Five years in the tower

Stephen G Cecchetti[1]

Economic Adviser at the Bank for International Settlements (BIS),
and Head of its Monetary and Economic Department

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It is my pleasure and privilege to welcome all of you to the 12th BIS Annual Conference. This is my fifth and last opportunity to deliver opening remarks. Consistent with this year's theme, "Navigating the Great Recession", I'd like to focus on what I have learned during my five years at the BIS and offer some insights in three broad areas: economic research, policy and, lastly, the work of the BIS itself.

Insights for economic research

For economic research, I draw two lessons from my experience:

1) Quantities matter more than we thought.
2) Moral hazard is worse than we thought.

The importance of quantities

Let me start with quantities. I think it is fair to say that, in the past, monetary economics paid insufficient attention to quantities. Old-style monetarists would surely take issue with this claim. After all, didn't Milton Friedman and his acolytes always tell us that we should keep our eye on the quantity of money?

In fact, some people did, at least into the 1980s. But the way they did it was too mechanical. They focused on the stable historical relationship between money and the price level that Friedman and Schwartz had found.[2] This may have been fine for the pre-1960 period, but with rapid financial innovation and as intermediation shifted away from traditional banks, it worked less well.

Realising that the relationship between growth in conventionally defined monetary aggregates and inflation was too unstable to be useful in making monetary policy, we shifted our attention to interest rates, or prices more generally.[3] The equilibrium between supply and demand would take care of the quantity. And, since we thought of the interest rate as the

[1] I thank Dietrich Domanski, Andrew Filardo and Boris Hofmann for their contributions to this presentation. The views expressed here are those of the author and do not necessarily reflect those of the BIS.

[2] Milton Friedman and Anna J Schwartz, *A Monetary History of the United States, 1867–1960*, Princeton, N.J.: Princeton University Press, 1963.

[3] As Gerald Bouey, Governor of the Bank of Canada, put it in 1982: "[w]e didn't abandon the monetary aggregates, they abandoned us." See "Dropping the anchor", *The Economist*, 23 September 1999.

primary link between the financial system and the real economy, this new focus made sense. By stabilising the interest rate policymakers could isolate the real economy from movements in the demand for money arising from changes in behaviour or shifts in the supply of money because of changes in the financial system.[4]

The crisis reminded us that quantities tell us something important about the behaviour of individuals and the system as a whole; something that is not contained in prices. Quantities reflect exposures, constraints and vulnerabilities. This point becomes clear when we think about the role quantities play, or will play, in our models. Take the familiar structure where we have impulses and propagation mechanisms. In this standard formulation, quantities are going to enter as state variables that affect the nature of the propagation mechanism. A vulnerability is then a situation in which some quantity gets large in a way that amplifies the propagation of a shock so as to create a large movement in welfare.

As examples of quantities that signal vulnerabilities, let me cite international asset positions of countries and cross-currency banking system exposures. Here, my focus is on the need to consider *gross* rather than *net*.

Prior to the crisis, large and persistent current account surpluses and deficits took centre stage in the discussion of *global imbalances*. Analysts and policymakers rightly noted that large current account imbalances were almost always a precursor to crises. And, what made people think that just because the main culprits this time were very large countries, some of them advanced rather than emerging, it would be different this time?

Well, surely this mattered. As we said in June 2009, "the symbiotic relationship between leverage-led growth in several industrial countries and export-led growth in other economies contributed to sustaining the unsustainable for too long."[5] But this was about current accounts; about net flows. Financial vulnerability comes from gross stocks. A run, whether on a bank or a country, is devastating because of the size of the balance sheet; not because of net flows, but because of gross stocks.

