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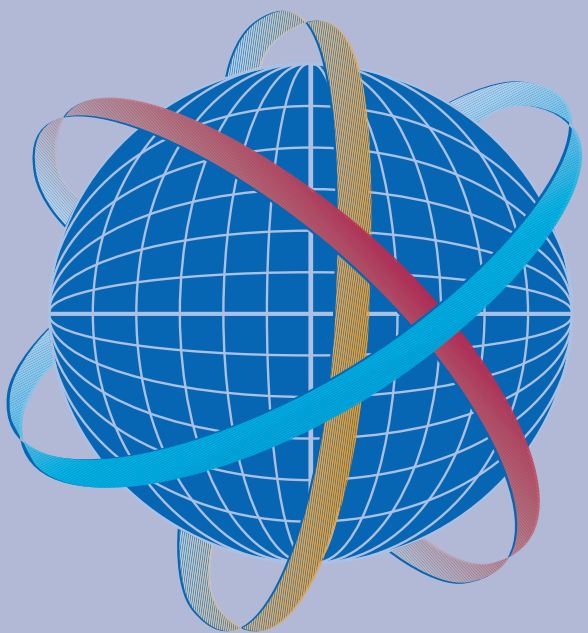
Central Banking after the Crisis



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Opening Remarks

Dear Chancellor Faymann,
Dear President Trichet,
Ladies and gentlemen:
In the name of the Austrian central bank I would like to welcome you to this year's Economics Conference. We are especially grateful that Chancellor Faymann and President Trichet are with us this morning, given their heavy workload. Let me also use this occasion to thank the Austrian government under the leadership of Chancellor Faymann and Vice Chancellor and Finance Minister Pröll publicly for the good and respectful cooperation between the Austrian government and the Austrian central cank during very challenging times. I would also like to use this occasion, President Trichet, to express my full admiration and trust in your leadership of the ECB during these years of crises and especially also over the past few weeks. We all had to navigate, as you always say, in uncharted waters – and it was extremely important during these times to have such an experienced captain in command. My own life experience has taught me, that also in big-policy issues one should never underestimate the human factor.

Thus, it is essential for the ECB to have as a President a personality who, due to his life-long achievements, is able to convey full credibility that the ECB is and remains fiercely independent and inflexibly attached to price stability, our primary mandate. We are indeed proud that price stability has been fully maintained in the euro area since the inception of the euro more than 11 years ago.

Ladies and gentlemen,
This year's Economics Conference is entitled: "Central Banking after the Crisis: Responsibilities, Strategies, Instruments."

The term "after the crisis" seems somewhat premature and obviously needs some clarification: It refers to the specific role of central banks and the lessons to be learned from the experience of the last three years. But we have to be aware that there is a typical sequencing of crises – as Professors Reinhardt and Rogoff have shown (again) recently: A banking crisis tends to evolve into a general crisis of the financial sector. Via financing channels and wealth effects this then may trigger a crisis of the real sector of the economy. And this in turn via automatic stabilizer-effects and additional measures may lead to a crisis of public finances.

The big challenge is to prevent a vicious circle, where a crisis of the public sector then may again lead to crisis developments in the financial and real sectors of the economy. The prevention of such a vicious circle was indeed the main motivation for the actions taken by European governments and by the ECB this month.

At this conference, however, we do not intend to discuss primarily current crisis management, but will try to gain some insights – or at least some feeling – into underlying longer-term developments.

Those of you who know me from my academic profession know that I am a great believer in the importance of the knowledge of economic history, especially to understand economics as disequilibrium economics – to follow the approach of my academic teacher and friend, Kurt Rothschild.

So I ask you for your understanding that I will use these opening remarks to introduce some historical perspectives.

I will give you two citations and let you guess who made them and when. Both citations comment on the link between monetary policy and financial

stability, in particular on how central banks and monetary policy should deal with financial imbalances and ensuing financial crises.

Here is citation number one:

> *"[N]othing short of a sharp increase in short-term rates that engenders a significant economic retrenchment is sufficient to check a nascent bubble. The notion that a well-timed incremental tightening c[an be] calibrated to prevent [a] bubble is almost surely an illusion. Instead, we [...] need to focus on policies to mitigate the fallout when it occurs and, hopefully, ease the transition to the next expansion."*

And here is citation number two:

> *"The idea that banks of issue can thwart financial crises – in the sense of preventing their occurrence – is absolutely wrong; however, large and solidly governed central banks can contribute crucially to alleviating a crisis as their strength and unquestioned credibility provide a safe recourse in a climate of general unsteadiness and eases the return of confidence."*[1]

Now, for the solutions:

The first citation – and I am sure many of you have got this one right – is from Alan Greenspan. It is drawn from a 2002 speech of the then Chairman of the Federal Reserve before the annual central bankers' meeting in Jackson Hole. In his opening remarks, Greenspan discussed the recent experience of the sharp increase in the price of technology stocks – the dot-com boom – that had burst two years before in 2000. Greenspan argued that central banks stand no chance when it comes to preventing bubbles. First, they would have to be able to recognize a bubble when everyone else was still thinking that prices were driven up by technological progress or increased future earnings. Second, and this is the argument made in the citation that I have just given, the policy tool of the central bank, the short term interest rate, is very blunt: an increase in the interest rate is either too small to affect the targeted asset prices, or so large that the entire economy is hurt. So instead of using the interest rate preemptively, what central banks should do is to mop up the mess after the crisis, in fact what the Fed did after 2000/2001 by keeping the interest rate at very low levels for quite some time.

The argument of the second citation sounds very much like Greenspan: Again it is argued that central banks cannot (and should not) prevent bubbles from arising. Instead they should throw their weight behind a swift restoration of stable conditions after the outbreak of a financial crisis. However, the citation is not from Greenspan. You might have suspected from the somewhat archaic wording – like for instance the *"strength of the solidly governed central bank"* or the *"climate of general unsteadiness"* – that the citation is older. This is true. In fact it dates from 1870 and is drawn from a testimony of the then Secretary General of the Austro-Hungarian central bank (Oesterreichische Nationalbank), Wilhelm von Lucam, to the Hungarian Parliament. Lucam was a widely regarded expert in economic and monetary matters. In late 1869, the Hungarian Parliament called for a parliamentary commission on monetary reform. One of the subjects to be dis-

[1] *"Die Ansicht, daß Notenbanken Krisen entgegenwirken, muß ich unbedingt als eine unrichtige bezeichnen, wenn darunter die Verhütung von Krisen gemeint ist. [...] Dagegen können große und solide geleitete Notenbanken, namentlich auch in Handels- und Creditkrisen, zu einer milderen Abwicklung der Krisen wesentlich beitragen, indem ihre Kraft und ihr unbezweifelter Credit in dem allgemeinen Schwanken einen sicheren Rückhalt bietet und die Wiederkehr des Vertrauens erleichtert." Neue Freie Presse, 22 May 1870, p. 14.*

cussed was the Hungarian stock market crash of 1869.

Following the "Ausgleich" – the compromise that saw the creation of a largely autonomous Hungary within the dual monarchy of Austria-Hungary – the newly gained political independence and a series of bumper harvests fuelled optimism. New banks, railroads and other companies sprouted in Budapest, the period was named the famous "Gründerzeit" or "founder years". And in fact, at the Ringstraße in Vienna and in the center of Budapest you still see the marvellous buildings, giving testimony of the optimism of this period.

However, excessive speculation in Budapest led to a crash in 1869. In 1870, the disappointed members of the Hungarian Parliament were looking for the culprit, and the Oesterreichische Nationalbank (that issued money for both the Austrian and the Hungarian parts of the monarchy) was among the natural candidates. It is in this context that Lucam testified before the parliamentary commission, arguing that the Oesterreichische Nationalbank had been neither in there for the creation of the speculative bubble nor responsible for its eventual bursting.

He also argued that not only in the specific case but as a matter of principle, the Oesterreichische Nationalbank had no means at its disposal to prevent a bubble from arising but could only do its utmost in the period following the crash in order to restore confidence in the financial system and the economy at large.

Note a last interesting parallel in terms of timing between the statement by Greenspan in 2002 and the one by Lucam in 1870: both came a year after a heavy fall in the stock markets; in both cases the much larger financial crisis was only to come a couple of years later: Greenspan advanced his ideas of "mopping up" after the burst of the dot-com bubble in 2001, the true shock hit in 2007/2008. And it was in the year 1873, three years after Lucam's testimony, on the infamous 9 May – the Black Friday at the Vienna Stock Exchange – that ushered in a prolonged period of economic stagnation.

I hope these two examples have convinced you that the interactions between monetary policy and financial stability are barely new questions for central bankers. In fact, the debates were at the centre of the process that saw the emergence of modern central banking in England in the early 19th century.

At those times monetary stability had a slightly different meaning from today, mainly being understood as a stable price of precious metal (silver, gold, or both) in terms of the domestic currency. When talking about price stability today we look at a broader set of goods; in the euro area for instance the basket of goods included in the Harmonised Consumer Price Index (HCPI). However, both then and today monetary policy was principally guided towards monetary stability, and the questions about the implications of monetary policy actions and their interaction with financial stability do resemble each other quite a bit.

Is monetary stability a *necessary precondition* for financial stability? That is, do we need an environment of stable prices for a healthy financial sector? Or to put it even stronger: Is monetary stability *sufficient* for financial stability?

That would mean that having a monetary policy that successfully keeps prices stable is also by itself already a guarantee for stability in the financial system?

Or is the contrary true: that monetary stability, instead of ensuring financial stability, could lead to financial instability (a point made by BIS economists not too long ago). At first, it might seem paradoxical that something good – stable prices – could bring about something bad – financial instability. The idea here is that policies narrowly focused on price stability might miss arising imbalances in the financial area or even set in motion processes that put financial stability at risk. For instance, some have argued for the recent crisis that low inflation rates, low interest rates and a general sense of confidence in the ability of central banks to deal effectively with any shock to the economy that might come – all positive things, I would argue – have led economic agents to underestimate risks and to take positions that in the end turned out to be unsustainable.

How were these questions answered in 19th century England? In the 1820s and 1830s the English economy was rocked by several financial crises. In 1844 the Bank of England received new statutes, the famous Peel's Act, that put severe constraints on the ability of the Bank of England to issue banknotes.

In particular, all notes issued in excess of a fixed amount had to be backed 1:1 in gold. Compared to earlier practice, this rule was extremely strict. The hope of the authors of the law was that the monetary stability brought about by strict limits on the amount of banknotes in circulation would also prevent speculation in financial assets. This hope was disappointed only four years after the Peel's Act was signed into law, when the severe financial crisis of 1848 triggered a run on the Bank of England and forced the suspension of the convertibility of bank notes in metallic coin. The episode forced to recognize that the monetary target in itself was not enough to keep financial crises at bay. Instead, financial emergencies created a need for central bank action over and beyond the simple and automatic rules of a metallic currency. In the second half of the 19th century, the Bank of England implicitly assumed this responsibility and became the de facto "lender of last resort" for the financial system, a concept explicitly spelt out by Walter Bagehot in his 1873 book "Lombard Street".

Central bankers today are therefore in good company with their historic predecessors. Does this mean that nothing has been learned since Lucam's testimony in 1870?

I would strongly disagree. What it means is that there are some constants

in the basic challenges that monetary policy makers face. However, the possibilities that we have today are quite different from the possibilities 150 years ago. The financial system has evolved significantly since then, and so have the resources available to policy makers.

Lucam himself did not argue that speculative bubbles are benign and could be ignored. In his view, the inaction of monetary policy is rather grounded in a *helplessness* of policy.

Central banks cannot prevent speculative bubbles from arising because – I cite again from the Hungarian Parliamentary Commission – *"the only means [to prevent the emergence of crises] would be moderation in the entrepreneurial spirit and one cannot count on such moderation as the pursuit of quickly gained wealth will always be one of the prime moving forces of mankind."*[2] You would probably agree that *"the pursuit of quickly gained wealth"* is still one of the *"prime moving forces of mankind"* today and the hope on *"moderation"* is as elusive these days as it was as back in the 19th century.

However, as economic policy makers today we do dispose of a set of tools that can be used to moderate or guide *"the entrepreneurial spirit"* in a way that prevents the emergence of financial imbalances and ultimately financial crises. The regulation and supervision of financial institutions and financial markets are powerful instruments that were unavailable to my predecessors 150 years ago.

This brings me to what is the sort of *leitmotif* of the conference. Reform and significant strengthening of financial regulation and supervision is generally considered as the prime lesson coming out of the crisis experience of the last two years. Before the crisis, we had trusted the discipline of financial markets combined with microprudential regulation, i.e. the regulation of individual financial institutions. Both have failed to address the risks arising at the system-wide level; risks that could not be seen by looking at individual institutions and individual markets alone.

There is broad agreement now that the focus of regulation has to turn the stability of the financial system as a whole, what is termed "macroprudential regulation".

Macroprudential policy is the use of prudential tools (often the same tools as in microprudential regulation like capital requirements) with the explicit objective of promoting the stability of the financial system as a whole, not necessarily of the individual institutions within it. To be able to do so, macroprudential regulation takes into account explicitly the interlinkages between financial institutions and financial markets as well as the procyclicality of the financial system.

There is also broad agreement that central banks will play a crucial role within the new regulatory framework, evidenced already in the central position that the ECB and EU central banks will take in the European Systemic Risk Board (ESRB), a newly created body set up to assess and prevent potential risks to financial stability in a wide range of areas, extending from the financial situation of banks to the potential existence of asset bubbles or the good functioning of the market infrastructures.

[2] *"Entstehen Speculations-Krisen und in Folge derselben vielleicht acute Geld- und Creditkrisen durch Ueberstürzungen des Unternehmungsgeistes, so können solche Krisen nicht von vornherein verhütet werden, weil das einzige Mittel im Maßhalten des Unternehmungsgeistes läge und weil auf dieses Mittel insoferne nicht gerechnet werden kann, als das Jagen nach rasch erworbenem Reichthume immer eine der Hauptleidenschaften des Menschen bilden wird." Neue Freie Presse, 22 May, 1870, p. 14.*

But the devil is in the details. What exactly should central banks be in charge of and how are they expected to fulfil their tasks? These are still very much open issues. In the next two days of the conference we will have the occasion to look at the intersections of monetary policy and financial stability from various angles. As the title of the conference indicates, we will do so at three different levels: responsibilities, strategies and instruments.

The most general level is the question of *responsibility*.

Clearly, central banks are – if not by intention then at least by necessity – also responsible for financial stability. Yet, unlike in the domain of price stability, where central banks are solely in charge, the duty for financial stability is divided up among a larger number of agencies. This raises immediately the question how the responsibility of the central bank can be delimited optimally relative to the responsibilities of other public bodies like regulatory agencies? How can we ensure that necessary information flows freely?

How can we ensure that if there is a problem, there is someone who is responsible and is also in a position to act effectively? The issue of delimiting responsibilities between central bank, supervisors, regulation agencies and the government on the national level reappears on the international level. The crisis has clearly demonstrated the limits of national responses in dealing with cross-border, systemically important financial institutions, markets and instruments. This is particularly evident in the European Union where financial markets have integrated rapidly and cross-border entities have become much more important since the introduction of the euro, while at the same time the EU's supervisory framework has not kept pace, remaining fragmented along national lines.

The flip-side of responsibility is accountability. Given their responsibilities for financial stability what will be the criteria to judge the performance of central banks? This is very important for a public agency, in particular a public agency that enjoys a high degree of independence from daily political influence and can therefore not be held accountable at the ballot box. Accountability is relatively straightforward for the price stability target, even though we might debate whether headline inflation or core inflation or medium term inflation is the best target: a quick glance in the official statistics is enough to assess the success of monetary policy. With financial stability this becomes much trickier and even more so as the responsibility for financial stability – by its nature a much larger area than price stability – is held by several agents at once.

Independence is a crucial ingredient to monetary stability, this the success of the Eurosystem in keeping inflation low and stable since the introduction of the euro has well demonstrated. I would argue that independence is equally important in the area of financial stability, in particular macroprudential regulation (as has been argued by some authors e.g. at the IMF for quite some time). Like in monetary policy making, there will be occasions when determined action is called for that might in the short term hurt one or the other special interest in the economy.

In order to hold firm, independence will be indispensable. Underpinning the independence of central banks is crucial for their success in achieving the objectives which have been conferred upon us by the polity. Failure to achieve their objectives is a threat to

their independence. And rightly so: Independence is not an end in itself; it is a political mechanism helping that common political objectives such as price stability are attained. Central banks have to earn their independence every day. The introduction of new objectives for central banks therefore creates a host of issues in terms of the credibility of central banks. What if an objective and thus the measurement of success are not clearly defined? What if two objectives are in conflict? What if failure in one objective contaminates the credibility concerning another objective?

We will surely do our best to avoid failure, yet the question remains what to do if despite our best efforts results are not as we had hoped for. We will discuss central bank independence this morning and the issue is sure to reappear time and again throughout the conference.

Given the responsibility of central banks for price and financial stability, what should be the *strategies* employed and what are the instruments that we need?

Let us start with the traditional tool of monetary policy, the short-term interest rate. The Tinbergen principle states that one tool cannot serve two purposes; that is, interest rate policy cannot deal with both macroeconomic and financial stability at the same time. Still, events over the last years have implicitly revived the discussion of the interaction between monetary policy and asset prices. For many years the "mainstream view" was that monetary policy should not "lean against the wind" and/or should not include asset prices in the monetary policy objective function. We have seen that this was also the mainstream thinking in Austria in the 1870s.

However, there are strong indications that monetary policy does – at least indirectly – play an important role for financial stability by affecting the measurement of risk, risk perception and risk tolerance and has done so in the run-up to the current crisis.

Shall therefore financial imbalances be considered when deciding on the appropriate interest rate level? Or can we alternatively try to weaken the link between interest rate and risk perception and risk taking through technical improvement in the way risk is measured for regulatory purposes, and constrained through regulatory rules?

According to the Tinbergen principle we need two tools to deal with our two objectives of price stability and financial stability. Macroprudential regulation is this second tool. In the past, central banks have employed interest rate policy to achieve stable prices. When deciding on the appropriate level of the policy rate, we have taken the regulatory environment as given.

The question has been, for instance, given certain regulation on capital requirements for banks and on the working of securities markets, what is the impact of an increase or a lowering of the policy rate by a quarter percentage point. The mechanism through which a change in the policy rate influences the development of prices and the real economy – the so called transmission

mechanism – was seen as exogenous from the point of view of the central bank. This is in fact a sensible approach to microprudential regulation, which is concerned with the health of individual institutions. Microprudential rules, once agreed upon, are not altered frequently and certainly not in reaction to macroeconomic developments.

Macroprudential regulation, i.e. the use of prudential tools with the explicit objective of promoting the stability of the financial system as a whole, however, is per definition concerned with macroeconomic outcomes and much closer to the core monetary policy objective of the central bank.

The introduction of macroprudential tools is a game changer that raises very complex questions of interaction between, and coordination of, monetary policy and macroprudential use of (regulatory) instruments. I have already looked at this interplay in terms of central bank responsibilities and accountability.

In the daily handling of interest rate policy and macroprudential tools the existence of two tools raises tricky issues: Since monetary policy decisions may also affect financial stability, should central banks take into account the possible implications of their decisions on financial stability when making decisions targeted at future inflation risks? What would be the prescription when both goals conflict?

For the ECB, as I mentioned at the beginning, there is a clear priority for our statutory commitment to price stability. Therefore, the relevant strategy should be to avoid by pre-emptive action that conflicts of goals may arise. That means to have a strict regulatory regime that ex ante prevents the emergence of a financial crisis and that contains credible resolution mechanism in case of need.

But to prevent the sequencing of crisis, of which I spoke before, more fundamental changes will be needed. Austria fortunately has a rather conservative banking system, although there had been some unfortunate exceptions with which we had to deal in the past. But world-wide it is obvious that the financial sector, over time has become dramatically bigger and riskier. A striking example is the UK – with banking assets jumping from 50% of GDP to more than 550% over the past four decades – the main drivers being excessive leverage and often dubious so-called financial innovations.

The introduction of new macroprudential tools also raises the question of how these tools should be employed in practice. In particular, is it better to have fixed rules, for instance a formula linking capital requirements to loan growth, or should regulators be allowed to exercise discretion when setting capital requirements or leverage ratios?

Rules simplify life and resolve some of the problems of responsibility and accountability alluded to before: it is the rule that is responsible, not the regulator. On the other hand, the future cannot be perfectly foreseen and the prevention of future financial crises might necessitate different policies and

therefore significant discretion on the part of regulators and policy makers.

Ladies and gentlemen,

I am afraid, we have many open points here. But I believe it is the purpose of an event like the annual Economics Conference of the Oesterreichische Nationalbank to provide time and intellectual space to step back from the demands of everyday policy and look at the more fundamental questions behind policy making. This year we have slightly changed the format of the conference. All sessions and panels combine people with different backgrounds, thereby providing even more occasions for what I hope will be fruitful debates between academics, central bankers, commentators, practitioners and the public. I anticipate very productive discussions of these and other issues related to the future of central banking over the next couple of days.

Let me conclude:

Over the last months the dramatic events around Greece have reminded us that the crisis that began in 2007 is still far from over. Public finances in the entire euro area face significant challenges from the unexpectedly strong declines in GDP, leading to lower revenues while demanding higher public expenditures, coupled with structural problems in public finances that predate 2007. When turmoil in government debt markets reached unacceptable levels in early May, the ECB together with the national central banks of the Eurosystem intervened forcefully to stabilize markets, just as it did in August 2007 and in September 2008.

Providing liquidity in a moment of general uncertainty is a key role of central banks. We are the lenders of last resort. When banks stopped trusting each other in the wake of the collapse of Lehman Brothers, central banks stepped in to provide funds as long as it took to sort out the problems. We have acted similarly in the last month, though this time less in the interbank market but principally in the market for sovereign debt.

In both cases, however, the important point is that while central banks can calm *liquidity* crises, they cannot resolve *solvency* crises. For the banks after September 2008 this implied writing-off bad loans and raising capital, either in private markets or with the help of the public authorities. The central banks did provide crucial temporary relief; the long-run adjustments had to be made by the banking sector itself. In the current situation that means that the Eurosystem can ensure and will ensure that short-term volatility and speculation in financial markets do not derail the fiscal consolidation efforts in the euro area. Again, however, it is the governments that have to ensure that their public finances again become sustainable in the long run.

Within this context of uncertainty, the key ingredient to successful stabilization of the European economy is that the roles in economic policy remain clearly defined. The primary objective of the Eurosystem is price stability. The Treaty of Lisbon is very clear on that. Confidence in the long-run stability of the euro is a crucial precondition of economic stability and growth and thereby sustainable public finances. Be assured that the Eurosystem will stay the course.

Werner Faymann

Chancellor of the Republic of Austria

After the Crisis: Challenges Ahead

Good morning ladies and gentlemen,

"Central Banking after the Crisis"– frankly, I would be glad if the topic of my speech was "Politics after the Crisis". But unfortunately this crisis has many chapters.

Now, while the clean-up efforts are still in full swing, we have to lay the groundwork for a new economic recovery. And in order to ensure these foundations are solid, we need to learn the right lessons from the crisis and build on these lessons.

In my view, one of the main lessons to be learned from this crisis is that the belief in the all-pervading power of the markets is a thing of the past, as is the belief in the all-powerful state which is long since obsolete.

A wise balance of market and politics is the best strategy against future crises and for a sustainable recovery coupled with full employment.

This balance is decisive to handling today's three major political challenges: firstly, regulation of the financial markets; secondly, budget consolidation that is socially fair; and thirdly, a new growth strategy to promote full employment.

Fair Financial Markets

Regulation of the financial markets is way overdue. Intransparent financial products were responsible for the financial crisis. This cannot be allowed to happen ever again.

Furthermore, new financial markets are also important from a democratic policy point of view. If we do not succeed in getting down to the root causes of the problem that led to this crisis we will lose citizens' trust. And this in turn will de-stabilise both democracy and markets. Because fair investors call for fair financial markets. Let me quote Jean-Claude Juncker, the President of the Eurogroup, who very aptly stated that serious investors preferred regulated transparent markets while speculators preferred the Wild West.

In order to avoid such a destabilisation, we therefore require:

- The introduction of a banking levy and a financial transaction tax
- The establishment of an EU rating agency
- More rights and powers of authority for the European financial market authorities
- Stricter regulation of securities trading and specific bans on speculation
- Legal regulations for manager bonuses
- Stricter controls for hedge funds
- Improved consumer protection in the field of financial products
- Banking insolvency laws

A reform based on these principles will enable us to re-establish the balance between financial markets and the real economy. In the spirit of establishing this new balance, the financial sector will have to make its contribution, because fairness in line with social requirements means fairness in line with market requirements. Budget consolidation with a sense of social proportion is vital for the many small and medium-sized enterprises that are dependent on

their customers' purchasing power. Reducing this purchasing power by imposing higher mass taxation would mean reducing their sales.

And by making a fair contribution banks will, after all, be able to improve their image that has suffered as a consequence of this crisis. Taxpayers have incurred major risk under the banking bail out schemes and are justly calling for banks to contribute their fair share.

New Growth for New Jobs

We need to make money available for policies to lead us out of this crisis and we require a socially-balanced, just and fair government revenues scheme to generate the necessary funds. This is why the areas of research and education will be less strongly affected by the

tough cost-cutting programmes we will have to implement over the next few years. Ensuring we provide the best educational system for our children as well as implementing a future-oriented research strategy will certainly cost money, but the costs of thinking that we could do without will be much higher.

As we clear up the debris of the crisis, we have to rise up again in order to be able to succeed in international competition.

I was in China just a week ago and was able to see for myself how much effort and zeal Chinese industry is putting into shifting their business from the assembly lines to the research labs.

Under the old neoliberal doctrine, the immediate response to this global economic competition would have been: down with social standards, down with wages and up with weekly working hours – an approach that would only increase poverty and threaten the middle classes.

Austria and Europe are therefore called upon to combine their traditional values with new ones.

One such traditional value is the welfare state our ancestors fought so hard for and which the Americans are increasingly taking their bearings on – as we have seen in Barack Obama's health care reform.

Today, this welfare state has an increasingly important role to play in fighting poverty. Poverty, which is no longer automatically caused by unemployment in Europe – where 12% of employees earn so little from their work that they live below the poverty line. That is 40 million out of 320 million employees in Europe. In order to be able to fight poverty we therefore require new and qualified jobs. And we will only be able to sustain this welfare state by promoting education, research and development.

One of Europe's priorities is climate protection. We must support technologies in the field of climate protection. Because they will give us a competitive edge achieved by know-how – and not by wage dumping, granting generous tax incentives to large business groups or by cut backs in the welfare state.

A New Economic and Social Union

This brings me from the lessons learned to the challenges ahead.

One of the lessons to be learned from this crisis is that Europe needs to improve coordination in order to be able to respond faster in the event of a crisis.

It is clear that sound budgets and a stable currency are decisive yardsticks for a stable European economy. But if all European countries were to simultaneously cut costs in all the wrong places this would only lead us straight into the next recession – and reduce our perspectives for the future. What we need now is joint initiatives to be launched all around Europe.

As is the case with our joint savings and cost-cutting programmes, we also need to better coordinate our social growth strategies to enable us to create new highly qualified jobs and ensure that Europe will become an economic and social union – in the spirit of striking this new balance between people and markets.

Ladies and gentlemen, I thank you very much for giving me the opportunity to address you today and wish you every success for your conference.

Session 1:
Financial Crisis Management and Central Bank Independence

Jean-Claude Trichet

President of the European Central Bank

The ECB's Response to the Recent Tensions in Financial Markets

Meine sehr verehrten Damen und Herren,
ich danke den Veranstaltern dieser Konferenz recht herzlich für die Einladung zur 38. Volkswirtschaftlichen Tagung der Oesterreichischen Nationalbank.

I would like to use the occasion of today's conference to recall how the European Central Bank has reacted to the crisis and, in particular, put our most recent actions into this context.

As I am sure you all appreciate, there is a single thread running through all of these actions, namely to ensure that we deliver on what we are expected to deliver: price stability across the euro area over the medium term.

To those observers who have recently asked whether we have changed our orientation, I can only assure them that, on the contrary, it is the circumstances that have demanded special actions, and our orientation remains the same.

As we all know, these are challenging times for Europe and for the ECB. We are confronted with tensions in financial markets, a difficult fiscal situation in some parts of the euro area and an associated adverse impact on the effective functioning of monetary policy.

The current tensions are the most recent repercussions of the financial crisis of 2007 and 2008, which culminated by the failure of Lehman Brothers in September 2008. After that, we saw a sharp fall in global economic activity, hitting the euro area and other advanced economies hard. In the fourth quarter of 2008 and the first quarter of 2009, global trade volumes fell by 18%, the GDP of the euro area fell by altogether almost 4.5% and unemployment rose by 1.4 percentage points in just six months.

The ECB acted quickly and decisively in response to these circumstances. We reduced our key interest rates to unprecedented low levels and introduced a series of non-standard measures to support credit provision by banks to the euro area economy. This was essential at a time when the financial crisis had led to a virtual "free fall" in economic activity and severe problems in the money market were hampering the transmission of lower key ECB interest rates to money market and bank lending rates.

Our non-standard measures, which we refer to as "enhanced credit support", aimed to sustain financing conditions and credit flows above and beyond what could be achieved through reductions in key ECB interest rates

alone. They included lengthening of the maximum maturity of refinancing operations, extension of the eligible collateral list, provision of liquidity in foreign currencies, covered bond purchases, and, above all, provision of unlimited liquidity in all refinancing operations at a fixed rate.

Enhanced credit support fostered a considerable improvement in market liquidity and helped to alleviate funding risks. The measures also protected us

against any possible deflationary situation and helped focus on medium-term price stability.

Earlier this month, at a time when we had already exited from some of our enhanced credit support measures, we were suddenly faced with renewed market tensions. This time, they erupted in a number of segments of the euro area's debt securities markets. After very careful consideration of all implications of acting, as well as of those of not acting, we decided to intervene

in these markets starting on 10 May by launching our Securities Markets Programme. Along with cuts in our interest rates back in 2008 and early 2009, and measures of enhanced credit support, this programme constitutes the third element of our response to the financial crisis.

In my remarks today, I would like to give you some further details about this third element: Why we have introduced it, how it is designed to operate and why it is in line with the key principles of our monetary policy-making. And I would like to place our actions in the context of the broader challenges for economic policy-makers and private sector decision-makers, in our collective pursuit of return to financial stability and ensuring a sustainable economic recovery.

The Fundamental Importance of a Functioning Transmission Mechanism of Monetary Policy

Like all other non-standard measures we have taken, the Securities Markets Programme is time-bound in nature. It aims to ensure the proper transmission of monetary policy impulses to the wider economy and, ultimately, to the general price level. To achieve our primary goal of ensuring price stability, monetary policy-making needs to be effective. In this respect, well-functioning securities markets are indispensable.

Let me briefly describe why this is the case. We implement monetary policy by setting our key policy rates. Through this, we directly influence short-term interest rates in the money market. Financial markets transmit this impulse along the maturity spectrum, since term rates reflect current and expected future short-term rates as well as risk premia.

These rates, in turn, affect the costs of funding for households, for firms, and for governments. The resulting financing conditions affect economic activity and, in the end, prices.

The functioning of the market for government bonds is central to the transmission of the ECB's policy rates. This is because of several channels.

Via the *price channel*, interest rates on government bonds influence financing conditions within the economy. For example, they are often used as a reference rate when a bank prices a loan for a customer, or when a company borrows money by issuing a bond. Sovereign financing conditions, under normally functioning bond markets, often

provide a floor for the funding conditions of the private sector.

Interest rates on government bonds always include add-ons to compensate for liquidity risk and credit risk. But these risk premia should not become so large that they dominate the signal from the key policy rates to a point where it is no longer distinguishable and does not reach the real economy. This can happen when markets no longer function properly.

Closely related is the *liquidity channel*, which comes into play at the start of the transmission mechanism, influencing short-term interest rates beyond the conditions set by policy rates. Government bonds are often used as collateral for banks' refinancing operations. In fact, government bonds are the primary collateral used in the secured interbank market.

If government bond markets are disrupted, this hampers the functioning of the interbank market and reduces liquidity in this market. The consequences are increased money market rates due to premia for liquidity risk. As a result, the capacity of banks to issue loans and refinance the real economy suffers.

A third channel, the *balance sheet channel* , is indirect: Lower government bond prices, which correspond to higher bond yields, imply valuation losses in the assets held by the financial and non-financial sectors. For banks, the lower capital base may mean that they can supply fewer loans to the economy. For borrowers, their creditworthiness is reduced, and this affects their capacity to borrow.

Because of these channels, severe tensions in the bond market hamper the monetary policy transmission mechanism. The relation between our key interest rates and the rates applicable in the real economy gets out of order, and our main tool for influencing refinancing conditions in the real economy does not work the way it should.

This is the situation that threatened us at the beginning of this month, so we saw the need to act quickly to re-establish a more normal functioning of our monetary policy transmission mechanism. The very rapid consolidation of that situation depends crucially on the effective implementation of the fiscal retrenchment programmes that have been decided in a number of countries.

How the Securities Markets Programme Works

Let me now explain how the Securities Markets Programme works. The programme consists of interventions in the euro area's public and private debt securities markets. In order to sterilise the impact of these interventions on the liquidity conditions in the banking system, we re-absorb the liquidity injected. Thus, these measures do not influence our monetary policy stance.

More specifically, the programme focuses on these securities markets that have been affected by severe disruptions recently.

These tensions did not come out of the blue. The sky had darkened since the end of last year, when difficulties with public finances in some euro area countries came into the focus of financial market participants. Following prolonged discussions about the possibility of a loan support facility for Greece, tensions rose further towards the end of April and the beginning of May.

On 6 and 7 May, on Thursday afternoon and throughout Friday, we observed a further deterioration in financial market conditions, both in Europe and, as a consequence, at the global level. On Friday 7 May, spreads on sov-

ereign bonds in Europe, CDS spreads and indices of volatility and stress in the interbank market were signalling the spreading of severe tensions.

Bond spreads for several euro area countries widened beyond any reasonable level. Liquidity in government bond markets of some euro area countries almost dried up. And the tensions in the sovereign bond markets spilled over to other market segments, such as the foreign exchange market and equity markets, where trading volumes and liquidity became erratic, and volatility spiked.

