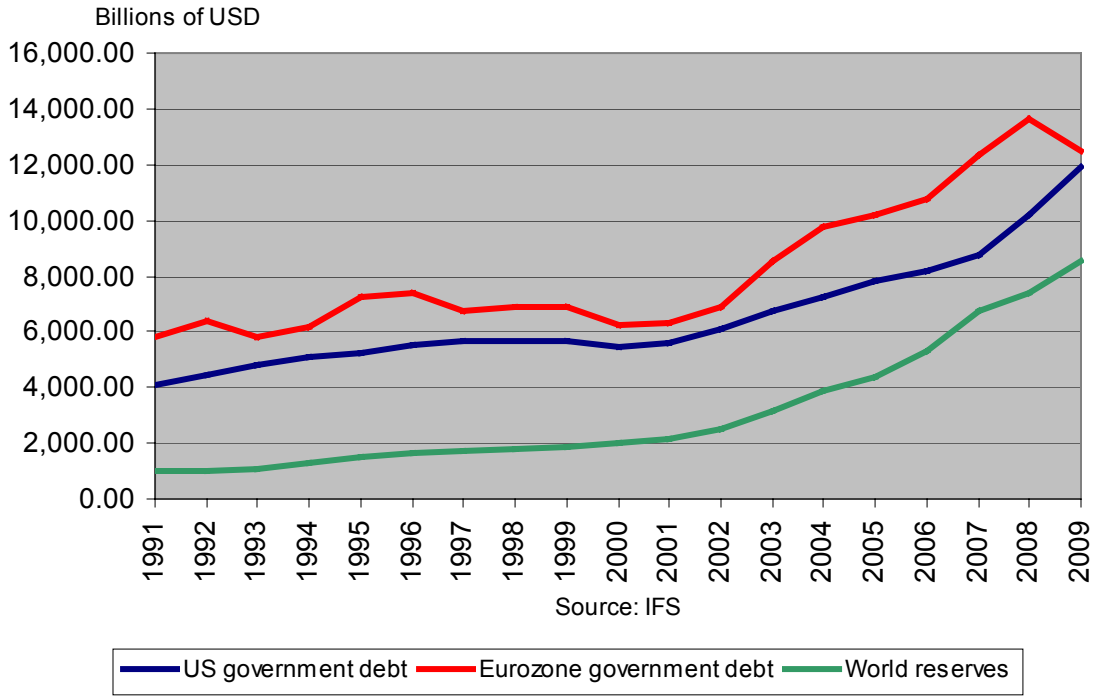


Figure 5: Gross external positions as a multiple of GDP, 1970-2007

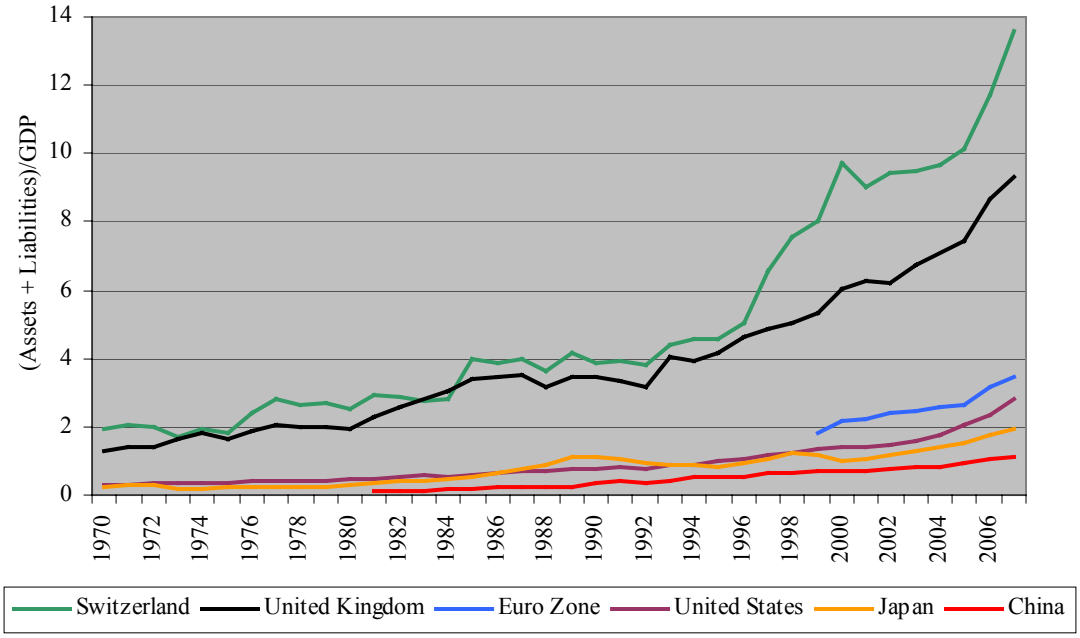
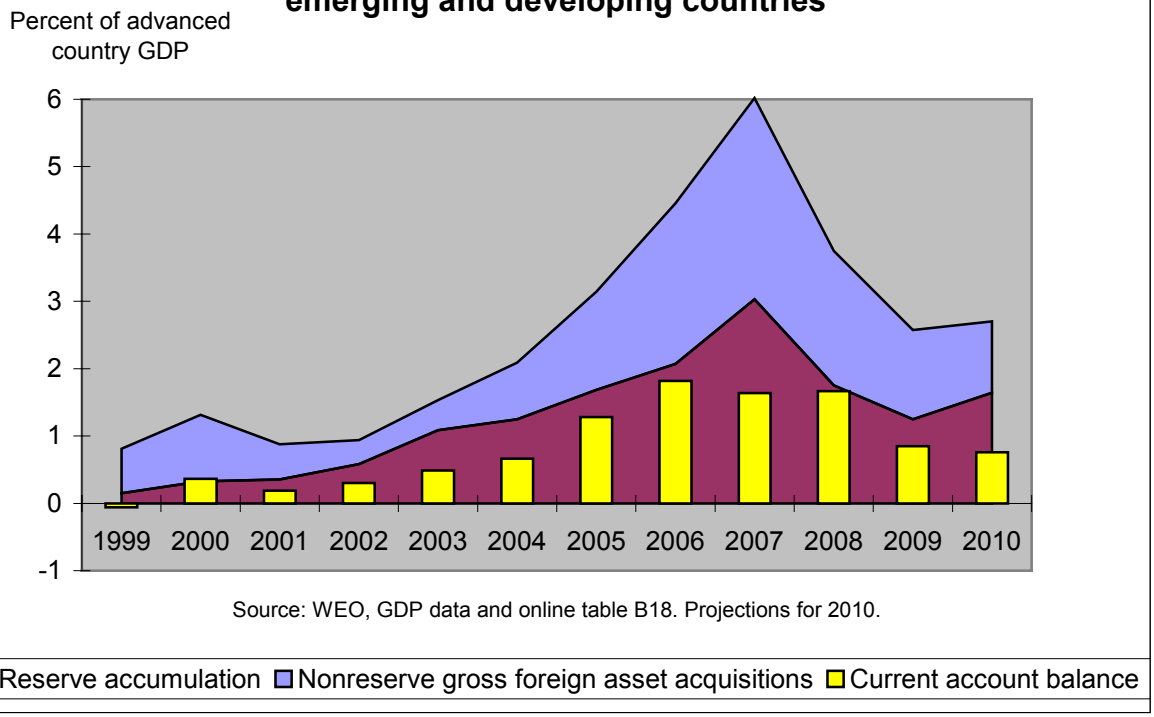


Figure 6: Gross asset accumulation and current accounts of emerging and developing countries



Source: WEO, GDP data and online table B18. Projections for 2010.

