

Managing Global Finance as a System

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The lessons from the global financial crisis are many and varied. Among the most important is perhaps also the simplest: to safeguard against systemic risk, the financial system needs to be managed as a *system* (Haldane (2009)). As put, this statement seems rather obvious, perhaps even tautological.

Yet, pre-crisis, it was far from obvious. The orthodoxy then believed that safeguarding individual financial firms was both a necessary and sufficient condition for system-wide stability. This was the financial stability equivalent of the English aphorism: “look after the pennies and the pounds will look after themselves”. And so it appeared during the long pre-crisis period of stable growth and stable banks, often called the “Great Moderation” (Bernanke (2004)).

The crisis has rewritten that orthodoxy. It revealed that the safety of individual banks was neither a necessary nor sufficient condition for systemic stability. Not necessary because, in a well-functioning system, individual banks can and should fail. Not sufficient because, in an integrated web, the links in the chain are more important than any individual node. In focussing on individual banks, policymakers were, to coin another English aphorism, “penny-wise but pound-foolish”. That is why Great Moderation gave way to Great Recession (Gai and Kapadia (2010))

Avoiding systemic risk, then, calls for a system-wide approach to risk monitoring and management. That lesson would have come as no surprise to anyone familiar with dynamic, integrated networks outside of the world of finance. Every network known to man – natural, physical, social, economic – relies for its stability on a systemic approach (Goldin and Mariathan (2014)). Financial webs are no exception. Indeed, the history of crises suggests they may be closer to the rule.

In the light of the crisis, the good news is that this lesson has been taken to heart. The regulatory reform agenda has had an explicitly systemic focus (Haldane (2009)). That is why so-called *macro*-prudential policy has risen in prominence. That is why the world’s largest banks will be required in future to run with extra layers of capital and liquidity. That is why OTC derivatives will in future be centrally traded and cleared. And that is why cross-border resolution of the world’s largest banks has become such a priority. For the global banking system, we now have an emerging set of international rules of the road.

Yet it is far from clear that these lessons have been applied to the global monetary and financial system: if instead of banks we consider countries; if instead of inter-bank lines we consider cross-border capital flows; if instead of international banking regulation we consider the international financial architecture. The rules of the road for this system have, arguably, not kept pace with the growing scale and complexity of global financial flows. For that very reason, some have called it a “non-system” or an “anti-system” (Truman (2012) and De Larosiere (2014)).

This paper discusses these issues and their public policy implications. We first discuss the evolution of the global financial network and why financial integration might be a double-edged sword. We then consider steps to strengthen the international architecture, to better manage global finance as a system.

The Evolution in Global Finance

It is first worth tracking how global financial integration has evolved over the past century or so. Has global finance indeed become more of a system over time? One way of gauging that is by looking at measured stocks of external asset and liabilities – the cumulative consequences of past cross-border capital flows (and valuation changes). Charts 1 and 2 plot world gross external assets, measured relative to world GDP, over the past 140 years. As a comparison, world trade relative to world GDP is also shown.

Global integration of trade and finance has followed roughly similar patterns. Both rose prior to World War I during the heyday of the classical Gold Standard, when trade and capital liberalisation were last at their peak. Both then fell during the interwar years, as national protectionism led to trade and financial barriers being erected. Then, from around 1960 onwards, trade and finance once more began to rise due to the lifting of restrictions on cross-border trade and capital flows.

Despite this close historical correlation, the undulations in global finance are far greater than those in world trade. In 1960, global finance was around one third of its value in 1914, measured relative to world GDP. By 2010, it had risen to three times its value in 1914. Put differently, in 1980 global trade and global finance were on a broadly equal footing, at around a quarter of world GDP. By 2010, global finance was nine times global trade. At the same time as world trade has flat-lined, global finance has come of age.

Today, cross-border stocks of capital are almost certainly larger than at any time in human history. The same is true of cross-border flows of people, goods and services and information (Haldane (2013)). We are accustomed to talking of the revolution in information technology. Yet the revolution in global finance has in some respects been every bit as great.

While these trends tell us something about relative patterns of global interconnection over time, they leave unanswered the question of whether global finance is

a truly integrated network. To gauge that, consider an alternative measure of global capital market integration – the correlation between national saving and investment rates. From Feldstein and Horioka (1980), we know that this correlation provides a proxy for cross-border capital market integration.

For example, a savings/investment correlation of one indicates a closed capital account: all domestic investment needs to be fully financed from domestic saving. At a global level, this would signify something close to global financial autarky. By contrast, a correlation of zero implies that domestic investment can be fully financed on global capital markets. This would signal something close to perfect capital market integration. So saving/investment correlations of zero and one define the outer limits of global capital market integration.

Chart 3 plots this correlation coefficient over the same 140-year period shown in Chart 1. Broadly-speaking, the two series track one another fairly closely. But Chart 3 now allows us to say things about the *absolute* degree of capital market integration. And what a roller-coaster ride it has been. During the first period, from around 1880 up until the Great Depression, global financial integration sat roughly mid-way between its outer limits. Integration was highish, but far from perfect.