This brings me to Graph 1, which plots international investment positions for 127 countries as a percentage of world GDP. We can see that, since the mid-1990s, gross international asset positions have risen steadily from roughly 50% to more than 150% of world GDP.[6]

To get some sense of whether this number is large, we can do a rough calculation. Since the capital stock is roughly four times GDP,[7] perfect risk-sharing would imply gross international asset positions on that scale. If cross-border positions were entirely equity, which they are not, we would be roughly half-way there. My point is that assuming globalisation continues, we are likely to move further. But the move will not come without risks. The bigger cross-border positions become, the more damaging a sudden exit will be.

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[4] This intuition was built on the result in William Poole's seminal contribution, "Optimal choice of monetary policy instruments in a simple stochastic macro model", *The Quarterly Journal of Economics*, vol 84, no 2, May 1970, pp 197–216.

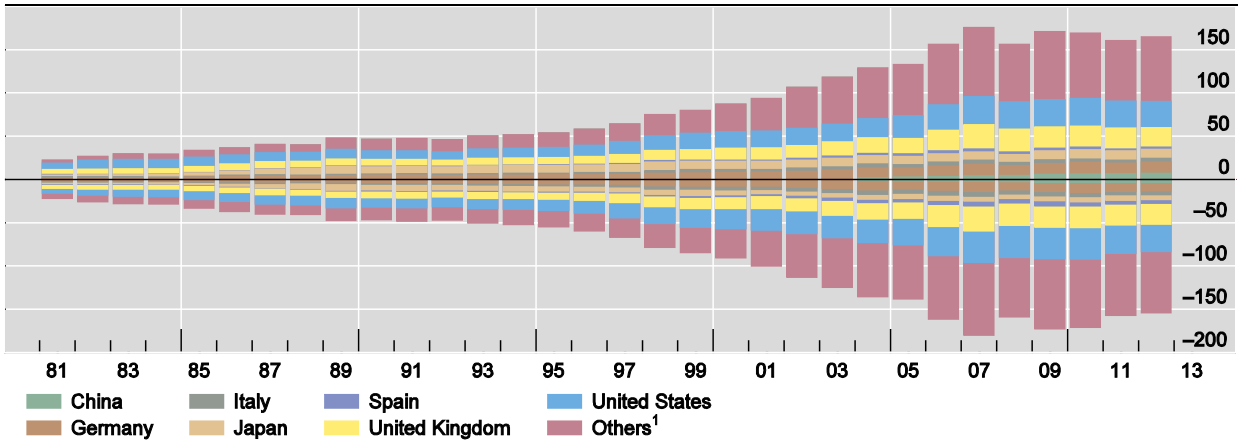
[5] J Caruana, "The narrow path ahead", speech presented on the occasion of the BIS Annual General Meeting, June 2009.

[6] For a more detailed discussion, see S Cecchetti, "Global imbalances: current accounts and financial flows", remarks prepared for the Myron Scholes Global Markets Forum, University of Chicago, 27 September 2011.

[7] For the United States, in the first quarter of 2013 nominal GDP was reported to be US$ 16,004.5 billion while the net worth of the country was estimated at US$ 70,349.1 billion. This is a multiple of 4.4.

International investment positions of all countries

As a percentage of world GDP Graph 1



[1] Sum of 120 economies.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; BIS calculations.

My second example of a quantity that signals vulnerability is the dollar liabilities of non-US banks. Even though current account imbalances between Europe and the US were relatively small, continental European banks managed to acquire substantial quantities of mortgage-backed and US Treasury securities prior to the crisis. My BIS colleagues Patrick McGuire and Goetz von Peter estimated that these created short dollar positions in excess of US$ 1 trillion.[8] When interbank funding markets started to dry up in August 2007, these banks were left without sources of the dollars. And, since the banks were outside the US, the central bank could not lend to them – until the creation of the swap lines in December 2007. The BIS estimates that, at their peak in December 2008, the Fed lent US$ 583 billion to foreign central banks.

So, prices are not enough; think about quantities. And, net is not enough; think about gross.