Figure 7: Global foreign exchange reserves

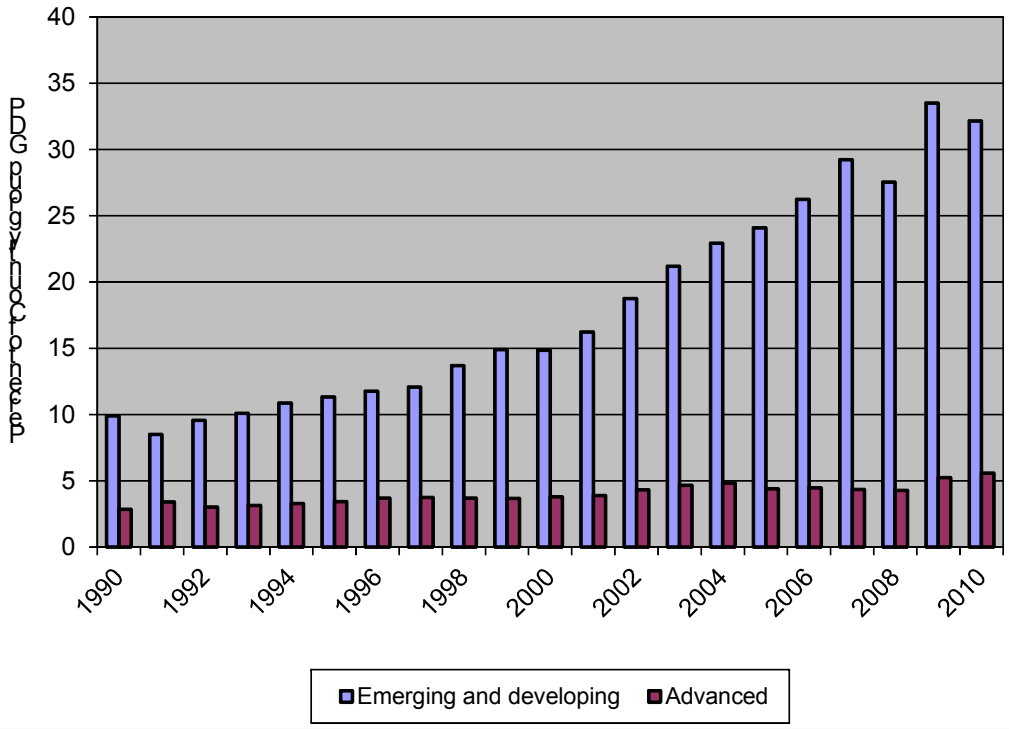
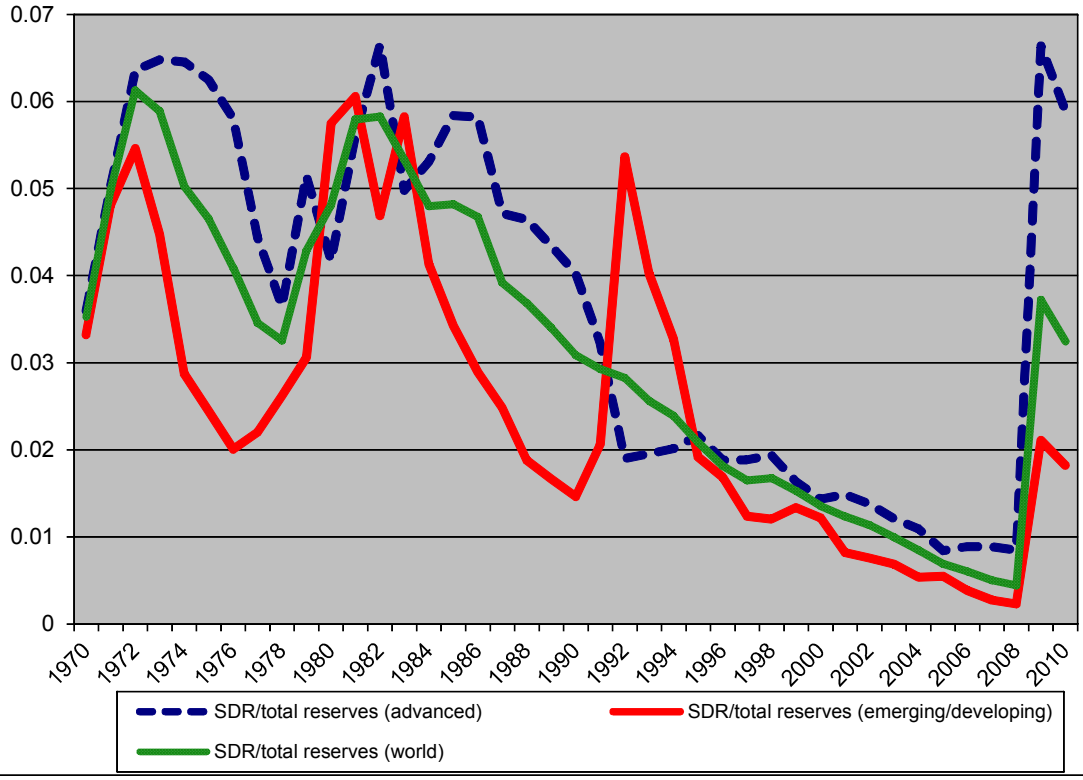