For around a fifty year period, from the 1930s through to the 1980s, global finance then went into hibernation. The Feldstein/Horioka coefficient skirted one for large parts of this period. The global financial system operated as anything but a system. Indeed, it was this which prompted Feldstein and Horioka in the early 1980s to present the “puzzle” of still-low levels of capital market integration.

Yet at pretty much precisely the point this puzzle was being identified, it began to disappear. Correlations quickly moved from close to unity in the early 1980s to close to zero by the start of a 21st century. This was an astonishingly rapid evolution from a world close to financial autarky to one close to financial nirvana. In the light of the crisis, measured levels of global capital market integration have fallen somewhat. But they remain at higher levels than at any point in history.

Overall, then, the picture is clear. For much of the 20th century, global finance was more patchwork than network. But the past thirty years have seen that picture change spectacularly. Today, global finance is a well-connected network, a tangled web, a genuine system.

The Double-Edged Sword of Financial Integration

So what are the implications of this increase in global financial integration? There have been large numbers of studies exploring the growth and welfare implications of these trends, using cross-country and time-series evidence. These are well-summarised in Rey (2013). It is fair to say that this evidence paints, at best, a mixed picture. While capital integration ought to enhance international risk-sharing, there

is precious little evidence of this having conferred macro-economic benefits – and some of it having imposed large costs.

For some economists, this is a perplexing and contentious conclusion. It is made all the more so by the fact that the evidence on global trade integration points overwhelmingly towards positive effects (Kose et al (2009) and Berg and Krueger (2003)). Yet, outside of economics and finance, this conclusion would be far less perplexing and contentious.

For many other disciplines, it is well-known that the increased integration of a network can be a double-edged sword from a stability perspective (Watts (2002), Haldane and May (2011)); whether it is physical networks, like utility grids; or natural networks, like eco-systems; or social networks, like the world wide web. The logic is straightforward.

Within limits, connectivity acts as a shock-absorber, a risk-spreader. Links in the system act as a mutual insurance device, helping distribute and disperse risk. These systems are thus more “robust” to shocks. But when shocks are sufficiently large, connectivity instead serves as a shock-transmitter. Risk-sharing then becomes risk-spreading. Links in the system acts as a mutual incendiary device, amplifying risk. These systems are thus also more “fragile”.

So connected systems tend simultaneously to be both stable and unstable, calm and turbulent, robust-yet-fragile (Acemoglu et al (2013), Gai and Kapadia (2010)). In other words, integration can be a double-edged sword, generating a world which is both stronger and more brittle, with instances of more frequent and/or larger dislocations.

What is true of natural, physical and social systems is also true of global economic and financial systems. To illustrate that, consider Chart 4. This shows the results of simulation of a hypothetical financial network of firms with differing levels of financial strength (measured on the x-axis) and with differing degrees of connectivity (measured on the z-axis). On the y-axis is a measure of systemic risk – the incidence of default across this network.

As the network becomes better integrated, for a given degree of financial strength, the zone of systemic stability widens. That is because the network is operating as a shock-absorber. For a large-enough shock to financial strength, however, the system flips to a zone of systemic instability. That is because the network is then operating as a shock-transmitter. And the greater the degree of integration, the sharper this knife-edge, the more brittle the system.

There was no better example of this robust-yet-fragile property than during the global financial crisis. Then, the flat earth that was the Great Moderation gave way to the fragile planet that was the Great Recession. Risk-sharing gave way to risk spreading, risk distribution to risk contagion. But this was by no means an isolated incident.

Chart 5 plots a measure of global capital market integration (external assets/GDP) against a measure of the incidence of crises – all crises and banking crises (Reinhart and Rogoff (2011)). Integration appears to have been associated with an increase in the incidence of crisis over the past couple of decades.

It is not just the incidence, but also the prospective size of crises and their spill-over consequences that has increased. Chart 6 provides one perspective on that. It looks at the scale of IMF programmes over time, normalised by the borrowing country's quota. Two features are striking: first, the increased incidence of programmes; but second, more dramatically, their increased scale.

As for cross-border spillovers, academic evidence has long pointed towards important cross-border spill-over effects from national or international disturbances, in particular monetary policy (Obstfeld and Rogoff (1995), Forbes and Warnok (2012) and Fratzscher (2012)). But more recent evidence points towards stronger and more potent cross-border contagion channels than previously.

For example, Rey (2013) finds evidence that a common global risk factor drives international asset prices and cross-border capital flows, for both advanced and emerging economies. Most recently, the World Bank have found a strong and significant impact of quantitative easing by the world's major central banks on capital flows to developing countries (Lim, Mohapatra and Stocker (2014) and Fratzscher et al (2013)).

All of this evidence tends to point in one direction: the global financial system operates in a similar fashion to all other tightly-knit networks – it is robust yet at the same time fragile. That mix spells danger for policymakers.