Moral hazard is a big problem

The second lesson I have learned in my time in the BIS tower is that the nature and size of the risks financial institutions take on are much bigger than we thought. This really comes as no big surprise.[9]

The fundamental problem is that the private interests of banks and bankers diverge from those of society at large. This is especially true when it comes to the stability of the system and the direct or indirect burden on taxpayers. The source of this conflict is limited liability: the fact that owners and employees are not held financially accountable beyond their initial investment. In addition, increasing leveraging increases the value of the claims on a bank for equity holders. What this means is that the bank's owners and managers have an incentive to take on risk.

[8] See P McGuire and G von Peter, "The US dollar shortage in global banking," *BIS Quarterly Review*, March 2009, pp 47–63.

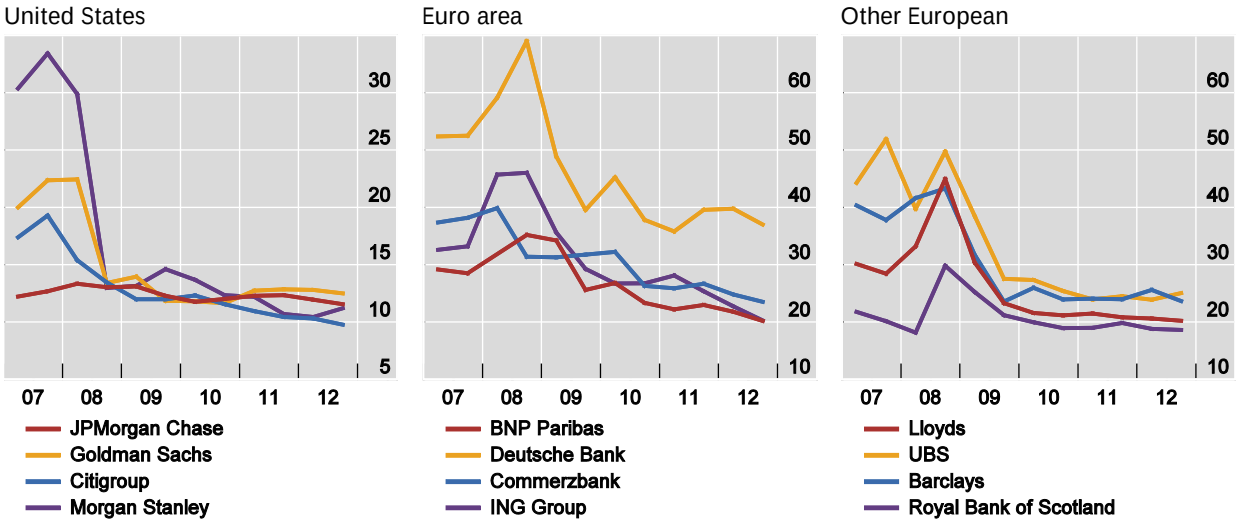
[9] This draws on S Cecchetti, "The future of financial intermediation and regulation", remarks prepared for the Second Conference of the European System of Central Banks Macro-prudential Research Network, Frankfurt, Germany, 30 October 2012.

The problem with incentives is compounded by the increase in opportunities to take risk. That is, financial innovation has made things even worse. In the past, payment streams and risks tended to come bundled together. Today, you can purchase or sell virtually any payment stream with any risk characteristics you want – that's what financial engineering is all about. This ability to separate finance into its most fundamental pieces – the financial analogue to subatomic particles – has profound implications for the way in which risk is bought and sold. While it is true that risk can go to those most able to bear it, the ability to sell risk easily and cheaply comes along with the ability to accumulate risk in almost arbitrarily large amounts. The result is that small numbers of firms or individuals have the potential to jeopardise the stability of the entire financial system.

Graph 2 gives a sense of the extent of leverage that was created in the banking system prior to the crisis. As you look at the graph, note that the US data are based on GAAP while the other panels present data that use IFRS.[10] I draw your attention to the vertical scale on the centre panel, and the fact that Deutsche Bank's leverage was over 50 in early 2007.