Figure 8: SDR holdings as a fraction of total international reserves: Advanced countries, emerging/developing countries, and world



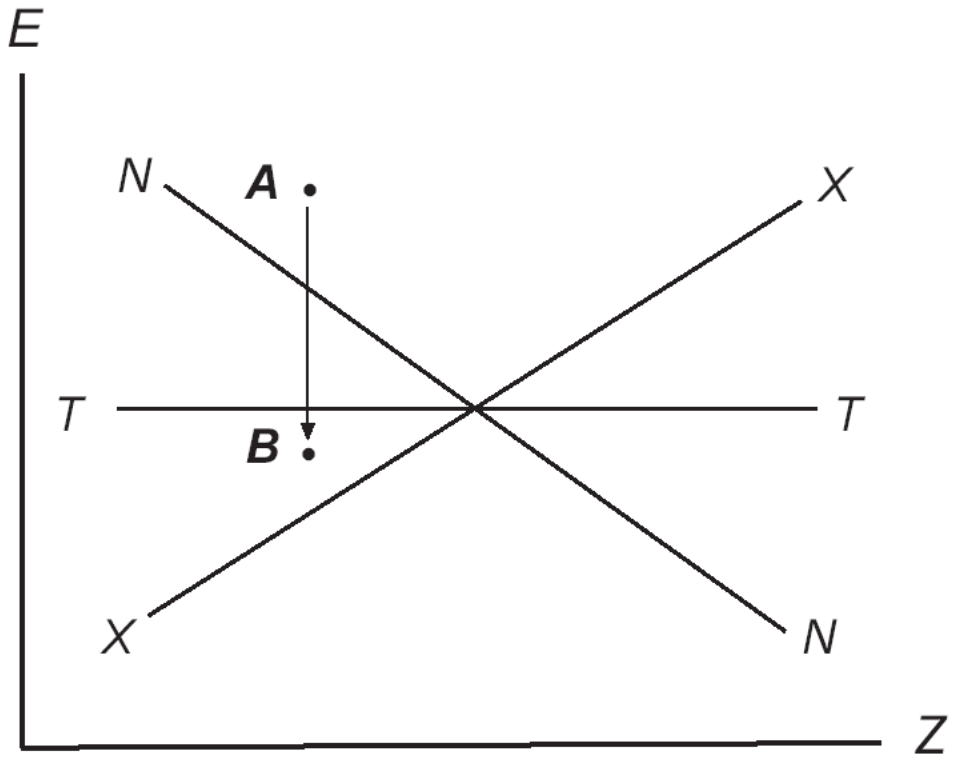
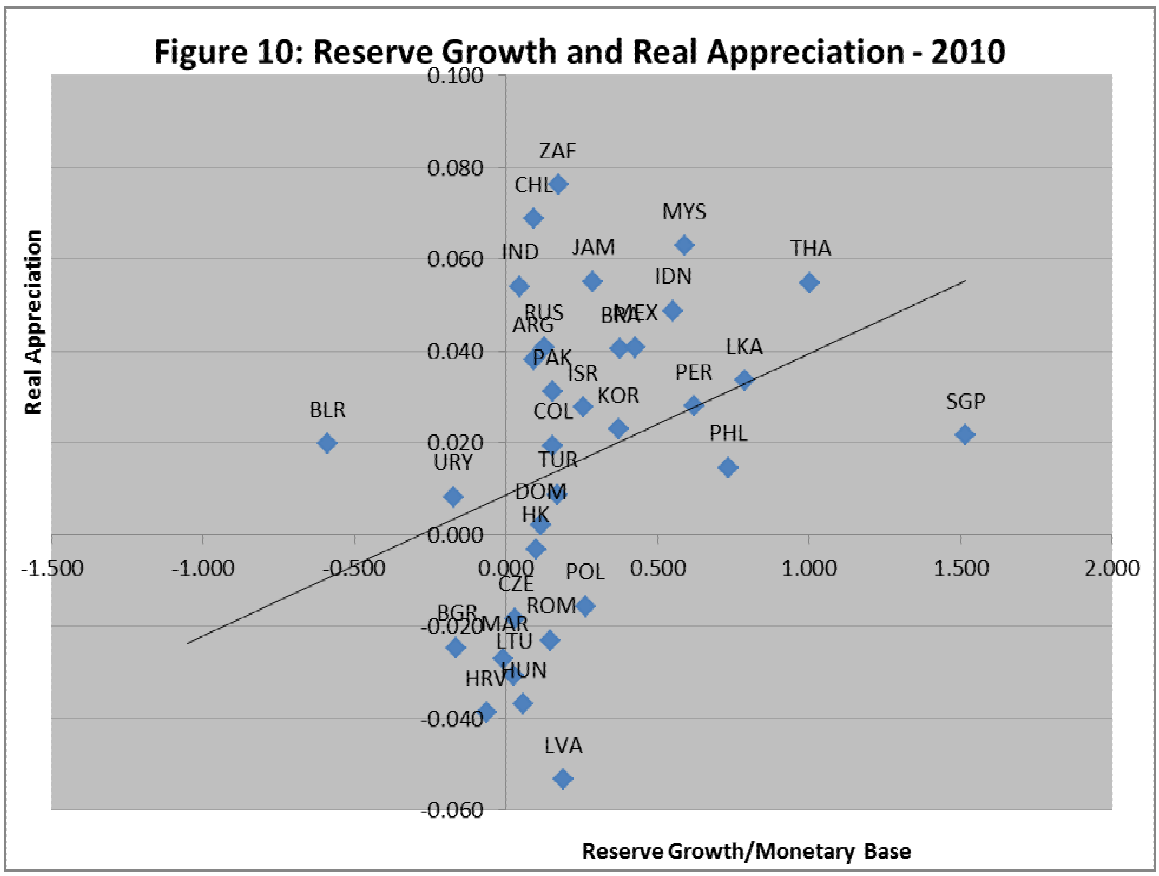


Figure 9: Internal and External Balance


Figure 10: Reserve Growth and Real Appreciation - 2010
Real Appreciation
Reserve Growth/Monetary Base
0.100
0.080
0.060
0.040
0.020
0.000
-0.020
-0.040
-0.060
-1.500
-1.000
-0.500
0.000
0.500
1.000
1.500
2.000
ZAF
CHL
MYS
IND
JAM
THA
IDN
RUS
MEX
ARG
PAK
LKA
ISR
PER
KOR
BLR
COL
SGP
PHL
URY
TUR
DOM
HK
POL
CZE
ROM
BGR
MAR
LTU
HUN
HRV
LVA