In view of these exceptional circumstances prevailing in the financial markets, we decided that exceptional intervention was necessary.

The Securities Markets Programme and the Principles of Monetary Policy-Making

As always, our actions have been guided by our principles. In this respect, let me focus on three aspects that are key for the credible conduct of monetary policy: price stability, central bank independence and the prohibition of monetary financing.

First, price stability, which is our primary objective. The latest measures address a malfunctioning of certain market segments. Without such measures, the market problems could have created risks to the favourable outlook for price stability. However, we have not gone beyond the goal of re-establishing a more correct transmission of our monetary policy. We have not changed our monetary policy stance: we have maintained the present level of interest rates which is, in our view, appropriate; and we have not embarked on more ample liquidity conditions.

Precisely in order to guarantee that the stance remains unaffected, we sterilise our interventions, as I have explained. The Securities Markets Programme should not be confused with quantitative easing. In simple words: We are not printing money. This confirms and underpins our commitment to price stability.

Credibility is crucial for ensuring price stability. As long as inflation expectations remain well-anchored in line with our definition of price stability, long-term interest rates do not need to reflect the risks stemming from an uncertain inflationary process. In an environment in which the central bank fully preserves its credibility, economic agents do not need to try to anticipate uncertain inflationary developments, thus potentially fuelling inflationary pressures.

In this respect, let me highlight that inflation expectations in the euro area have remained well-anchored in line with the Governing Council's definition of price stability throughout the financial crisis. This is evidenced by a range of indicators. For example, in the Survey of Professional Forecasters, inflation five years ahead is continuously expected to stand either at 1.9% or 2.0% since the beginning of 2002.

A *second key principle* guiding our action is central bank independence. We were fully independent in our decision to act as we have done. We have never hesitated to take the decisions needed to ensure price stability. And we will continue to act accordingly.

Let me recall that in December 2005, we increased rates against the publicly expressed sentiment of the governments. In 2008 we did not hesitate to raise interest rates, even in a period of financial turbulence. We took this decision to prevent broadly based second-round effects at that time, with a view to counteracting increasing upside risks to price stability over the medium term.

We always act fully in line with our own responsibilities. And that is the reason why we have been delivering price stability.

Third, our actions are in full compliance with the prohibition of monetary financing and thus with our financial independence. The Treaty prohibits the direct purchase by the ECB of debt instruments from governments. We are buying bonds on the secondary market only, and we stick to the principles of the Treaty, which are price stability, our primary mandate, and central bank independence. Since our inception, we have always called upon governments to respect budgetary discipline. We had a lot of difficulty with several governments during the last ten years, both as regards their own national responsibilities and as regards their collegial responsibilities of peer surveillance in the Eurogroup. This period is over. We expect from governments strict respect for the principle of budgetary discipline and effective mutual surveillance.

The purchases made on the secondary market cannot be used to circumvent the fundamental principle of budgetary discipline. The Securities Markets Programme strictly aims at correcting malfunctioning of markets.

The prohibition of monetary financing underlines precisely the fact that budgetary discipline is of the utmost importance. We have taken note of the commitments of euro area governments to take all measures needed to meet their fiscal targets. We have also taken note of the precise additional commitments taken by some euro area governments to accelerate fiscal consolidation and to ensure the sustainability of their public finances.

It is crucial that governments implement rigorously the measures needed to ensure fiscal sustainability. It is in the context of these commitments only that we have embarked on an intervention programme in the securities markets.

The Securities Market Programme is an extraordinary action, which was undertaken in the situation of severe tensions in financial markets. I would like to stress that the rigorous application of the adjustment programmes by governments is essential to guarantee the progressive return to a more normal functioning of financial markets.

Conclusion

Let me conclude.

Recent experience, since 2007, has demonstrated how important it is for all decision-makers to analyse lucidly the unexpected situations that they are facing and to act in a timely manner when needed. As soon as it became clear that the intensity of recent market disruptions could have implied very serious consequences for price stability in the euro area, we took firm action. As I have said time and again: we are permanently alert and always prepared to act when necessary.

Price stability is the central contribution, which monetary policy makes to economic growth, to job creation and to financial stability. Our success-

ful track record since the inception of the euro – both in terms of low inflation rates and well-anchored inflation expectations – is remarkable. Since the inception of the euro, more than 11 years ago until April this year, the average annual inflation in the euro area was 1.98%. This is exactly in line with our definition of price stability and it is better than the achievement of any major central bank over a period of many decades, including the Bundesbank.

But the ECB's measures cannot substitute for the actions required to address more deep-seated and fundamental problems. It remains for others – national governments, regulators and supervisors, and the private sector and financial industry – to proceed with the difficult, but vital, measures required to re-establish the trust on which a well-functioning market economy relies.

Cohesive action at a European level is essential to alleviate the current tensions. Such action will also support a sound, longer-term economic recovery in the euro area and beyond. This will benefit all of us who live and work in Europe.

I call on euro area governments to work together. Looking ahead, countries have to take up their responsibilities. Major improvements need to be made to prevent bad fiscal behaviour, ensure effective implementation of the recommendations made by partners and enforce real and effective sanctions in case of breaches. It is equally decisive for the European Commission and the Eurogroup to engage in an effective control of the evolution of relative competitiveness inside the euro area, including of the evolution of unit labour costs. And the implementation of structural reforms, under the surveillance of the peers, is of the essence to elevate the growth potential in Europe.

I call on euro area governments in particular to work actively together to reach agreement on a quantum leap of the effectiveness of their collegial surveillance.

Thank you for your attention.


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Central Bank Independence and Financial Crises in History

Central bank independence is important because a central bank needs to be insulated from short-run political pressure in order to pursue its core mission of providing price stability. This involves the ability to tighten monetary policy at the expense of temporarily reduced real activity and increased unemployment without political interference. It is also crucial that the central bank is not forced to fund fiscal deficits in peacetime – that it be independent of fiscal policy. Finally a central bank has the important role of serving as a lender of last resort and independence from government influence can aid it in this pursuit.

The crisis of 2007/2008 has created considerable challenges for central bank independence. The Federal Reserve (and other central banks) have engaged in fiscal operations including credit policy(the extension of discount window lending to firms and markets other than commercial banks and the money market on the basis of risky collateral), bailouts of non bank financial institutions, and quantitative easing involving the purchase of risky mortgage backed securities and long-term Treasury securities. These actions have seriously threatened central bank independence and its crucial corollary credibility for low inflation. Are these developments novel? What does history tell us about central bank independence and financial crises? To answer this question I examine the record of the history of the Bank of England (one of the progenitors of modern central banking) before 1914 and the Federal Reserve since.

The Bank of England from 1694 to 1914

The Bank of England established in 1694 was a private institution with a government charter. Its original mandate was to purchase and help market government debt. It was not initially set up as a central bank but it gradually evolved in that direction (Bordo, 2008; Flandreau et al., 2009; Grossman, 2010). The Bank of England like the Swedish Riksbank founded in 1664, engaged in private banking activities. Because it held the deposits of other banks, it came to serve as a bankers bank facilitating transactions between banks and providing other banking services. It also became the repository for many banks because of its large reserves and extensive correspondent network. These factors eventually allowed it to become the lender of last resort in the face of a banking panic. In other words it became willing to provide emergency cash to its correspondents in times of financial distress. Also of great importance, the Bank played a crucial role in maintaining long term price stability by

following its charter and maintaining the convertibility of its notes into gold at a fixed price, i.e. adhering to the gold standard.

Learning to be an effective crisis manager involved a lengthy and painful process for the Bank and its independence was often compromised. Moreover, its independence often acted as a barrier to effective crisis management. There were two problems. First, before the passage of the Bank Charter Act of 1844, the government used the threat of revoking the Bank's charter when it periodically came up for renewal to pressure it to bail out the bill market on numerous occasions against its wishes (Calomiris, 2010) . It also forced the Bank to suspend the convertibility of its notes into gold in 1797 at the outset of the Napoleonic wars and to issue fiat money. Second, actions by the Bank itself worsened financial crises on several occasions (1825, 1837, 1847, 1857). The Bank as a profit making institution acted in its own interest to protect its gold reserves and did not provide liquidity to other banks and to the money market. In the face of severe criticism, the Bank adopted the responsibility doctrine proposed by Walter Bagehot, which required the Bank to subsume its private interest to the public interest of protecting the banking system as a whole. The Bank began to follow Bagehot's rule which was to lend freely on the basis of any sound collateral offered, but at a penalty rate to prevent moral hazard. The Bank learned its lesson well. No banking panics occurred in England after 1866 (at least until the run on Northern Rock in September 2007).

During the classical gold standard era from 1880 to 1914 the Bank of England adhered to the credible nominal anchor of gold convertibility and served as an effective lender of last resort. Its experience (as well as that of the Banque de France and the Reichsbank) served as a model for later central banks, especially the Federal Reserve System, established in 1914.

The Federal Reserve from 1914 to 2009

The Federal Reserve was established in 1914 primarily to deal with the periodic banking panics which frequently jolted the U.S. economy throughout the 19th century. The banking panics reflected two problems: first serious structural deficiencies in U.S. banking, a system based on unit banks (branching was prohibited) and a prohibition on interstate banking; second the absence of an effective lender of last resort, after the rejection of the charter of the Second Bank of the United States in 1836 the country had no authority resembling a central bank. The Federal Reserve System was set up to overcome these problems. Twelve regional Federal Reserve banks coordinated by the Federal Reserve Board in Washington were empowered to use their discount rates to adhere to the gold standard, to accommodate the "needs of trade" and to act as a lender of last resort to the member banks.

The Federal Reserve Act gave the institution a considerable amount of independence from the fiscal authorities. The Reserve banks could set their discount rates based on the demand by member banks to discount eligible paper. Government securities were not included in eligible paper (this was changed in 1931) so that the Fed, unlike the Bank of England in its early history, was not created to be a central bank to finance short-run government revenue shortfalls. However, the Fed was not completely independent, the Secretary of the Treasury and the Comptroller of the Currency were ex officio members of the Board.

World War I changed the picture considerably. The System quickly became involved in war finance, absorbing short-term government securities at low pegged rates and marketing war bonds, and by 1917 became an engine of inflation. Once the war ended, it took the Fed two years to regain its independence during which it fueled two more years of inflation.

In the 1920s the Fed carried out an independent monetary policy based on the Burgess Rieffler doctrine – a variant of the real bills doctrine – (Meltzer, 2003) in what Friedman and Schwartz (1963) termed "The High Tide of the Federal Reserve". But then its flawed real bills perception of the stock market boom (as a harbinger of inflation) led it to tighten policy to kill the boom triggering a recession in August 1929 and the Wall Street crash in October. Disaster followed in the next three years when the Fed failed to use its open market policy to offset a series of banking panics. Its performance reflected a mistaken reliance on the real bills doctrine and an endemic structural split between the Federal Reserve Board and the Reserve banks (Friedman and Schwartz, 1963; Meltzer, 2003). Indeed the Fed's poor performance in the Great Contraction of 1929-33 led Milton Friedman to propose in a 1962 essay that the Fed be made a branch of the Treasury for the purpose of following his famous k-percent rule.

In reaction to the Great Contraction the Fed was reorganized in the Bank Acts of 1933 and 1935. In theory the 1935 Act solidified the Fed's independence by removing the Secretary of the Treasury and the Comptroller of the Currency from the Federal Reserve Board and centralizing control in the new Board of Governors. However, as Meltzer (2003) points out, although the Fed in theory had the trappings of a powerful central bank ("Independent within the government") in practice it was subservient to the Treasury gold policy and a low interest rate peg from the mid 1930s to 1951. The one episode when the Fed used its policy independence was in 1936–37, when it doubled reserve requirements in a mistaken attempt to mop us excess reserves in the commercial banking system. This action led to a serious recession in 1937/38.

From 1941 to 1951 the Federal Reserve was completely subservient to the debt management policies of the Treasury and during World War II became an engine of inflation initially by lending to commercial banks on the collateral of government securities at a preferred rate below the official peg and later by directly purchasing Treasury securities.

By the end of the 1940s some Fed officials, concerned about inflation, pressed for the institutional independence to raise rates. From 1949 to 1951, there was growing conflict between the Treasury arguing for bond market stability and the Fed urging higher rates to stem inflation. The conflict ended with the famous Fed-Treasury Accord on February 26 1951, which gave the Fed the independence to conduct its own interest rate policy.

In the 1950s under Chairman William McChesney Martin the Fed followed sound monetary policies within an economic environment under the Eisenhower administration which emphasized budget balance, price stability and the Bretton Woods peg to gold at USD 35 per ounce. During this period until the 1970s there were no banking crises as the banking system had become highly regulated after the Depression and was also protected by deposit insurance.

The Fed's independence came increasingly under challenge beginning in 1965. Mounting pressure from the Treasury and the Johnson administration to coordinate monetary and fiscal policy and to follow "even keel" policies under which the Fed would hold Trea-

sury bond prices steady to aid funding operations reduced the Fed's ability to raise rates to ward off inflationary pressure. During this period Keynesian views and belief in the Phillips curve tradeoff between inflation and unemployment gained dominance within the Fed and the U.S. government. In December 1965, after the Fed had raised the discount rate to stem incipient inflationary pressures and mounting gold losses, President Johnson verbally attacked Chairman Martin (Meltzer, 2010). For the rest of his tenure as chairman, Martin was increasingly acquiescent to the Administration's demands and inflation momentum kept building up.

The Fed's performance in the 1970s under chairman Arthur Burns and later G. William Miller was abysmal. The Fed lost its will to tighten sufficiently to completely offset the buildup in inflationary expectations for fear of the political costs of rising unemployment. Indeed Burns caved in to political pressure from President Nixon to avoid tightening and raising unemployment and thereby jeopardizing the Republicans chances in the election of 1972 (Hetzel, 2008).

By 1979, inflation had reached double digit levels. In August 1979, President Carter appointed a well known "inflation hawk". Paul Volcker, as Chairman of the Federal Reserve. Volcker raised the federal funds rate by 7 percentage points between October 1979 and April 1980, the largest increase in Fed history. This tightening combined with consumer credit controls in the spring of 1980 led to a sharp recession. The Fed then shifted to an expansionary policy in July 1980 but in the face of a resurgence of inflation the Fed began to tighten again in May 1981. The FOMC policy reversal and acquiescence to political pressure in 1980 was widely viewed as a signal that the Fed was not committed to achieving a substantial decline in inflation.

The second and more durable round of tightening succeeded in reducing the inflation rate from about 10% in early 1981 to 4% in 1983 at the cost of a very prolonged recession (Bordo et al., 2007). The second Volcker shock, which was supported by the Reagan ad-

ministration succeeded in breaking the back of inflationary expectations. It also augured a new era of Fed independence after a 20 year hiatus. During the subsequent Great Moderation period from 1984 to 2006 the Fed demonstrated its credibility to commit to low inflation as seen by its willingness to raise the funds rate sharply in the inflation scare of 1994.

Since the financial crisis of 2007/2008 the Fed's independence has again been challenged with echoes of the 1940s, 1960s and 1970s. In 2007 and 2008, the Fed worked closely with the Treasury to set up a number of discount window credit facilities to alleviate the credit crunch. Such quasi fiscal facilities provide credit directly to firms the Fed deemed most in need of liquidity and exposed the Fed to the temptation to politicize its selection of recipients of its credit. In addition, the Fed's balance sheet ballooned with the collateral of risky assets including those of non banks and an insurance company AIG. These assets were in part backed by the Treasury. Thus, the Fed abandoned its traditional "Treasuries Only"policy and exposed its balance sheet to credit risk (Goodfriend, 2010). The Fed also worked closely with the Treasury to stabilize major banks with capital injections and stress testing. Moreover, the purchase of mortgage backed securities and long term Treasuries in 2009 (quantitative easing) combined monetary with fiscal policy. Finally a sense of déjà vu was evident in the close cooperation between the Chairman of the Fed and the Secretary of the Treasury in their appearance before Congress requesting financial rescue funds in the fall of 2008. All of these moves have compromised the Fed's independence.

Lessons from History

From this brief survey of the histories of the Bank of England and the Federal Reserve several policy lessons can be discerned.

First, central bank independence can be helpful in dealing with financial crises. This was the case in Western Europe during the classical gold standard era. The Bank of England and its counterparts in Western Europe as publicly chartered banks of issue, effectively maintained a credible nominal anchor and served as an effective lender of last resort to the financial system. They operated in a rules based regime.

Second, based on the experience of the Federal Reserve in the interwar period, central bank independence can be harmful if it is based on a flawed policy doctrine or a structurally flawed institution.

Third, serious financial crises can compromise central bank independence. This was the case with the Bank of England in the crisis of 1797 and especially during the recent crisis where the Fed has lost much of its independence and will need to struggle to regain it. It is an open question whether the Fed needed to abandon its "Treasuries Only" policy and purchase long-term Treasuries and mortgage backed securities, whether it needed to follow credit policy and engage in credit allocation, whether it needed to bail out non bank financial institutions or to follow the "too big (and too interconnected) to fail" doctrine? Or whether a different approach to the crisis could have preserved its independence and hence assured its credibility for low inflation. One possibility would have been for it to follow highly expansionary monetary policy from August 2007 throughout 2008 (the Fed held policy too tight through much of 2008 hence

aggravating the downturn (Hetzel, 2009)), and let the Treasury deal with all the bailouts and selective credit allocations by itself. Likely the Fed would have hit the zero nominal bound in 2008 and would have had to engage in quantitative easing involving the purchase at least of long-term Treasuries to attenuate the recession. Thus in the end it might have not been possible for the Fed to completely separate itself from fiscal policy actions but it may have gone a lot farther than it did in that direction.

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Panel I:
Safeguarding Price Stability and Financial Stability: Complementary or Contradictory Mandates for a Central Bank?

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Are Price Stability and Financial Stability Complementary or Contradictory Mandates? Four Issues

Welcome to our first panel of this conference. The topic of this panel is: "Safeguarding Price Stability and Financial Stability: Complementary or Contradictory Mandates?"

To a central bank practitioner, this issue may seem theoretical at first sight: in practice, he would argue, virtually any central bank in the world nowadays will in the event of a severe financial crisis do anything possible to restore functioning financial markets and to resolve the crisis.

However, this is not precisely the issue of this session. The question which we will discuss rather is: What potential conflicts might arise for a monetary policy maker in pursuing both goals? Against this background, should the central bank be mandated to safeguard financial stability, alongside price stability? If so, what kind of instruments would the central bank need to be able to fulfil these two mandates in parallel at the same time? Should it in the first place be the central bank which is in charge of both tasks, or should separate institutions with separate tools be responsible?

Let me, by way of introduction, briefly address four issues, which will then certainly be broadened and developed in more depth by our panellists.

1 How Should Central Banks Deal with Financial (In)stability ex ante? Changing Mainstream Views

The first point touches upon the rapidly changing mainstream view on how central banks and/or monetary policy should deal with financial (in)stability.

The traditional view of the past couple of decades was:

1. The central bank should be in charge of (consumer) price stability.
2. By doing so, it makes its best possible contribution also for financial stability.
3. With one instrument the central bank cannot pursue several targets at the same time.

4. In any case, influencing asset prices ex ante would be very difficult, and potentially very costly.
5. So, the answer seemed to be benign neglect ex ante, and mopping up the mess ex post.

In this set up, only minor goal conflicts are felt in normal times. In a way, the issue is avoided. This may also be described as the approach followed during the *Great Moderation* in the two decades up to 2007.

This view was challenged by some, most notably BIS economists several years ago. They argued:

1. Central banks' success in ensuring low consumer price inflation may in itself create a paradox of stability: the underpricing of risk leads to asset price and financial bubbles.
2. A successful inflation targeting-type of monetary policy may itself be-

come a source of financial bubbles and macroeconomic instability.
3. Therefore, central banks should also take asset prices into account – in other words, inflation is to be defined more broadly than just consumer price inflation.

This view implies that there may be major tensions between the two objectives. In practice, asset prices never gained substantial weight either in ex ante monetary policy strategies or in practical policy action, and there are only quite few central banks around the world that have openly mentioned asset price developments as one factor (among many others) informing their interest rate policy.

The latest developments in mainstream thinking may be summarised as stating:

1. (Macro)financial stability is so important that it needs to be pursued explicitly as a policy goal in itself.
2. But two objectives – price stability and financial stability – need two instruments to be pursued successfully at the same time.
3. For (consumer) price stability, monetary policy, in other words the level of interest rates, is the appropriate tool, for macro financial stability, a new set of instruments summarised under the term *macro prudential policies* needs to be installed.

So, the potential tensions between monetary and financial stability are explicitly acknowledged, and a solution to this problem is offered – at least in theory. It will be interesting to discuss at this conference and to see over the next couple of months and years, what macro prudential surveillance will turn out to be, what concrete instruments it will encompass, and what it will be able to achieve – in practice.

2 Goals and Strategies: Important Differences between Monetary and Financial Stability

Secondly, I would like to point to interesting differences between monetary policy and financial stability in terms of goal definition and formulation of an explicit strategy.

Concerning the goal, most central banks nowadays have a fairly clear quantitative definition of their price stability objective. By contrast, I have so far not seen a clear quantitative definition of financial stability, and due to its broad nature, this also seems quite inconceivable. This raises important issues for decision-making in collegial decision-making bodies and for accountability.

There are also important differences in the area of strategy. Most central banks have defined – for internal and for communication purposes – clear strategies on how to achieve the price stability goal. By contrast, I am not aware of any explicit *financial stability policy strategies* so far. Given the complexity of the issue and the lack of precision of the goal, formulating such strategies will likely be very difficult. I am not sure whether it will – or should be – attempted at all.

It also seems to me that the role of credibility in influencing behaviour is much more emphasised and observed in monetary policy than in financial stability matters. What credibility is for inflation expectations, one might argue, should be incentives and the avoidance of moral hazard for financial market regulation and supervision.

3 What Are Monetary Policy Instruments? What Are Financial Stability Instruments?

A third point that seems important to me is the increasingly blurred nature of what we have traditionally viewed as monetary policy instruments, and the potential challenges arising from this.

Over the past two years, what would normally and traditionally have been considered as typical monetary policy instruments – to some extent at least – turned into instruments to safeguard financial stability. To name just a few examples: collateral policy, the maturity and tender procedure of repos, the use of foreign exchange swaps, and recourse to outright purchases. Are these unconventional *monetary policy instruments*, or are these *macro prudential stabilisation instruments?*

Some central banks have taken great pains in keeping a clear distinction. For instance, the ECB in the early phases of the crisis emphasised the so-called *separation principle* between measures affecting the monetary stance and those (just) affecting liquidity in the interbank money market. More recently, the ECB Governing Council explicitly emphasised that the Securities Purchase Program (SMP) does not aim to alter the monetary stance (and is fully sterilised), and instead explicitly aims to restore orderly market conditions. So if the instrument does not aim to influence the monetary stance, this would suggest that we are dealing with a financial stability instrument. At the same time, dysfunctional financial markets affect the monetary policy transmission mechanism. This was also emphasised by the Eurosystem. Arguing in this way implies that any measures restoring orderly financial market conditions are an integral part of monetary policy.

I am sure, this issue is going to stay with us for some time.

4 Credibility Spillovers

Let me, to conclude my introduction, mention a fourth aspect where I see potentially important linkages between the two mandates, which may pose problems. I am talking about credibility spillovers.

Let us, purely hypothetically, assume, that a central bank which is also, officially and by formal mandate, in charge of financial stability, was not able to ensure financial stability, e.g. because of spillovers from other countries outside the influence of the central bank, or because of other reasons outside its sphere of influence. Obviously, such failure might have severe negative implications for its public acceptance, its credibility also in the area of price stability, and for long-run political support for its independence, which would in turn negatively affect its monetary policy mandate of maintaining price stability.

Or, to take another scenario, let us assume that, to safeguard financial stability, the central bank takes measures which are – rightly or wrongly – regarded by the public and by financial markets as signalling a softening up of its commitment to price stability. Then this might also affect inflation expectations and thus potentially inflation itself. Or it might affect the required path of official interest rates to achieve a given level of inflation, with, in the

short run, potential negative effects on output.

I am sure there are many more possible examples for potential synergies but also tensions between the two mandates of price and financial stability, and the instruments used to achieve them. To shed further light on these issues, we have two eminent speakers on our panel.

Petra M. Geraats from the University of Cambridge tellingly called her paper *Price and Financial Stability: Dual or Duelling Mandates?* As you will see, Petra's paper brings academic structure into the topic, by discussing potential tradeoffs, or policy conflicts, under different shocks, and by discussing to what extent the seemingly straightforward distinction between the two mandates and the instruments to be used in their pursuit is in reality quite blurred. The many links and synergies in turn lead her to the conclusion that both objectives should be pursued by the same institution, the central bank.

Our second speaker, Martin Čihák from the International Monetary Fund, discusses the topic of *Safeguarding Price Stabililty and Financial Stability: Complementary or Contradictory Mandates for a Central Bank?* from a practitioner's point of view. He will argue that, yes, there might be goal conflicts for central banks formally mandated to pursue price and financial stability, but they have these conflicts already now, due to their functions of lender of last resort and crisis managers. Against this background he suggests to introduce financial stability as an explicit, subordinated secondary objective in central bank mandates, while he concedes that financial stability will have to be defined quite broadly, and will be hard, if not impossible, to quantify. He also shows empirically that independent central banks are likely to perform better in safeguarding financial stability than less dependent institutions.

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Price Stability, Financial Stability, and Central Bank Independence

1 Introduction

One of the upshots of the recent global financial crisis is that in addition to maintaining price stability, central banks also have a key role in maintaining financial stability and in crisis management. This is not a completely new role, but it is one that has become much more central than in the past. This "new" role of central banks raises a number of questions. A crucial one among them is whether maintaining financial stability is helped or hindered by having a central bank that is independent.

The relationship between financial stability and central bank independence is nontrivial. Unlike price stability, financial stability is rarely within the sole purview of the central bank, as it is usually shared with other government bodies. The actual outcome then depends – much more than in the case of price stability – on a number of factors, both internal to the central bank (such as the tools it has available to deal with financial instability, and the potential conflicts between financial stability and price stability) and external (such as the actions of other players, including the ministry of finance and other government agencies). Arguably, a system in which the central bank is very autonomous and is narrowly focused on achieving the objective of price stability, may get into problems if maintaining financial stability requires policies that, in the short term at least, deviate from policies for achieving price stability. On the other hand, greater independence from outside pressures means that central banks are less politically constrained when it comes to addressing financial distress. This should allow them to act earlier and more decisively before a crisis erupts; also, it may give them wider latitude in managing a systemic crisis.

This paper focuses on central bank independence and its linkages to financial stability and price stability. The relationship between central bank independence and price stability has received much attention in the literature. In contrast – and despite the emergence of financial stability as an important item on central bank agenda in many countries in the last three decades – relatively little has been written on the relationship between central bank independence and financial stability. In the remainder of the paper, section 2 overviews central banks' role in financial stability, section 3 examines the tradeoffs between financial stability and price stability, section 4 discusses time inconsistency in financial stability policy, section 5 presents empirical evidence on the relationship between central bank independence and financial stability, and section 6 concludes.

2 Central Banks and Financial Stability

The global financial crisis has put into question many of the accepted "policy wisdoms." One of them was that that monetary policy should have a single objective, a corresponding single tool, and an operationally independent and accountable central bank. This view has been put to a major test during the cri-

[1] *mcihak@imf.org. The views expressed here are those of the author, and do not necessarily represent those of the IMF or IMF policy.* *I would like to thank participants of the 38th Economics Conference at the Oesterreichische Nationalbank for their useful comments. I would also like to thank participants in a Bocconi University conference "Does Central Bank Independence Still Matter?" for useful comments on a related paper. All remaining errors are my own.*

sis, as central banks have taken on important roles in financial stability, going far outside the narrow concept of monetary policy, taking on other objectives and tools, and arguably compromising their independence along the way.

Compared to central bank activities in the area of price stability, central bank work in the area of financial stability is characterized by lower clarity of the underlying concepts and operational definitions. Central bank work in the area of financial stability also uses tools that have only a partial impact on the ultimate objective of financial stability (table 2).

The legal basis for central bank involvement in financial stability is weaker than in the area of price stability. While price stability is usually listed as a primary objective in a central bank law, financial stability is rarely contained in basic central bank legislation as a key objective. Instead, central banks' financial stability role is often based on an interpretation of the law.[2] If financial stability is included in the law, it is often bundled with other tasks, such as the support for smooth functioning of the payment system, regulation and supervision of the banking system, or lender-of-the-last resort functions. Financial stability and the central bank's role in it are more commonly specified in other documents, such as mission statements or memoranda of understanding. Central banks typically justify their engagement in the stability and general health of the financial system by their monetary policy objectives, payment system functions, and lender of last resort roles (which they almost universally have) as well as their role in prudential supervision (which many have).

Corresponding to the absence of an explicit legal responsibility for financial stability, most central banks do not have clear accountability to their shareholders, the government, or the general public with respect to the area of

Table 1

Central Banks' Role in Financial Stability

Central bank:	% of All economies	Advanced economies	Others
has an explicit legal responsibility for financial stability	3	9	2
derives responsibilty for financial stability from interpretation of law	34	89	18
… derives it from monetary policy objectives	10	26	5
… derives it from from payment system tasks	8	20	4
… derives it from banking supervisory tasks	12	26	8
… other interpretations	5	17	1
oversees payment system(s)	100	100	100
supervises banks	47	34	51
supervises all financial institutions	16	11	18
publishes a financial stability report	29	77	15
has a seperate organizational unit on financial stability[1]	32	83	17
has clear general accountability (to shareholders/government/public)	45	63	40
has clear accountability for financial stability	2	6	1

Source: Author's survey of central bank laws and other information listed on the 157 central bank websites listet at: www.bis.org/cbanks.htm

[1] *Percent of all central banks that publish their detailed organizational structure on their website.*

[2] *For an earlier overview of institutional frameworks for financial stability, see Oosterloo and de Haan (2004).*

Table 2

Schematic Comparison of Price Stability and Financial Stability

Element	Price stability	Financial stability
General definition	Clear	A range of definitions
Operational definition	Clear (variable and target), especially in inflation targeting	Typically not specified
Legal base for central bank's role	Based on law	Based on an interpretation of law
Scope of central bank's responsibility	Full responsibility	Partial/shared responsibility, exact boundaries not clear in some countries
Interventions	Regular, high frequency	From time to time
Research	Well developed	Developing

Source: Author's compilation.

financial stability. Many central banks have general accountability requirements with respect to their main objectives, and some include reporting on financial stability under those requirements.

Correspondingly, central banks' responsibility for financial stability is usually only partial or shared with other institutions. The exact boundaries of this responsibility are often unclear. Some countries use memoranda of understanding among the various institutions to delineate the responsibilities more clearly. However, such memoranda are nonbinding by their nature, and their resilience in a situation of crisis is an open question.

3 Conflicting Mandates?

Bigger involvement of central banks in financial stability has some advantages. It may enable them to better respond to important developments in credit growth and asset prices, which may be more difficult for central banks focusing on narrow price stability objectives. There are also potential synergies between monetary policy and financial regulation and supervision. A central bank's role in financial supervision can inform its response to banking sector stresses. Indeed, in response to the crisis, both monetary and prudential policies are being revised to take greater account of the need to mitigate systemic risk.

The bigger role in financial stability is, however, not without challenges for central banks. First, there are potential tensions between monetary policies on one hand and prudential policies (as well as lender-of-last resort functions) on the other. These tensions, as illustrated by the recent crisis, are quite real, and need to be carefully managed and communicated.

Second, there are reputational risks for monetary policy. If a central bank has responsibility for financial stability, an occurrence of financial instability may be seen as a sign of ineptitude. If this damages the central bank's credibility, it might also impair its ability to conduct monetary policy. These risks are not insurmountable. They can be mitigated by steps such as institutional separation and different accountability mechanisms for price stability and for financial stability. Moreover, these kinds of risk are not entirely new: there are already important reputational risks arising from non-price-stability tasks that central banks manage (e.g. use of lender of last resort facilities).

Third, the greater role of central banks in financial stability raises the issue of concentration of power. Adding a wide-ranging objective such as financial stability to an already independent

central bank can be seen as giving too much power to decision makers who are appointed rather than being directly elected. At the same time, the crisis has illustrated that there is a premium on a well-coordinated policy framework. Arguably, to achieve this, it is important to balance increased independence with more accountability.

Fourth, there is a risk that the increased involvement in "non-core" areas, such as those relating to financial sector issues, will threaten central bank independence. The risk can be managed by ensuring that the improved accountability does not threaten the legal

boundaries that secure central bank independence.

To some extent, it could be argued that the issue of conflicting mandates can be addressed by extending the policy horizon. If the policy horizon is sufficiently long, the tradeoff between price stability and financial stability diminishes substantially. However, it is still necessary to address the practical challenges, in particular how to come up with operational measures of financial stability in the short term, how to improve forecasting tools, and what are the appropriate policy tools to achieve financial stability. On the last point, this clearly needs to go beyond report writing (although better and more regular informing of the public is important). More regulatory and supervisory powers are needed, and other important tools include roles in ensuring integrity of payments systems, broader roles in crisis management

4 Financial Stability, Time Inconsistency and Independent Central Banks: Some Theory...

The relationship between central bank independence and financial stability is far from trivial. In a long-term perspective, price stability can be seen as a key component of financial stability (e.g. Christl, 2005). So, the relatively well-documented relationship between central bank independence and price stability (e.g. Arnone et al., 2008) may well translate into a positive relationship with financial stability. However, the relationship between price stability and financial stability is rather complex in the short- and medium-term, with potential tradeoffs between the two. An independent central bank charged with maintaining financial stability is likely to end up with levels of inflation that are higher than those in similarly independent central banks that do not follow the financial stability objective (Bauducco et al., 2006).

There are reasons to expect a positive relationship between central bank independence and financial stability. In particular, greater independence from outside pressures should mean that central banks are less politically constrained in acting to prevent financial distress. For example, if the central bank's monitoring picks up signals of emerging financial sector problems, it is free to act as a "whistle-blower," alerting the relevant parties, and triggering their adjustment actions, ultimately helping to prevent crisis. Moreover, if the central bank has prudential powers, it can use its enforcement ac-

tions to require adjustments by market participants. In contrast, if a central bank lacks independence, it may become captured by political interests associated with weak financial institutions threatened by insolvency. This is likely to prevent the central bank from tough and timely action.