Leverage ratios

Ratio of total assets to total equity — Graph 2



Note: financial accounts reported under IFRS except for US banks (US GAAP).

Source: Bloomberg.

Banks also knew that by growing larger, they would become too big to fail. Once markets figured out the implicit or explicit official support for these too-big-to-fail institutions, they offered cheap funding. This was totally rational from a private perspective but meant an underpricing of systematic risk, further increasing institutions' incentives to up load on it.

The conclusion is clear: moral hazard is much worse than we thought.

[10] The two differ primarily in their treatment of derivatives and repurchase agreements, where GAAP allows for netting while IFRS does not.

Insights for policy

In the area of policy and policymaking, I have three insights to offer:

1) Short-term interest rates are not enough.

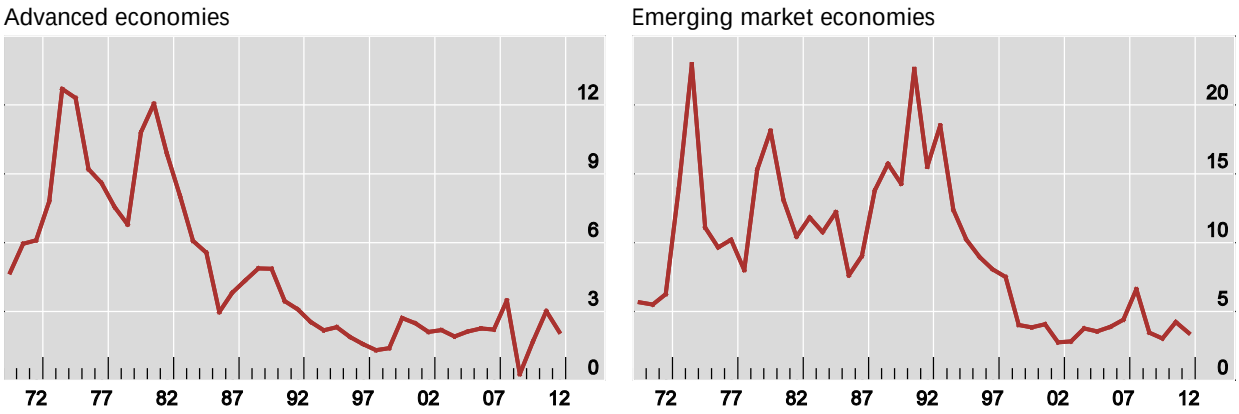
2) High debt levels are a drag on growth.

3) Market discipline is not enough.

Before discussing each in turn, I want to make sure that we don't lose sight of an enduring lesson from before the crisis: price stability is the foundation for strong, sustainable growth. Looking at Graph 3, you see one of the great successes of the past quarter-century: low and stable inflation! But the crisis taught us that price stability is not sufficient for economic stability. The achievement of low inflation, and the associated focus on deviations of output from potential and employment from full employment, did not prevent the build-up of financial imbalances. Looking forward, we now realise how integrating financial stability considerations into monetary policy frameworks is the most important required refinement for inflation targeting.

Historical inflation[1]

Average annual changes in consumer prices, in per cent — Graph 3



[1] Median of the economies listed. Advanced: AU,CA,DK,JP,NZ,NO,SE,CH,GB,US and 12 initial euro area members. EMEs: AR,BR,BG,CL,CN,CO,HR,CZ,HK,HU,IN,ID,IL,KR,LV,LT,MY,MX,PE,PH,PL,RO,RU,SG,ZA,TH,TR (based on available data).

Source: IMF, *World Economic Outlook*.

Short-term interest rates are not enough

As policy rates reached their lower bounds, central banks devised new tools to stabilise their financial systems and economies. Depending on the exact nature of the problem and structure of their financial system, central banks purchased securities directly, offered loans to institutions to whom they hadn't lent before, changed their collateral rules, and the like.[11] As they did this, the size and composition of their balance sheet changed.