Reasons to be Cheerful, Reasons to be Fearful

If the global financial system has entered such an era, the next obvious question is what mechanisms are in place to deal with its adverse consequences? Let me highlight four reasons to be cheerful and four to be fearful.

One positive trend in the international flow of funds is their changing composition. Table 1 breaks down these flows of funds into their foreign direct investment (FDI), portfolio and debt components, for advanced and emerging markets, over the periods 1980–1994 and 1995–2012. Two features stand out.

First, the declining share of debt-based finance and, second, the rising share of portfolio and in particular FDI investment. For example, since 1995 the dominant source of emerging market capital has switched from debt-based finance to FDI. That is significant from a stability perspective. Empirical evidence strongly suggests that FDI is a far more stable source of external financing than bank debt (Kose et al (2009)), in part because of its longer duration. Bank of England research adds a nuance to this story. Dell'Erba and Reinhardt (2013) find that financial sector FDI appears to behave more like debt flows than traditional FDI flows.

A second positive development comes from looking at countries' degree of self-insurance against instabilities in external financing flows, in particular their stock of foreign exchange reserves. As Chart 7 shows, these have grown dramatically, both in money terms and relative to world GDP, since the second world war and especially since the Asian crisis. Reserves have risen from \$ 1.5 trillion in 1995 to over \$ 11 trillion by end-2013, or from around 5% of world GDP to around 15% today.

Third, this has been accompanied by some augmentation of multilateral official sector facilities for helping handle external financing shocks. For example, since 1980 IMF quota resources have risen from just under \$ 80 billion to around \$ 370 billion, or from 0.7% to just less than 2% of world GDP (Chart 8). The most significant augmentation in resources came from the New Arrangements to Borrow (NAB) in 2009, which were agreed to increase temporarily the resources available to the IMF at the height of the financial crisis.

Fourth, alongside these multilateral facilities, the past few years have seen rapid growth in regional and bilateral financing facilities (Chart 9). Regionally, we now have a number of arrangements, including the Chiang Mai initiative in Asia (established in 2000), the European Stability Mechanism (established in 2012), the Latin American Reserve Fund (established in 1991), the Arab Monetary Fund (established in 1976) and, most recently, the BRICS development bank (established in 2014)). In total, regional facilities now total perhaps around \$ 1.3 trillion.

In addition, during the course of the crisis, bilateral foreign currency swap lines were agreed between around 14 central banks, in both advanced and emerging market countries. Although these swap lines were temporary, in October 2013 they were replaced by a set of permanent, and potentially unlimited, swap lines among a group of advanced economy central banks: the US, Canada, the UK, the euro-area, Switzerland and Japan.

These four developments, in combination, are likely to have increased significantly the degree of liquidity insurance available to the global financial system in dealing with systemic country crisis. It is questionable, however, whether this degree of insurance has kept pace with the scale of global capital market integration.

One metric for that is found by scaling countries' foreign exchange reserves by external assets (Chart 10). Despite the rapid rise in reserves, that ratio has fallen since 1980, from around 10% to around 8%.

Second, these reserves are held unevenly across countries, with the countries most at risk from capital flight not necessarily those with the largest reserves stockpile. The degree of concentration in reserves has increased threefold since 2000, according to Herfindahl indices. And scaling individual countries' reserves by measures of their external short-term indebtedness suggests a highly-uneven pattern (Chart 11), with a number of countries holding less than would be needed to meet a year's worth of capital outflows.

Third, this pattern is broadly mirrored when moving from measures of self-insurance to official financing measures. Chart 12 scales IMF resources by external assets. Since the 1980s, this measure has roughly halved from 3% to 1.5% of external assets. And fourth, even once we augment multilateral financing with measures of regional official financing, total official resources relative to external assets are still shy of their levels in 1980. It is only when all central bank swap lines are added do we get back close to 1980 levels.

Taken in combination, this paints a picture of a global financial system whose underlying topology has fundamentally changed shape, but whose insurance mechanisms have failed to keep pace. Therein lies the potential fault-line in the current international financial architecture.

Strengthening the Global Financial System

This naturally begs the question of what might in future be done to improve the resilience of the international financial system. Let me discuss four areas where progress could realistically be made. They are not, individually or collectively, a new global financial architecture. But each is a potentially important new brick in the wall.

First, improved *global financial surveillance*. Understanding the dynamics of a global financial system, its tipping points and edges, is a pre-requisite of managing this system effectively. Some progress has been made on this front. For example, the IMF's Global Financial Stability Report has, since 2002, sought to plot the evolving contours of global finance. And the publication by the IMF of "spillover reports", since 2011, is a further step in the right direction.

Nonetheless, it remains an open question whether these steps take us sufficiently far. The centrepiece of the IMF's surveillance efforts remains the country-specific Article IV consultations. Whether that focus, enshrined in the IMF's 1944 Articles, can still be justified in today's highly integrated global financial network is an open question. The IMF's 2014 Triennial Surveillance Review could seek to further improve the Fund's multilateral and spill-over analysis.