Financial institutions' owners and managers may have good reasons to capture the central bank. If a financial institution gets close to insolvency, the incentive structure of its owners and managers (in particular the combination of deposit taking and limited liability) encourages a "gamble for resurrection": continue to absorb deposits from the public and invest them in increasingly risky projects. If the projects turn up successful, they can create substantial profits to owners, and allow saving the bank; if not, they usually create only limited costs to the owners or managers, but they substantially increase the costs of the ultimate failure (Kane and Klingebiel, 2004 document the effects of such gambles for resurrection on a sample of 12 systemic crises). This creates incentives for financial institutions' owners and managers to capture the central bank. These incentives are likely to be stronger if the public sector plays an important role as an owner of financial institutions. Additionally, central bankers themselves may have motivation not to "blow the whistle" or enforce prudential action. For example, Kane (2000) notes that opportunistic forbearance offers personal and bureaucratic rewards, while officials who confront bank insolvency in a timely way are threatened with substantial reputational and career penalties.

If the central bank is perceived weak or hesitant to act in a situation of growing financial instability, the very perception can make financial crises more likely. The problems with moral hazard arise well before a crisis, and weak banks are tempted to "gamble for resurrection" by undertaking very risky projects. Central bankers can try to claim that they would be "tough" in response to a crisis. However, as long as the weak behavior is ex-post efficient for the central bank, the "tough" strategy would be seen as time inconsistent and not credible. In terms of game theory, is can be shown that an inferior equilibrium exists if the central bank cannot pre-commit to a "tough" course of action (Kydland and Prescot, 1977).

I illustrate this problem (of time inconsistency in financial stability policy) in table 3, using a stylized payoff matrix of the financial stability policy game. The policymaker has two possible responses in the face of financial instability: "tough" and "lenient." If the market believes the policymaker to be of the tough type (i.e., it believes that the policymaker would enforce a prudential action in a weak financial institution or "blow a whistle" in a situation of financial sector weakness), he has a short-term incentive to act leniently (i.e., engage in regulatory forbearance, pump liquidity into an insolvent institution, or be silent about the weaknesses in the system and allow "gambles for resurrection") if a stressful situation actually arises. In other words, being lenient is *ex-post* efficient in this case. However, rationally behaving participants knowing about this motivation of the policymaker would expect the policymaker to be lenient. This expectation leads to worse payoffs to the policymaker. Specifically, it leads to a (Nash) equilibrium (–1,0), in which the policymaker

would be worse off than if he were able to credibly commit to being tough (0,0).[3]

The time inconsistency problem in the area of financial stability is arguably even more acute than time inconsistency in the area of price stability. A part of the reason is that monetary policy decisions are taken relatively regularly and their impact on inflation can be evaluated on a frequent basis. Therefore, the strategic interaction between the monetary policy maker and the public has the nature of a repeated game, giving the policy maker an opportunity to establish a track record of being tough. In contrast, a financial crisis may strike a given country once in a generation or even less frequently. In other words, before the next financial crisis strikes, the existing generation of policymakers is usually gone. This makes it difficult for a policy maker to establish a credible track record.

How to address this version of the time inconsistency problem? Similarly to the time inconsistency in monetary policy, the policymaker needs a commitment device that will persuade the market that he or she will indeed be tough in a stressful situation. This commitment device can have the form of delegating the task of "acting tough on financial instability" to an independent agency, such as the central bank, and appointing as its head a person with a strong aversion to financial instability (or designing a contract with the central bank head in a way that rewards tough behavior and penalizes leniency).

Table 3

Time Inconsistency in Financial Stability Policy: Payoff Matrix

Policymaker chooses to be:	Market expects policymaker to be:	
	Tough	Lenient
Tough	0, 0	–2, –1
Lenient	1, –1	–1, 0

Source: Author's compilation.

Note: In each cell, the first number is the policymaker's payoff and the second one is the payoff to the public.

The above discussion suggests a positive relationship between central bank independence and financial stability. However, there are also several complicating factors. In particular, it is possible that publication of a central bank report at a time of increasing risk to financial stability might precipitate the very shocks or crisis that the central bank is trying to avoid, by inducing liquidity problems in particular markets or financial institutions. These considerations may lead even an independent central bank to be cautious about issuing strong warnings or implementing harsh measures that may ultimately defeat their own purpose.[4] Nonetheless, the danger of precipitating a crisis by "whistle-blowing" is reduced if the central bank publishes its analyses regularly, and has an established track record of unbiased analysis. Establishing such a track record may be more feasible for central banks that are independent and thereby better insulated from political and other pressures.

Another reason why the relationship between central bank independence and financial stability may not be straightforward is that central banks

[3] *It is possible to generalize this matrix by using variables such as crisis costs and supervision/monitoring costs instead of parameter values to denote the payoffs; however, it adds little in terms of analytical insights.*

[4] *Empirical literature has so far offered little evidence on the pros and cons of publishing timely information on financial stability. However, preliminary empirical data suggest that there are net benefits (Čihák, 2006).*

have an incomplete degree of control over policy outcomes in the area of financial stability. Unlike price stability, financial stability is rarely within the sole purview of the central bank. It is usually a shared responsibility with other agencies, including the ministry of finance, and often also a separate supervisory agency and a deposit protection fund. The actual outcome therefore depends on a number of factors not only inside the central bank (the availability of tools to the central bank, and its ability to resolve conflicts between financial stability and price stability) and outside the central bank (e.g., the actions of other players, including the government).

5 … and Some Empirical Results

What do empirical data say on the relationship between central bank independence and financial stability? To examine this question, I use the central bank independence index (CBI) from a recent world-wide survey of central bank independence (autonomy) by Arnone et al. (2008). They apply the methods developed by Grilli et al. (1991) and Cukierman (1992) to assess CBI for 163 central banks representing 181 countries.

For measuring the degree of financial instability, use a dummy variable taking on the value one if a systemic banking crisis surfaced in a particular year or zero otherwise. I use two widely employed databases of financial crises, namely those by Demirgüç-Kunt and Detragiache (2005) and Honohan and Laeven (2005), and define a country being in a crisis in a certain year if it has be classified as such in at least one of the two databases. Using this classification, I record up to 61 systemic crises since 1980.

A preliminary analysis suggests that countries with more independent central banks are indeed less likely to experience a systemic crisis. In particular, pairwise correlation coefficients between the CBI index and the crisis dummy variable are consistently negative for the different definitions of the crisis dummy and the different sample sizes (table 4). Similarly, countries with

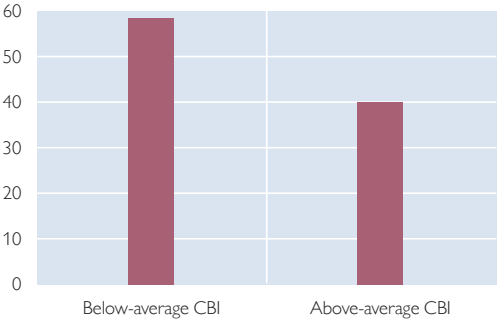
above-average values of the CBI index (CBI>0.64) have a markedly lower probability of ending up in a systemic crisis at least once during the observation period than other countries (chart 1). This preliminary analysis suggests that whether a country has an independent central bank matters for financial stability.

These preliminary results are confirmed by a more rigorous regression

Chart 1

Central Bank Independence and Financial Stability

Probability of (at least one) crisis in the sample period



Source: Author's calculations.

analysis, based on a logit model. The model estimates the probability of a crisis in a given country and a given year as a function of the CBI and other explanatory variables. Specifically, to distinguish whether a central bank is involved in banking supervision, I use a "CB supervisor" dummy that takes a value of 1 it is a banking supervisor and 0 if it is not. To approximate quality of banking supervision, I use information from the assessments of compliance with the Basel Core Principles (BCP), collected by IMF missions.[5] I also include a range of macroeconomic control variables that are commonly employed in early warning system models (real GDP growth, the real interest rate, the rate of inflation, changes in the terms of trade, changes in the foreign exchange rate, credit growth, and the ratio of M2 to gross foreign reserves). To avoid simultaneity, these variables are lagged by one period. I account for the effect of deposit insurance schemes on bank stability, using a "moral hazard index" by Demirgüç-Kunt et al. (2005). To capture the effect of ownership structure in the countries' banking systems, I include the proportion of bank assets controlled by foreign entities (Barth et al., 2001), and the degree of government ownership (La Porta et al., 2002).

The results (presented in detail in Čihák, 2007) suggest that central bank independence indeed maters for financial stability. Both the CBI index and the "CB supervisor" dummy variable have the expected signs. The Basel Core Principles (BCP) index, which approximates quality of banking supervision, has the expected (positive) sign, but is not significant. The other explanatory variables previously used in the early warning systems literature (see e.g. Demirgüç-Kunt and Detragiache, 1998) have the expected signs.[6]

Based on the estimates, one can compute the impact of an increase of a one standard deviation in the CBI index (0.20) using the marginal effect, evaluated at the mean, on the probability of observing a crisis in a country. The results suggest that a one standard deviation increase in central bank independence (which, for illustration, corresponds roughly to the difference between observations for the United States and Uganda) decreases the probability of observing a crisis by about 3%.[7]

The empirical analysis also provides some evidence supporting the statement made earlier that a more independent central bank is more likely to act as a "whistleblower." Many central banks nowadays publish financial stability reports (FSRs), and previous research finds little empirical evidence that overall, financial stability reports provide useful early warning (Čihák, 2006). In the run-up to the recent global financial crisis, some financial stability reports for instance warned of risks from the U.S. economy, but more in terms of its impact on global imbalances rather than U.S. mortgage mar-

[5] *The BCP contains 25 "Core Principles" (CPs) that cover aims of supervision, autonomy, powers, and resources, capital adequacy, regulation of risks, supervision of foreign banks, and other issues. I calculate a "BCP compliance index," which is an unweighted average of all the 25 CP gradings, normalized to be from 0 (no compliance) to 100 (full compliance). The website www.imf.org/external/standards/index.htm has more details on the BCP and shows the gradings for the subset of countries that agreed to publication.*

[6] *In particular, I find that strong credit growth, higher inflation, higher real interest rates, and exchange rate devaluations are associated with higher likelihood of banking crisis.*

[7] *As regards the reliability of the estimates, some 25% of the crises in the sample are misclassified (Type I Error), which compares favorably with the existing early warning system literature (for a survey, see Demirgüç-Kunt and Detragiache, 2005).*

kets. And some financial stability reports have clearly missed risks that have materialized in a dramatic fashion (the financial stability report published on Iceland, for example, seriously underestimated the extent of risks in the domestic banking system).

But perhaps, going beyond this aggregate picture, more independent central banks are more effective in their FSRs. To examine this relationship between central bank independence and its ability to act as a "whistleblower," I have calculated the correlation between the CBI index and an index of FSR quality developed in Čihák (2006).[8] The correlation coefficient is significantly positive (table 4), suggesting that independent central banks are indeed likely to be more transparent in their analysis of domestic financial stability.

Finally, as expected, we find a positive correlation between the CBI index and an index of compliance with the Basel Core Principles (for central banks that are also banking supervisors). In other words, independent central banks that are also bank supervisors are likely to have higher degrees of compliance with international good practices.

In sum, the analysis suggests that central bank independence is correlated positively with financial stability. A one standard deviation increase in central bank independence index (corresponding roughly to the difference between Uganda and the United States) is associated with 3 percentage point decrease in crisis probability. This relationship holds even controlling for macroeconomic and other systemic factors identified by the literature. The relationship holds even in a series of robustness tests, such as different crisis coding, country samples, and time spans (central bank independence index becomes insignificant in some specifications, but its sign holds). The analysis also suggests that if a central bank publishes a financial stability report, the effectiveness of the report is positively correlated with central bank independence. In central banks carrying out banking supervision, supervisory quality (compliance with international standards) is positively correlated with independence.

Table 4

Central Bank Independence and Financial Stability

	CBI Index[1]	
	Narrower sample (68 countries)	Broader sample (163 countries)
Crisis Dummy		
– Honohan and Laeven (2005)	–0.229 (0.055)	–0.346 (0.038)
– Demirgüç-Kunt and Detragiache (2005)	–0.233 (0.050)	–0.352 (0.041)
Financial stability report grading	0.583 (0.012)	0.584 (0.011)
Compliance with Basel Core Principles	0.314 (0.051)	0.423 (0.032)

Source: Author's calculations.

[1] *Central bank independence index. For definitions and country samples, see Arnone et al. (2008).*

Note: Pairwise correlations, p-values in parentheses.

[8] *The index is based on a framework that identifies 5 key elements of a FSR (aims, overall assessment, issues, tools, structure and other features) and 3 characteristics (clarity, consistency, and coverage). Each FSR was assessed against each of the criteria, on a 4-point scale: 4 (fully compliant), 3 (largely compliant), 2 (partly compliant), and 1 (not compliant) and averages were used to arrive at the aggregate gradings (Čihák, 2006).*

Concluding Thoughts

An expanded role of central banks in financial stability may enhance overall effectiveness of financial regulation, allowing synergies to be exploited among tools to mitigate systemic risk. Independent central banks can help in achieving financial stability. This paper points to new empirical evidence that higher central bank independence is associated with more financial stability.

At the same time, higher independence needs to be complemented by robust mechanisms for transparency and accountability in safeguarding financial stability. One of the reasons why this is important is that it is usually the treasury that bears the ultimate responsibility for fiscal (or quasi-fiscal) costs incurred in the resolution of financial institutions.

Whether central banks actually achieve the objective of financial stability (and price stability) also depends on some factors not explicitly captured here. One of the factors is the quality of leadership, difficult to model, but very important in practice. A central bank governor needs to be a skilled manager and leader to be successful. Leadership skills are useful in normal times, and they become absolutely critical in situations of financial instability, when the going gets tough and the monetary and financial policies enter "unexplored waters."

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Price and Financial Stability: Dual or Duelling Mandates?

The recent prolonged period of financial turmoil makes clear that financial stability cannot be taken for granted. It requires proactive efforts by policymakers, just as much as maintaining price stability. This gives rise to the question whether price and financial stability are dual or duelling mandates.

The answer depends on whether these two policy objectives generate potential tradeoffs, and if so, whether the policy horizon is sufficiently long to achieve both objectives, or whether an effective policy instrument is available for each objective. The *Tinbergen rule*, first formulated by Tinbergen (1952), requires that the number of effective policy instruments is (at least) as large as the number of independent policy objectives. When price and financial stability are potentially conflicting objectives, they can still both be achieved provided the monetary policy instrument is supplemented by effective tools for prudential policy.

The remainder of this short paper first analyzes potential tradeoffs between price and financial stability. It then discusses how a framework of monetary and prudential policy can be developed to achieve a dual mandate of price and financial stability. The final section concludes.

Potential Price and Financial Stability Tradeoffs

The relation between two policy objectives depends on the nature of the disturbances that affect the economy. For example, in monetary policy it is common for central banks to care about stabilizing both inflation and the output gap. When the economy is hit by aggregate demand shocks, the central bank is able to adjust the policy rate to achieve both objectives. For instance, in case of a positive aggregate demand shock, raising the policy rate contributes to the stabilization of both inflation and the output gap. However, when the economy experiences aggregate supply shocks, the central bank faces a tradeoff between its objectives. For instance, in case of a negative (inflationary) aggregate supply shock, raising the policy rate contributes to stabilizing inflation at the cost of greater output volatility.

There are two solutions to this trade-off problem. First, the policy objectives could be ranked. Many central banks nowadays provide a prioritization for their monetary policy objectives, typically identifying price stability as the primary objective.[1] Second, the policy horizon for the objectives could be adjusted to achieve both objectives to some extent. In particular, choosing a horizon for inflation stabilization that exceeds the length of the monetary policy transmission process gives some flexibility to contribute to output stabilization (e.g. by ignoring some supply shocks). In practice, central banks generally aim to achieve their price stability objective in the medium term.[2]

Although there are many measures of price stability (e.g. GDP deflator, producer price index, consumer price index), these tend to be highly correlated, so most central banks focus on a

[1] *Using a sample of 98 central banks throughout the world, the prevalence of an explicit primary objective for monetary policy has increased from 39% in 1998 to 47% in 2006 (Geraats, 2009).*

[2] *The European Central Bank (ECB) aims to achieve its primary objective of price stability over the medium term, which it considers to be 18 to 24 months, leaving little scope for other objectives (Geraats, 2010a).*

headline or *core* measure of inflation.[3] However, no such consensus exists about the measurement of financial stability.

In principle, financial stability could be described as a stable financial system with healthy financial institutions and markets in which asset prices are consistent with fundamentals. Thus, financial instability could manifest itself through the bankruptcy of financial institutions, the disruption of financial markets, or misalignments in asset prices.

There is an intricate relation between price and financial stability. First of all, price stability could contribute to financial stability. In particular, when a central bank is credible in its pursuit of price stability, inflation expectations are more firmly anchored, which reduces interest rate volatility and helps to maintain financial stability. Disinflation often requires high interest rates and a yield curve inversion that weakens financial institutions. In addition, persistent deflation could lead to financial instability due to a debt-deflation spiral in which rising real debt values exacerbate deflationary pressures.

Similarly, financial stability could contribute to price stability. In particular, a financial crisis that induces deflationary pressures is harmful to price stability. Also, an asset price bubble raises inflationary pressures as aggregate demand is boosted by wealth effects. In addition, turmoil in financial markets complicates the transmission of monetary policy, which makes it harder to achieve price stability.

On the other hand, a narrow focus on price stability could endanger financial stability. Macroeconomic stability with low interest rates may induce more risk-taking behaviour and give rise to financial imbalances (see also Borio and Lowe, 2002; White, 2006).

Whether price and financial stability are complementary or contradictory objectives depends on the type of economic shocks. For aggregate demand shocks, maintaining price and financial stability generally go hand in hand. Adjusting the policy rate to offset aggregate demand shocks helps to stabilize not only the output gap but also goods and asset prices.

However, aggregate supply shocks are more likely to have opposite effects on price and financial stability. For instance, suppose there is a positive supply shock that depresses inflation but boosts output. Then expansionary monetary policy could further inflate asset prices. Instead, it may be more prudent to accommodate the supply shock and aim to achieve price stability over a longer horizon.

In addition, there are shocks that directly affect the financial system or asset prices. Most closely related to monetary policy are money market shocks. The turbulence that erupted in the interbank market on 9 August 2007 wreaked havoc with the monetary transmission mechanism as interbank rates deviated significantly and persistently from the policy rate set by the central bank. Liquidity operations conducted to preserve the proper functioning of money markets thus facilitate both financial and price stability. In fact, such liquidity interventions can be completely separated from monetary policy decisions, effectively providing an additional instrument to ensure the smooth functioning of money markets. This is also the position of the ECB, which has repeatedly emphasized that its liquidity interventions since the summer of 2007 do not influence the

[3] *A similar issue arises for central banks that focus on the external (rather than internal) value of the currency.*

determination of the monetary policy stance.[4]

The monetary transmission mechanism could also be affected by credit shocks that cause disruptions in financial intermediation. For instance, the dramatic monetary easing in the aftermath of the bankruptcy of Lehman Brothers on 15 September 2008 appears to have been (at least partially) counteracted by a credit crunch. Actually, this holds more generally for countercyclical monetary policy as bank lending tends to be strongly procyclical. Additional policy or regulatory instruments such as countercyclical capital requirements or dynamic loan loss provisioning (used by Spain since 2000) could be employed to mitigate this.

Finally, there could be *sentiment* shocks to expectations that directly affect asset prices.[5] For example, *irrational exuberance* could cause an equity price bubble. Although the central bank could wait until the bubble bursts and then ease monetary policy to prop up aggregate demand, this does not address the distortions in real allocation caused by the misalignment of asset prices. A more proactive policy response would be for the central bank to *lean against the wind* through contractionary monetary policy. But it may be necessary to persistently undershoot the inflation target to deflate an asset price bubble, creating a trade-off between price and financial stability. This could be overcome by extending the policy horizon for the inflation target to allow for a gradual unwinding of financial imbalances (Borio, 2006). Nevertheless, it would be desirable to develop alternative instruments that more directly mitigate irrational exuberance. For instance, leverage restrictions could be imposed to avoid adding fuel to the fire. These could be applied directly to financial institutions, but also take the form of limits on the loan-to-value ratio for mortgages or higher margin requirements for traders. The leverage restrictions could be adjusted based on the rise in asset prices, providing more effective *leaning against the wind* that is independent of monetary policy.

Table 1

Potential Price and Financial Stability Trade-Offs

Shocks	No trade-off	Weakening monetary policy	Trade-off
Aggregate demand	✓		
Aggregate supply			▲
Money market		<	
Credit		<	
Sentiment			▲

Source: Author's compilation.

To sum up, depending on the nature of economic and financial shocks, there may be trade-offs between price and financial stability.[6] As summarized in table 1, no trade-off arises for aggregate demand shocks; money market and credit shocks tend to weaken the effec-

[4] *See for instance ECB President Trichet's introductory speech at the hearing of the Economic and Monetary Affairs Committee of the European Parliament in Brussels on 26 March 2008. However, since July 2009 the euro overnight index average (EONIA) has been around 0.35% and the three-month euro interbank offered rate (EURIBOR) has declined to around 0.7%, both well below the ECB main refinancing rate of 1%. Thus, it appears that the ECB has used its liquidity operations to conduct monetary policy by stealth (Geraats, 2010b).*

[5] *Disturbances to expectations that directly affect consumption or investment, which could be called "confidence shocks", have the same effect as aggregate demand shocks.*

[6] *See also De Grauwe and Gros (2009), who focus on technology shocks and "animal spirits." They suggest using legal reserve requirements and macro-prudential controls as policy instruments for financial stability.*

tiveness of monetary policy; and aggregate supply and sentiment shocks could induce a trade-off. However, with the adoption of additional policy or regulatory instruments, it is still possible to achieve both objectives of price and financial stability.

A Framework for Monetary and Prudential Policy

The analysis above shows that central banks could achieve a dual mandate of price and financial stability provided they supplement their monetary policy instrument with additional prudential policy tools. In this respect, prudential policy could be described as any measures that promote financial stability,

which could be through supervision and regulation (ex ante) or liquidity interventions (ex post).[7]

Central banks already routinely conduct liquidity operations in the implementation of monetary policy and these could be enhanced to address any turmoil in money markets. Similar tools could be used to address problems in other financial markets (e.g. the ECB's EUR 60 billion purchase program for covered bonds, which started in July 2009, or the *Securities Markets Programme* it announced on 10 May 2010.)

In addition, many central banks engage in supervision and regulation of financial institutions to maintain financial stability at the micro level. These micro-prudential efforts focus on managing liquidity and solvency risks, but the recent financial turmoil has shown that these risks are interrelated. In particular, a financial institution with liquidity problems that is forced to sell some risky assets in illiquid markets could end up with solvency problems as well due to mark-to-market accounting.

Furthermore, micro-prudential supervision and regulation do not suffice to safeguard financial stability at the macro level as the global financial system is characterized by a complex web of financial interconnections. The fire sales of one financial institution could spread to many other institutions through illiquid markets. In addition, micro-prudential tools may not be very effective in stemming asset price bubbles. Hence, it is essential to develop macro-prudential policy instruments to maintain stability of the financial system.

So, central banks could fulfil a dual mandate of price and financial stability if they have a sufficient number of effective instruments to conduct both monetary and prudential policy. The Tinbergen rule teaches us that every separate policy objective requires an additional policy instrument. Therefore, tools to achieve financial stability should be developed, such as liquidity operations to stabilize financial markets, micro-prudential supervision and regulation to maintain the health of financial institutions, and macro-prudential requirements to prevent finan-

[7] *Although one could argue that the latter is not really prudential policy but crisis management, this is often essential to prevent financial instability from spreading through contagion, which makes it prudential.*

cial imbalances and safeguard the stability of the financial system. Thus, a framework is obtained for monetary and prudential policy, illustrated in table 2.

Table 2

Framework for Monetary and Prudential Policy

	Objective	Instruments and tools
Monetary policy	Price stability	Repo rate
Prudential policy	Financial stability	
	– Financial markets	– Liquidity operations
	– Financial institutions	– Micro-prudential regulations
	– Financial system	– Macro-prudential requirements

Source: Author's compilation.

This framework gives rise to the question whether the adoption of additional policy instruments allows monetary and prudential policy to be conducted separately from each other, similar to monetary and fiscal policy. There are three reasons why it would be beneficial for central banks to perform both monetary and prudential policy.

First, both policies sometimes rely on the same tools. In particular, open market operations are frequently used by central banks to implement their monetary policy stance, but they could also be employed to provide liquidity support to ease tensions in money markets. In fact, as the monopoly supplier of the monetary base, the central bank plays a unique and critical role in maintaining financial stability. This also makes it natural for the central bank to host a standing lending facility (or *discount window*) to provide reserves to banks with temporary liquidity problems. This automatically produces useful information about the (lack of) health of financial institutions.

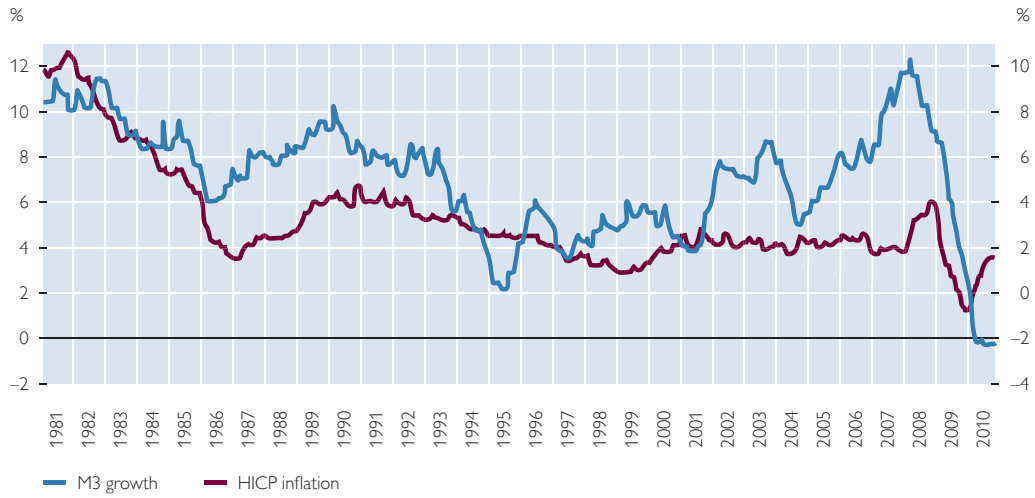
Second, there may be an important informational advantage for central banks to be involved in both monetary and prudential policy. For instance, central banks will immediately detect any signs of trouble in the interbank market as they implement monetary policy. In addition, the health of financial institutions affects the transmission of monetary policy through the credit channel. Furthermore, information about individual financial institutions is vital to assess the stability of the financial system as a whole. The latter in turn determines how robust the risk defences of financial institutions need to be. Because of such synergies, micro- and macro-prudential policy are best conducted hand in hand.

A third reason for delegating monetary and prudential policy to central banks is that there may be an economic connection between price and financial stability as both appear to be affected by monetary aggregates. The classical quantity theory of money predicts a one-to-one relation between money growth and inflation in the long run, but large fluctuations in money demand make the short-term association more tenuous. Chart 1 shows a positive relation between the annual growth rate of M3 and HICP inflation for the euro area from January 1981 to May 2010, with a highly significant correlation coefficient of 0.62. After the great disinflation of the 1980s, the episodes of persistently high money growth during 1988–1990 and 2007–2008 have both been followed by bursts of inflation in excess of 3%.

Nevertheless, even when taking into account sometimes high levels of inflation, there appear to have been episodes of significant excess money

Chart 1

Money Growth and Inflation in the Euro Area



Source: Statistical Data Warehouse (ECB).
Note: Annual growth rate of M3 (left-hand scale) and of HICP (right-hand scale) for euro area (changing composition). Sample: 1981:01-2010:05.

growth, which may have contributed to asset price booms. This is illustrated in chart 2, which shows the real annual growth rate of euro area M3 loans and the level of the Dow Jones Euro Stoxx 50 from January 1987 to May 2010.[8] The equity price booms (or bubbles) of the late 1990s and late 2000s were both preceded by prolonged periods of excess credit. All in all, there has been a strong positive relation between real credit growth and (log) equity prices, with a correlation coefficient of 0.46 (0.35).[9]

As a result, when excessive money and credit growth is not igniting inflation, it may be quietly adding fuel to the fire of an asset price bubble. Since price and financial instability appear to have a common cause, they are best tackled together by a central bank in charge of both monetary and prudential policy.[10]

Conclusion

Recent financial crises have revealed that a "nice" (non-inflationary, continuously expanding) economy can mask the buildup of toxic imbalances that threaten the financial system. So, it is vital for policymakers to proactively pursue not only price but also financial stability. Although the pursuit of both objectives could give rise to uncomfortable trade-offs, these can be bypassed by supplementing the main in-

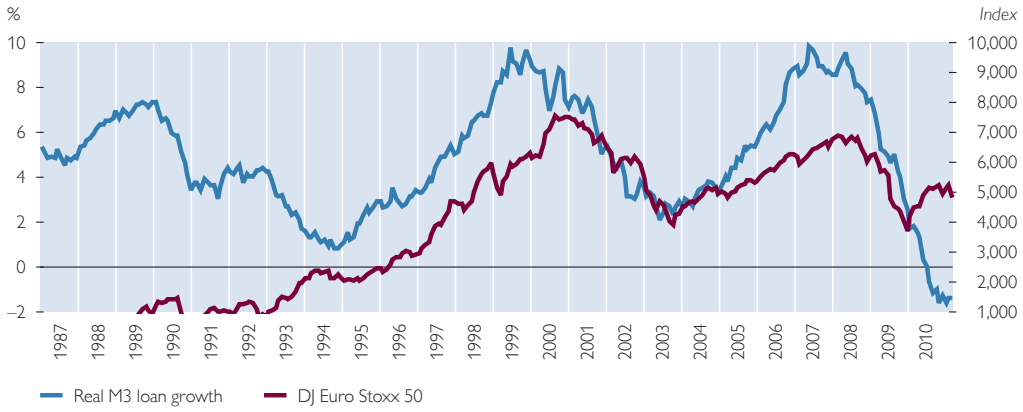
[8] *The sample is shorter due to data availability.*

[9] *The correlation between the real annual growth rate of M3 loans and the annual growth rate of the Dow Jones Euro Stoxx 50 is 0.29. For the annual growth rate of M3 loans, the correlations are less significant with 0.26 (0.13) and 0.24 for the (log) level and the annual growth rate of the Dow Jones Euro Stoxx 50, respectively. There is no such significant positive correlation for M3 growth.*

[10] *De Grauwe and Gros (2009) recommend that the ECB adopts a new* two-pillar *strategy based on the objectives of price and financial stability. In the United Kingdom, the new coalition government has recently announced the creation of a* Financial Policy Committee *at the Bank of England in addition to its Monetary Policy Committee, although it is not clear yet whether sufficient prudential policy instruments will be introduced to ensure effectiveness.*

Chart 2

Credit Growth and Equity Prices in the Euro Area



Source: Statistical Data Warehouse (ECB) and author's calculations.

Note: Real annual growth rate of M3 MFI loans to non-MFIs excluding government (left-hand scale) for euro area (changing composition), calculated by subtracting annual growth rate of HICP inflation; Dow Jones Euro Stoxx 50 equity price index (log scale, right-hand scale). Sample: 1987:01-2010:05.

strument of monetary policy with tools for prudential policy, in line with the Tinbergen rule.

Thus, a framework could be developed for monetary and prudential policy in which each policy objective has its own instrument. Although this allows a conceptual separation between monetary and prudential policy, it is undesirable to split up the twin objectives of price and financial stability as they appear to have a common cause, benefit from exchanging information and share some key tools. Instead, these twin objectives are likely to be easier to accomplish when they are pursued together. Although the twin goals sometimes give rise to duelling demands, with an appropriate policy framework central banks can accomplish both and achieve a dual mandate of price and financial stability.

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Klaus Liebscher Award

Klaus Liebscher Award for Scientific Work on European Monetary Union and Integration Issues by Young Economists

Ladies and Gentlemen,
this is the 6th time that we give the *Klaus Liebscher Award* to a team of young researchers in economics.

On the occasion of the 65th birthday of Klaus Liebscher, former Governor of the Oesterreichische Nationalbank (OeNB), the bank in 2005 established the Klaus Liebscher Award. We did so in recognition of his unrelenting commitment to the cause of European integration and Austria's participation in European Economic and Monetary Union. This award is the highest scientific distinction, the OeNB offers. It is granted every year for an excellent paper on European Economic and Monetary Union and European integration issues. Young economists, up to 35 years from EU member and EU candidate countries are eligible. The award is worth EUR 10,000. The papers are refereed by a panel of highly qualified reviewers.

The OeNB is motivated to support economic research in response to its integration into the ESCB and very much increased its research activities and research capabilities. Meanwhile academic publications and the contributions to the system have been substantial. The efforts to increase the economics and research output certainly also reflect the fact that we now operate in a very different environment, where the role of research for modern central banking has become much more important. The OeNB's support for economic research is visible in numerous activities, like for example the Klaus Liebscher Award, which we give to three outstanding young researchers this year. The support of research and the exchange with other researchers in economics is an important investment of OeNB in its economic expertise.

The winning paper of this year is co-authored by a team of three young economists: *Zeno Enders* from the University of Bonn, *Philip Jung* from the University of Mannheim and *Gernot Müller* from the University of Bonn. Their joint paper has the title: *Has the Euro Changed the Business Cycle?*

The European business cycle is analyzed from the perspective of volatility of macroeconomic fundamentals as well

as cross country correlations of these variables. EMU led to a decline in real exchange rate volatility and a change in cross country correlations. The volatility of macro economic fundamentals remains unchanged. The analysis demonstrates that the introduction of the euro lead to significant changes in the business cycle. While the interdependence between euro area countries has increased the impact to domestic shocks declines relatively to external shocks.

Zeno Enders is a junior professor at the University of Bonn and holds a Ph.D. in economics from the European University Institute in Florence. His research fields are international macro

economics, asset markets and monetary policy. *Philip Jung* is a junior professor at the University of Mannheim. He is a graduate from the Johann Wolfgang Goethe University Frankfurt. His main fields of research are labor markets, incomplete financial markets and computational macroeconomics. *Gernot Müller* is a professor of economics at the University of Bonn. He is also a fellow of the Center of Economic Policy Research in London. He holds a Ph.D. in economics from the European University Institute in Florence. His main fields of research are international macroeconomics and business cycle theory.