With assets in excess of US$ 20 trillion, the balance sheets of the world's central banks today are twice what they were in 2007. Not only that, but their composition is quite different too. Most notably, the maturity of the assets has grown significantly.

[11] For a summary of the myriad of actions taken through May 2009, see Chapter II of the *79th Annual Report* of the BIS, June 2009.

Looking forward, there are several important lessons to be learned from this experience. First, the size and composition of central bank balance sheets matter. We now know that the size and the maturity structure of the consolidated government balance sheet influence the yield curve. This means that central bank bond purchases and sales can be used to influence both the level and slope of the term structure, but will also create overlaps and potential conflicts of interest with debt managers.[12]

Second, central banks will continue to have a wider-ranging role in financial markets than they did prior to the crisis. On an operational level, this will call for flexible collateral frameworks to target specific developments in different financial market segments. One way to think about this is through the lens of the lender of last resort function. Created in the 19th century for a financial system in which intermediation was almost entirely through traditional banks, this looks to need an overhaul for the 21st century. Specifically, in a market-based financial system, being the lender of last resort to banks isn't enough. If we expect markets to remain liquid in all states of the world, we need a market-maker of last resort. Equivalently, when liquidity transformation is being done by financial institutions other than banks, access to discount lending facilities is not sufficient to ensure the liquidity of the financial system as a whole.

Taking all of this together, we will have to work hard to understand exactly how the monetary transmission mechanism works. How is it that the central bank can best stabilise the financial system and the real economy? What is clear is that the supply of central bank reserves remains the anchor of monetary control. But beyond that, many questions will have to be answered, including the role of interventions along the yield curve, collateral frameworks, and the role of central banks as lender of last resort.

High debt levels are a drag on growth

In work with my BIS colleagues Enisse Kharroubi, Madhu Mohanty and Fabrizio Zampolli, I have explored the relationship of growth to debt and the size of the financial sector.[13] One would expect public debt to be a drag on long-term GDP growth for at least three reasons. First, higher debt means higher interest payments, and higher debt service means higher taxes and lower productive government expenditure. Economics and politics both put limits on how high tax rates can go. The probability of hitting such limits increases with the level of debt. Second, as debt rises, so do sovereign risk premia. And with higher sovereign risk premia come higher borrowing costs, lower private investment and lower long-term growth. Third, with higher debt, authorities lose the flexibility to employ countercyclical policies. This results in higher volatility, greater uncertainty and, again, lower growth. Extensive empirical research confirms this negative link between public debt and trend growth: a 10 percentage point increase in the debt-to-GDP ratio is associated with a 13–17 basis point decline in trend GDP growth per capita for debt levels above about 80%.

For a number of years, we have also emphasised the importance of ensuring that fiscal trajectories are sustainable. This is not a new lesson. As I discussed in my opening remarks at the 2011 Conference, nearly 20 years ago Paul Masson and Mike Mussa estimated the net present value of the unfunded pension liabilities of the G7 countries at something like two

[12] See J Chada, P Turner and F Zampolli, "The interest rate effects of government debt maturity", *BIS Working Papers*, no 415, June 2013.

[13] See S Cecchetti, M Mohanty and F Zampolli, "The real effects of debt", in *Achieving Maximum Long-Run Growth*, proceedings of the Federal Reserve Bank of Kansas City's Jackson Hole Symposium, 2011, pp 145–96; and S Cecchetti and E Kharroubi, "Reassessing the impact of finance on growth", *BIS Working Papers*, no 381, July 2012.