So what might be feasible? I have a dream that, a generation hence, it will be possible to track the global flow of funds in close to real time, in much the same way as we do now with weather systems and internet traffic (Haldane (2011)). This would allow us to not just plot the evolving global financial system but to simulate and stress-test it to help detect impending financial cliff-edges and chasms. The IMF would be the natural guardian of such a global financial weather map.

Second, improved country *debt structures (and restructures)*. Debt flows are known to be a potent source of instability within the global financial system. The instabilities they generate are exacerbated by frictions in the design of debt contracts. One such friction is that debt is an inherently pro-cyclical instrument. For example,

a negative shock to a country's income prospects will tend to raise debt sustainability concerns and hence borrowing costs, thereby worsening sustainability.

Another friction is that, once internationally-held debt becomes unsustainable, restructuring it is usually a messy and complicated process because of the lack of an internationally-agreed legal framework. In part for that reason, countries have tended to delay tackling unsustainable debt problems. But if debt is unsustainable, delay will tend to make a bad debt situation worse, prospectively increasing costs for both the debtors and creditors (Krugman (1988)).

In combination, these frictions can make debt a fickle friend. They will tend to encourage investors to withdraw credit at the first sign of trouble – so-called “sudden stops” (Calvo (1998)). And these frictions are well-illustrated by recent sovereign debt restructuring experience, most recently in emerging market economies such as Argentina and some advanced economies in Europe.

Yet it is widely accepted that there are some, relatively straightforward, technical solutions to these debt problems. One is to issue debt instruments whose contractual features reduce pro-cyclicality and prevarication. One example is GDP-linked bonds, whose repayment profile adjusts with a country's ability to pay, thereby acting counter-cyclically and quasi-automatically to defuse repayment risk (Shiller (1993 and 2003), Barr et al (2014)).

The impact of such instruments on debt dynamics could be significant. A recent Bank of England study considered the debt-to-income ratios of the G7 countries, given shocks to growth and real interest rates, comparing conventional and GDP-linked debt. The latter shrunk the variability of the debt-to-income ratio among the G7 by as much as half. Yet despite their potential attraction, no more than a handful of countries have so far issued GDP-linked debt instruments.

Contingent convertible (“CoCo”) bonds are a second potentially useful instrument. They can be designed with a duration which is automatically extended if a country breaches certain pre-set stress conditions – for example, if it is the subject of an IMF lending programme (Brooke et al (2012)) – thereby delivering some temporary alleviation of liquidity pressures. So far, no country has issued such instruments, even though broadly-similar instruments have become popular among banks.

There has been somewhat greater progress towards the inclusion of contractual clauses which assist in the restructuring of sovereign debt, in particular Collective Action Clauses (CACs) following the Asian financial crisis. Yet as recent Argentine experience underlines, this has not closed the book on sovereign debt restructuring problems. In the future they might do so if stronger formulations, such as the recently proposed “super aggregation CACs”, are introduced.

Third, enhanced *macro-prudential and capital flow management*. Significant progress has been made over the past decade in the design and implementation of such regimes. A decade ago, policies to manage actively inflows and outflows of

capital tended to be frowned upon by the IMF and the international community. Today, these measures have been accepted as part of the toolkit for protecting countries from boom/bust cycles in capital flows (IMF (2012)). More importantly still, more than 40 countries have already deployed these measures since 2009.

That is by no means, however, the end of the story. A great many important analytical and operational issues remain open. What are appropriate states of the world for introducing and releasing such measures – first resort or last resort?; which measures are likely to be most effective – outflow or inflow?, price or quantity?; and how do these policies operate alongside the other arms of policy – monetary, macro-prudential, micro-prudential?

At present, we have neither the theory nor the experience to answer these questions definitively, although case law is rapidly emerging (Forbes et al (2013) and Magud et al (2011)). Pending answers to those questions, there is no real framework or “rules of the road” for capital flow management policies.

The same is true, to a somewhat lesser extent, of macro-prudential policy frameworks. These too have come significantly back into fashion, with many countries now implementing macro-prudential policies and a number of them having distinct, if still fledgling, macro-prudential frameworks (Nier et al (2011)). Case law is being built rapidly and empirical evidence is emerging on the efficacy of different classes of macro-prudential tool (Lim et al (2011) and Kuttner and Shim (2013)).

The new Basel III banking rules have added further momentum to this policy trend, by introducing an explicitly macro-prudential requirement – the Countercyclical Capital Buffer (CCB). The CCB rules hard-wire in some degree of cross-country co-ordination, with any adjustment in the buffer by one country (up to a limit) being automatically reciprocated by other countries whose banks are lending into that country.

This means that some co-ordination of macro-prudential policies is likely, helping smooth some of the peaks and troughs in risk-taking caused by cross-border capital flows. Whether it is possible to go one step further – for example, by having macro-prudential policies explicitly lean against common global risk taking factors – is an interesting analytical and operational question for the future.