Session 2:
Financial Crises, Monetary Policy Strategies and Instruments

Wolfgang Duchatczek
Vice Governor
Oesterreichische Nationalbank

Introductory Remarks

Ladies and Gentlemen,
before the crisis the consensus view was that there is a single (predominant) strategic objective of monetary policy: price stability (inflation targeting). Accordingly there is one instrument for this single target. On the side of operational procedures and monetary policy implementation we saw a parallel development that mirrored this consensus view.

The financial crisis has posed a challenge to this view of monetary policy implementation. In the two years following August 2007 central banks have multiplied initiatives beyond the previous narrow focus on the short term interest rate. Central banks adapted the design of their standing facilities, open market operations and reserve requirements. These initiatives were accompanied first by significant changes in the composition of balance sheets, later also by a significant increase in balance sheet size. To distinguish them from traditional interest rate policy, which was also employed to lower nominal short term rates to unprecedentedly low levels, these new policies could be labelled balance sheet policy, i.e. the use of size and composition of balance sheet to influence financing conditions.

Are these changes a temporary crisis related deviation from established practice or do they mark a more fundamental change? If the driving force behind changes in operational framework was the dysfunctional state of financial markets, will we see a return to the pre crisis world or will the crisis framework influence post-crisis design? What are the wider implications for monetary policy strategies and instruments?

I am happy to present the following four distinguished experts, one from a financial institution, two from academia and one economic journalist who will go into these issues, and discuss the wider implications of recent developments in monetary policy.

Dietrich Domanski is the Head of the Secretariat of the Committee on the Global Financial System (CGFS) at the Bank for International Settlements (BIS) in Basel. He joined the BIS as a Senior Economist in 2000 from the Bundesbank, where he headed the capital markets group in the Economics Department. He also worked as IMF Advisor to Bank Indonesia during the Asian crisis. At the BIS Dietrich Domanski was in charge of the macroeconomic analysis unit before taking over the CGFS Secretariat in September 2007. He has worked on a broad range of CGFS initiatives related to financial crisis, including studies on procyclicality, the development of macro prudential policy, the implications of the crisis for international banks and central bank liquidity operations during the financial crisis. He has published widely on financial stability issues. His main research interests include the interaction of monetary policy, financial markets and the real economy and the role of financial intermediation in economic development.

He will give a lecture with the title *Exit from Unconventional Monetary Policy*

Measures and the Future of Central Bank Operational Frameworks.

Stefan Gerlach is Professor of Monetary Economics and Managing Director of the Institute for Monetary and Financial Stability at the Goethe University Frankfurt. He also holds academic positions as a research Professor of the Bundesbank, as a research fellow of the Center for Finance and Credit Markets at the University of Notting-

ham, as a fellow of the Center of Financial Studies in Frankfurt, and a Fellow of the Center of Economic Policy Research CEPR London. He also holds several advisory positions. He is a Member of the Monetary Experts Panel of the European Parliament's Committee on Economic and Monetary Affairs, External Member, Monetary Policy Committee, Bank of Mauritius and Overseas Adviser, Hong Kong Institute for Monetary Research. He worked with the BIS and the Hong Kong Monetary Authority and the Hong Kong Institute for Monetary research. In his career he also held several academic positions in the USA and France. He has published widely in academic Journals and he is also an active commentator on monetary and financial policy issues. His presentation has the title *Monetary Policy after the Crisis.*

After these two lectures, we have a panel where with a debate from an academic and a non-academic angle on the narrower question about the risk taking capacity of central banks, a question which is clearly on the table since the policy measures taken during the crisis. We will have two highly distinguished panellists with us.

Anne Sibert is Professor of Economics at Birkbeck College, University of London. She is also a member of the Monetary Policy Committee of the Bank of Iceland since 2009. She has many other academic and non-academic appointments: She is a fellow of CEPR, CESifo and the Kiel Institute for World Economics and of the European Economic Association. She is a member of the Panel of Economic and Monetary Experts in the Committee for Economic and Monetary Affairs of the European Parliament and she is a founding member of the internet platform VoXEU.org, a forum for research based policy analysis and commentary from leading economists. She has published widely in academic Journals, books and on macroeconomic and monetary policy issues.

Wolfgang Münchau is associate editor and European economic columnist of the Financial Times. Together with his wife, the economist Susanne Mundschenk, he runs *eurointelligence.com*, an internet service that provides daily comment and analysis of the euro area, targeted at investors, academics and policy makers. Wolfgang Münchau was one of the founding members of Financial Times Deutschland, the German language business daily, where he served as deputy editor from 1999 until 2001, and as editor-in-chief from 2001 until 2003. Previous appointments included correspondent posts for the Financial Times and the Times of London in Washington, Brussels and Frankfurt. He was

awarded the Wincott Young Financial Journalist of the Year award in 1989. He holds the degrees of Diplom-Betriebswirt (Reutlingen), Diplom-Mathematiker (Hagen), and MA in International Journalism (City University, London). Mr. Münchau has published three German language books. His book Vorbeben, on the financial crisis, has received the prestigious GetAbstract business book award in 2008, and is now published by McGraw Hill in the USA.

Dietrich Domanski
Head of the Secretariat of the Committee on the Global Financial System (CGFS)
Bank for International Settlements (BIS)

Exit from Unconventional Monetary Policy Measures and the Future of Central Bank Operational Frameworks[1]

The global financial crisis that started in 2007 has raised fundamental questions about the character of central bank market operations. Central bank operations have evolved from an ancillary tool – used to ensure that the interest rate target is met – to a set of measures directly targeting broader financial and monetary conditions.[2] In the early phases of the crisis, central banks expanded their operations especially to address liquidity hoarding and banks' reluctance to lend to each other.[3] After September 2008, amid the deepening financial crisis and rapidly deteriorating macroeconomic conditions, central banks increasingly replaced interbank money and credit markets. And as policy rates in major advanced economies approached near-zero levels, central banks embarked on large-scale purchases of private sector credit assets and government bonds to provide additional stimulus. The term "unconventional policies" has become commonly used for this wide array of measures.[4]

Against the backdrop of stabilising and improving market and macroeconomic conditions over the course of 2009, central banks began to wind down unconventional measures. Timely exit from unconventional policies is important to contain adverse effects on market functioning.[5] However, mounting liquidity pressures in European bank funding markets in early May 2010 led the Eurosystem to expand the range of unconventional policies, and the Federal Reserve to re-establish US dollar swap lines with the Eurosystem and other advanced economy central banks.

The need to re-introduce some unconventional measures highlights two questions. First, what are the near-term issues that central banks face in the transition towards policy normalisation? This broader question includes issues such as the timing and sequencing of exit and the management of large central bank balance sheets. Second, which elements of unconventional policies, if any, should be retained in post-crisis operational frameworks?

This note discusses these questions. Focusing on measures taken by the Bank of England, the Eurosystem and the Federal Reserve, the paper is organised as follows. Section 1 reviews the progress in exiting unconventional policies. Section 2 sets out some the near-term issues in exiting unconventional policies and discusses challenges for the design of central bank operational frameworks. Section 3 concludes.

1 Progress and Experiences in Exiting Unconventional Policies

Unconventional central bank policies fall into three broad categories (table

[1] *The views expressed here are my own and do not necessarily reflect those of the BIS or the CGFS. I would like to thank Bilyana Bogdanova, Michael Davies, Corrinne Ho, Tim Ng and Philip Turner for useful comments and contributions. The paper also draws on background work done for meetings at the BIS.*

[2] *See Caruana (2009).*

[3] *For a discussion of central bank operations until May 2008, see CGFS (2008).*

[4] *There is no agreed definition of unconventional central bank policies. In particular, some authors also consider the pre-commitment to keep policy rates low for an extended period as unconventional policy (see e.g. Meier, 2009).*

[5] *See BIS (2009) for a discussion of the adverse effects of unconventional policies on market functioning.*

Table 1

Unconventional Operations and Facilities Introduced during the Crisis

	BoC	ECB	BoJ	SNB	BoE	Fed
	Information as of 2 August 2010					
(a) Provision of liquidity to banks						
Term funds, domestic currency	○	●	*	○	⊙	○
Foreign currency funds		●	●	●	●	
Term securities lending					⊙	○
(b) Intervention in credit markets						
Corporate bonds/CP			⊙		●	○
Asset-backed securities						○
Covered bonds		○				
Government bonds		●				
(c) Large/open-ended purchases						
Government bonds			●		⊙	⊙
Other securities				⊙		⊙
Foreign exchange				⊙		

● = *in use;* ⊙ = *partially wound down (for securities lending, includes the case where new lending has ceased but existing transactions can still be rolled over; for asset purchases, includes the case where purchases have ceased but outstanding holdings are still exceptionally large);* ○ = *terminated/no longer active;* ● = *reactivated.*

* *There are longer-term funds supplying operations, but they tend to be designed to facilitate corporate financing or enhance monetary easing, not to alleviate interbank market pressures per se.*

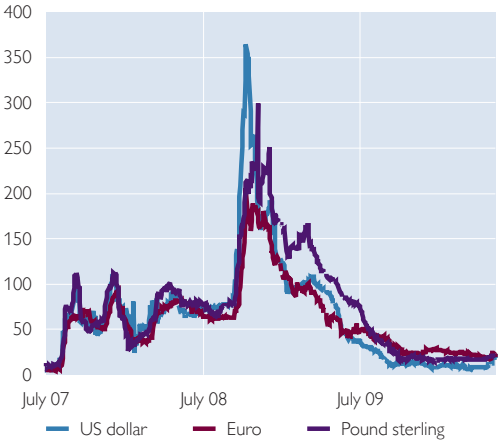
1): (a) lending to the banking sector on extraordinary terms – including at longer maturities and/or against a wider range of collateral – in domestic and foreign currency; (b) intervention in credit markets to support secondary markets for specific instruments; and (c) outright asset purchases aimed at easing monetary conditions beyond what could be achieved by policy rate cuts.

Chart 1

Money Market Rates and the Use of Central Bank Refinancing Facilities

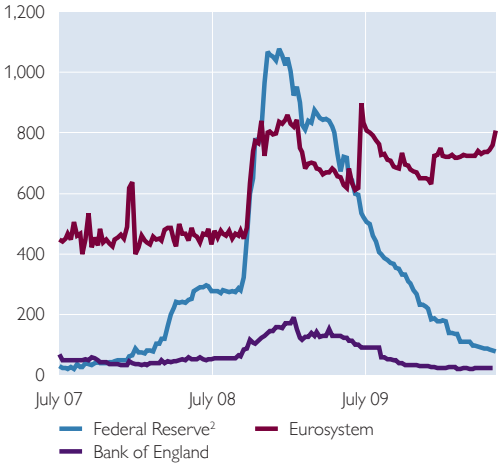
Three-Month Libor-OIS Spreads

Basis points



Central Bank Lending Facilities[1]

Billions of units of domestic currency



Source: Central banks; Bloomberg.

[1] *Repurchase agreements in domestic currencies.*

[2] *Includes repos, term auction credit, other loans and Commercial Paper Funding Facility.*

1.1 Supplying Liquidity to the Banking System

The phasing out of facilities to provide liquidity to banks is the most advanced. Banks became less reliant on *domestic currency* liquidity as interbank markets recovered. Interbank market conditions improved substantially over time (chart 1). Since March 2009, many money market indicators have come back to the levels last seen before the beginning of the crisis in August 2007.

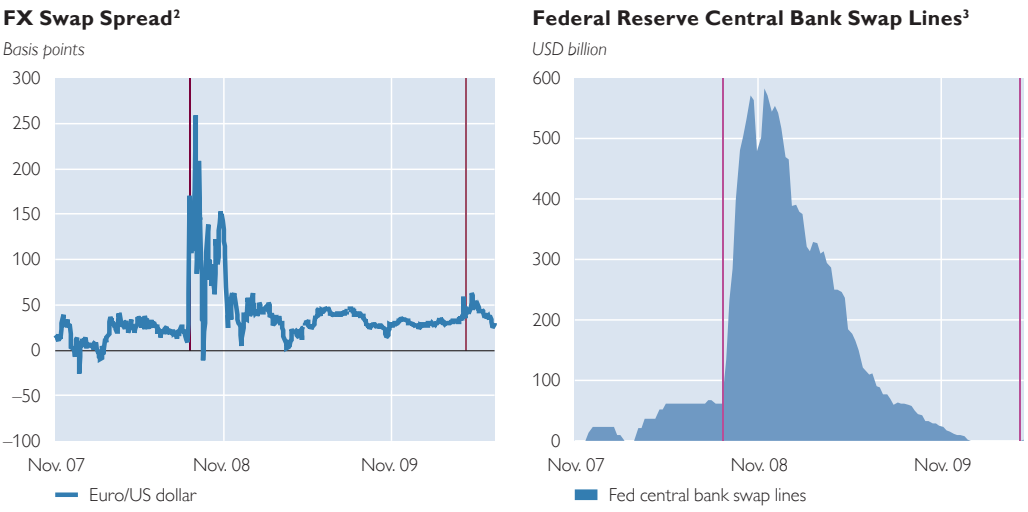
As markets gradually resumed functioning, demand for central bank funding declined. This allowed the Federal Reserve and the Bank of England to scale back, or end, the provision of term funding.[6] The Eurosystem has discontinued its special longer-term refinancing operation, but the stock of long-term transactions outstanding remains sizeable owing to the large 12-month refinancing operation due in July 2010.[7]

The exit from liquidity operations in *foreign currencies* was essentially completed before the May 2010 crisis (chart 2). The Federal Reserve's currency swap arrangements with 14 central banks formally expired on 1 February 2010, though some partner central banks had already discontinued some or all of their US dollar auctions well before then. Dollar swap lines were re-established with some central banks in May, but to date only a relatively small amount of dollar funding has been provided through these facilities.

One key element supporting a relatively quick exit from unconventional

Chart 2

Central Bank Swap Lines and US Dollar Swap Spread[1]



Source: Central banks; Bloomberg.

[1] *The first vertical line indicates the first expansion of the Federal Reserve's temporary reciprocal currency arrangements (18 September 2008), the second indicates the reactivation of the Fed swap lines (9 May 2010).*

[2] *Spread between the three-month FX swap implied dollar rate and the three month USD Libor, in basis points; the FX swap implied rate is the implied cost of raising US dollars via FX swap using the funding currency.*

[3] *Outstanding amounts.*

[6] *The Bank of England (BoE) has scaled back the frequency and size of its expanded three-month pound sterling repo operations against a wider range of collateral. The Federal Reserve has ended its Term Auction Facility (TAF), which supplied term funds to banks via competitive auctions against discount window collateral, and its Term Securities Lending Facility (TSLF) for primary dealers.*

[7] *In early May, the ECB conducted a six-month funding operation.*

bank lending facilities was the pricing of such operations. Many central bank facilities were priced as backstops, attractive only under stressed market conditions. This provides for a built-in exit mechanism.

However, the rapid deterioration in early May 2010 demonstrated that funding market conditions remain fragile. Unsurprisingly, emergency liquidity provision has not resolved the underlying bank balance sheet mismatches, including a considerable dollar funding gap of European banks,[8] or concerns about counterparty risk.

1.2 Supporting Dysfunctional Credit Markets

Central banks have also partially exited from measures to *directly support specific credit markets*.[9] On 1 February, the Federal Reserve terminated four extraordinary facilities, including the Asset-Backed Commercial Paper (ABCP) facility, the Asset-Backed Commercial Paper Money Market Fund Liquidity Facility (AMLF) and the Commercial Paper Funding Facility (CPFF).[10] The Term Asset-Backed Securities Loan Facility (TALF) was closed on 30 June 2010. The Bank of England's purchase of corporate securities, financed by treasury bill issuance and Debt Management Office cash management operations, also continues, though on a modest scale. The Eurosystem's Covered Bond Purchase Programme (CBPP) was completed on 30 June 2010.

In most cases, central banks pre-announced an expiration date for credit market programmes. This was seen as an important means to limit distortions to market functioning when introducing unconventional measures. Pre-announcement of exit may also explain why market conditions around expiration dates have generally been calm – which contrasts with significant price movements after the announcement of credit market facilities (chart 3).

However, it is difficult to assess whether the targeted markets have resumed normal functioning. One key issue is to identify the drivers of credit spread movements. Disentangling liquidity risk premiums in spreads from the price of credit risk is not straightforward and can complicate central bank communication. This is a challenge that the Eurosystem may face in implementing the Securities Markets Programme (SMP).

A related issue concerns the sustainability of improved market conditions. Narrower or more stable spreads may be supported only by thin trading activity. Moreover, the willingness to take positions may reflect a perception that central banks would intervene if market conditions were to deteriorate again.

1.3 Providing Additional Monetary Stimulus

Central banks' *large-scale outright asset purchases* have mostly ceased. The Federal Reserve and the Bank of England

[8] *See Fender and McGuire (2010) for the evolution of the dollar funding gap, and Domanski and Turner (2010) for an overview of the liquidity management issues confronting international banks.*

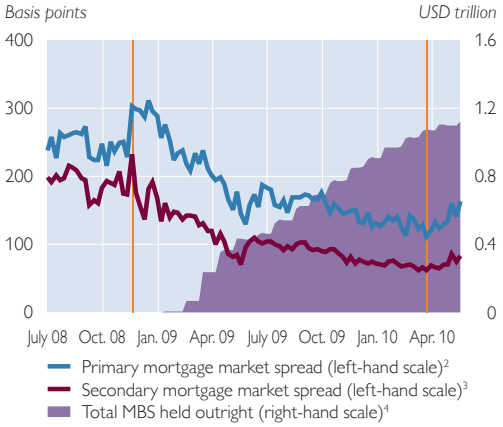
[9] *Other measures supported credit markets indirectly. In particular, the eligibility of ABS originated by the pledging bank as collateral in Eurosystem refinancing operations supported ABS issuance in the euro area. The annual average share of ABS pledged with the Eurosystem rose from 6% in 2004 to 28% during 2008 (Cheun, von Köppen-Mertes and Weller, 2009).*

[10] *The other two extraordinary facilities are the TSLF and the Primary Dealer Credit Facility (PDCF). The Money Market Investing Funding Facility (MMIFF), introduced post-Lehman along with the AMLF and the CPFF, was withdrawn in late October 2009 owing to a lack of demand.*

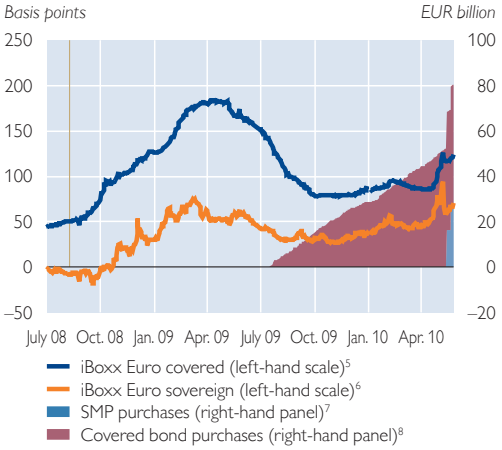
Chart 3

Central Bank Intermediation in Credit Markets[1]

Federal Reserve: MBS Purchases



Eurosystem: Covered Bond and SPP Purchases



Sources: Central banks, Bloomberg, Freddie Mac, Markit.

[1] *The first vertical line indicates the announcement of the programme, the second indicates its termination. For the ECB, the announcement of the covered bond purchase programme.*

[2] *Spread between 30-year fixed mortgage rate provided by Freddie Mac's Primary Mortgage Market Survey and 10-year Treasury yields, weekly data, in basis points.*

[3] *Spread between Fannie Mae's 30-year current-coupon MBS and 10-year treasury yields, in basis points.*

[4] *In trillions of US dollars; settled transactions only.*

[5] *Spread between the yield on a basket of euro-denominated covered bonds and interest rate swaps with a similar maturity, in basis points.*

[6] *Spread between the yield on a basket of euro-denominated government bonds and interest rate swaps with a similar maturity, in basis points.*

[7] *Purchases under the Securities Markets Programme announced on 9 May 2010; in billions of euros; settled transactions only.*

[8] *In billions of euros; settled transactions only.*

reached their targets for government bond purchases in late October 2009 and late January 2010, respectively. The Federal Reserve completed its agency debt and agency mortgage-backed securities (MBS) purchases in March; maturing securities and prepayments are not being replaced in this case. The Bank of England completed gilt purchases in late January 2010.

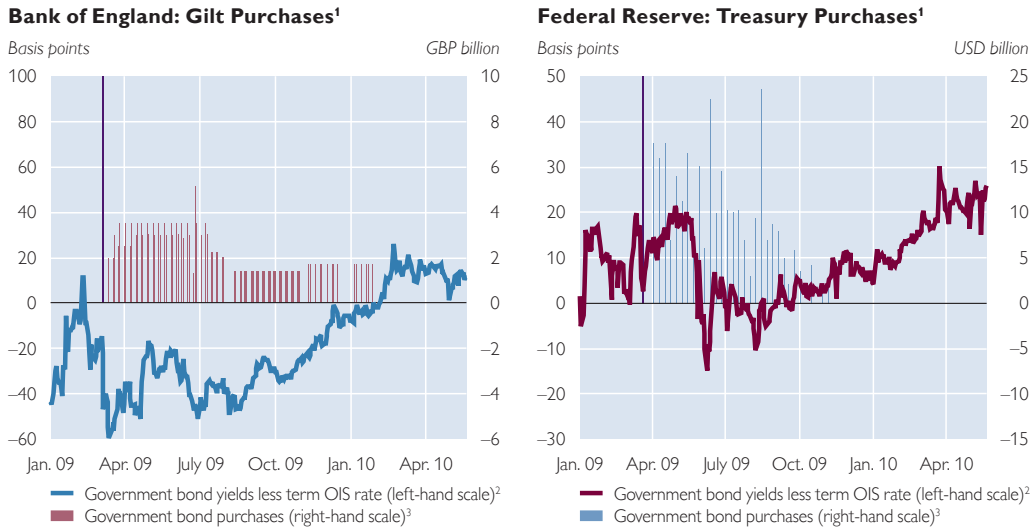
However, it is not clear whether, and to what extent, ending asset purchases actually constitutes an exit from the provision of additional monetary stimulus. Through government bond purchases, the central bank seeks to alter benchmark yields and affect economy-wide credit conditions and, ultimately, aggregate demand. But views differ on the relative effectiveness of large-scale asset purchases (i.e. flow effects) and portfolio composition (i.e. stock effects) in achieving these effects. A casual comparison of changes in the spread of government bonds over OIS rates suggests that the *purchase* of assets has influenced spreads, consistent with empirical work documenting the impact of Treasury issuance on long-term interest rates (chart 4).[11]

Moreover, the role of bank reserves in the monetary transmission process is subject to debate. Reserves held with the Federal Reserve and the Bank of England grew more or less in lockstep with asset purchases. Similarly, full allotments at fixed rate auctions have created large excess reserves in the Eurosystem. Some authors argue that such an expansion can prevent a self-fulfilling deflationary spiral from developing, citing the experience in Japan in the

[11] *See Gagnon (2009).*

Chart 4

Central Banks' Outright Purchases of Government Bonds



Sources: Central banks, Bloomberg.

[1] *For the Bank of England, the vertical line indicates the announcement of the GBP 75 billion asset purchase programme by issuance of central bank reserves (5 March 2009). For the Federal Reserve, the vertical line indicates the announcement of the USD 300 billion Treasury purchase programme (18 March 2009).*

[2] *Spread between 10-years government bond yields and the 10-year OIS rate, in basis points.*

[3] *In billions of units of domestic currency. For the Bank of England, daily data, gross amounts purchased; for the Federal Reserve, weekly change in nominal Treasuries held outright, face value.*

early 2000s.[12] Others maintain that an expansion of reserves only changes the composition of liquid assets in the banking system, but not their level.[13] A key question is how the liquidity of banks influences their decision to lend. Overall, uncertainty about the impact of unconventional policies increases as measures become less targeted.

2 Challenges Ahead

2.1 Managing Large Central Bank Balance Sheets

The balance sheets of major central banks are now much larger than before the crisis (chart 5). Those of the Federal Reserve and the Bank of England have more than doubled in size, and the Eurosystem's balance sheet has increased by about two thirds. However, the drivers of balance sheet expansion differ. Assets purchased in extraordinary actions now dominate the asset side of the Federal Reserve's and the Bank of England's balance sheets. Correspondingly, the duration of central bank assets has increased substantially. The Eurosystem's balance sheet has mainly grown because of the extension of longer-term refinancing operations. Outright securities purchases have been relatively small, but may become more important with the SMP.

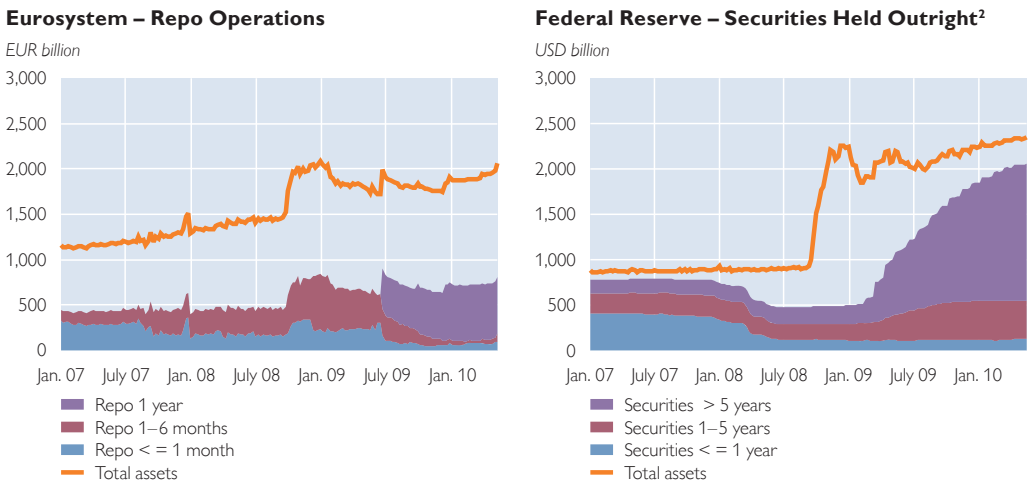
Central banks need to be able to manage large balance sheets actively. Letting assets roll off passively at maturity could take a long time. For instance, only about 10% of the Federal Reserve's holdings of Treasury securities have a remaining maturity of one year or less, while essentially all of the agency MBS held have a remaining ma-

[12] *See Wieland (2009).*

[13] *Borio and Disyatat (2009).*

Chart 5

Central Bank Balance Sheet Size and Asset Duration[1]



Sources: Central banks.

[1] *In billions of units of domestic currency. For the Eurosystem, breakdown of outstanding repo operations refers to original maturity; for the Federal Reserve, breakdown of securities held outright refers to remaining maturity.*

[2] *Includes mortgage-backed securities, US treasuries and agency debt securities held outright.*

turity of over 10 years, with prepayment unlikely to accelerate unless there is a substantial decline in long-term interest rates. The Bank of England's gilt purchases include bonds maturing no earlier than 2013 and as late as 2060.[14]

Technically, shrinking the balance sheet is not a necessary condition for raising policy rates. In principle, a central bank can set the policy rate independently from the size of its balance sheet.[15] Central banks can establish a floor on money market rates through remuneration of reserves or reduce the amount of "free" reserves through reverse repo operations, issuance of central bank paper or term deposits, and transfer of government deposits from the banking system to the central bank.[16] However, raising policy rates in an environment of large excess reserves may complicate the communication of the stance of monetary policy if the level of excess reserves is seen as indicator of the policy stance.

Different approaches to normalising the size of the central bank balance sheet may have different implications for the path of policy rate increases and yield curves. Holding assets to maturity should contain upward pressure on long-term interest rates. As a result, any need to tighten monetary conditions may require larger or faster policy rate hikes at the short end. By contrast, asset sales will tend to exert upward pressure on longer-term interest rates. As a consequence, the policy rate may not need to rise as fast or as much. However, a large gap between the policy rate and long-term rates may raise questions about central bank credibility

[14] *The Eurosystem's balance sheet could shrink faster as long-term refinancing operations mature. However, the SMP could entail a significant extension of asset duration.*

[15] *See Bech and Klee (2009) for a discussion of the increase in bank reserves on the federal funds market.*

[16] *These tools are not new: many Asian central banks have long been using them to maintain control over short-term interest rates in the context of a structural liquidity surplus resulting from foreign exchange purchases.*

– and encourage too much short-term borrowing.[17]

Finally, a large balance sheet gives rise to other challenges. One is greater exposure to changes in market valuations of assets and hence possible volatility in central bank profits and/or capital. Another issue is delineating monetary and fiscal policy. Central bank purchases of sovereign bonds affect government funding costs. Conflicts could arise, for instance, if the central bank wished to reduce large holdings of government bonds at a time of increasing government financing requirements.

2.2 Designing Post-Crisis Operational Frameworks

Deciding on an appropriate exit strategy requires an understanding of whether any of the unconventional instruments should become part of a central bank's post-crisis operational framework. Adverse effects on market functioning and the need to reduce the size of central bank balance sheets call for an unwinding of unconventional measures. However, there may be a case for retaining elements of the measures introduced during the crisis.

The crisis has demonstrated that both *broad* and *narrow* operational frameworks have advantages and disadvantages. On the one hand, the Eurosystem's framework, featuring a broad range of counterparties and pool of eligible collateral in regular operations, allowed emerging tensions in interbank markets to be addressed swiftly and without larger modifications to operating procedures. However, the option to pledge a broad range of assets with the central bank may weaken risk management by financial institutions and expose the central bank to credit risk. On the other hand, the Federal Reserve, starting from a narrow framework, was able to innovate new facilities relatively quickly. But developing and implementing new tools entails operational risk. Moreover, facilities that are not regularly used, such as the Federal Reserve's discount window prior to the crisis, may be stigmatised, raising issues for the distribution of liquidity within the banking system.

Against this backdrop, three principles could guide future modifications to both *broad* and *narrow* frameworks:

1. Central banks should retain, and strengthen, measures that can mitigate immediate stress in interbank markets arising from a typical liquidity shock. These include:
   - *Standing lending facilities that are free of stigma.* Standing facilities can serve as a safety valve in case of an unexpected liquidity shortage in the banking system if they are not subject to stigma. Addressing stigma may call for regular, possibly mandatory, use of such facilities by a broader range of counterparties.[18]
   - *Regular provision of term funding.* In a liquidity crisis, central banks may have to provide term funding to prevent banks from becoming overly reliant on overnight funding.[19] Regular term funding operations with a broad range of counterparties, such as the Long-Term Refinancing Operations conducted by the Eurosystem prior to

[17] *These effects can be expected to be larger if markets are segmented, for instance because of liquidity preferences of investors.*

[18] *See Goodhart (2009) and Tucker (2009) for a discussion of possible approaches to dealing with stigma.*

[19] *See Turner (2009) for a more detailed discussion.*

the crisis, can enhance the effectiveness of such operations during crisis.

- *Accepting a wider range of collateral in certain operations.* The central bank may wish to limit the pool of eligible collateral to high-quality assets. However, such a policy may be time-inconsistent: under stressed conditions, the central bank may be forced to accept lower-quality collateral. One approach could be to accept a wider range of collateral in operations that are likely to be of particular importance in stress situations, e.g. term funding operations.[20]

2. Central banks should phase out instruments that were introduced to deal with shocks to specific markets or types of counterparties:
   - *Credit market support facilities.* The impact of liquidity problems on individual markets may crucially depend on the nature of the shock and be different for each crisis. Central banks were able to (re-)establish these facilities relatively quickly and unwind them relatively smoothly, suggesting that it may be sufficient for central banks to have the operational capacity to run such facilities. This would be consistent with the notion that central banks should be prepared to act as market maker of last resort to counter a systemic liquidity shock.[21]
3. Central banks need adequate instruments for managing their balance sheets:
   - *Enhanced risk management capacities.* It is likely that central banks have to accept a wide range of collateral during a crisis. More generally, deteriorating sovereign credit quality may affect the availability of highly liquid, credit risk-free collateral going forward. Hence, central bank haircut practices and collateral risk management capacities become more important.
   - *Instruments to manage the liability side of central bank balance sheets.* Uncertainty about banks' demands and a desire to avoid shortages may result in an accidental excess supply of liquidity during crises. In order to avoid an unintended decline in the overnight rate, central banks should have the capacity to issue liquidity-absorbing paper and/or to remunerate reserves.

An open question is whether, and how, central banks should have mechanisms in place providing liquidity in foreign currency as part of their regular operations. On the one hand, one can argue that cross-currency funding needs are an integral part of international banking and that this should also be reflected in regular central bank liquidity operations. On the other hand, recent experience shows that when circumstances warrant, the central bank swap arrangements can be put in place

[20] *See Tucker (2009).*

[21] *See the principles for central bank operations in crisis periods set out in CGFS (2008).*

quickly and on a scale commensurate with the circumstances.[22] Central bank swap or repo lines are one obvious candidate solution for systemic liquidity problems such as the global US dollar liquidity shortage observed in the recent crisis. At the same time, they are no panacea.[23]

3 Conclusion

Unconventional central bank measures adopted during the crisis have contributed to the stabilisation of the financial system in a major way, even when taking into account the difficulties in assessing the impact of policies aimed at influencing broader financial conditions. Moreover, to date the exit from measures to provide liquidity support to the banking system and specific credit markets has worked reasonably smoothly. Policies aimed at providing additional monetary stimulus through large-scale asset purchases – especially government bonds – have arguably raised bigger issues. Their effectiveness is more difficult to assess than that of targeted measures, they are more difficult to unwind and they may ultimately distort markets.

But the unprecedented use of unconventional policies has placed a heavy burden on central banks. Balance sheets are very large, may remain bloated for some time and expose central banks to risks that are more naturally the domain of governments. Communication has become more difficult. And perhaps most importantly, it is questionable whether it will be possible to design central bank liquidity provision in a way that contains moral hazard. The scale and scope of the unconventional measures taken during the crisis may make it difficult for central banks to credibly commit to limiting emergency liquidity assistance in the next crisis. All this calls for more emphasis on crisis prevention – policies aimed at strengthening the resilience of the financial system and preventing the build-up of systemic liquidity risk.[24]

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[22] *For a discussion of the implementation details, see CGFS (2010a).*

[23] *See CGFS (2010a).*

[24] *For a discussion of the need for a macroprudential framework, see the contribution by Gerlach (2010) prepared for this conference.*

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Monetary Policy after the Crisis[1]

1 Introduction

The last few years have presented a hostile and demanding environment for central banks. The difficulties started in August 2007 when severe tensions erupted in money markets in many, if not most, advanced economies. The financial turmoil was sharply amplified following the collapse of Lehman Brothers in September 2008, which triggered the deepest recession in the developed economies since the Great Depression. With economies across the world closely integrated through international trade in goods and services, the recession soon spread to emerging economies which had escaped the direct impact of the financial turbulence.