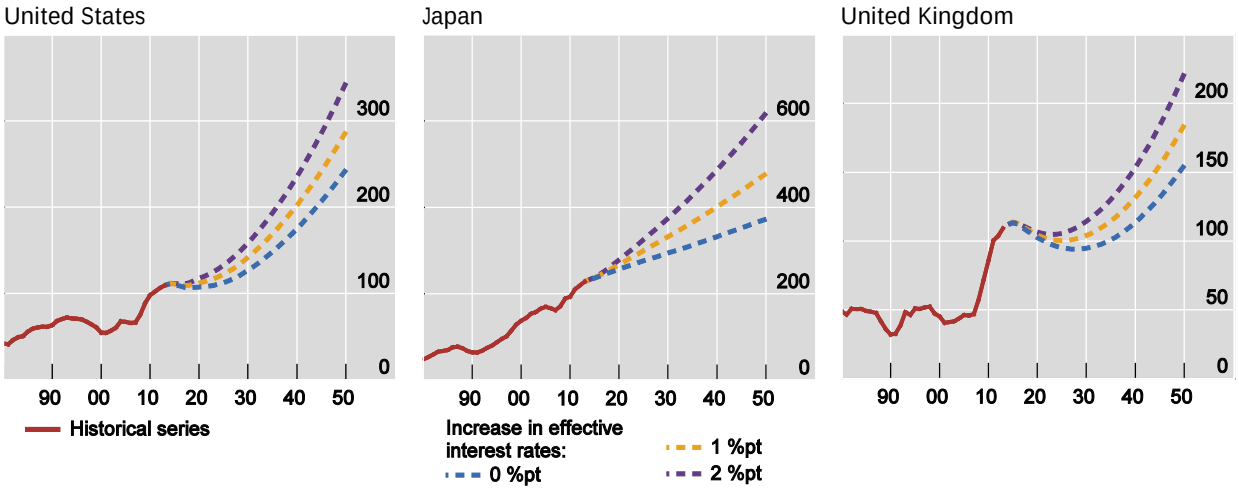
to four times their GDP.[14] Analysts and commentators rightly point to the impact of the financial crisis in driving up the level of government debt, but in reality all this has done is accelerate by a few years what was already coming.

Graph 4 provides our most recent estimates of the trajectories for the United States, Japan and the United Kingdom. The different lines are based on different interest rate assumptions and serve as a reminder of how low interest rates provide a false sense of security. I doubt anyone here today finds these pictures very reassuring.

The lesson is that public debt is high, it is rising, and it is almost surely a drag on growth.

General government debt projections, 1990 – 2050

As a percentage of GDP (incorporating projected increases in age-related spending) Graph 4



Sources: IMF; OECD; Japanese Cabinet Office; UK Office for Budget Responsibility; US Congressional Budget Office; BIS calculations.

Market discipline is not enough

My next insight concerns the regulatory sphere. Before the crisis, the hope was that if investors, managers and traders were all forced to face the consequences of their own actions, then the system would operate efficiently and safely. Markets would provide the discipline. If only it were so easy. To quote Willem Buiter: "Self-regulation is to regulation as self-importance is to importance."[15]

We now know that the pre-crisis regulatory regime left the financial system vulnerable. Banks that found ways around the capital requirements had virtually no effective capital buffers at all. This prompted a switch in both the definition of capital, to ensure its quality, and the level of capital, to ensure resilience. Large global banks that face a capital surcharge will be required to hold capital equal to nearly 10% of their risk-weighted assets. Taking account of the changes in the definition of capital and the treatment of assets, this is an increase of roughly 10 times.

Related to this is the need to ensure that every financial institution is able to fail. One way to control moral hazard is to create a resolution system where managers, owners and liability

[14] P Masson and M Mussa, "Long-term tendencies in budget deficits and debt", in *Budget deficits and debt: issues and options*, Federal Reserve Bank of Kansas City, 1995, pp 5–55.

[15] W Buiter, "Regulating the new financial sector", VOX, 9 March 2009.

holders are forced to face the consequences of their actions. Each of these groups must know ex ante what their responsibilities will be in the event that the institution gets into trouble. During the crisis, banks' bondholders were bailed out, and in some cases so were the stockholders. Next time, the capital structure of the bank must be honoured. And, the resolution regime that enforces losses must be one that is able to operate across international borders, minimising disruptions to the national and global financial system.