Fourth, improved *international liquidity assistance*. This is plainly the thorniest of the issues. Fifteen years ago, IMF Deputy Managing Director, Stan Fischer set out the case for the IMF becoming a quasi-international lender of last resort (Fischer (1999)). His argument then was that the IMF needed more financial firepower given the increasing scale of cross-border capital flows.

In the period since, there has been a further dramatic ratchet up in cross-border capital flows which has not been matched by increased IMF resources. Ratification by the US of the 14th general review of IMF quotas would be a step in the right direction, but would not reverse the retreating tide. Various proposals for augmen-

ting IMF resources, including by borrowing on capital markets, have foundered on political rocks (Lachman (2006) and Farhi et al (2011)).

Regional facilities have sprung up as a partial substitute and could potentially play a useful complementary role. Their resources have grown to around the same size of those of the IMF. But the financial system is a global, not regional, one. And the global public good of financial stability risks being under-provided for if it is reliant on purely regional solutions. Indeed, access to some of these regional facilities is itself conditional on an IMF programme.

One hybrid solution, proposed by some, is to develop further the foreign exchange swap lines agreed among central banks, bilaterally or multilaterally (Farhi et al (2011)). Although such facilities rose to prominence during the crisis, they have a lengthy history dating back to the 1930s.

At present, the number of bilateral swap lines between central banks totals almost 90, in addition to the unlimited multilateral swap lines agreed recently among some advanced economy central banks. This web of bilateral and multilateral lines could, at least in principle, be augmented to cover a larger part of the global financial system.

Conclusion

The global monetary and financial system has undergone a mini-revolution in a generation, the result of financial globalisation. It has become a genuine system. This has altered fundamentally the risk-return opportunity set facing international policymakers: larger-than-ever opportunities, but also greater-than-ever threats.

Dealing with these risks calls for managing this system as a system. That means turning the current “non-system” of rules and regulations into one with an identifiable architecture to support it. Measures to improve the monitoring and management of private capital flows, and to augment and strengthen official sector financing facilities are important milestones towards this long-term objective.

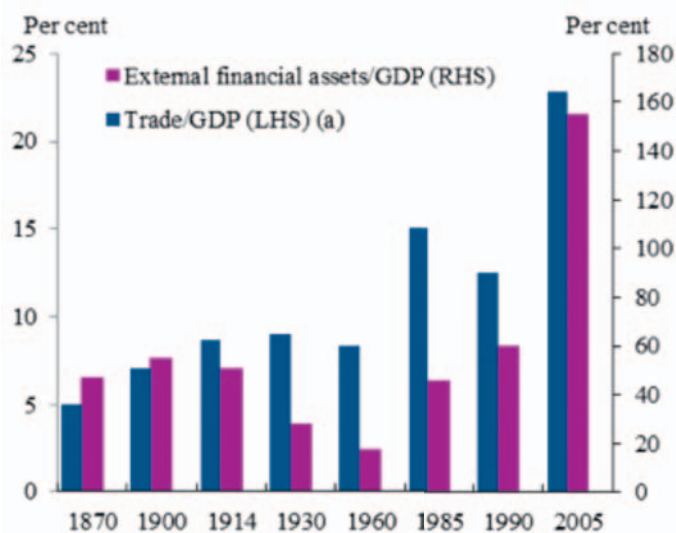
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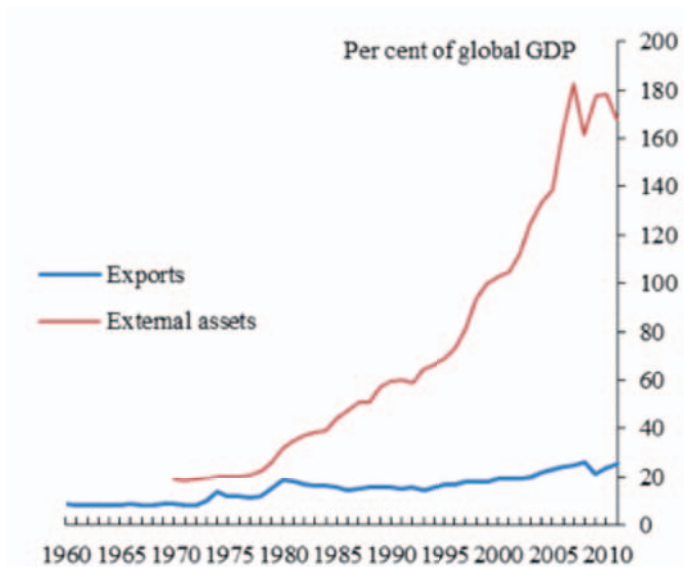
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Chart 1: Capital Stocks and Trade Flows