While the world economy was clearly recovering by late 2009, in the spring of 2010 the crisis entered a new stage that is, at least for the moment, focussed on the euro area. Since an economic slowdown reduces tax revenue and increases spending on the social safety net, a deep and lasting recession can lead to many years of substantial fiscal deficits and a potentially very large accumulation of public debt.

For Greece, whose fiscal position was serious but sustainable before the crisis, the projected increase in debt quickly triggered concerns in financial markets about sovereign risk. With interest rates rising to compensate bond holders for the risk of default or debt restructuring, the cost of debt service rose, increasing the likelihood of default.[2] While Greece is now receiving support from its euro area partners, it is too early to tell what the long-run implications of the Greek public debt crisis will be. In any case, the realisation that sovereign risk is an issue in the euro area, and that contagion is possible, came as a surprise to many.

For central banks, these turbulent times contrast sharply against the extraordinarily placid period they enjoyed in the years before the crisis.[3] With inflation low and real economic growth strong and stable, and risk spreads in financial market increasingly compressed, managing monetary policy had become an unexpectedly easy task.

In this paper I ask whether and how monetary policy will change as a consequence of the crisis. Since it is not yet fully over, it is clear that any definitive review will have to wait. Nevertheless, it is useful already now to sketch the answers to this question.

The paper is structured as follows. In the next section I briefly review how monetary policy frameworks had developed in the years before the crisis. This is useful since many of these developments are now being reconsidered. In section 3, I reflect on some questions that are being raised regarding the design of monetary policy. I discuss whether central banks should raise their inflation objectives; whether they should *lean against the wind*; how best to incorporate the financial sector in the setting of monetary policy; and the desirability of introducing a macro prudential framework to constrain the financial sector. In section 4, I turn to an issue that many thought would never reappear: the implications of the large projected increases in public debt for monetary policy. Section 5 concludes. While I focus on issues pertaining to

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I am grateful to Petra Gerlach for many useful discussions.

[2] *See Obstfeld (1994) for a formal analysis of such multiple equilibria.*

[3] *See Cagliarini et al. (2010) for a review of monetary policy in the last fifty years.*

the euro area, many considerations are also highly relevant for central banks in other economies.

2 Monetary Policy before the Crisis

In order to see what challenges central banks are facing, it is useful to contrast them with those they faced before the crisis erupted in 2007. The previous decade was characterized by consistently positive real economic growth and low and stable inflation; charts 1 and 2 show real GDP growth and consumer price inflation for Austria, the euro area and the USA.[4] These benign economic conditions led to declining inflation expectations, a gradual contraction of risk premiums in a range of financial markets, and an increase in property prices across much of the world.[5]

This highly satisfactory macro economic performance came after a long series of changes in monetary policy frameworks across the world. The two most important of these were a generalised increase in central bank independence and the adoption of price stability as the overriding goal for monetary policy.

The Maastricht treaty, which provides the legal basis for European Monetary Union, played an important role in this process by requiring a sharp increase in central bank independence among the countries that aspired to membership of the euro area, that is, in much of Europe. Just as importantly, it also led to broad acceptance, in Europe and elsewhere, of the notion that operational independence is a crucial precondition for good monetary policy.

The movement towards the establishment of the euro area also led to a growing realisation that sound public finances are necessary to achieve price stability. Overall, this resulted in debt reduction in some economies with large public debts: in Belgium general government gross financial liabilities fell from 141% of GDP in 1993 to 88% in 2007 and in Italy they decreased from 132% in 1998 to 112% in 2007. In the euro area as a whole, they declined from 80% in 1998 to 71% in 2007.[6]

The adoption of price stability as the main objective of monetary policy took different forms. In New Zealand, Canada, the UK and many other economies, explicit inflation targeting was introduced, typically involving an inflation target of around 2%. Some other economies, notably the euro area and Switzerland, introduced closely related monetary policy strategies which included, crucially, a numerical definition of price stability as inflation between 0–2% as the main policy objective, but which entailed more flexibility than inflation targeting strategies.[7]

But many other changes to monetary policy frameworks were also undertaken. For instance, transparency was increased and central banks became more willing to provide market participants with information about the likely future course of monetary policy, for instance by providing staff forecasts of the likely future path of policy-controlled interest rates. This reduced un-

[4] *I use data from OECD (2009). The observations for 2009-10 are forecasts.*

[5] *Another factor contributing to this decline in long interest rates was the fall in real interest rates (see Gerlach et al. 2009). Bernanke (2005) suggests that this decline was largely due to global imbalances.*

[6] *See OECD (2009).*

[7] *These frameworks are more flexible since they do not express the inflation objective as a point but as a range and do not require the central bank to indicate how fast it will return inflation to target if it has been missed.*

certainty arising from monetary policy. Decision-making procedures were also improved, in many cases through the adoption of monetary policy committees. And developments in economics, statistical techniques and information technology made it possible to formulate and estimate forecasting models that provided a better basis for monetary policy decisions than solely relying on judgment.

These changes were all intended to improve monetary policy and it therefore seemed natural to assume that, taken together, they were the causes of the improved macroeconomic performance in the decade before the crisis. Thus, it came to be widely believed that central banks had mastered the art of stabilizing the macro economy. As noted by Kohn (2010), this may have lulled the public into complacency about financial risks. A similar argument applies to policymakers.

The financial crisis provided a sudden change in the monetary policy environment. Since these issues were discussed in the 37th OeNB Economics Conference in 2009, I will not review them here.[8] Instead I will focus on the re-evaluation of monetary policy that the turmoil has started. This has led to a reassessment of best practice in monetary policy and has thus brought back many issues that monetary policy makers thought were settled.

3. Reassessing Monetary Policy

The crisis has raised important questions regarding the design of current monetary policy frameworks, in particular concerning the pre-crisis consensus that central banks should focus on stabilising inflation. I address this question by first assessing the central element of pre-crisis monetary policy, namely the inflation objective, and then discuss changes to the framework that have been suggested.

3.1 The Inflation Objective

Monetary policy frameworks adopted before the crisis typically incorporate an inflation objective of around 2% per annum. Under ordinary macroeconomic conditions with inflation at the desired level and the business cycle at neutral, policy-controlled interest rates will be equal to the inflation objective

plus the neutral real interest rate, say 3%.[9] This implies that central banks can cut interest rates by at most 300 basis points if an adverse shock hits. Blanchard et al. (2010) note that this might be insufficient to stabilise the economy if a highly contractionary shock occurs. They go on to ask whether central banks should raise their inflation objectives to, say, 4% since that would increase the room to relax interest rates.

Whether that is sensible depends partially on whether the zero lower bound has been a constraint in the current crisis. The ECB cut the policy rate from 4.25% to 1% during the crisis but

[8] *See, in particular, the discussion in Papademos (2009).*

[9] *The average policy rate in the euro area between January 1999 and July 2007 was 3%.*

did not prevent the overnight rate from falling to about 0.3%. One interpretation is that the ECB wanted to avoid cutting its official interest rates too far but did not object to having short-term market determined rates fall as far as

possible.[10] Furthermore, the Federal Reserve cut interest rates to zero and some calculations suggest that it would have wanted to reduce interest rates much below zero if that had been possible. A number of other central banks also cut interest rates to essentially zero. Overall, I think central banks were in fact unable to lower interest rates as far as they desired.

On its own, that does not imply that the zero lower bound is an important constraint on monetary policy since central banks can – and did – adopt unconventional policy measures.[11] While it is too early to make a final judgment, these appear to have been effective. If so, there may be less need to aim for a higher average inflation rate than suggested by Blanchard et al. (2010).

The desirability of aiming for a somewhat higher inflation rate also depends on how the central bank has defined its inflation objective. The ECB has defined it as inflation of 0 to 2% and has stated that it aims for inflation "below but close to 2%." Raising the objective to 4% would therefore have serious consequences for the ECB's credibility, in particular since the zero lower bound does not seem to have been a severe constraint on policy rates in the euro area. The Federal Reserve, by contrast, has never adopted a numerical objective for inflation and would presumably suffer less damage to its reputation if it were to aim for a somewhat higher inflation rate than in the recent past. Overall, raising the inflation target does not seem to be an obviously good idea, except possibly for central banks that have recently reached the zero lower bound and that have not adopted an explicit inflation objective.

3.2 Incorporating the Financial Sector into Monetary Policy

One conclusion many draw from the crisis is that the analysis underlying monetary policy decisions must incorporate financial sector developments better. Currently, central banks use a mixture of judgment and model-based forecasts of future economic conditions to set a level of, or a path for, policy rates that leads to desirable outcomes for inflation and real economic activity.

This assessment will be crucially influenced by the central bank's forecasting model and policy discussions will naturally focus on the variables that appear most prominently in it. Obviously, such models only integrate features of the economy that can be formalised.

[10] *See Rudebusch (2009).*

[11] *See the discussion in Orphanides (2010).*

Capturing the financial sector is very difficult in these models, and as a consequence, it is included in a rudimentary way, if at all. Financial market developments therefore only influence interest rate setting through their impact on policy makers' judgments of future economic conditions. This may lead to too little weight attached to financial conditions when setting monetary policy.

To overcome this problem, models that explicitly incorporate the financial sector must be developed. While much work is currently being undertaken in this area, whether that will be successful is not yet clear. Since judgment is thus likely to remain important, central banks need to attract staff with relevant understanding of the functioning of specific financial markets. It is also desirable to enhance the cooperation with bank supervisors, if legally possible, since they may have greater understanding about developments in the banking sector than central bank staff. This is one reason why it is desirable for central banks to be responsible for bank supervision.

3.3 Leaning against the Wind

There is much agreement that the financial crisis was caused by a range of different factors and that monetary policy most likely played a secondary role.[12] These factors include the economic stability in the decade before the crisis that caused financial firms to underprice risk, weaknesses in firms' risk management practices, financial innovation and a growing use of extremely complex and opaque financial instruments, excessive reliance on ratings, failures in regulation and supervision, and distorted incentives that led to excessive risk taking in financial markets.[13]

But even if monetary policy did not cause the crisis, some argue that central banks should use monetary policy to reduce the likelihood of future financial crises by raising interest rates if credit and asset prices rise strongly. This may be helpful, it is argued, because asset price booms are almost surely followed by asset price busts that may depress inflation and economic activity below the desired level and do so beyond the standard two-three year horizon that central banks typically focus on when setting policy. *Leaning against the wind* may therefore better stabilise the economy in the medium term.

But whether this makes sense depends on how informative rapid credit growth and asset prices are about the build-up of bubbles and future economic activity. While there is anecdotal evidence that these variables do help forecast future economic conditions, Assenmacher-Wesche and Gerlach (2010) study the information content of common measures of financial imbalances for a set of 18 countries over 25 years and find that their information content is limited. Reacting to them is therefore likely to worsen inflation control and amplify swings in real economic activity in ordinary times, without reducing the likelihood that a bubble will form and burst.

Overall, this suggests that it is difficult to predict bubbles and crashes by looking at economy-wide measures of credit and asset prices and by responding to them with monetary policy in a discretionary manner. What is needed are tools that can be used to slow financial activity in specific markets and, in

[12] *See Svensson (2009, 2010). For dissenting opinions, see Taylor (2008) and De Larosière (2010).*

[13] *Bean (2008) contains a review of the many factors that caused the crisis.*

the euro area, countries where it appears worrisomely buoyant.

3.4 The Need for a Macroprudential Framework

Macroprudential tools are best described as non-interest rate tools that can help prevent excessive credit expansion and prevent risks from accumulating in the financial sector. While designing a macroprudential regime is not trivial, several desirable characteristics are already clear.

Most importantly, it must involve a range of tools – including procyclical capital requirements, leverage ratios and loan-to-value ratios – since there is no single instrument that can be relied upon to ensure financial stability. A pragmatic approach must be taken.

Furthermore, since financial firms avoided regulation during the tightly controlled financial regime of the

1970s by shifting their activities to the unregulated sector, the new regime must apply to all institutions that are highly leveraged or engaged in maturity transformation. It must therefore be international in scope. One risk with financial regulation is that activity simply shifts to financial centers with more liberal regulatory regimes. Of course, if risky financial activities move abroad, they are somebody else's problem. But a financial crisis in one country can spread quickly globally so merely moving activity off-shore is not a solution.

Transparency is important. To limit the procyclicality of the financial system, the macroprudential policy instruments will be varied over time. Since policy changes may trigger unexpected and potentially harmful swings in asset prices, policy must be predictable. That requires transparency about the reasons for policy changes and the authorities' assessment of financial conditions.

While macroprudential policy can be focused on the specific market segment that raises financial stability concerns, it affects the economy in broadly similar ways as traditional policy rate changes, and the two tools must therefore be coordinated. It is essential that macroprudential policy is determined jointly by the central bank and all government agencies with responsibility for financial stability. Since the crisis showed that cooperation between central banks and other authorities responsible for financial stability has not always functioned well, it is crucial that the authority for setting macroprudential policy is vested in one body. At the international level, these bodies must maintain close contacts.

As this short review of issues suggests, the crisis has raised questions both about the best design of new, macroprudential policy tools and about more traditional features of monetary policy frameworks that we long thought had been settled.

4 Monetary Policy and Large Public Debts

The recent experiences of Greece raise the issue of how large fiscal deficits and high public debt impact on monetary policy. While these issues were debated before the establishment of the euro,

the adoption of the Stability and Growth Pact was intended to relegate them to the dustbin of history. That did not happen.

To see why excessive deficits and debts may affect the setting of monetary policy, it is useful to consider the standard debt equation:[14]

$$db/dt = (r-g)b - d$$

where b denotes the debt-to-GDP ratio, r the real interest rate, g the growth rate of real GDP, d the primary budget surplus as a percent of GDP and db/dt the growth rate of the debt-to-GDP ratio. The sharp recession triggered by the financial crisis led in many countries to a large primary deficit that, since economic activity rebounds only gradually, may last for several years (see chart 3). The associated fall in inflation raised real interest rates and the low growth in the years to come will increase debt relative to GDP, as suggested by chart 4. What will the implications of this be for monetary policy?

The obvious concern is that high public debt will lead to inflation. While there is ample historical evidence that governments in fiscal difficulties in the end turn to inflationary finance, that evidence stems from periods in which central banks did not enjoy independence. Under current institutional arrangements, with high levels of independence and monetary policy objectives set in law, high inflation seems unlikely. Moreover, only if inflation is unexpected will it reduce the burden of the public debt. Given the high level of transparency that now characterises monetary policy, generating an unexpected burst of inflation is not easy. And if an attempt was made, the central bank's reputation would be lost for a generation to come.

But although high inflation seems an unlikely outcome, other complications of the crisis seem plausible. First and most importantly, when debts are large the link between monetary and fiscal policy become closer as tight monetary policy raises public debt by increasing real interest rates and by slowing real GDP growth and therefore the primary surplus. When the stock of debt is so large that default becomes an issue, the central bank will always be under pressure to monetise the debt. The recent decision by the ECB to suspend the application of the minimum credit rating requirements for debt issued by the Greek government is a case in point. It should also be remembered that while central bank independence in the euro area is hardwired in the Maastricht Treaty and not at risk, central banks in other countries with large public debts may not be so lucky.

Second, the fiscal consequences of monetary policy will become increasingly asymmetric in the euro area since public debt stocks vary sharply between Member States. Tight monetary policy will thus exacerbate the problems managing fiscal policy in highly indebted countries, forcing reductions in government spending which will slow economic growth. While all the evidence suggests that the ECB sets interest rates for the overall euro area, to the extent that the views of the members of the Governing Council of the ECB are shaped by local economic conditions, it may become more difficult to achieve consensus in the setting of monetary policy.

Third, the financial crisis will lead to a marked rise in unemployment, which raises the risk of political pressure on the central bank for easier mon-

[14] *See, for instance, Dornbusch (1996).*

etary policy. Again, this effect is likely to be unimportant in the euro area as a whole, but it may be of greater concern in economies where no numerical inflation objective, or definition of price stability, has been adopted.

5 Conclusions

While central banks appeared before the crisis to have entered a period in which they could do nothing wrong, it is now clear that this judgment was premature. The crisis has raised a number of fundamental issues regarding the design of monetary policy frameworks that though had been settled. In particular, even the view that central banks should focus solely or predominantly on stabilising inflation at a low level is now subject to debate and calls have been made for greater attention to be paid to financial market developments.

Going forward, the crisis will raise the question of how to conduct monetary policy in situations in which fiscal deficits and public debts are large, an issue that has not been debated in the profession for twenty years. All-in-all, central banks face plenty of monetary policy questions – old and new – to contemplate in the years ahead.

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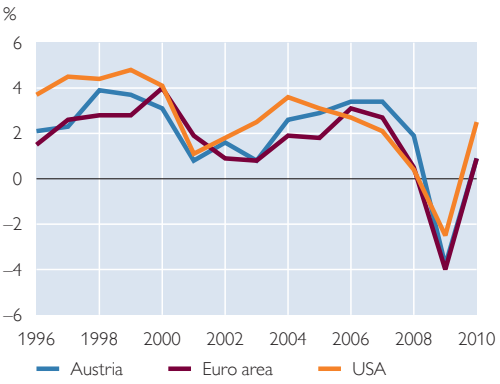
Appendix

Chart 1

Real GDP Growth



Source: OECD (2009). Forecasts are used for the years 2009–10.

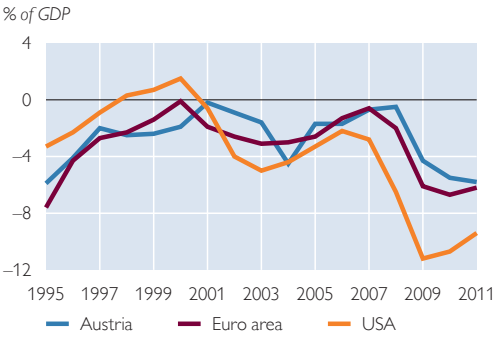
Chart 2

CPI Inflation

Source: OECD (2009). Forecasts are used for the years 2009–10.

Chart 3

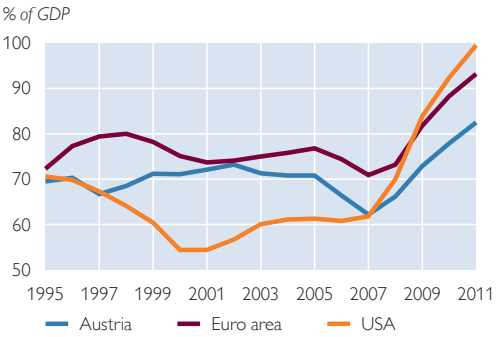
General Government Financial Balances



Source: OECD (2009). Forecasts are used for the years 2009–11.

Chart 4

General Government Gross Financial Liabilities



Source: OECD (2009). Forecasts are used for the years 2009–11.

Panel II:
How Much Risk Can a Central Bank Assume?

Wolfgang Münchau

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President of Eurointelligence

How Much Risk Can a Central Bank Assume?

I will not answer this question because it is essentially unanswerable in abstract. The more relevant question for us today is whether the European System of Central Banks (ESCB) is taking on too much risk by accepting lower standards of collateral than before, and by purchasing sovereign European bonds in the secondary markets.

The question is complicated because the answer necessitates assumptions about future political decisions. For example, would the European Union be prepared to extend the European Financial Stabilisation Facility (EFSF) beyond its currently envisaged three-year term? Would it turn the EFSF into a proper institution of the euro area? How will the political system deal with a potential default of a Member State, or the imposition of a haircut? The risks for the central bank obviously very much depend on the willingness of a Member State to share the risks. If you take the European Treaties literally, especially Article 125 of the Treaty on the Function of the European Union (TFEU), the famous "No Bailout clause", it would be a prudent decision not to assume too much in terms of political risk sharing beyond the measures agreed so far. While it is impossible to predict how governments will behave if a Member State were to default, it would be prudent for a central bank to base its action on a conservative view about government behaviour, and to adopt a literal interpretation of Article 125 TFEU.

In other words, the risk management consideration should be based on the assumption that the ESCB itself should remain well capitalised.

In this essay I shall explore the riskiness of the bond purchase programme in view of the accompanying banking crisis. I shall not, however, present central bank recapitalisation scenarios. This would take us a scenario too far at this stage. It is best to focus on the inherent riskiness of the new policies themselves.

Greece: a Sovereign Debt Crisis

Let me start with some simple back of the envelope analysis of Greek debt sustainability. This will show that default – under any realistic political and social assumptions – must now be the most probable outcome despite the agreement in May 2010 with the EU and the International Monetary Fund (IMF) about a multi-annual fiscal and structural adjustment programme.

In 2009, Greece had a primary deficit of 7.9%. On the assumption of 2% nominal growth during the adjustment period, a marginal interest rate of 6% on future debt, the primary balance Greece needs to achieve debt sustainability is a surplus of almost 5%. The total size of the adjustment is thus 13 percentage points. The only advanced economies in modern times ever to achieve a shift of such scale were Denmark, Sweden and Finland during the 1980s and 1990s. But they benefited from vastly superior growth.

The Greek general government had total expenditures of 44% of GDP in 2008, and tax revenues of 41% of GDP. If the 13% adjustment effort were to come entirely from expenditures, this would imply a cut in public spending of 30% of GDP. Conversely, if all the adjustment were to come from taxes, it would require a tax hike of a similar scale. Given the degree of corruption and the inadequacy of the Greek tax collection system, there is no way that taxation could take the lion share of this adjustment.

These numbers are future projections, and thus liable to errors. The interest rate Greece would have to pay may be a little under 6%, but probably

not much less. Maybe, for reasons unknown in 2010, the reform process produces such high rates of economic growth that the adjustment is self-sustainable. The IMF calculated that the debt levels will stabilise at just under 150% of GDP. To get down to a level of 60% of GDP, the reference criterion under the Maastricht Treaty, would require an implausible increase in potential growth – at a time when it is not clear whether the world economy can sustain the growth rates of the previous decade. A factor that aggravated the situation in Greece was a loss of competitiveness during that period. Greek competitiveness fell by 15% to 30% against the euro area average during the last decade – depending on which measure is used. One metric is the current account deficit, which was 11.2% of GDP, a clearly unsustainable position, even inside a highly integrated monetary union.

Apart from a fiscal retrenchment, Greece would also need to take measures to restore competitiveness, i.e. reduce wages. But it must do so by avoiding a depression, which in turn would endanger the adjustment programme, as tax revenues would collapse. It is not impossible that Greece can succeed, but based on what we know in 2010, it did not seem plausible, even under the assumption that Greece would stick to the agreed programme word for word.

Greece was thus faced with the following universe of options:

1. Leave the euro area
2. Default inside the euro area, or negotiate a restructuring of the debt
3. No default, reforms, internal devaluation, fiscal retrenchment

Option 3 is obviously preferred by all actors, but there is no guarantee that option 3 can physically work. If the nominal rate of growth were to decline to 0% over the entire adjustment period, the primary surplus necessary for debt sustainability would jump to over 7%. Such a surplus is extremely hard, perhaps impossible to achieve during a recession. This shows how important it is to avoid a self-sustaining slump. The consolidation under option 3 would get progressively harder, and the danger of an Argentinian-style vicious circle is immense.

The problem is that Greece will not just have to make an improbable fiscal adjustment, but it will also have to seek a fall in prices and wages. These two goals may well be inconsistent. And this is why the Greek bond spread to Germany rose from almost 0 to over 10% (it briefly peaked at over 20%). A 10% spread is roughly consistent with a 30% probability of a 30% loss under a risk-neutral setting. In view of the economic analysis of the situation, that would seem to be an entirely appropriate rating for a ten-year bond, even under the presence of a protective shield from the EU – which is set up only to last for three years.

Greece has no interest to default, or restructure, straight away. The country has been taken off the international capital markets for the duration of the adjustment programme. The danger arrives once the adjustment produces the first primary surplus. This is the moment, when a country is no longer dependent on the capital markets to finance public expenditure.

But given the large internal imbalances in the euro area, a default would have serious implications for the Northern European banks. They are, essentially, the counterparty to the large Greece current account deficit. This is an estimate of the exposure in May 2010:

Altogether, European banks have invested more than EUR 240 billion in

Table 1

Estimated Exposure of European Banks

French banks	EUR 55 billion (Société Générale, Crédit Agricole)
Swiss banks	EUR 47 billion
Greek banks	EUR 40 billion (14% share of the total volume)
German banks	EUR 30 billion (Deutsche Bank, Commerzbank, Hypo Real Estate)

Source: Barclays Capital.

Greek sovereign debt, and approximately 10% of all sovereign bonds in the euro area are Greek.

This is the reason why it was impossible for the German government to accept the advice of countless German economists, who advocated a Greek default, or a Greek exit from the euro area. Both recommendations would have triggered another European banking crisis, which would have cost the governments potentially more than the bailout for Greece. A bank recapitalisation would have had to be met out of current expenditure, while the EFSF is essentially a special purpose vehicle that borrows on the capital markets. So far – June 2010 – the rescue of Greece has not cost the European taxpayer a penny – thanks to the instruments of modern finance, which let its users bask in a false sense of security, as contingent debt piles up. The bill comes if, or rather when, Greece defaults.

Spain: a Private Sector Crisis

Unlike Greece, Spain has studiously followed all the rules of the stability and growth pact. Until the recession, the country used to run a budget surplus. The debt-to-GDP ratio was around 40%, well below those of Germany and France. What the rules did not foresee, was that the advent of monetary union produced a housing bubble, which in turn created a private sector debt problem. Those debts landed in the banking sector, which is indirectly guaranteed by the Spanish government. Spain's sovereign debt problem is thus a contingent debt problem.

Like Greece and Portugal, Spain also has a competitiveness problem. Depending on which measure one uses, Spain needs a real devaluation of 20% to 30%, which in turn would require falling wages or prices – or at least stagnating wages and prices on the assumption than Northern European wages and price continue to rise by moderate amounts.

One measure of the loss of competitiveness is the current account, which reached a deficit of 10% in 2008. This deficit reflected an even stronger private sector financial deficit (as the government sector was in surplus). The debt of the Spanish private sector ended up, either directly or indirectly via Spanish banks, in the euro area banking sector. According to data from the Bank for International Settlements[1] German banks had exposures to Spain in the order of EUR 170 billion, while French banks had exposures of EUR 210 billion.

[1] *BIS Quarterly Review. June 2010. Retrieved from www.bis.org*

Because of the post-Lehman bank guarantees, the debt of the Spanish banking sector are ultimately debts of the Spanish state, as a result of which investors treated the risk of the Spanish banking system as a contingent debt problem of the Spanish government. This is why Spanish spreads have been rising, despite the fact that the Spanish fiscal position has remained sound.

As with Greece, Spain would require very strong growth rates to make the adjustment – which would logically have to consist of shifting economic resources from the construction sector to the industrial sector. But that in turn would require a significant improvement in competitiveness, which in turn is likely to have severely negative implications on economic growth. That in turn is likely to exacerbate the private sector's contingent debt problem. Spanish households and banks are facing the prospect of debt-deflation, as the real value of their debt is likely to rise for as long as the adjustment takes place.

The Spanish government responded with the imposition of labour market reforms in June 2010 – which, at the time of writing, had yet to be approved by the Spanish parliament – while the central bank has forced mergers among the country's savings banks, which hold most of the mortgage debt, and toughened the accounting rules. While the reforms are a step in the right direction, it is hard to see how a reduction in dismissals costs – from 45 to 30 days per year worked – are going to produce a macroeconomic miracle. These costs are still the highest in Europe. Their short-term effect is surely to increase unemployment, as it makes it cheaper for companies to fire staff.

The country is thus very likely to face a prolonged slump. The uncertainty that arises from this prospect is how the Spanish political system will react to this. Will it accept the adjustment, or will political forces arise that advocate default – either inside or outside the euro area. And when the recession enters its later stages, will Spaniards not begin to start blaming the euro or other European countries for their problems? The answer to these questions will have a direct bearing on the risk the central banking system is taking on when purchasing Spanish bonds.

The Dilemma of the Central Banks

Apart from the uncertain political scenarios, what makes this situation so complicated, and risky, is the presence of large cross-border financial flows. German and French banks have built significant exposures to both Greece and Spain. The combined French and German bank exposure to the four countries is about USD 1 trillion. Now this is not all bad debt, even on the most pessimistic of assumptions, but even relatively small losses on those debts could knock the European banking sector off course, considering that these losses come on top of the US-structured product losses, which have not yet been written off for their most part.

The euro area's problem can be summed up as a combined banking and

fiscal crisis in the presence of large cross-border financial exposures. It is not easy to disentangle the private and public sector risks, given the state guarantees to the banking system. Because of the inter-connectedness, one can observe that the share prices of German and French banks correlate almost perfectly with Greek sovereign CDS. In other words, the interconnectedness has the consequence that investors perceive various euro area entities to be of identical risk.

These are risks the central banks are taking on with their bond purchasing programmes. If a large part of southern European private and public sector debt ends with up with ESCB, the risks would be severe. The system would encounter losses, which in extremis, might require a recapitalisation.

This is why the ECB was so keen to get the European Financial Stability Facility (EFSF) up and running to ensure that the ultimate responsibility lies in the realm of fiscal policy, not monetary policy. If the EFSF was allowed to turn into a full EU-body, it could form the core operational institution of the euro area, an extended European debt agency, the core of a fiscal union. In this role, it could even issue euro bonds, eventually covering a certain percentage of the Member State debt. From the perspective of the investors, that would be one of the better outcomes.

But if, for example, the EFSF's mandate was not renewed in 2013 – an election year in Germany after all – there may be a severe risk of sovereign default by Greece in the absence of any new backstop agreement. By then, most of the Greek bonds will be in the hands of the ESCB and the EFSF because most of the existing bonds will have expired by then.

This scenario in turn would give rise to a problem for the ESCB. The German taxpayer would not only have to co-finance the losses of the EFSF, but also incur a loss of the ECB, or possibly have to recapitalise the system. The answer I am hearing from politicians who support the EFSF is that this would absolutely not happen, both for political and legal reasons. Politically, it would be exceedingly tough to demand austerity at home, while transferring billions – actual fiscal billions, not virtual money – to recapitalise the ECB or the EFSF.

In other words, there are sufficient reasons to expect an accident along the way. The EU has taken a course where it is likely to hit a critical watershed in a few year's time, at which point it would have to make a binary decision about the future of the euro area. In or Out. Fiscal union, or breakup. As the answer is unknown and unknowable, nervousness about the euro area is likely to persist.

The ESCB and the ECB have no way of answering that question either. But they must keep in mind that they are pursuing risky policies without a political backstop agreement. It is not clear how the political system will react to those losses. Even though the bond purchases are not intended as a programme of quantitative easing, there are some parallels in terms of risk. The Fed's Quantitative Easing (QE) programme is ultimately guaranteed by the Treasury – or by its ability to print money. The European Treaties explicitly and implicitly exclude both options. This is why the ESCB bond purchasing programme is inherently more risky than the Fed's programme of QE.

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Accountability and the ECB[2]

Since the financial crisis, the Eurosystem (the ECB and the national central banks (NCBs) of the 16 euro area Member States) have greatly expanded both the scope of their actions and the size of their balance sheets. NCBs have conducted lender-of-last resort actions for their governments' accounts. The ECB has massively expanded the range of securities that are acceptable as collateral in the repos and other collateralised loan transactions done by the NCBs. It has participated in currency swaps with other governments and provided repo facilities to non-euro area countries such as Hungary. On 9 May 2010, it announced that it would purchase euro area government bonds outright in secondary markets as part of the financial support scheme for heavily indebted euro area Member States. In acting as a lender of last resort, or otherwise intervening in financial markets, the Eurosystem is taking on risk and redistributing income. Allowing an independent and unelected body to have such a political role is only palatable in a democracy if the institution is viewed as legitimate.

The ECB Must be Transparent to Ensure that It Has Legitimacy

The ECB will be viewed as legitimate as long as the electorate believes that it has both the right to do the new tasks it has taken on and that it is the most appropriate institution to perform them. There are two related sources of such legitimacy: input legitimacy and output legitimacy. Input legitimacy can arise if the citizenry approve of the way that tasks were delegated to the ECB and if the ECB is accountable. Output legitimacy can occur if the ECB does its assigned tasks in a satisfactory manner and does not undertake tasks that it has not been assigned, even if it can do these tasks well.

Unfortunately, the Treaty, which gives the ECB some input legitimacy in its role as monetary policy maker, has little to say about a financial stability role, and what it does say is vague and ambiguous. In addition, the ECB's latest expansion of its powers, buying government debt outright in secondary markets – rather than directly in the primary issuer market – is widely seen as a flouting of the spirit of the Treaty. This action may have been necessary, but an unfortunate consequence is less output legitimacy. Thus, if the ECB is to have a hope of being perceived as legitimate, it must be seen as both competent and accountable.

The ECB has not existed for long enough to draw a firm conclusion about its competency, even in making monetary policy. Nevertheless, most economists would probably view the ECB's performance, both in ensuring price stability and in its financial stability role, at least since August 2007, as being as good as that of the world's other major central banks. Thus, the ECB has some output legitimacy because it is viewed as doing its job well. Unfortunately, this is not enough. Bad luck alone might cause it to lose this source of legitimacy in the future. It is, thus, crucial that the ECB also be viewed as accountable.

Schedler (1999) provides a typical definition of accountability: "A is accountable to B when A is obliged to inform B about A's (past or future) actions and decisions, to justify them, and to suffer punishment in the case of eventual misconduct". From this definition, it is seen that accountability has

[1] *The author is an external member of the Monetary Policy Committee of the central bank of Iceland.*

[2] *I am grateful to Willem Buiter and Petra Geraats for helpful comments.*

three components for the ECB: first, the public should be able to observe or be provided with the relevant information about the ECB's actions and decision-making processes; second, the ECB should explain and justify its actions; third, it should be possible to punish ECB policy makers who engage in bad or incompetent behaviour. The first two components are often referred to as *formal accountability*; the third component is often referred to as *substantive accountability*.