Not only will market discipline not save individual institutions, it will not save the system. This is no surprise, since system risk is not something private agents can insure against. Only the government can do that. But, more than that, as I mentioned earlier, private agents have an interest in hiding systemic risk. So, this leaves regulators and supervisors to guard the system. How should they do it?

The simplest way I have found to think about this question is this: following a macro shock, a common shock that affects everyone, there is no one to sell assets to, nor anyone to raise capital from. That means banks have to be able to stand alone when the shock hits. The best way to figure out whether banks can weather a large macro shock without resorting to any asset sales or capital raising is through stress tests. When they can, that's fine. The issue, then, is how high capital levels need to be to meet that test.

I believe that stress tests are the most powerful tool we have discovered in the past five years. Policymakers should focus on understanding how to use them.

Overall, then, my regulatory insight is that market discipline is not enough.

Insights for the BIS

Finally, we come to the BIS. Here I will focus on two insights:

1) Cross-border activity is even more important than we thought.
2) Global problems require global solutions.

Cross-border activity is even more important than we thought

Globalisation has brought tremendous benefits. Trade in commodities, goods and services has spurred development and reduced poverty. And, as the costs of communication and transport have fallen, the benefits have just gotten bigger. But global production and trade are supported by global finance. Without the ability to make payments; to buy and sell property and securities; and to borrow and lend across borders, the world would be a much poorer place.

Ensuring well-functioning and stable global finance requires constant effort. This has been the focus of the BIS's work during the past three years. We have done it in two ways. One is setting of minimum standards: an international regulatory framework based on coherent principles and consistent implementation is critical for openness, fair competition and stability. Developing such a framework is a long and complex process. But the alternative to cooperation is fragmentation – with all its negative consequences.

We have also been working to improve our assessment of the vulnerabilities in the global financial system. We need to understand whether the consequences of a shock will be benign or catastrophic. Our work has three elements. First, as I already discussed, this means being able to analyse the vulnerabilities that arise from cross-border flows and asset positions. Second, it requires reliable data. And the third means understanding details about financial markets and institutions, knowledge that national central banks have. The BIS, through its research and cooperation with academia, through its function as the global hub for international banking statistics and through its cooperative activities with central banks, is in a unique position to bring these ingredients together.

Global problems require global solutions

The purpose of the BIS is to provide a forum for discussion and cooperation. In addition to helping groups of central bankers and supervisors forge agreements, we facilitate discussions on topics of common interest. That means helping people see the world through the eyes of others. It means putting people from all over the world in the same room so they can learn from each other.

I have listened to and participated in these discussions for five years. I have benefited greatly from this experience, not least because I have been able to prepare these discussions. But in addition I have learned how problems that are local in their origin can become global in their impact. And it is here that we need to work harder to understand how and when a narrow focus on local concerns is short-sighted. I believe that the crisis has sharpened our awareness of the need to overcome domestic biases.

My own change in perspective may serve as example. Before I arrived in Basel in 2008, I thought that for emerging market countries to succeed they should follow the path blazed by the advanced economies. Slowly, these less developed countries would prosper and become more like their older and richer siblings. The crisis taught me that something strange had happened. Yes, the emerging market countries were adopting institutional frameworks that mimicked those in advanced economies; they were laying the groundwork for prosperity. But at the same time, the advanced economies' financial systems were becoming fragile. And, in 2008 we found out that they bore a very strong resemblance to their crisis-prone less developed brothers and sisters. It was the advanced economies that in an important way had come to look like the emerging markets.

My point is that we all need to keep learning from each other. No one has a monopoly on either good policy or bad! This recognition underpins the BIS's cooperative approach. It is a strength that should help us to master the challenges that lie ahead.