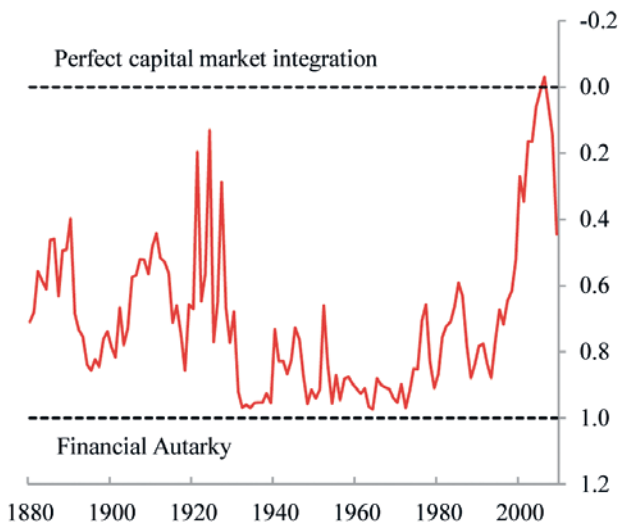
Sources: Maddison (1995: pg 227,239), IMF International Financial Statistics, World Bank WDI, National Bureau of Economic Research, Mckeown (2004 P 184) and Bank calculations.
 (a) Trade = volume of exports in world prices.

Chart 2: Capital Stocks and Trade Flows, 1960–2012



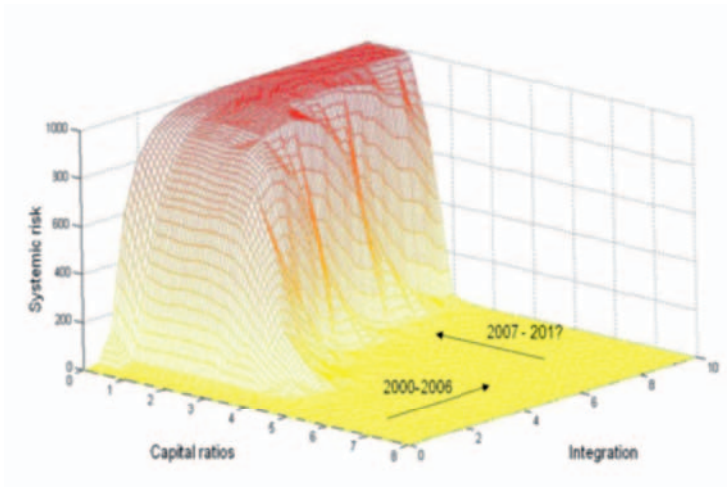
Sources: IMF International Financial Statistics, World Bank WDI and Bank calculations.

Chart 3: Global capital market integration^(a)



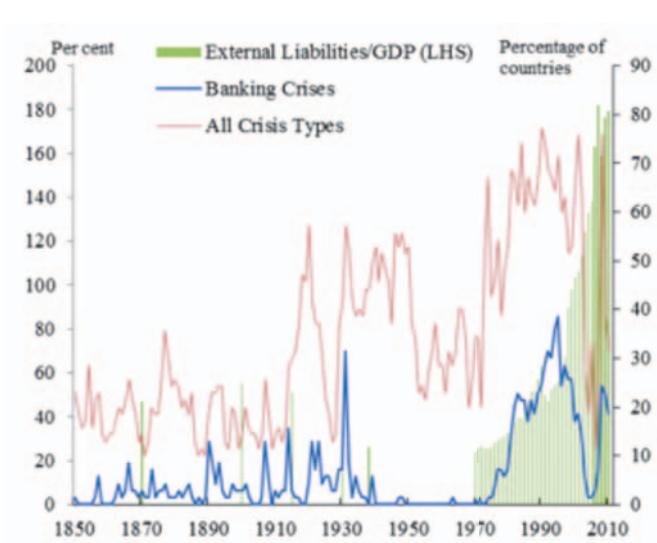
Sources: Taylor (2002), IMF WEO, Obstfeld and Taylor (2004) and Bank Calculations
 (a) Global capital market integration is the correlation coefficient between domestic savings and investment for 15 countries (the sample varies slightly over the period).

Chart 4: Contagion in financial networks



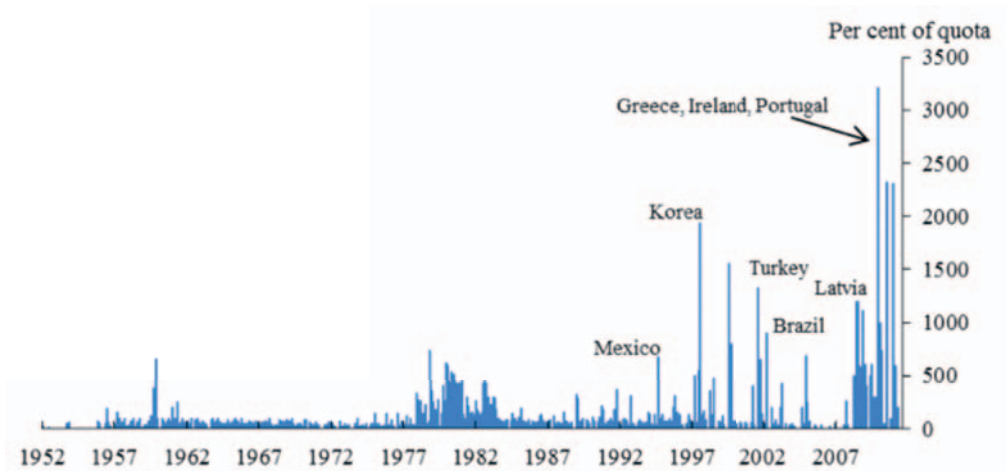
Sources: Bank of England.