The ECB's extraordinary degree of independence precludes the possibility of substantive accountability. Members of the Executive Board serve eight-year, non-renewable terms; NCB governors serve at least 5-year terms. Their compensation is internally decided. Governors of NCBs and members of the Executive Board can be fired only in the event of incapacity or serious misconduct; mere gross incompetency does not count. It is clear that no one, not the European Parliament, nor the Council of Ministers, nor the European Commission can impose sanctions on the ECB. It is telling that while the Federal Reserve Board Chairman *testifies* before the US Congress, the President of the ECB has a quarterly *dialogue* with the European Parliament.

As it does not have substantive accountability, for the ECB to have legitimacy it must be formally accountable. For there to be formal accountability, the ECB must be transparent: that is, it must inform the citizenry of its actions and decisions and justify them. Unfortunately, the ECB – notoriously opaque in its conduct of monetary policy – is demonstrating perhaps even less transparency in its financial stability role.[3] In the rest of this paper I consider some examples where transparency is or might be lacking.

The ECB's Procedures for Collateralised Lending

The ECB is far from transparent in its procedures for collateralised lending. It is not clear how it values illiquid marketable securities or how it decides upon a *haircut*.

When the ECB values marketable securities as collateral, it uses market prices, if they are available. If not, it computes *theoretical prices*. Unfortunately, the public is not informed, even with a lag to protect market-sensitive information, what these prices are. Nor will the ECB divulge its methodology or models. Without knowing how it computes these prices, outside observers cannot evaluate whether the ECB is pricing risk correctly, or instead is subsidising or taxing particular counterparties.

Members of the ECON committee in their Quarterly Dialogue with the ECB have attempted to extract information about this from President Trichet. On one occasion a member asked: "To increase its legitimacy, the ECB should publish the minutes of the Governing Council meetings … And should not this transparency also apply to the internal models used to value (il) liquid collateral?" Trichet ignored the question and said: "We have transformed the way transparency is looked at."[4] When another member asked about how asset-backed securities (ABS) are valued, Trichet said: "As regards the way we value the ABS, we have our own way of going through a

[3] *Post-meeting statements that appear pre-cooked are no substitute for published votes and minutes.*

[4] *The Committee on Economic and Monetary Affairs of the European Parliament's Quarterly Dialogue with the ECB, December 2009.*

hub in the system. This is done by the system in ways which I considered appropriate but that we can improve at any time if we judge that they should be improved – as we have demonstrated very recently, because the last improvement dates from only a few days ago."[5] In other words: the ECB is not going to say and only the ECB has the right to judge its own methods.

After deciding the value of a security, the ECB imposes a haircut. If a, say, 10% *haircut* is imposed on securities valued at EUR 10 million, then they can be used as collateral against EUR 9 million worth of collateralised lending. Unfortunately, the ECB does not tell us how it determines the *haircuts* that are imposed.

Haircuts are not typically thought of as a penalty for default risk; this is supposed to be reflected in the security's value. Instead, they might be viewed as a compensation for a loss of liquidity. For marketable securities this could be illiquidity due to asymmetric information problems. They might also be viewed as compensation for taking on correlated default risks of the ECB's counterparty and of the issuer of the security offered as collateral by the counterparty. If there is a non-trivial risk that a systemically important institution might default and if it is not known which potential borrowers would be in danger of defaulting if that institution defaulted, then it is reasonable to increase the *haircut* on the debt of the systemically important institution above what it would otherwise be.

The *haircut* on Greek government debt, despite the Greek sovereign being systemically important and having a

non-trivial possibility of default, is the same as the haircut on the debt of the other euro area national governments or that of the Eurosystem.[6] In addition, the *haircuts* on all government and Eurosystem debt rise sharply with the maturity of the debt, even when this debt is readily tradable in secondary markets at all maturities. Neither of these rather surprising phenomena have been adequately explained by the ECB. In addition to being non-transparent this could lead to – perhaps unfounded – suspicions that the ECB does not have a coherent view of what should determine a *haircut*.[7]

[5] *The Committee on Economic and Monetary Affairs of the European Parliament's Quarterly Dialogue with the ECB, December 2009.*

[6] *Currently, Greek sovereign debt is rated BBB– (minimum investment grade) by Fitch and BB+ ("junk") by Standard & Poor's. Moody's gives it the highest rating: A3 (upper medium grade). Since it is the highest rating that applies, Greek sovereign debt continues to be subject to the same haircut as any other euro area sovereign debt. Should Moody's downgrade Greek sovereign debt to BBB-, then Greek government debt would be subject to an extra 5% haircut. The ECB has not specified what the haircut on Greek debt would be should it sink into the junk category.*

[7] *At the 23 May 2005 Quarterly Dialogue between the ECB and the European Parliament, a member of the Parliament noted that all euro area government debt is treated as equivalent and asked if the ECB is willing to differentiate between debt. The representative of the ECB responded that market valuations might change but the ECB would not "introduce a particular judgement".*

The ECB's Outright Purchases in Dysfunctional Markets

On 9 May 2010, the Governing Council decided, "To conduct interventions in the euro area public and private debt securities markets (Securities Markets Programme) to ensure depth and liquidity in those market segments which are *dysfunctional*." (italics mine) As of 28 May, the ECB had bought EUR 26.5 billion worth. This is a sizable amount of money. A dysfunctional market is typically characterised by asymmetric information and adverse selection. A counterparty who can sell Greek government debt to the ECB at a price that it could not get in the market may be better off than another entity that is not given that opportunity and it has the possibility of gaining at the expense of the ECB.

Because of its potential to redistribute wealth the ECB must be transparent about how it chooses its counterparties. Once sufficient time has passed to ensure that the information is no longer market sensitive, the details of these outright purchases should be publicly available. The citizenry should know who was able to sell what, how much and at what price. In the absence of this, some might suspect – even if it is not true – that after the supervisory and regulatory failures of certain euro area governments allowed some of their banks to become highly exposed to Greece, the ECB helped these governments to bail out their banks by buying back the debt at a rate that was more favourable to them than what was on offer in the market.

Icelandic Love Letters

In this section, I detail a particularly egregious example of a lack of ECB transparency – and, perhaps, competency.

It was a common practice in Iceland for two banks to swap their debt securities with each other and to use the other's debt as collateral in their borrowing from the central bank of Iceland. This collateral was referred to as *love letters*.[8] Rather surprisingly, the central bank of Iceland was not the only monetary authority to accept *love letters* as collateral.

Between the start of February and the end of April 2008 subsidiaries of the three large Icelandic banks (which were eligible counterparties of the Eurosystem in Luxembourg) increased their borrowing from the central bank of Luxembourg (CBL) by EUR 2.5 billion and a significant fraction of the collateral was in the form of *love letters*.[9] It is questionable whether the debt of an Icelandic bank should have been acceptable collateral for any borrower, but given the likelihood that if one of the Icelandic banks failed the other two would as well, it should never have

[8] *Hreinsson et al (2009), p. 44, Flannery (2009), p. 101 and Jännäri (2009), p. 18.*

[9] *Hreinsson et al. (2009), p. 44.*

been acceptable collateral for another Icelandic bank.

On 25 April 2008, ECB President Jean-Claude Trichet phoned Icelandic central bank governor Davið Oddsson and demanded a meeting with representatives of the Icelandic banks. As a result, an agreement was reached on 28 – 29 April to limit the use of the *love letters* as collateral. This was not effective and by the end of June, loans to euro area subsidiaries of Icelandic banks had risen sharply to EUR 4.5 billion.[10]

On 30 June, the CBL advised Landsbanki, one of the three large Icelandic banks, that it could no longer use love letters for more than a quarter of its collateral and that it must phase out the use of this type of collateral altogether.[11] At the end of July, the CBL finally prohibited the use of love letters and lending to the Icelandic banks fell back to EUR 3.5 billion.[12]

It appears that apparently frustrated by this turn of events, the badly behaved Landsbanki then took its love letters to the central bank of Iceland. It used its borrowing to purchase Icelandic-krónur denominated Icelandic government or government-guaranteed debt. It then set up a company called Avens B.V. The assets of this company were the Icelandic debt and Icelandic bank accounts; its liabilities were euro-denominated debt. Landsbanki appears to have then successfully presented this euro-denominated debt as collateral in further borrowing from the CBL.[13]

In the autumn of 2008, five counterparties defaulted on their Eurosystem loans and three of these were the subsidiaries of the Icelandic banks.[14] At the March 2009 Quarterly Dialogue with the ECB, a member of the ECON committee of the European Parliament asked President Trichet about the CBL's loans of EUR 800 million to Kaupthing (another of the Icelandic banks) and EUR 1 billion to Landsbanki, saying, "What do you think of this? Is there any dialogue on this subject? It is an enormous risk after all!" President Trichet responded with: "I do not know the details – you are very well informed: you are better informed than I am. I have to say, at the moment – but I have no doubt that the Luxembourg bank is complying precisely with the requirements imposed by its position as a member of the Eurosystem and is applying the Eurosystem rules to the banks that submit eligible collateral to it."

During the crisis, the ECB might have been right to keep certain market-sensitive information from the citizenry. The Icelandic banks, however, had met their demise almost half a year earlier. So, why could the ECB not answer the European Parliament's question?

[10] *Hreinsson et al. (2009), p. 44.*

[11] *Flannery (2009), p. 101.*

[12] *Hreinsson et al. (2009), p. 44.*

[13] *Central Bank of Iceland news report, 15 May, 2010. It appears that either the CBL was overly trusting and did not look too closely at what it was being offered or it did not consider the correlated risks. The Icelandic banks had assets that were about 11 times Icelandic GDP. If the banks failed, Icelandic-krónur denominated Icelandic government or government-guaranteed debt was unlikely to retain its value.*

[14] *European Central Bank, Eurosystem Monetary Policy Operations in 2009, Press Release, 5 March, 2009.*

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Dinner Speech

Josef Pröll

Vice Chancellor and Finance Minister of Austria

Central Banking after the Crisis

In the following, I would like to focus on two aspects: the need for a strong Europe and the need for budgetary discipline! During this conference, you have heard a lot about the need for new regulation, the fight against speculation and the crisis itself. Concerning regulation, I only want to mention that new rules must be proportionate. As for example, the new capital requirements for banks – Basel III – that are currently elaborated. These new rules could cause a regulatory credit crunch. Therefore, we must take care of reasonable regulation, a regulation serving traditional banking business and enterprises.

We Need a Strong Europe

We presently have to manage a crisis of credibility of our currency and our economic policies! You are well informed about the past weeks, so that I can focus on some important aspects concerning the lessons learned. What we have learned from the international crisis is that we need a stronger Europe and greater joint efforts.

The years 2010 and 2011 are important years in terms of economic and budget policy for the economies of Europe, as we must set our course today in order to achieve success in the future. At the end of the day, a common economic area with a common currency requires a common economic government in order to meet the challenges we are facing. I am convinced that we will have to further increase our joint efforts and regulations in Europe in the future. The challenges raised by the situation in Greece have shown us that speculators are looking for weak spots that allow them to speculate against the euro and individual countries. The present troubles in the euro area stem – first and foremost – from unsustainable debt. That is the problem we must solve. Some states did not use the good economic times to reduce their debt, while the stability pact was not used to address this.

Austrian Budgetary Policies

We know that only sound government finances are the best protection against speculation. Although, Austria's position is relatively good compared to other EU Member States, we must take countermeasures now, in order to curb our deficit. The crisis has not only increased our expenditures, it has also reduced our income, which is why the 2010 deficit is rising to 4.7%. If we do not react, it will increase again in 2011 and remain permanently at around 5% of GDP. Therefore, we are taking great pains to economise and our Federal

Budgetary Framework Act has laid the foundation for a sustainable budget policy. The federal budgetary framework establishes clear limits and provides a clear path for budget consolidation until 2014. Ministry budgets must remain within this framework: there is no alternative. This ensures that Austrian budget policy will be sustainable while at the same time providing incentives for economical management of each ministry. Sound government finances form the foundation for economic growth and jobs. If we do not manage

our finances as proper as possible, we would really act unsocially!

So let me underline my main contribution to the European Council's Task Force work: The crisis in Greece and the spillovers to other Member States have unveiled severe weaknesses in policy coordination within the European Union, and in particular among euro area Member States. I agree with the basic diagnosis that the

current set of rules has failed to create the necessary discipline, be it because they are insufficient or insufficiently followed. Sticking to the status quo would foster imbalances, create new tensions and dampen growth and employment, thereby putting at risk the European integration process as a whole.

First of all budgetary discipline must work! Even countries with robust public finances are negatively affected by excessive deficits and debt ratios in other Member States. Therefore, Austria calls for more transparency and monitoring as well as improved budgetary planning. The preventive arm of the Stability and Growth Pact must be strengthened. The Austrian government firmly believes that we need multi-year budgetary frameworks such as Austria's Financial Framework Law offers.

Eurostat should be given more rights, including direct access to national budgets. Eurostat should give early warnings to Member States about emerging fiscal problems. The lack of reliable statistical data has been disastrous in the current crisis, and credible action will need to be taken to regain confidence.

As for the corrective arm of the Pact, there is no doubt that effective sanctions should be put in place and implemented if and when necessary; however, they should be triggered in gradual steps and early on in the process. The Task Force should carefully explore any available option.

Secondly, competitiveness divergences and macroeconomic imbalances are a big risk for strong hikes in the business cycle and crises, leading to a loss of potential growth and jobs. Austria supports a more formal procedure to examine competitiveness divergences among euro area Member States, building on the current peer review process. Regular reviews and the possibility of issuing warnings should lead to an early detection of nascent problems and a discussion on necessary counter-measures. The Austrian government believes that all relevant players must be included in this exercise. In particular, wage negotiation processes would form a natural starting point to avoid misalignment of wages and productivity growth. It is extremely important that the work of the European Systemic Risk Board is taken into account.

Finally, crisis management mechanism must work perfectly! The temporary European Stability Financing Mechanism put in place by the EU Ministers of Finance on 9 May fulfills the main criteria for a robust permanent mechanism. This instrument shall only serve as an „instrument of last re-

sort" after having exploited all other possibilities. Incentives structures should be designed accordingly. The design of the conditionality must ensure a swift return to macro-financial stability. The financial terms must give strong incentives for a return to market financing as early as possible.

Financial Transaction Tax

We also give support – in principle – to the financial transaction tax, which is now being discussed in detail. The solo efforts that some have demanded make no sense. A financial transaction tax in particular requires international action, not individual solutions. Expressed in clearer terms, this means that I am committed to a strong and competitive financial centre in Austria.

The Oesterreichische Nationalbank

Finally, I may say some words concerning the finalized complete purchase of the Oesterreichische Nationalbank. After decades of discussion, I could manage in a transparent and consequent manner to complete the ownership of the Oesterreichische Nationalbank. Let me confirm that I am very much interested in an independent central bank. Therefore, I will make some steps that should enhance this status. But I am also dedicated to a central bank with clear tasks and a clear focus!

Thank you for your attention!

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Session 3:
Central Banking, Financial Stability and Regulation

Andreas Ittner
Executive Director
Oesterreichische Nationalbank

Central Banking, Financial Stability and Regulation

Ladies and Gentlemen,

Welcome to this session and a particular welcome to our distinguished speakers, Professor Elena Carletti and Giovanni Carosio.

The session is entitled "Central Banking, Financial Stability and Regulation". There is no need to emphasize that the crisis has put issues of financial stability to the fore. Yesterday, we already had ample occasions to discuss the impact on central bank strategy, namely how to combine or reconcile the macroeconomic objective of price stability with the objective of financial stability.

Today, we will go more into the details of how the financial stability objective could be achieved. What kind of new regulation do we need? In particular, how can regulation be made more intelligent? And what role should central banks play in the new regulatory and supervisory environment?

Let me briefly summarize what I consider the main lessons from last years' events.

1. The financial crisis has made us painfully aware that in order to preserve financial stability, not only is a thorough analysis at the level of individual banks necessary, but also greater consideration must be given to the linkages within the financial system and the associated risks. In short, the crisis has revealed the fundamental importance of systemic risk.
2. The crisis has also revealed the shortcomings of the Basel II framework for capital regulation. As it turned out, when push came to shove, banks had too little high quality capital at their disposal, were too highly leveraged, and had neglected the risk that the liquidity in funding markets might suddenly dry up.
3. Finally, the crisis has had a substantial impact on all major economies and has clearly demonstrated the limits of national responses in dealing with the activities of cross-border, systemically important financial institutions, markets and instruments. This is particularly evident in the European Union where financial markets have integrated rapidly and cross-border entities have become much more important since the introduction of the euro, while at the same time the EU's supervisory framework has not kept pace, remaining fragmented along national lines.

The reform proposals that are currently being debated at the European level try to address these fundamental weaknesses, namely the shortcomings in the Basel II framework, the geographical bias of nationally oriented supervisory structures and the micro bias of focussing on single institutions and neglecting systemic risks.

In order to link national supervisors, three new European authorities will start to operate with the beginning of 2011, dealing with banks, insurance

companies and securities. At the same time the European Systemic Risk Board (ESRB) will deal with the exposure of the financial system to interconnected, complex, and cross-sectoral systemic risks. The ESRB will monitor and assess risks to the stability of the financial system as a whole. Additionally, the Board will provide early warning of systemic risks that may be building up and, where necessary, issue policy recommendations for action to deal with these risks.

However, we should keep in mind that what is difficult in macro-prudential supervision is less its design than its implementation. Concerning the ESRB, the vital question will be the binding strength of recommendations. A further challenge for effective macro-prudential supervision concerns the quality of recommendations themselves. Here, the key lies in their specificity. The more specific recommendations are, the easier is their implementation in concrete actions. Concerning the effectiveness of cooperation between central banks, supervisors and regulatory authorities, which is relevant both within countries and across borders, the timely exchange of information is crucial. Moreover, the success of regulatory and supervisory reforms will depend largely on the right balance between regulation and freedom of markets. New rules should not impair the viability and innovation of financial markets and thus prevent economic growth. Furthermore, the rules for all financial market participants have to be harmonised internationally and across borders to avoid regulatory arbitrage. I appreciate the leading role of the EU in the regulatory reform discussions. However, it is of fundamental importance for the competitiveness of the EU that reforms are adopted in an internationally coordinated way.

With these introductory remarks, I would like to hand over to our two speakers. As in yesterday's session again we have a practitioner and an academic economist. I am very much looking forward to an interesting and fruitful exchange of views.

I am very happy to welcome Giovanni Carosio. Giovanni is a member of the Governing Board of the Banca d'Italia, and he will talk on the topic of "Financial Stability and Macroprudential Supervision: Challenges for Central Banks".

Our second speaker, Elena Carletti, is professor at the renowned European University Institute in Florence. Elena will speak on "An Overview of the Crisis: Causes, Consequences and Solutions".

Giovanni Carosio
Member of the Governing Board
Banca d'Italia

Financial Stability and Macro-Prudential Supervision: Challenges for Central Banks

1 The New Regulatory Architecture for Financial Stability

The crisis that has been rocking the world economy for the last three years has heightened the need for regulators and central banks to refocus on systemic risk, a key concept that must be embedded in their *modus operandi* through the development of a macro-prudential framework. Activity towards this goal is in full swing in a host of different fora, and the outline of a new framework is beginning to emerge. A broad agreement has been reached on some policy measures to be implemented, although important elements of the new regulatory structure are still under discussion. The coordinating role of the Financial Stability Board (FSB) has been essential towards achieving a global agreement.

The reform package of the Basel Committee, an important outcome of this effort, will include several measures addressing macro-prudential concerns. First, a significant portion of these reforms is targeted towards firms and activities that are systemic in nature; in particular, capital requirements have been increased for trading book activities, counterparty credit risk, complex securitizations and re-securitizations. Second, micro-prudential rules are being revised to address the risk of spillovers to the real economy, with the proposal to introduce counter-cyclical capital buffers. Third, in the overall calibration process of the reform package the Committee is paying close attention to its impact on the economy, both in the steady state and in the transition period, to ensure that the phasing-in process does not jeopardize the ongoing recovery.

We are also witnessing a parallel re-orientation of supervision. For instance, together with the monitoring of individual intermediaries, many supervisory authorities now conduct so-called horizontal reviews of large financial institutions, aimed at identifying specific sources of risk for the financial system as a whole. A second example is given by the simultaneous, consistent stress tests conducted by large financial institutions under the direction of national supervisory authorities, and, in Europe, of the Committee of European Banking Supervisors (CEBS).

Many initiatives are underway to improve the global governance of financial markets, products and institutions. The G-20 is emerging as the main forum for the international discussion on global economic stability. Under the aegis of the G-20, the Financial Stability Board has expanded its membership and range of competencies and ensures an unprecedented degree of international coordination in regulatory matters. New members add to the breadth of its perspectives and to the weight of its deliberations. In addition to its old mandate, as a Financial Stability Forum, of assessing vulnerabilities and promoting coordinated action to address them, the FSB is now charged with additional tasks, which include undertaking joint strategic reviews of the policy development work of the international standard setting bodies; setting guidelines for, and supporting, the establishment of supervisory colleges; supporting contingency planning for cross-border crisis management. In this context, the International Monetary Fund (IMF) is re-focusing its activity on monitoring the international financial system and identifying threats to global financial stability.

In Europe, based on the current draft legislation, financial supervision

will feature a two-pillar structure. The European Systemic Risk Board (ESRB) will be responsible for the macro-prudential oversight of the EU financial system as a whole; the European System of Financial Supervisors (ESFS) will focus on micro-prudential supervision. In particular, the ESRB is to focus on potential threats to financial stability arising from macroeconomic developments, as well as from developments within the financial system as a whole. It will issue warnings of a general nature, or concerning specific aspects (e.g. at the country, or industry level) whenever risks are deemed significant. Where appropriate, it will issue recommendations for action to deal with these risks, and monitor compliance with its recommendations. The ESFS will entertain a dialogue with the ESRB, and convey the recommendations to the national supervisors, who will abide by the "act or explain" principle.

The design of a fully fledged global framework for macro-prudential supervision is taking shape. In my remarks today I will focus on what I see as the open issues that need to be addressed to make it operational and effective.

2 Will the New Policy Framework Make a Difference?

The new macro-prudential framework that I have briefly described is centered on the concept of systemic risk. This is defined in the IMF-BIS-FSB Report to the G-20 Finance Ministers and Governors as the risk of disruption to financial services that is caused by an impairment of all or parts of the financial system and that has the potential to have serious negative consequences for the real economy. Other sources provide complementary definitions, emphasizing pro-cyclicality (the collective tendency for financial firms and economic agents in general, to overexpose themselves to risk in a cyclical upswing, and to become overly risk-averse in a downswing, thereby amplifying the business cycle).[1] Implicit in these definitions is the notion of negative externalities – costs that an institution or a market impose on other players but that are not taken into account by them or their counterparties, and therefore are not reflected in market prices.

How is this new regulatory framework going to tackle systemic risk? To answer this question we should start by acknowledging two key difficulties in the design of any institutional system aimed at ensuring financial stability.

First, although systemic risk is easy to define, it is hard to be given operational content, because of its various dimensions: pro-cyclicality, as mentioned previously; network or contagion risk, the spillover effects of a single institution's distress to the rest of the financial system; correlation risk, depending on the common exposures of all financial institutions to the same risk factors; concentration risk, due to the presence of a few dominant institutions in key financial markets and activities. Furthermore, systemic risk can stem from multiple sources, which make it hard to predict. For instance, in the late 1990s and early 2000s the hedge fund industry was considered a main source of systemic risk, and a candidate for regulation. However, this risk failed to materialize: the industry was not a trigger of the current crisis, nor, probably, the key element of the propagation mechanism. By contrast, the recent events provide several examples of triggers

[1] *See e. g. Bank of England. 2009. The Role of Macro-Prudential Policy. Discussion Paper.*

that did have systemic consequences but were not perceived as crucial ex ante: the behavior of certain insurance companies, commonly thought to be well-understood and non-systemic; the supposedly safe mortgage market of the most financially developed system of the world; the current situation in the European sovereign debt market. In a sense, policymakers were taken by surprise by each turn of the crisis.

The second key difficulty in the design of an effective framework to contain systemic risk is that, even when a source of risk is identified, acting upon this knowledge has historically proved very difficult. Consider for example the Government Sponsored Enterprises (GSEs) operating in the U.S. mortgage market. The portfolio of mortgages held by the two main GSEs, Fannie Mae and Freddy Mac, went from USD 160 billion in 1990 to over 1.5 trillion in 2003. That this might be a problem for financial stability had long been known to regulators.[2] As far back as 2004, following the emergence of accounting problems at the agencies, the Federal Reserve and the Treasury proposed to Congress to enforce a gradual reduction and eventual extinction of the portfolio of the GSEs, based on the argument that it was a source of considerable systemic risk. Yet, in the following years total assets of all GSEs continued to expand, to about USD 3.2 trillion at the end of 2007. This example bears witness to the difficulty, not so much of identifying the key risks before they materialize, but rather of taking prompt corrective action.[3] This is true especially when, as is often the case, corrective action ends up being costly, or unpopular: the regulator, or the politician, may find it hard to run against the sentiment of the time.

In the light of these two key difficulties, let me turn to discuss why the new regulatory and supervisory framework and its European components are an important step in the direction of preserving financial stability.

Concerning the first difficulty, the question is: Does the new system improve regulators' ability to identify the

ever-changing sources of systemic risk? I think that the answer should be cautiously optimistic. Central banks and supervisory authorities had identified some of the sources of risk that led to the current crisis, as witnessed by many annual reports and financial stability reviews in the first half of this decade. What was missing was a clear understanding of the linkages – between markets, institutions, countries – that

[2] *In 2002, William Poole, then president of the Federal Reserve Bank of St. Louis, wrote: "The issue with Fannie and Freddie is not one of disclosure. Their annual reports disclose quite well the high degree of complexity of their operations, and the small amount of capital they carry […].Why is [Fannie and Freddy's capital] standard so far below that required of federally regulated banks? What will happen to the housing market if Fannie and Freddie become unstable?". Speech held before the Council of State Governments, Southern Legislative Conference Annual Meeting, New Orleans, Louisiana, August 4.*

[3] *The De Larosière Report makes this point clearly: "Insofar as macro-prudential risks were identified … there was no mechanism to ensure that this assessment of risk was translated into action". (p. 40 of the High-Level Group on Financial Supervision in the EU, Brussels, February 25, 2009).*

ended up transforming a real estate bubble in some states of the USA into a global crisis. Institutions with a broad membership and a deep view over the whole world and the European financial landscapes, such as the FSB and the ESRB, would have had a better chance of interpreting the signals coming from the different countries and markets, that were lost also because of the fragmentation of points of view. Let me emphasize that I am talking about "better probability" of predicting a crisis, not about a once-and-for-all solution to the problem. Nevertheless, I think that this is the type of improvement that may reasonably be expected from a well-designed regulatory framework.

How should the new regulatory framework address the second difficulty which I mentioned above, i.e. how will it ensure that prompt corrective action is taken, once the risks are identified? In this crisis, one reason for inaction was that there was no authority with a specific and clear mandate to act. Indeed, one key motivation for the creation of the Financial Stability Board and the ESRB was the recognition that early warning signals were visible, but failed to trigger concrete pre-emptive policy action. In the European context, not only will the ESRB issue warnings about specific risks; it shall also issue recommendations for action, and monitor compliance with its recommendations. The "act or explain" mechanism should "give teeth" to these recommendations.

Let me give you an example of how a proper institutional arrangement can help solve stability problems. In the 1980s, the risk of a systemic crisis spreading through the wholesale payment system was a common cause of concern. Realizing this, central banks worldwide began to promote real-time gross settlement systems. The recent experience confirms that widespread adoption of these systems has all but eradicated systemic risk from payment networks. Three preconditions were important in this success story: central banks had the instruments to foresee the source of risk; they had the means to act; and, just as important, they had the incentives to foresee and to act. In a similar vein, I believe that the new regulatory framework is a serious attempt to establish similar preconditions towards the far broader goal of financial stability. The incentives for the ESRB to foresee and to issue recommendations are present, since this is precisely its mandate. The means to act, following a recommendation, are in the hands of supervisors, central banks, possibly governments – the "owners" of the macro-prudential tools – who in turn have an incentive to abide.

In sum, the current design of the new regulatory framework, although by no means simple, seems to have the potential to bring about substantial improvement in the area of financial stability. What will it take to translate this potential into action?

3 Translating the New Framework into Action

In principle, the macro-prudential work process can be separated into various steps: (i) identifying and monitoring the relevant macro-prudential risks; (ii) assessing their relative importance; (iii) issuing risk warnings and policy recommendations. Steps (i) and (ii) correspond, to a large extent, to the two core components of the financial stability analysis conducted by a number of central banks and international financial institutions and often published in financial stability reports. Step (iii) is essentially new at the international level, even if some central banks, especially those with supervisory tasks, devote significant parts of their internal reports to discussing policy measures to address the identified risks.

3.1 Risk Assessment

The first essential step for macro-prudential regulators is to identify the sources of risk. Some signals for concern are easy to gauge, such as rapid growth in aggregate credit, or in asset prices, but are hard to interpret, as the short- and medium-term developments of these indicators contain a significant amount of noise. The problem is with "false positives", cases in which risk indicators would trigger corrective action, which ex post would turn out to be unwarranted, and hence damaging for the economy. Although progress has been made towards improving signal extraction,[4] more work in this area is needed.

An important requisite for a thorough risk assessment process is a set of statistics, as detailed, timely and comparable across countries as possible. I argued previously that the information to diagnose the roots of the current crisis was probably available to a careful observer. Nevertheless, significant gaps concern data on the build-up of risk in the financial sector, on cross-border financial linkages and worldwide consolidated exposures, on off-balance sheet exposure, on interbank exposures, on non-bank financial exposures. A joint effort led by the IMF and the FSB is currently addressing these data gaps. A problem is that, in order to build reliable measures of interconnectedness, high frequency data on bilateral exposures would be required, but this objective seems out of reach for the moment. While deciding which data are required and collecting them will represent a major challenge, an even greater challenge will be to keep the data collection systems abreast of market developments. The markets for certain financial instruments can record spectacular developments in a matter of just a few years (consider e.g. the market for CDOs). Adapting internationally harmonized data collection systems to a rapidly evolving financial environment will be a major effort.

The second step of the macro-prudential process consists in ranking risks according to some criterion. It will be necessary to go beyond a mere list, however systematic and rigorous, of the "things that could go wrong", as often found in financial stability reviews. Risks need to be prioritized, starting with those warranting a risk warning and subsequent policy action. In principle, one would like to have a technology to identify the events with potential systemic consequences; to attach a probability to each of them; to estimate

[4] *The BIS has done extensive research on this issue. See e. g. Borio, C. and M. Drehmann. 2009. Towards an Operational Framework for Financial Stability: "Fuzzy" Measurement and Its Consequences. BIS Working Paper 284.*

the loss conditional on each risk materializing. While all this is easier said than done, some form of cost-benefit analysis of the various policy actions is necessary for the next step of the macro-prudential policy process, the issuance of operational recommendations. The IMF and the FSB are moving in this direction. They are developing a monitoring process (the so-called Early Warning Exercise) that allows a more integrated and comprehensive view of emerging global developments and the corresponding risks. Using an integrated macro-financial and regulatory perspective, the process provides the first example of an organized, structural attempt to identify and prioritize systemic macro-financial risks at a global level and to propose policy responses.

Stress tests represent an important diagnostic tool in this process: as they yield a measure of the consequences of the various sources of risk, they will be key in the prioritization process.

Although the IMF-FSB Early Warning Exercise provides an example of a systematic monitoring of potential sources of vulnerability, its top-down perspective lacks the detailed views and information coming from micro-prudential supervisors. I believe that, whenever possible, the information flow should also be bottom-up: analysis and assessment by micro-prudential supervisors should support the risk prioritization process, and the selection of those risks which warrant a warning.

The European macro-prudential framework seems well-suited for this purpose. In fact, there will likely be an interaction between the ESRB prioritization exercise and the micro-prudential assessments that will be regularly carried out by the European Supervisory Authorities. ESAs could provide additional inputs into the macro-prudential assessment cycle of the ESRB; in turn, the latter is expected to share with the ESAs and national supervisors the results of its macro-prudential risk assessment, so that these institutions can analyze the system-wide risks identified by the ESRB from a micro-prudential perspective. The micro-prudential assessment should add to the process the ability to identify sources of risk originating from areas that are hard to monitor on an aggregate basis. Stress testing is again a good example of such a two-way information flow: in perspective, the current EU-wide stress testing exercise will be conducted together by the ESRB and the ESAs, enhancing the cooperation already established towards fully consistent methodologies and approaches.

3.2 Implementing Macro-Prudential Policies

The third step of an effective macro-prudential process is the issuance of recommendations, the "wielding of the tools". What policies and tools are best suited to address systemic risk? The question is clearly complex, and defies a tidily arranged approach. I will confine myself to an overview of some of the main proposals, and to some general considerations on macro-prudential instruments.

To date, probably the clearest progress in the area of macro-prudential instruments has been made on capital regulation. Capital requirements are the cornerstone of micro-prudential regulation, but they also have a macro-prudential dimension linked to the pro-cyclicality of the financial sector. One promising tool to counteract pro-cyclicality is the capital buffer proposed by the Basel Committee, which requires banks to accumulate resources in periods of buoyant economic activity, when aggregate credit tends to grow "too

fast". The buffer should serve a dual purpose. First, it should help the banking system withstand the risks that build up in such a situation and materialize in the subsequent downturn. Second, it should contrast the very build-up of risk, thus dampening cyclical upswings and contributing to reduce the severity of downturns and the likelihood of economic crises. In the end, both micro- and macro-prudential considerations would concur to determine the amount of regulatory capital. Several key questions remain open. Should discretionary intervention on the buffer be kept to a minimum, to prevent regulatory capture? What level of geographical aggregation should be adopted to calibrate the buffer? For instance, in the euro area should it be linked to area-wide variables (e.g. credit growth), to address level playing field concerns, or should we leave the door open to disaggregated measures, as I will argue below? And, would market pressures allow banks to run down the buffer in a downturn? Probably, only the test of implementation will allow to solve some of the doubts and to make the necessary adjustments.

For other sources of systemic risk, such as liquidity dry-ups, uncontroversial solutions have not yet emerged. The new standards proposed by the Basel Committee (the Liquidity Coverage Ratio and the Net Stable Funding Ratio) seem to be powerful instruments, but are still very micro-prudential in nature and do not necessarily address the "fallacy of composition" that is typical of liquidity (the classical example is that the maturity mismatch of the financial system need not be equal to the average mismatch of its components). In principle, the systemic dimension of liquidity risk could be addressed by designing a countercyclical liquidity buffer, similar to the capital buffer that I have just discussed, possibly without raising overall liquidity requirements. An important advantage of this option would be to eliminate the pro-cyclicality of the micro-prudential liquidity

regulation in its current formulation; a disadvantage would be an added layer of complexity. Another solution would be to levy charges on banks' funding maturity, a proxy for systemic liquidity risk.[5] Still other proposals suggest to tie levies to measures of systemic risk,[6] or to devise market instruments that make liquidity available on a contingent basis, when a systemic trigger is activated.[7] These are examples of first steps in the direction of approaching liquidity risk directly from a macro-prudential perspective. More work is needed on this crucial issue.

Another set of tools that – stretching the definition a bit – might be considered among those aimed at macro-prudential objectives concerns the proposals to address the problems raised by systemically important financial in-

[5] *Perotti, E. and J. Suarez. 2009. Liquidity Risk Charges as a Macro-prudential Tool. CEPR Policy Insight 40.*

[6] *Adrian, T. and M. Brunnermeier. 2009. CoVaR. Federal Reserve Bank of New York. Staff Reports 348.*

[7] *Nicoletti Altimari, S. and C. Salleo. 2010. Contingent Liquidity. Bank of Italy. Mimeo.*

stitutions (SIFIs). Beyond a general agreement on the need for some harmonization of prudential regulation, since SIFIs are all cross-border in nature, not much consensus on a solution has been reached. I see two main approaches being developed, both building on the three keywords for SIFIs: size, complexity, interlinkedness. According to the first approach, structural measures should be devised to ensure that no institution is too big, com-

plicated or interconnected to fail. In this spirit there are proposals to limit banks' size, to separate commercial and investment banking, to dis-integrate conglomerates via living wills, etc. This line of reasoning is controversial, since the effectiveness of these measures depends on the specific characteristics of a relatively small number of SIFIs: different countries are likely to devise different solutions. While an agreement is likely to be reached on some of these proposals, in particular on resolution mechanisms, others (e.g. breaking up institutions according to some criterion) would require a broad international political consensus, which seems unlikely at this stage. A second approach would be to link an additional capital requirement, or a tax, to some measure of systemic relevance. The tax seems more appropriate in a burden-sharing perspective, the former tool in a financial stability perspective. Legislation underway in the USA as well as proposals in Europe contemplate measures of this type.[8]

This brief overview does not exhaust the list of suggestions for macro-prudential tools. Indeed, the search for adequate instruments is still work in progress, and is clearly very important; it will be essential to achieve some convergence on this issue in time for the start of the new European regulatory framework. However, I believe that the quest for an "optimal", time-invariant set of macro-prudential tools should not be overemphasized. For the reasons discussed above – essentially, the difficulty of gauging systemic risk due to its multi-faceted nature – macro-prudential policy is hard to translate into operationally useful concepts and measures. In my view, this requires the adoption of a flexible and, if necessary, discretionary approach, using the instrument that is more likely to be effective for the purpose at hand. Let me illustrate this point with a couple of examples.

First, with the benefit of hindsight, it appears that reducing loan-to-value ratios could have been beneficial for some euro area countries in the early years of this decade, whereas for some

[8] *The "Restoring American Financial Stability Act", passed by the U.S. Senate on May 20, would impose substantial new requirements and restrictions on SIFIs, envisioning the possibility for the Federal Reserve to enforce increasingly strict rules for capital, leverage, liquidity. On May 26, the European Commission proposed that member states form national funds, financed by a levy on the financial sector, to help wind up or reorganize failing banks.*

others this policy would have made little sense. A similar reasoning could hold for other instruments, e.g. ceilings on leverage. This suggests that the regulator should be ready to consider policy actions targeted at individual countries or sectors, rather than across the board, and be willing to face difficult trade-offs, as such actions may raise level-playing-field concerns and open the door to regulatory discretion, with all its pros and cons.

A second example is provided by the recent seizure of interbank markets. As soon as the crisis began to expose banks' weaknesses, transactions on the e-MID, a screen-based facility used by the main European banks to exchange interbank deposits, started to drop. From a daily average of about EUR 24 billion at the beginning of 2007, transactions declined to the current value of EUR 5 to 6 billion. Anecdotal evidence points to the very transparency of this market as the cause of its waning: banks facing strains were unwilling to reveal their liquidity needs to all market participants, and probably turned to the opaque OTC market. At the end of 2008 the Bank of Italy, together with the bank treasurers' associations, launched the MIC (Mercato Interbancario Collateralizzato), a new market segment where trades are anonymous and collateralized. Thanks to this, and to other features that made it appealing for both borrowers and lenders, the MIC recorded a rapid expansion in the early months of 2009, when interbank markets were most dysfunctional. While anonymous to its users, the MIC is fully transparent for the Bank of Italy, The MIC is not intended as a permanent structure: it will be dismantled when the e-MID will be again fully operational. This suggests that the macro-prudential regulator should also consider ad hoc interventions, limited in time, to mitigate specific market failures.

These examples suggest that a good amount of flexibility is required of the macro-prudential authority. The macro-prudential toolbox, unlike that of the monetary policymaker, should not be viewed as a closed set of instruments, nor should these instruments be thought of as applicable only and always across all markets and situations. This conclusion is also warranted by a forceful argument: whereas there is limited room for strategic interplay as far as monetary policy decisions are concerned, financial intermediaries and market operators have the incentives and the means to circumvent the policies adopted by the regulator (e.g. witness the abnormal development of off-balance sheet activity, or of the shadow banking system, over the past few years). A static approach by the latter is doomed to failure.

Finally, the tools in the macro-prudential toolbox are a very heterogeneous lot: they may have been devised for micro-prudential purposes, but be adapted to macro-prudential objectives; they may belong to different classes, including intervention on market infrastructure, or central bank operations. This implies that the authorities "owning" the instruments may be different, giving rise to various problems: responsibilities must be shared, while keeping the respective roles separate; effective coordination must be achieved. Before moving to discuss these problems, I would like to touch briefly upon whether monetary policy itself should contribute to financial stability.

4 Monetary Policy and Financial Stability

What are the lessons for monetary policy from the current crisis? Some com-

mentators have argued that monetary policy in developed countries, especially in the USA, bears an important responsibility for the crisis.[9] A more balanced opinion, which I share, is that while the main failures lie on the regulatory side, expansionary monetary policies may have contributed to the financial imbalances which built up prior to the crisis. Research at the Bank of Italy suggests that a policy of "leaning against the wind" in the US would not have avoided overheating in the residential property market, which was an essential ingredient of the current crisis. However, it also suggests that loose monetary policy did provide a contribution to the appreciation in this market.[10] More generally, it appears that the danger signals coming from the real estate market, as well as those coming from external imbalances, from declining households' saving ratios, from the exceptional pace of growth of some financial markets, could have been given more weight in the decision making process. The central idea of inflation targeting regimes, that credit, money and asset prices should be considered only insofar as they affect the inflation forecast, has shown its limitations. This idea was built on the view that we have a relatively reliable model of how the macroeconomy works and how inflation is determined. However, we have been reminded that the world is non-linear, that an excessive credit expansion which goes unchecked for a long period of time may eventually prove disastrous.

On the other hand, the credibility that the ECB and other central banks have acquired over the years by maintaining stable prices has proved crucial during the crisis. Even in an emergency situation, we have been able to control inflation expectations, reduce uncertainty and risk premia, sustain the flow of finance to the economy and thus reinforce the prospects for real activity and financial stability. Had inflation and inflation expectations not been under control, the room for central banks to implement an active management of liquidity policies would have been much narrower. I truly believe that the benefits of a sound monetary framework have become more, not less, apparent with the crisis.

The fact is that financial market and credit developments are becoming increasingly relevant also for the management of inflation, and not only for the purpose of detecting financial imbalances. Indeed, the crisis has exposed fundamental weaknesses in the ability to integrate financial sector linkages into the macroeconomic models that guided policymaking for decades, and efforts are underway to improve these models.[11] The Basel Committee recently created a group to study the monetary policy transmission channels that operate via financial institution balance sheets in periods of financial crises, relative to periods of more normal financial market conditions, in order to gauge their impact on financial stability.

[9] *White, W. 2008. Should Monetary Policy Lean against Credit Bubbles or Clean Up Afterwards? Speech at the Monetary Policy Roundtable. Bank of England. London. 30 September.*

[10] *Iacoviello, M. and S. Neri. 2010. Housing Market Spillovers: Evidence from an Estimated DSGE Model. In: American Economic Journal: Macro-economics 2. 125–164. For an opposite view, see Del Negro, M. and C. Otrok. 2007. 99 Luftballons: Monetary Policy and the House Price Boom across U.S. States. Journal of Monetary Economics. 1962–1985.*

[11] *See, e. g., Gerali, A., S. Neri, L. Sessa and F. Signoretti. 2010. Credit and Banking in a DSGE Model of the Euro Area. Journal of Money, Credit and Banking. Forthcoming.*

Summing up, monetary policy should remain primarily concerned with price stability, whereas primary responsibility for financial stability should be of macro and micro regulators and supervisors. At the same time, it is increasingly accepted that monetary policy should lean against the wind in periods of growing financial imbalances, even in the absence of immediate threats to price stability; it should aim at a greater symmetry throughout the cycle and should not neglect the modifications and innovations affecting the structure of the financial system. This symmetry may not be sufficient *per se* to avoid bubbles and subsequent crashes, but it may contribute, together with other policies, to a more stable financial environment. The monetary policy strategy of the Eurosystem, which emphasizes the analysis of money and credit, goes a long way towards embodying these views. In this respect, exploiting the interaction with the ESRB appears a promising way forward, as well as a challenge to be met.

5 Coordination Issues

The new regulatory framework will require an increased amount of interaction among authorities: among macro-prudential bodies (the IMF, the FSB, the ESRB); among the latter and the micro-prudential authorities (the Basel Committee, the European Banking Authority and the other European supervisory authorities, the national supervisors); among macro-prudential and monetary policy authorities.

Concerning the first type of interaction, I mentioned previously the structured process that the IMF and the FSB are building to identify vulnerabilities and to address them. The ESRB will also conduct a regular assessment of systemic risk and translate it into recommendations towards the adoption of mitigating policies. The potential for overlap seems ample. Given that the ESRB has a regional mandate while the FSB and IMF are global in nature, effective collaboration could have the IMF and the FSB focus on the analysis of interlinkages and contagion channels across the main macro areas and on developing policy options to contain spillover risk. The ESRB, and analogous national and regional institutions elsewhere, could focus on sources of risk within their purview, on how their financial system would react to a shock generated elsewhere and devise policy measures to mitigate "domestic" developments. The coming years will be crucial to assess the functioning of the new framework, and to minimize potential inefficiencies.

Concerning the second type of interaction, among the authorities in charge of systemic risk assessment and those in charge of micro-prudential supervision, the above discussion and a number of practical examples show that

micro-prudential tools (capital and liquidity requirements, loan-to-value ratios, etc.) may be appropriately calibrated also to serve macro-prudential goals. If the tools are broadly the same but must serve two purposes and be used by two different authorities, potential for conflict arises. Consider

again capital requirements. It is not hard to imagine a scenario of economic downturn, in which the macro-prudential regulator would want to run down the equity buffers built up during good times in order to avoid a credit crunch, whereas the micro-prudential regulator might be reluctant to let that happen, to preserve the safety and soundness of individual institutions. For this reason, cooperation and coordination among these authorities is required. Indeed, they will have to move rapidly beyond the cooperation stage, devising procedures and protocols to make their action synergic and, most importantly, timely.

Coordination/interaction will also be necessary between macro-prudential policy and monetary policy. The key question here is: What is the relationship between the policy interest rate and the "new" macro-prudential instruments? Answering this question requires understanding the macroeconomic effects of macro-prudential policies. This is the case in particular if one accepts the view that macro-prudential tools, such as capital buffers, should be moved discretionarily.

The analysis of the interaction between monetary and macro-prudential policies is at a very early stage. Current research at the Bank of Italy indicates that the discretionary use of a macro-prudential instrument, such as a countercyclical capital buffer or a loan-to-value ratio to smooth fluctuations in lending, may help dampen output fluctuations, although the benefits could be small in non-crisis times. At the same time, it suggests that assigning the responsibility for monetary and macro-prudential policies to separate authorities creates the risk of a coordination failure and suboptimal macroeconomic results (significant instrument instability and interest rate volatility).[12] The intuition behind these results is that macro-prudential decisions may not be consistent with price stability and force the central bank to offset them.

The new European institutional arrangement is well-conceived in this respect. Coordination between the ESRB and the monetary policy authority will be ensured by the composition of the ESRB and by the important role assigned to the ECB in the preparation of the background analysis. I also see consistency in the institutional set-ups. There is a long-standing consensus that monetary policy should be conducted by a technical body, which should be held accountable for its action to elected bodies. This institutional principle also informs the statute of the ESRB. The counterpart of its broad powers is accountability: the ESRB is responsible for its recommendations in front of the European Parliament and Council. At the same time, not giving the ESRB direct powers but only the right/duty to make recommendations achieves a

[12] *Angelini, P., S. Neri and F. Panetta. 2010. Grafting: Macro-prudential Policies in a Macro-Economic Framework: Choice of Optimal Instruments and Interaction with Monetary Policy. Paper presented at the CEPR-EBC conference on procyclicality and financial regulation. Tilburg. 11 and 12 March 2010.*

good balance of powers, and leaves full accountability where decisions are made. But by making the ESRB responsible for its recommendations in front of the European Parliament and Council a degree of political oversight and thus democratic legitimacy is ensured, which is all the more important since the recommendations might impinge on national sovereignty.

6 Concluding Remarks

Financial stability is preserved by a plurality of institutions; central banks are essential members of this group. The international community of regulators and supervisors is developing a set of macro-prudential tools, which will need to be flexible enough to deal with a variety of situations that change over time. Sufficient resources should be devoted to this purpose, starting now, to have the system fully operational when times will be good again. The interactions between these tools and micro-prudential requirements and practices, on the one hand, and monetary policy, on the other, need to be taken into account. The complex institutional framework that is being devised will need fine-tuning, but more importantly it will need support from member countries. Coordination among all institutions is vital, both in the day-to-day business of monitoring trends and in acting once a major risk is identified, or a crisis occurs. Experience shows that ex ante agreements and procedures, while difficult to achieve, may be crucial to ensure an adequate management of crises.

Central banks should apply their knowledge of the macroeconomy and of financial markets to play a role in the development of effective macro-prudential analyses. The credibility gained with the responsible management of monetary policy can contribute to the effectiveness of macro-prudential policies, since in the long run there is convergence between the goals of price stability and financial stability.

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Financial Regulation Going Forward[1]

1 Introduction

In the majority of countries the financial sector is the most regulated part of the economy. The primary purpose of this regulation is to prevent financial crises. The Crisis of 2007–09 has shown the inability of current regulation to achieve this goal. The Basel Agreements provide a good illustration of the problem. Despite the large amount of resources devoted to designing and implementing these in the last two decades, and the extensive international cooperation involved, these agreements did very little to prevent the crisis or lessen its effects. The problem is that unlike other areas of regulation there is no coherent theoretical framework underpinning the measures. In contrast, with environmental regulation, for example, it is widely agreed that the problem is a missing market. Polluters do not need to compensate anybody for the damage that they cause. As a result it is necessary for the government to step in and regulate emissions and so forth. Similarly, with antitrust regulation everybody agrees the problem that is being solved is a lack of competition.

But with financial regulation, what are the market failures that justify intervention? The Basel Agreements do not provide an answer to this question. In fact, there is no wide agreement among academics, practitioners or regulators on this issue. One view is that financial crises are mainly due to panics as argued by Friedman and Schwartz (1963) for the U.S.A. in the 19th and early 20th centuries. As the seminal theoretical contributions by Bryant (1980) and Diamond and Dybvig (1983) have shown, if everybody believes there will be a panic, then the panic is self-fulfilling. Everybody will find it worthwhile to take their money out of the banking system. However, if everybody believes there will be no panic they will keep their money in. Another view is that crises are caused by the business cycle. If people expect a recession then they will withdraw their money from the banking system in anticipation of loans going sour and the banks being unable to repay them. Gorton (1988) and Calomiris and Gorton (1991) have provided evidence for this view using data from the U.S.A. in the late 19th and early 20th centuries. A third view is that financial contagion is a fundamental problem and provides a rationale for government intervention. If one financial institution fails then other institutions holding claims on it may also fail. Allen and Gale (2007) consider these and a number of other possible causes of financial crises.

The current structure of banking regulation is a patchwork of measures resulting from the historical sequence of events rather than the implementation of a clear regulatory design. In the Great Depression, the economic situation was so bad that governments adopted a whole range of measures to stop any kind of problem. In the U.S.A., legislators passed the Glass-Steagall Act separating investment and commercial banking, they founded the Securities and Exchange Commission (SEC), they put in place all the SEC Acts,[2] and the financial system became heavily regulated. In other countries, regulation was also increased and in some such as France, financial institu-

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[2] *The seven acts are: The Securities Act of 1933; The Securities Exchange Act of 1934; The Public Utility Holding Act of 1935; The 1939 Trust Indenture Act of 1939; The Investment Company Act of 1940; The Investment Advisers Act of 1940; The Securities Investor Protection Act of 1970.*

tions were nationalized. This regulation and government ownership was successful in terms of stopping banking crises. From 1945 until 1971, there were no banking crises, except for one in Brazil in 1962 that occurred together with a currency crisis (see Bordo et al., 2001). So it is possible to stop crises by stopping financial institutions from taking risks.

However, with the alternative to the private sector taking decisions about risks and the allocation of resources it is essentiall that the government determines who gets credit. This was done in different ways. In countries like France with nationalized banks, the government directly made deci-

sions. In the U.S.A., the government introduced so many regulations that banks could not take many risks and so low risk industries were allocated credit. As a result, the financial system stopped fulfilling its basic purpose of allocating resources where they are needed. In the 1970s it became clearer how inefficient this was and financial liberalization started in many countries. However, this led to a revival of crises. Since then, there have been crises all around the world (see, e.g., Boyd, De Nicolo, and Loukoianova, 2009). This historical evolution has led to a patchwork of regulations designed to stop particular problems rather than a well thought out way of reversing market failures in the financial system.

In this paper we start in section 2 by discussing the origins of the recent crisis and argue that the general pattern is similar to other major crises. As Herring and Wachter (2003) and Reinhart and Rogoff (2009) document, crises are usually the result of asset price bubbles, particularly in residential and commercial property. When these bubbles burst, the real economy and the financial sector are adversely affected. The current crisis provides a good example of this. We argue that the property bubbles in the U.S.A., Spain, Ireland, and elsewhere were the result of two main factors. The first was that central banks set interest rates that were too low during the period 2003–2004 at a time when house prices were already rising quite fast. This set off the bubbles. The second was that global imbalances, and in particular the acquisition of reserves by Asian central banks after the Asian Crisis of 1997 led to the easy availability of funds.

In section 3, we discuss how regulation and government intervention in the financial system should be reformed going forward. Capital regulation is the major form regulation used internationally and this is discussed at length. It is suggested that interest deductibility of debt for the corporate income tax should be eliminated as this would largely eliminate the social cost of requiring high equity buffers. We argue that "too big to fail" should not mean "too big to liquidate." Ways of eliminating the problems posed by large complex cross-border financial institutions are proposed.

Financial regulation is only one part of the intervention that is required to prevent crises and ameliorate their effects should they occur. Section 4 dis-

cusses the role of central banks in causing the crisis through low interest rate policies and the reforms necessary to prevent this going forward. Central banks need to be much more focused on controlling asset price inflation. In addition, their design needs to be changed to ensure that there are more checks and balances.

Section 5 discusses how the international financial architecture needs to be redesigned to reduce the desire of Asian central banks to hold large reserves. This will reduce the easy availability of funds that together with low interest rates played such a large role in creating the bubble.

Finally, section 6 concludes.

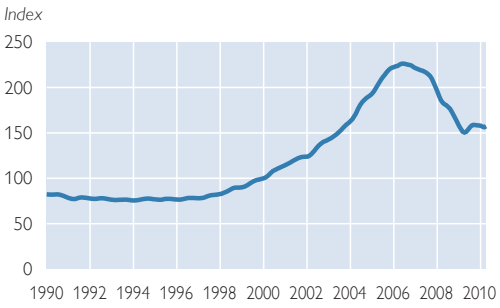
2 The Origins of the Recent Crisis

Despite its severity and its ample effects, the recent crisis is similar to past crises in many dimensions. There have been crises in many other parts of the world in the last few decades. Many of these were in emerging or middle income countries such as Argentina, Mexico, and Turkey, but many were in higher income countries. The crises in Japan, Scandinavia, and Asia in the 1990s stand out as being particularly severe. Reinhart and Rogoff (2009) document the effects of banking crises using an extensive data set of high and middle-to-low income countries over a long period of time. They find that systemic banking crises are typically preceded by credit booms and asset price bubbles. This is consistent with Herring and Wachter (2003) who show that many financial crises are the result of bubbles in real estate markets. In addition, Reinhart and Rogoff find that crises result, on average, in a 35% real drop in housing prices spread over a period of 6 years. Equity prices fall 55% over 3½ years. Output falls by 9% over two years, while unemployment rises 7% over a period of four years. Central government debt rises 86% compared to its pre-crisis level. These averages are not that dissimilar from what happened in many countries in the recent crisis.

This evidence from a wide array of financial crises suggests that the problems with subprime mortgages that marked the start of the current crisis in August of 2007 were a symptom of the bursting of the property bubble rather than the cause of the crisis as many people initially believed. No doubt, they considerably exacerbated the crisis, though. It was widely argued that what had happened was that the way the mortgage industry worked had changed significantly over the years. Traditionally, banks would raise funds, screen borrowers, and then lend out the money to those approved. If the borrowers defaulted, the banks would bear the losses. This system provided good incentives for banks to carefully assess the creditworthiness of borrowers. Over time, that process changed and incentives were altered. Instead of banks originating mortgages and holding on to them, brokers and also some banks started originating them and selling them to be securitized. The quality of the securitized mortgages was certified by the ratings agencies. This process is termed the "originate to distribute model." According to this mortgage incentives view of the crisis, the whole procedure for checking the quality of the borrowers, and the mortgages underlying the securitizations broke down. This analysis suggested that it would be fairly simple to solve the crisis and stop it from reoccurring. If the government regulated the mortgage industry to ensure everybody had the correct incentives, then this would prevent the problem in the future.

Chart 1

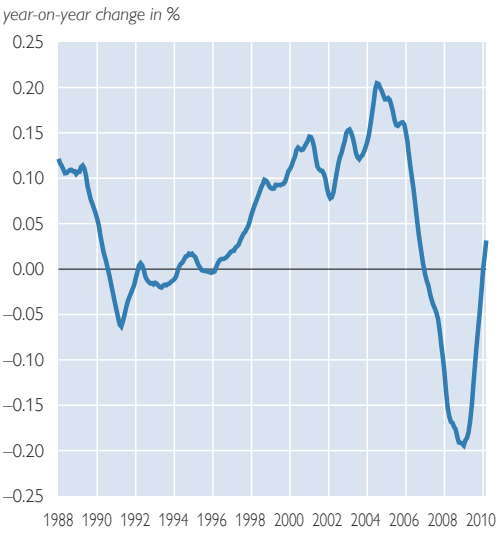
Changes in the Case-Shiller 10-City Composite Index



Source: Standard & Poor's.

Chart 2

Changes in the Case-Shiller 10-City Composite Index



Source: Standard & Poor's.

There seems little doubt that the changes in the mortgage industry exacerbated the crisis. However, their absence in many other similar crises over the years suggests that they were not the primary cause.

We shall argue that the basic problem that caused the crisis was that there was a bubble in real estate in the U.S.A. and also in a number of other countries such as Spain and Ireland. What happened is that the bubble burst, and this caused the huge problems in the securitized mortgage market and in the real economy. The bubble was large and global in many ways.

Chart 1 shows the Case-Shiller 10-City composite index since 1990. The chart illustrates the dramatic acceleration in house price increases in the early 2000s and their fall since July 2006. Chart 2 shows the year-on-year change in this index. It can be seen that the rise in house prices started in the late 1990s and then took off in 2003 and 2004.

What caused the bubble? We argue that there were two main causes. The most important reason that the bubble was so big in the U.S.A. was the policies of the Federal Reserve in 2003–2004. What they did to avoid a recession after the collapse of the tech bubble in 2000 and the 9/11 terrorist attacks in 2001 was to cut interest rates to the very low level of 1%. Taylor (2008) has argued that this was much lower than in previous U.S. recessions relative to the economic indicators at the time captured by the "Taylor rule." During this period housing prices were already rising quite rapidly. For example, it can be seen from chart 2 that the Case-Shiller 10-City composite index was growing at a rate above 10% throughout this period.

The Federal Reserve created a significant incentive for people in many parts of the U.S.A. to borrow at 1% and buy houses going up at a much higher rate. Unlike stock prices, which follow random walks, Englund, Quigley and Redfearn (1998) have found that house prices are positively serially correlated. This means that if housing has been going up recently then this may continue for some time to come. Lowering interest rates significantly below the current rate of house price appreciation thus created a profitable opportunity to buy property.

In addition, there were various other public policies that made it advantageous to buy. These included the tax advantages of being able to deduct interest on mortgages compared to the non-deductibility of rent payments, plus a number of other policies to encourage poor people to buy houses. All these factors created a large demand for houses that led to increases in house prices as shown in chart 2. Even when the Federal Reserve eventually started to raise interest rates in June of 2004, it was still worth borrowing because house prices continued to rise at a rate above 10% until 2006 as shown in chart 2. Thus the Federal Reserve's low interest rate policy was the first factor that really caused property prices to take off.

The U.S.A. was not the only country that experienced a bubble in property prices. Spain and Ireland also had very large run ups in property prices. Taylor (2008) argues that these countries also had loose monetary policies relative to the Taylor rule. He points out that Spain, which had the largest deviation from the rule, also had the biggest housing boom as measured by the change in housing investment as a share of GDP. Other countries in the euro area such as Germany did not have a housing boom because their inflation rates and other economic indicators were such that for them the European Central Bank's interest rates did not correspond to a loose monetary policy.

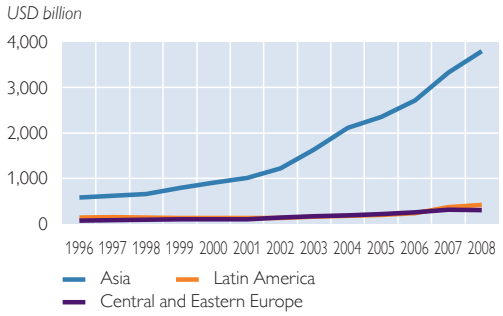
Loose monetary policy was not the only factor. As Allen and Gale (2000, 2007) have argued, growth in credit is important for asset price bubbles. The second important element in addition to low interest rates in the U.S.A., was global imbalances. These helped cause a growth in lending in the countries with a loose monetary policy.

Why are there global imbalances? This is a complex issue. However, we will argue that an important factor was the Asian Crisis of 1997. Many Asian economies, which had done very well, like South Korea, Thailand, and Indonesia, fell into serious difficulties. In the case of South Korea it was because its firms and banks had borrowed too much in foreign currency. The country turned to the International Monetary Fund (IMF) for help to see them through these difficult times.

In exchange for providing financial assistance, the IMF required South Korea to raise interest rates and to cut government spending. That is the exact opposite of what the U.S.A. and Europe have done when faced with a very difficult crisis. One potential reason why this happened is that the IMF is a European and U.S. dominated institution. The head of the IMF up to now has always been a European while the head of the World Bank has always been an American. Asian countries are not represented at the highest levels. That was part of the arrangements that were made when the Bretton Woods agreement was negotiated at the end of the Second World War, even though it is not explicitly stated anywhere in the treaty. The Asian countries did not have much weight in the governance process

Chart 3

A Comparison of Foreign Exchange Reserves in Different Regions



Source: IMF.

Note: Asia is the six East Asian countries China, Hong Kong, Japan, Singapore, South Korea, Taiwan.

and their quotas (i.e. effectively their shareholdings) were small. All this implied that when the IMF imposed harsh policies on the Asian countries at the end of the 1990s, there was no effective mechanism for these countries to protest and argue that they had fundamentally sound economies.

The consequence was that many Asian countries such as South Korea realized they had to become economically independent so that they would not need to go to the IMF to obtain relief from a crisis in the future. To achieve this independence, these countries accumulated trillions of dollars of assets.

Chart 3 shows this accumulation of reserves by Asian countries (here China, Hong Kong, Japan, Singapore, South Korea and Taiwan). In contrast, Latin American and Central and Eastern European countries did not increase their reserves during this period.

The motivation for accumulating reserves of China, which is the largest holder, is probably more complex than this. First, although they were not so directly affected by the Asian crisis, similarly to other Asian countries, China realized that it would be risky to seek help from the IMF if they should need it in the future. Second, and perhaps more importantly, it seems that China started accumulating reserves to avoid allowing its currency to strengthen and damage its exports. Over time China's reserves have continued to increase. As of the end of the first quarter of 2010, they stood at the level of USD 2,447 billion. One reason for the growth in reserves is the potential political influence this gives China, particularly with the U.S. China has been increasing its military spending over the last few years. Acquiring such large reserves gives them an alternative means of security.

How were the Asian countries to invest these reserves? One possibility could have been firms' equity. However, it became difficult in particular for the Chinese to buy companies. For example, when the Chinese state oil company CNOOC wanted to buy Unocal in 2005 the transaction was blocked by the U.S. authorities on the grounds that Unocal was a strategic firm. This happened on a number of other occasions. Thus, the Chinese ended up having to invest mainly in debt instruments. They bought a large amount of Treasuries, Fannie and Freddie mortgage-backed securities, and many other debt securities. Similarly,

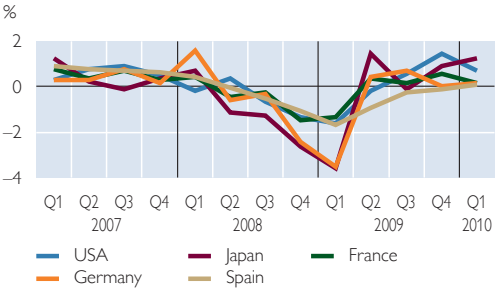
other countries acquiring reserves also invested large amounts in debt securities. It can be argued that the large supply of debt helped to drive down lending standards to ensure that there was enough demand for debt from house buyers and other borrowers.

Loose monetary policies and the increase in debt instruments available because of global imbalances were in our view two important factors responsible for the real estate bubbles. However, various other factors also contributed to the bubble. One of these was the yen carry trade. This involved investors borrowing at zero interest rates in Japan and investing somewhere else such as in Australia and New Zealand at much higher rates. The carry trade involved an exchange rate risk, but most of the time it was possible to earn a significant return. There is not much information on how large the outflow of funds the yen carry trade involved but it may well have helped contribute to the rise in property prices in Australia, for example. Currently, there is the question as to how much the carry trade from the U.S.A. is contributing to property bubbles in China and other parts of Asia.

One important issue is the extent to which the problems in the real economy have been caused by the collapse of the bubble as opposed to spillovers to the real sector from the problems in the financial sector. Spain provides an interesting example here. It had a very large property bubble. Its real economy has been very badly damaged with unemployment doubling. However, its financial system is arguably the best regulated in the world. The Bank of Spain implemented countercyclical loan loss ratios some time ago. As a result its banks have come through the crisis much better than banks in other countries. For example, Santander and BBVA were both able to expand their operations through mergers. While the other banks did not do as well, they still did not require the large bailouts observed in many other countries. The savings banks or Cajas had more problems but again these have been rela-

Chart 4

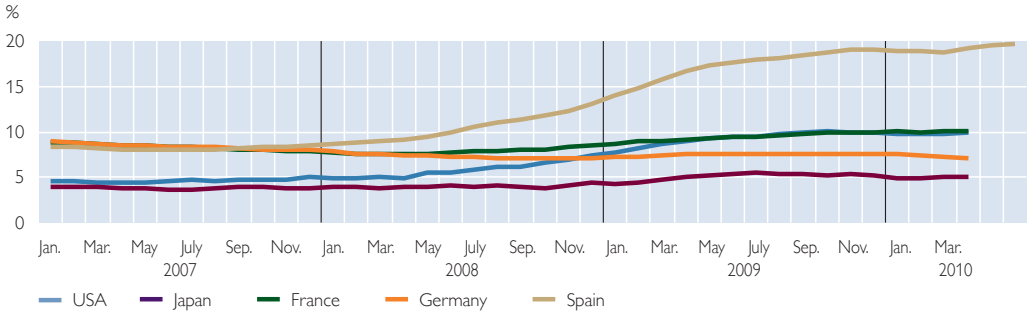
Percentage Change in Quarterly GDP



Source: OECD.

Chart 5

Harmonized Unemployment Rates



Source: OECD.

tively limited. Thus Spain provides an example where it seems that the bursting of the bubble has caused the most important damage to the economy.

Charts 4 and 5 illustrate this. Chart 4 shows the changes in GDP quarter by quarter. It can be seen that Japan and Germany had much larger GDP falls than the U.S.A., France and Spain. Chart 5 shows that despite their large falls in GDP, Germany and Japan's unemployment rates have not changed very much since the start of the crisis. However, unemployment in the U.S.A. and Spain, which had property bubbles, has approximately doubled. This observation emphasizes the important need to prevent bubbles.

3 Regulation and Government Intervention in the Financial System

In order to design effective financial regulation it is necessary to have a clear idea of the market failures that make intervention necessary. The benefit of regulation is that it can correct market failures and potentially stop very damaging crises but the cost is that the regulation needed to prevent these crises may prevent the financial system from doing its task of allocating resources. In turn that slows down growth, innovation and ultimately damages efficiency. The task of good regulation is to reduce the frequency of crises without impairing the operation of the financial system.

The main market failures in the financial system are panics, contagion, and mispricing due to limits to arbitrage. We next consider the various types of regulation that have been used to correct these failures.