Chart 5: External assets and crisis incidence



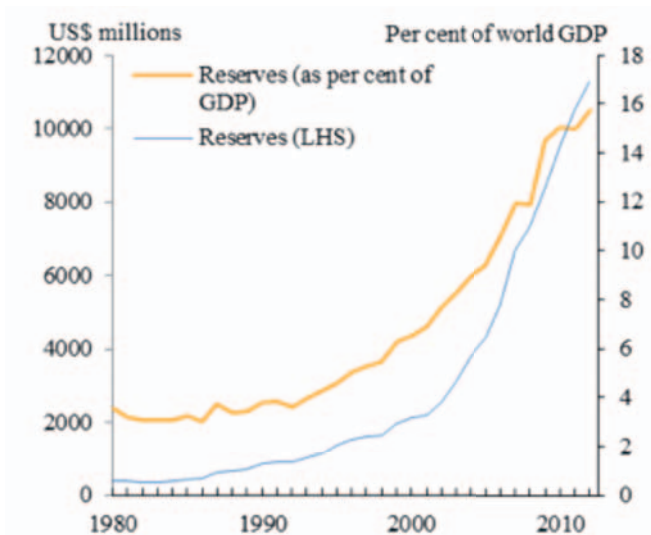
Sources: Reinhart and Rogoff (2011), updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007) and Maddison (1995).

Chart 6: Size of IMF programmes as share of borrower's IMF quota



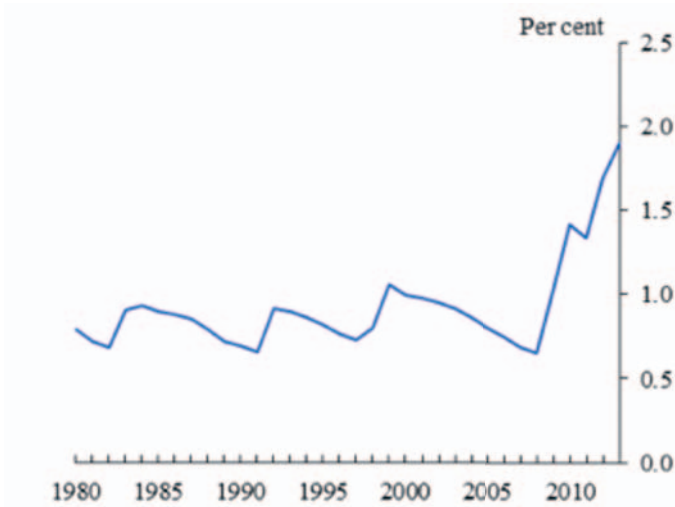
Sources: IMF.

Chart 7: International reserves (USD) and as a share of global GDP, 1980–2012



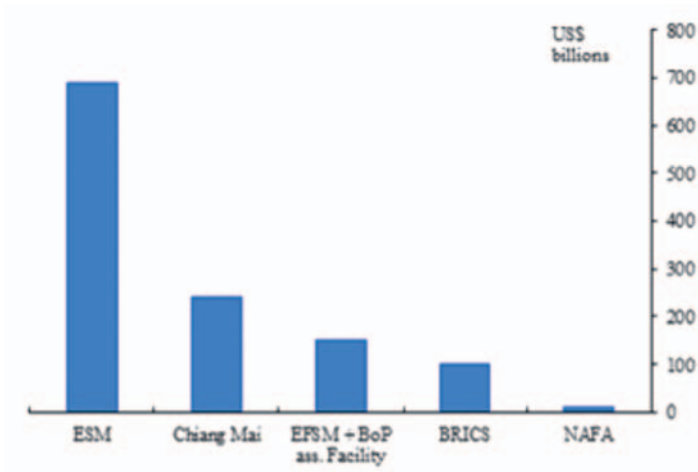
Sources: IMF IFS, IMF WEO and Bank calculations.

Chart 8: IMF resources as a share of global GDP^(a)



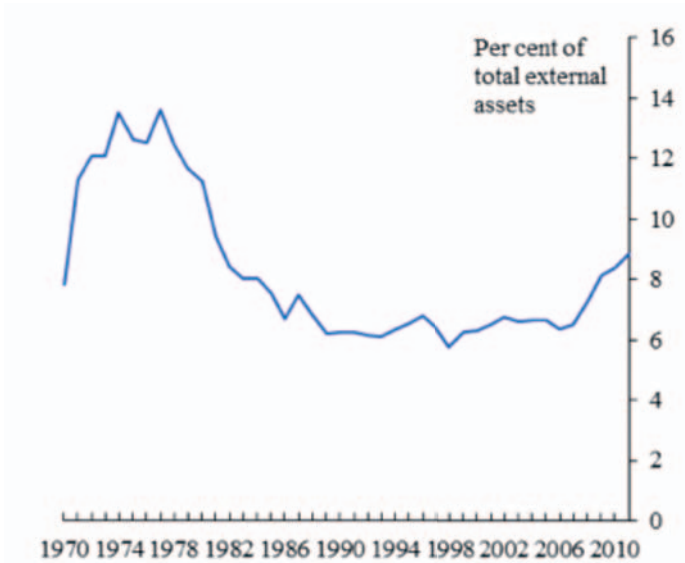
Sources: IMF International Financial Statistics, IMF WEO and Bank calculations.
 (a) IMF resources include quota, NAB, GAB and bilateral borrowing.

Chart 9: The 5 largest regional financial arrangements^(a)



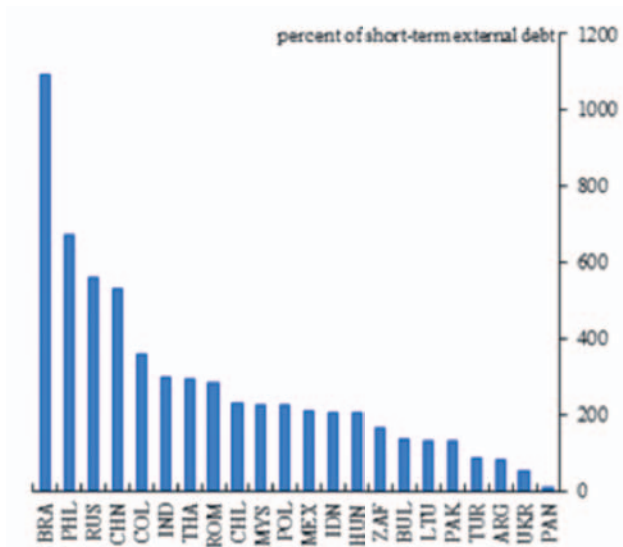
Sources: ESM, ABD, FLAR, AMF, BRICS Fortaleza declaration, NAFA, EFSM, EurAsEC ACF.
 (a) There many other RFAs including FLAR, AMF EurAsEC ACF.

Chart 10: International reserves as a share of global external assets, 1970–2012



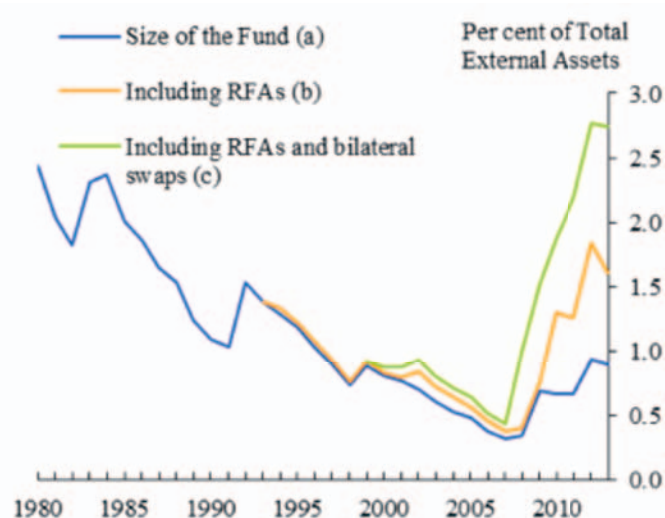
Sources: IMF IFS and updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007).

Chart 11: International reserves as a share of short term external debt, end-2012



Sources: IMF IFS, World Bank QEDS and Bank calculations.

Chart 12: Official resources as a share of global external assets



Sources: Sources: IMF International Financial Statistics, IMF WEO, updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007) and Bank calculations.

(a) IMF resources include quota, NAB, GAB and bilateral borrowing.

(b) Includes EFSF from 2010 until 2013.; ESM from 2012; CMIM and EFSM from 2010, FLAR, AMF from 2011; BoP Assistance Facility from 2002; Nafa from 1994; EurAsEC ACF from 2009.

(c) For swap lines that are formally unlimited, the value of their past maximal drawing was used (where drawn upon).

Table 1: Composition of capital flows, 1980–2012

	1980-1994	1995-2012
Advanced Economies		
Share of FDI	15.65	20.90
Share of Equity	6.22	11.11
Share of Debt	78.13	67.99
Emerging market Economies		
Share of FDI	39.00	56.80
Share of Equity	10.86	9.33
Share of Debt	50.14	33.86

Source: IFS and Bank calculations.