3.1 Designing Capital Regulation

Capital regulations have been the main tool for regulating banks in recent years. These have been coordinated internationally through the Basel agreements. They are the main tool for ensuring stability in the international financial system. The traditional justification in the academic literature for capital regulation has been that it is needed to offset moral hazard from deposit insurance (for an exception, see Hellman, Murdock and Stiglitz, 2000). Because banks have access to low cost funds guaranteed by the government, they have an incentive to take significant risks. If the risks pay off they receive the upside, while if they do not the losses are borne by the government. The argument is that capital regulation that ensures shareholders will lose significantly if losses are incurred is needed to offset this incentive for banks to take risks.

This rationale raises the issue of why there is deposit insurance. The usual answer is that this is needed to prevent bank runs that result from panics. If people know that the government will cover any losses, it becomes rational for everybody to leave their money in the banking system thus eliminating panics. However, in practice deposit insurance is only for small deposits, it does not cover large deposits or wholesale funding. As a result it does not solve the problem of panics. One possibility would be to guarantee all forms of short term debt. In this case there would again be a moral hazard problem. A better solution to prevent risk taking may be to remove deposit insurance and deal with the problem of runs through lender of last resort policies. If depositors know that the central bank will provide the needed liquidity if they attempt to withdraw early, they will not withdraw and there will not be a run. Another view is provided by Skeie (2008). He argues that in modern economies bank runs involve transfers

of funds to other banks rather than withdrawals from the banking system. As a result, the funds transferred out can be borrowed back through the interbank markets. Skeie is able to show that for this reason there are no panics.

Prevention of contagion is another rationale for capital regulation (see, e.g., Allen, Babus, and Carletti, 2009 for a survey of the literature on contagion). Contagion is the market failure that central banks often use to justify intervention, as, for example, in the case of the arranged takeover of Bear Stearns in March 2008. As Chairman Bernanke stressed in his speech at Jackson Hole in August 2008 (Bernanke, 2008), Bear Stearns would have defaulted if the Federal Reserve had not saved it. That would have led to a whole chain reaction where many other financial institutions would have gone bankrupt. There might have been a complete collapse of the financial system.

New theories of capital regulation based on preventing contagion are necessary. We need to understand the determinants of the optimal capital levels to prevent contagion. At the moment the literature on contagion is growing rapidly. However, as yet there are few theories of capital regulation to prevent it.

3.2 What is the Cost of Equity Capital?

One of the major problems in designing capital regulation is in modeling the costs of equity finance for financial institutions. It is usually simply assumed in the literature that equity is more costly than other forms of finance (see, for example, Gorton and Winton, 2003). However, it is not at all clear what this higher cost is due to. One simple answer is that it is privately more costly because in many countries debt interest is tax deductible at the corporate level but dividends are not. If this is why there is a desire to use debt rather than equity, then the simple solution is to remove debt interest deductibility. We do not know of any good public policy rationale for having this deductibility. It seems to have arisen as an historical accident. When the corporate income tax was introduced interest was regarded as a cost of doing business in the same way that

paying wages to workers was a cost. However, from a modern corporate finance perspective, this is not the correct way to think about it. Equity and debt are just alternative ways of financing the firm. If removing interest deductibility means financial institutions are willing or can be induced through regulation at little social cost to use more equity, then financial stability would be considerably enhanced.

Other possible rationales for the high cost of equity are agency problems within the firm. According to this rationale the cost of equity is that it does not provide the correct incentives to shareholders or managers to provide

the right monitoring. High leverage is needed to ensure this. There is little empirical evidence that this is in fact a severe problem. For example, leverage in private equity and venture capital firms where the agency problem seems much greater is typically less than in banks. This lack of a convincing rationale for the social cost of equity suggests regulation should ensure capital buffers are made large since there is little social cost to doing this. For example, if required capital ratios were 20%, the financial system would be considerably more stable than is currently the case and many more large shocks could be withstood.

3.3 Contingent Convertible Debt (CoCos)

It has been widely suggested that convertible debt should be issued by banks that could be converted into equity in the event of a crisis. In this case it would not be necessary for banks to raise capital in difficult times as it would already be available. The issue of this kind of security by Lloyds in the U.K. is an example. This certainly sounds attractive but the securities suffer from a number of potential problems. First, there will be the issue of whether moral hazard is increased by such instruments. Second, why not use equity from the start instead? As we have argued above, there is no good evidence that equity is costly except for the interest deductibility of interest for the corporate interest tax and this should be removed.

3.4 Capital Adequacy Regulation Using Accounting and Market Capital

Another important issue concerning current capital regulation is that it is based on accounting book values rather than market values. When Wachovia failed during the recent crisis its accounting capital was well above regulatory limits even though the market was no longer willing to provide funds. There is no existing theory that we are aware of that suggests why capital regulation should be based entirely on accounting book values and not at all on market values. We clearly need to investigate the extent to which capital adequacy regulation should be based on market capital rather than accounting capital.

3.5 "Too Big to Fail" is not "Too Big to Liquidate"

As long as a financial institution can maintain its required regulatory capital and funding from the market, then it will survive. An important issue is what happens when it cannot do so. Should it be allowed to fail or be bailed out? One of the most important principles guiding policy during the recent crisis has been that large institutions are "too big to fail." The notion is that if a large financial institution is allowed to fail, this is going to cause many other institutions to fail all through the financial system. This is the contagion problem discussed earlier. The way that this policy has been implemented is that governments have bought warrants, preferred shares and common stock in

many institutions that would otherwise have failed. They have made it clear that these institutions will be provided with the capital that they need in order to survive. The effect of this type of intervention has been to provide a guarantee to long term bondholders as well. There is very little in the way of current theory to justify these policies.

It can be argued that current approaches are the wrong way to deal with the "too big to fail" problem. As Lehman Brothers' bankruptcy in September 2008 illustrated, contagion is a very real problem and large banks and non-bank financial institutions should not be allowed to simply go bankrupt. However, "too big to fail" does not mean that these institutions should be allowed to survive.

It is a very bad precedent to provide failing banks with the funds they need to survive. In the future, it is likely that banks and other financial institutions will grow and become large knowing that they will not be allowed to fail. These banks will be willing to take large risks since they receive the payoffs if the gambles are successful while the government bears any losses.

"Too big to fail" does not mean "too big to liquidate." Financial institutions should definitely be prevented from failing in a chaotic way. The government should step in, take them over and guarantee their short term liabilities in order to prevent contagion. The top executives should be removed and pensions cancelled just as though the institution had gone bankrupt. Rather than allowing them to continue, these institutions should be liquidated in an orderly manner, even if this may take several years. That would allow the other institutions that did not fail and that were well-run to expand and take over the failed institution's market share. Propping up the weak ones that did badly is not a good idea in the long term. It rewards risk taking and, perhaps more importantly, it prevents prudence from being rewarded. Well-run banks that took limited risks and survived should be allowed to benefit.

An important aspect of the scheme needed for the government to prevent contagion by temporarily taking over failing institutions before liquidating them is to have bankruptcy rules for all financial institutions that allow the equivalent of prompt corrective action for banks. With a bank, the government can step in before it goes bankrupt and take control. There does not have to be a vote of the shareholders. Such a mechanism is needed for all financial institutions.

3.6 Resolution of Large Complex Cross-Border Financial Institutions

A major difficulty in designing a framework that allows financial institutions to be liquidated is how to deal with large complex cross-border institutions. In particular, there is the problem of which countries should bear any losses from an international mismatch of assets and liabilities. This has proved a thorny problem for the European Union in designing a cross border regime to support its desire for a single market in financial services. For countries without the EU's political ties, it is an even more difficult problem. Designing such a system is one of the most urgent tasks facing governments.

One possible way to proceed would be to eliminate cross border branching. Then any subsidiaries would be regulated by the host country. These regulators would be charged with ensuring that they were comfortable with any imbalances between assets and liabilities in their country. They could require collateral in the form of securities

to be posted to cover any excess of liabilities over assets within the country. The regulators would be responsible for intervening should a foreign subsidiary or home institution come close to failing and would be responsible for covering any shortfalls of cross border assets and liabilities that failure would lead to.

If capital regulation is designed so that large capital buffers are required, then institutions can be resolved when they hit thresholds of equity value that are also high, say 5% or 10%. This should ensure that the short and long term debt liabilities are more than covered by the assets. Any remaining funds can be paid to shareholders. Using large thresholds in this way will help to minimize the likelihood that the assets of foreign subsidiaries, including any collateral, are unable to cover the liabilities within the country.

A significant advantage of this type of scheme is that there is no need for international agreement on it. Each country can unilaterally impose it. This is not true of other types of scheme where any gaps between assets and liabilities must be covered by other countries. In this case there must be a agreement not to "ring fence" assets.

3.7 Limited Government Debt Guarantees for Financial Institutions

In the current crisis holders of long term bank debt have effectively had a government guarantee. An important issue is whether this is desirable. Such a guarantee prevents disorder in bond markets, but again the guarantee provides undesirable long term precedents. Going forward holders of bank debt will know it is guaranteed and will not have any incentive to exert market discipline. If failing banks are taken over and liquidated in an orderly manner as discussed above, it should be possible to impose losses on long term bondholders. This should provide incentives for market discipline by bondholders.

3.8 Limits on Leverage of Financial Institutions

Many financial institutions started the crisis with very high levels of leverage. It has been widely argued that the deleveraging of these institutions during the fist stages of the financial crisis considerably exacerbated the effects of the crisis (see, e.g., Adrian and Shin, 2009 and Greenlaw et al., 2008). We agree with this view. Some limitations on the leverage of financial institutions seem desirable. However, implementing such restrictions in practice may be problematic. The issue will be exactly what should be included in debt and what should be included in equity. Financial innovation will undoubtedly be used to try and circumvent any restrictions.

3.9 Implementation of Competition Policy in the Financial Services Sector

There has long been a tension between competition policy and financial stability (see Carletti and Vives, 2009). It is only in recent years that competition policies have been implemented in many countries. Often for stability reasons, countries have avoided implementing competition in the banking sector as rigorously as in other sectors.

An interesting question that has been raised during the crisis is why is it that in normal times financial services firms make such large profits. One possibility is that it is because competition policy is not enforced properly. Although on the face of it financial markets are very competitive, the nature of deviations from perfect competition is rather different than in markets for goods. One illustration is "front running". This is based on knowledge of

order flow by brokers and other participants in the market, which is extremely valuable. For example, if a large buy order is executed then this will typically drive up prices because market participants will deduce that the buyer has good information. If the processor of the order can trade before the large buy order is executed then it is possible to make money. Aggregated over time this front running can be extremely profitable. In the equity markets in the U.S.A. this is illegal. There are very careful records kept of when orders are received and brokers cannot trade on their own account before they execute customers' orders. However, front running is not illegal in the U.S. bond markets.[3] The large investment banks have set up trading platforms for bonds that give them an advantage in terms of knowledge of order flow. This has the potential to allow large profits from front running.

It is important that deviations from perfect competition such as front running be carefully investigated and regulated. Front running in the bond markets should be made illegal just as it is in the equity markets. However, this is just one example where deviations from perfect competition are different in financial services. There are many others that need to be understood and prevented.

Restrictions on the size of financial institutions and their activities (the so-called Volcker Rule) have the potential to increase competition. Such limitations would have done little to prevent the recent crisis but may nevertheless be desirable.

3.10 Macroprudential Measures

As argued in section 2, the basic cause of the recent crisis and many other crises is a bubble in real estate prices. Perhaps the best way to prevent such bubbles is to avoid having very low interest rates at a time when property prices are surging. Once they have started, the question is whether interest rates should be raised to prick them. It may be possible and desirable to do this in economies with a high degree of homogeneity. However, doing this may be difficult for political reasons. At least

initially when such policies are first introduced, it will be difficult to explain why it is worth causing a recession to burst a property bubble. In heterogeneous economies like the U.S.A. and the euro area, where there may be a large amount of divergence in the rate of property price increases, using interest rates to prick bubbles will not be so desirable because of the areas that do not have bubbles. In this case it may be better to use other forms of macroprudential regulation to prevent bubbles. One example would be limits on loan-to-value ratios that would be lowered as property prices increase at a faster pace. This can be effective for residential property but may be difficult to enforce for commercial property. The reason is that firms may be able to use pyramids of companies that effectively

[3] *We are grateful to Krishna Ramaswamy for pointing this out to us.*

increase leverage. Another measure is to have property transfer taxes that are greater the higher is the rate of property price increases.

3.11 Mark-to-Market or Historic Cost Accounting?

Financial institutions have traditionally used historic cost accounting for many of their assets. This is problematic if assets fall in value as they may able to hide this fact for significant periods of time. A good example is the S&L crisis in the U.S.A. in the 1980s. This kind of episode encouraged a move to mark-to-market accounting by the IASB and U.S. FASB (see, e.g., Allen and Carletti, 2008a and Plantin, Sapra, and Shin, 2008). During the recent crisis it was not at all clear that market prices reflect fundamental values. It has been widely suggested that limits to arbitrage allowed many asset prices, particularly those of securitized products, to

break free from fundamentals. As a result, mark-to-market accounting came under severe criticism by financial institutions and was relaxed by the FASB under political pressure from Congress.

How should the advantages and disadvantages of mark-to-market accounting be balanced? As long as markets are efficient, mark-to-market accounting dominates. However, if as during times of crisis they cease to be efficient, market prices do not provide a good guide for regulators and investors. The key issue then becomes how to identify whether financial markets are working properly or not. Allen and Carletti (2008b) suggest that when market prices and model based prices diverge significantly (more than 2% say), financial institutions should publish both. If regulators and investors see many financial institutions independently publishing different valuations they can deduce that financial markets may no longer be efficient and can act accordingly.

3.12 A Role for Public Sector Banks in a Mixed System

Some countries such as Chile with its Banco Estado have a publicly owned commercial bank that competes with private sector banks. In times of crisis, such a bank can expand and help stabilize the market as all market participants know that it is backed by the state and will not fail. That is what many central banks have effectively been doing by buying large quantities of commercial paper. These central banks have become like large commercial banks. But the officials in charge of central banks do not usually have much expertise in running a commercial bank or know much about credit risk. It would be better to have expertise in the public sector which allows the state to perform commercial banking functions during times of crisis. These state institutions would also act as firebreaks and limit the damage that can be done by contagion.

3.13 Reform of Market Structures

A number of commentators have argued that the over-the-counter markets for many derivative contracts such as credit default swaps are opaque so that

it is difficult to assess counterparty risk. The suggestion is that these markets should be moved onto exchanges so that the counterparty risk can be more systematically dealt with and eliminated. These suggestions have a lot of merit. The problem is whether socially valuable niche markets for derivatives that do not have sufficient volumes to trade on exchanges will be eliminated as a result of such measures. Reforms of over-the-counter markets should be carefully considered.

3.14 Other Measures

In the U.S.A. much has been made of the issue of consumer protection. While there does seem evidence that consumers are taken advantage of by financial institutions, there is not much evidence this was a major cause of the crisis. Much of the regulation that was put in place in the 1930s and 1940s with the SEC Acts was similarly meant to protect consumers. Strengthening this protection seems desirable. In other countries such measures would be even more desirable. In many European countries, for example, there seems to be very little in the way of consumer protection.

We have argued above that the removal of tax deductibility of interest will allow large equity buffers at small social cost. Such equity buffers would make it unnecessary to have countercyclical loan reserves. With low equity buffers such countercyclical loan reserves are desirable.

4 Checks and Balances on Central Banks

Going forward, what else should governments do to minimize the risk of a future financial crisis? What reforms in addition to changes in financial regulation and the other types of intervention discussed above should be undertaken? There has been a tremendous focus on the private sector and what the private sector did wrong in terms of taking excessive risk. However, if the basic cause of the crisis was the real estate bubble and central banks played a role in creating this, it is really the public sector that took the main risks. If there had not been a bubble in real estate prices there would not have been a problem with subprime mortgages. If property prices had remained stable or continued to rise at a slower rate the default rate would have been manageable. It is therefore important to try to prevent central banks from creating a similar problem going forward. In particular, we need to develop a system that provides a check on central banks to lessen the chance that they take risks in the way that the Federal Reserve did when it set interest rates so low in 2003 and 2004.

In a report on the Second Bank of the United States, John Quincy Adams wrote "Power for good, is power for evil, even in the hands of Omnipotence."[4] This statement reflected the considerable distrust of the concentration of power that central banks represented. The controversy over whether a central bank was desirable came to a head in the debate on the re-chartering of the Second Bank in 1832. Although the bill was passed by Congress it was vetoed by President Jackson and the veto was not overturned. There was no central bank in the U.S.A. from 1836 until 1914.

There were many serious financial crises during the period the U.S.A. had no central bank. The severity of the recession following the 1907 banking panic led to a debate on whether or not

[4] *Timberlake (1978, p. 39).*

a central bank should be established in the U.S.A. The National Monetary Commission investigated this issue and finally in 1914 the Federal Reserve System was established. The initial organization of the Federal Reserve System differed from that of a traditional central bank like the Bank of England. It had a regional structure and decision making power was decentralized. This meant it was ineffective at managing crises. In 1933 there was another major banking panic which led to the closing of banks for an extended period just after President Roosevelt took office. As a result of this, the Federal Reserve was reformed in the Banking Act of 1935, which centralized power in the Board of Governors.

During the recent episode the Federal Reserve System managed the crisis well. However, they did not do a good job in terms of preventing the crisis. In fact, as argued above, the case can be made that they were to a large extent to blame for the bubble that caused the crisis by setting interest rates so low at a time of rapidly rising real estate prices. The centralization of power particularly in the Board of Governors and the Chairman means that there are very few constraints on what they can do.

After the inflationary experiences of the 1970s, many countries made their central banks independent. The rationale was that if they are independent, they will not succumb to political pressure to cut interest rates and cause an inflationary boom every time there is an election. This independence has worked very well for preventing inflation. However, this crisis has demonstrated that central bank independence may not be good for financial stability. There are a few people making decisions that are very important and there is very little in the way of checks and balances. For example, it seems that one person, Alan Greenspan, played a large role in the decision to cut interest rates to 1% in 2003 and to maintain them there until 2004 so as to minimize the effects of the recession. According to reports at the time there was not much dissension within the Board of Governors in terms of votes against the position he took. The low interest rate policy worked in the short run, but at the cost of a financial crisis and an enormous recession several years later. There should at least have been more public debate about the wisdom of the low interest rate policy at the time.

It is important to stress that we are not advocating a return to political control of central banks. There are other alternatives to provide checks on the system. One possible reform is to impose a mandate of financial stability on the Federal Reserve. This might help to ensure the risks involved for financial stability in undertaking various policies would be more thoroughly discussed and assessed. Ensuring that there is a staff that focuses on financial stability issues may help to achieve this.

Another possibility is to create a Financial Stability Board with its own staff and resources separate from the Federal Reserve that would not be dependent in any way on them. Representatives from this Board could participate in Federal Open Market Committee meetings and could be given several votes. Since their focus would be on financial stability issues they would necessarily focus on the risk created by the public sector. The Federal Reserve and monetary policy would be independent from politicians but there would be checks and balances. We believe some kind of reform along these lines would be helpful going forward.

5 Reforming the International Financial Architecture

As mentioned above, the IMF arguably exacerbated the problem of global imbalances through the harsh policies that a number of countries were forced to undertake in the 1997 Asian Crisis. There was no reliable mechanism to stop this because the Asians are underrepresented in the IMF governance process. In the last decade the Asian countries have produced a large proportion of global GDP. They are the ones with very large reserves amounting to several trillion dollars. These are the countries with the economic power and arguably this should be reflected in the governance process of the important international organizations. In the recent crisis Asian countries such as South Korea have done much better than they did in 1997. Rather than raising interest rates and cutting government expenditure as the IMF forced them to do then, South Korea cut interest rates and allowed a large fall in the value of their currency. In contrast to the 1997 crisis when unemployment rose to more than 9%, it has only changed slightly in the current crisis. The reason that they were able to pursue these policies is that their large reserves meant they could make their own decisions and did not have to approach the IMF. They ran their reserves down but they always maintained a large balance of reserves.

While it is individually advantageous for countries to self-insure by accumulating reserves, this is an inefficient mechanism from a global perspective. One method of accumulating foreign exchange reserves is for a country to lower the consumption of its people so that it can run a surplus. In this case there must be other countries that run deficits to offset these surpluses. In practice the U.S.A. was the main country that did this. Another way for a country to accumulate foreign exchange reserves is to borrow funds using long term debt and invest them in short term debt. The buildup of reserves and short term debt through both mechanisms and their role in triggering the crisis meant that this was very undesirable. This raises the question of what are the alternatives to self-insurance through the accumulation of reserves.

The IMF can perform an important role by providing funds to countries that are hit by shocks. If countries could always rely on being treated fairly and equitably and not being forced to implement harsh measures, there would

not be a need to accumulate large levels of reserves. In order for this to happen the IMF needs to reform its governance structure so that Asian countries play a much larger role. This should be accompanied by an increase in Asian staff at all levels. Unfortunately, current proposals do not go far enough in this regard and it seems unlikely that the IMF will be sufficiently reformed to make large reserves in Asia unnecessary in the short to medium run.

A number of Chinese officials have made proposals for a global currency to replace the dollar. This kind of approach has the great long run advantage that reserves can be created initially without large transfers of resources and the attendant risk of a crisis. All countries could be allocated enough reserves in the event of a crisis so that they could survive shocks. The problem with this proposal is that there would be a need for an institution to implement the currency. It would need to be like the IMF. There would again be the issue of whether Asian countries would be properly represented in the governance process.

A more likely medium term scenario is that the Chinese renminbi becomes fully convertible and joins the U.S. dollar and the euro as the third major reserve currency. With three reserve currencies there would be more scope for diversification of risks and China itself would have very little need of reserves in just the same way that the U.S.A. and euro area countries do not need significant reserves. In our view this is one of the most practical solutions to the global imbalances problem. China should start moving in the direction of making the renminbi fully convertible as soon as possible.

One of the innovations that occurred during the crisis was the introduction of bilateral swap agreements between central banks for foreign exchange. This had the great advantage of allowing many countries to obtain U.S. dollars, in particular. However, these were one-off agreements. What many countries have argued is that these swap facilities need to be made automatic so that they can rely on accessing them in times of crisis. Since these countries could then rely on this foreign exchange safety net, they would no longer need to hold such large reserves. There would be no question of who would bear the credit risk in such agreements. One possibility is for both sides to be required to post collateral. This foreign exchange safety net would appear to be another important way to change the international financial architecture to reduce the need for countries to hold foreign exchange reserves. Moreover, this scheme has the great advantage that it can be implemented in the short run.

6 Concluding Remarks

We have suggested three important reforms. The first is that financial regulation and government intervention should be based on a coherent intellectual framework of correcting market failures and balancing its costs and benefits. The second is that central banks need to be subject to more checks and balances than is currently the case. The third is that the international financial architecture needs to be reformed so that Asian countries can rely on having access to foreign exchange in times of crisis.

Many reforms in a wide range of areas are needed to prevent another crisis from occurring. Unfortunately, there is very little consensus on what was the cause of the crisis and what needs to be done to prevent another one from oc-

curring. In this paper, we have outlined the view that the crisis was caused by loose monetary policy and global imbalances and have suggested a number of reforms. Much work remains to be done in detailing these policies.

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Panel III:
How Should We Deal with Large Financial Institutions in a Crisis?

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How Should We Deal with Large Financial Institutions in a Crisis?[1]

Banks and the Government: the Tables Turned

Throughout history, the fate of banks and their sovereigns has been closely intertwined (Alessandri and Haldane, 2009). For centuries, they have been mutually dependant on each other. Banking dynasties such as the Medici, Fugger, Rothschild's and Morgan's served as bankers to the government, and through that role, they were also often the financial savior of the sovereign. Since the middle of the 19th century, this relationship has been reversed. These days, it is more often than not the government which has to bail out the banks. However, it has come to a point whereby this role can threaten to break the finances of the country. Some banks have become "too big to fail" (TBTF).

By now, the sums involved are extraordinary and at a historical peak. Governments' budgets and, even more, banks' balance sheets have increased disproportionally in relation to the size of the economy. As an example take the following comparison: In 1895, the American banker John Pierpont Morgan, together with some fellow bankers, rescued the US government from financial impasse. Morgan had to mobilize 1,083% (i.e. the ten-fold amount) of his bank's balance sheet in order to finance just 0.4% of the US gross domestic product. This amounted to the equivalent of the US government's expenses for two years. Some 110 years later, in 2008, the Swiss government had to bail out one of its banks, the UBS. The bailout package covered just 4% of the UBS's balance sheet, but came at a cost of 13% of the Swiss gross domestic product (the equivalent of the Swiss government's expenses for one year).

The tables have turned. Banks have become *the* big risk for the governments, the former saviors turning into victims. Particularly vulnerable are countries that have a relatively large banking sector compared to the size of their economy, for example Ireland, UK and Switzerland. A particularly poignant example is Iceland where an attempted rescue of the banking sector in 2008 proofed disastrous. The severity of the recent financial crisis has put into doubt the financial capacity of many countries, and brought them to their limits. This can be seen, for example, in the market perceptions of sovereign bond risk. Government bonds of some countries, previously regarded as safe haven, have lost their high-grade status (Dötz and Fischer, 2010). A similar development can be observed in the European Union. Financial aid programs for distressed banks and weakened member countries have attempted to reverse a drop in their stocks, not always successfully.

TBTF as a Source of Distortions

Banks can fail for a number of reasons. Most of the time, their failure causes no long-lasting problem. In fact, failure is part and parcel of a healthy, robust market mechanism. However, when banks are too big (or too complex, too interconnected, too symbolic) to let fail, a whole host of problems arises. The most severe problems arise from the adverse incentives that are being created by moral hazard. In other words, TBTF banks are being subsidized by the government. In times of crisis, they can rely on discretionary

[1] *This paper is written with Inke Nyborg, University of Zurich.*

government support. The expectation of a bailout distorts the incentives of the TBTF bank and its management, even in tranquil conditions. Furthermore, the existence of one (or many) TBTF banks in a market leads to misallocation of resources. Simply put, in such an environment a poorly-run large bank has an undeserved advantage over a small, efficiently-run bank. Market entry and exit do not function effectively. Academic research has shown that the magnitude of the TBTF subsidy increases with size, portfolio risk, and leverage (e.g. O'Hara and Shaw, 1990; Hughes and Mester, 1993; Angbazo and Saunders, 1996; Cordella and Yeyati, 2003; Rime, 2005; Brewer and Jagtiani, 2007; Baker and McArthur, 2009; Gropp et al., 2010). Furthermore, TBTF rewards banks for complexity and inter-connectedness.

TBTF banks, *ceteris paribus,* take bigger risks, and they are also able to do so at lower cost compared to their smaller competitors. Market forces being circumvented, the TBTF bank is still able to attract cheap funds and keep on growing, despite potential internal inefficiency (Stern and Feldman, 2009). The allocation inefficiency is probably the most wasteful aspect of TBTF in the long run.

The Fiscal Cost of TBTF

In the short run, the discussion often focuses on the fiscal aspect of bank bailouts. The initial cost is likely to differ from the final (net) cost. The initial bailout cost will be advanced by the government or central bank. In the case of UBS, the rescue package of October 2008 amounted to some CHF 65 billion. In effect, this represented "only" a transfer payment. Yet, the financing of a large support package will require an increase in taxes at some point. Raising taxes comes with an economic distortion (a loss in consumers' and/or producers' rent). The magnitude of these costs will increase with the size of the bailout. In a worst case, there is a "death spiral": the cost of a bank rescue diminishes or even erodes the tax base of the country. Higher taxes means that mobile productive factors move abroad, further shrinking the tax base. As it happened in the case of Iceland, repeated increases in taxes were accompanied by growing emigration of young people from the island, which led to further erosion of the tax base. Iceland, in fast forward mode, thus experienced a development that many other countries, heavily dependent on their banking sector, may experience – Switzerland being definitely one of the most vulnerable candidates.

Political Cost

The political cost of TBTF should not be underestimated. Not surprisingly, tax payers do not approve of having to pay for bailing out banks. The last few years have given ample examples of vented frustration and anger at highly-paid bank managers, at "Main Street" having to pay for "Wall Street". A similar debate is being held in Switzerland ("Abzocker-Debatte"). Political tensions have arisen as a result of perceived injustice, and necessary social reforms

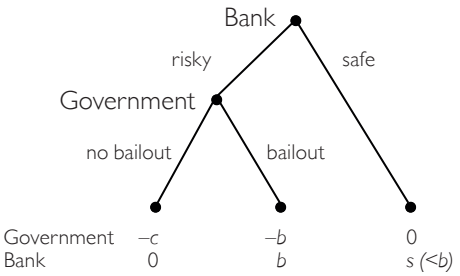
have been delayed because of this and the strain on the government's budget. A bank that is TBTF can also put the government under pressure in other ways. Politically, it can lead to disproportional lobbying power, like it has been observed by some commentators in the US It can also lead to regulatory capture. In the case of Switzerland, a politically delicate point occurred when Swiss bank law clashed with the UBS-IRS tax pact in 2009.

The Mechanics of TBTF

The problem with TBTF-expectations is that they cannot just be told to go away. Policy makers' pledge to end bailouts is not credible if they do not achieve consistency between words and actions over time. A denial of TBTF is not time-consistent.

Chart 1

Structure of the TBTF Problem



Source: Authors' compilation.

The strategic structure of the TBTF problem is shown in the game tree (chart 1)[2]. Let us assume two players, a bank and a government. The bank can make two investment choices; safe or risky investment. If the bank chooses the risky investment, the government chooses whether to save the bank or not. The financial consequences are listed in the lower part of the chart. In the case of the bank collapsing, the government loses the amount c, denoting collateral damage. This could, for example, include financial difficulties for the bank's customers, problems or stoppage in the settlement systems, possible spillover effects to other banks (contagion) and so on. On the other hand, if the government saves the bank, this will cost b, denoting bailout cost. If the government is rational, the government will want to save the bank if $c > b$. Likewise, if $b > c$, the government will let the bank collapse.

Assume now that the government announces in advance, that under no circumstances will a failing bank be rescued. If it is public information that $c > b$, such a statement is not credible. The same holds true for constructive ambiguity, i.e. the deliberate use of ambiguous language in order to confuse on a sensitive issue. Being known for its rationality, the government cannot convincingly announce an irrational decision.

For these reasons, the bank is safe in its knowledge that, come what may, it will be saved by the government. Thus the bank has no incentive to choose a safe investment. In chart 1, we call the bank's return on a safe investment s, denoting safe. In the absence of government support the bank would prefer the safe to the risky investment (paying nothing). Knowing that the government will step in, though, the bank prefers to receive b. As long as $b > s$, the bank will choose risk over safety.

This simplified game treats the bank as a monolith. In real life, the bank has shareholders and creditors. In most cases, the shareholders will have delegated the day-to-day business to the management. This would add to the complexity of the game tree. Yet, at the

[2] *An extended version is available from the authors on request.*

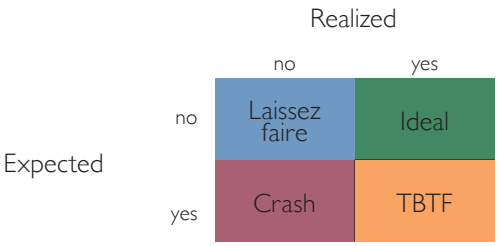
top of the financial "food chain" stand the potential creditors of the bank. They decide at the initial stage of the game, whether to invest in the bank or not. In the anticipation of government support in the case of financial difficulty, they would inject their money regardless of the bank's risk profile. Therefore, at the core of the TBTF problem is a lack of creditor discipline.

Expected and Realized Bailout

Chart 2 shows four possible scenarios in various combinations of expected and realized government support. The key aim of any measures towards reducing TBTF in a policy setting should be a transition from *TBTF* to *Laissez faire*. The scenario *Ideal* is not tenable in the long run – it would imply that banks act irrationally. The scenario *Crash* should be avoided – it would imply that the bank and the government act irrationally.

Chart 2

Scenarios of Government Support



Source: Authors' compilation.

In the above described game, we arrived at a combination of *risky* and *save* to describe TBTF. If the government could really commit itself, not to support under any circumstances, it would be preferable for the bank to invest safely. This scenario would correspond to *Laissez faire*.

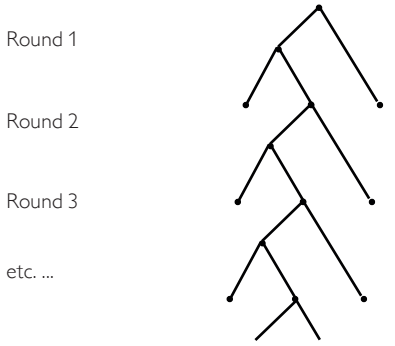
In an ideal world, the bank would invest safely and responsibly, and the government would help out only in real emergencies. However, such a constellation would assume irrational decisions on part of the bank, and is therefore not possible. Its counterpart is the *Crash* scenario, a case where the bank is relying on a rescue which does not materialize. An example for this is Lehman Brothers in September 2008. The reason for the expectations of a rescue being so high at that point can be found in the earlier support for Bear Stearns in March 2008 (Johnson and Kwak, 2010).

The Long Term View: Repeated Game

In a one shot game, it pays for the government to rescue the troubled bank because the bailout cost b is less than the collateral damage c. However, the nature of the game is such that the bailout of the bank is not the end of one game but the beginning of the next. It is a repeated game with infinite horizon. As shown in the chart 3, after each bailout, the next one already begins. Each round of the game is identical; except for the cost of the bailout b. In the repeated game, financial government support incurs the cost b, plus the expected cost of a (possibly) endless repetition of the game.

Chart 3

Repeated Bailouts



Source: Authors' compilation.

A Horrible End, or Endless Horror?

As long as all variables do not change from one round to the next, it is either advantageous to never or always to support the failing bank. In the latter case is the cost of *saving* a perpetual sequence of *b, b, b,* […]. Its current value is *b/d*, whereby *d* represents the discount at which government perceives the future. In the repeated game, the decision rule for the government is as follows:

- $c < \frac{b}{d}$: never bail out
- $c > \frac{b}{d}$ always bail out

Long termism (i.e. a low *d*) would assist government in being able to claw back financial support. In other words, a government that values the present as high as the future, does not encounter a TBTF dilemma. However, in an uncertain world it would not be reasonable to put the future on par with the present.

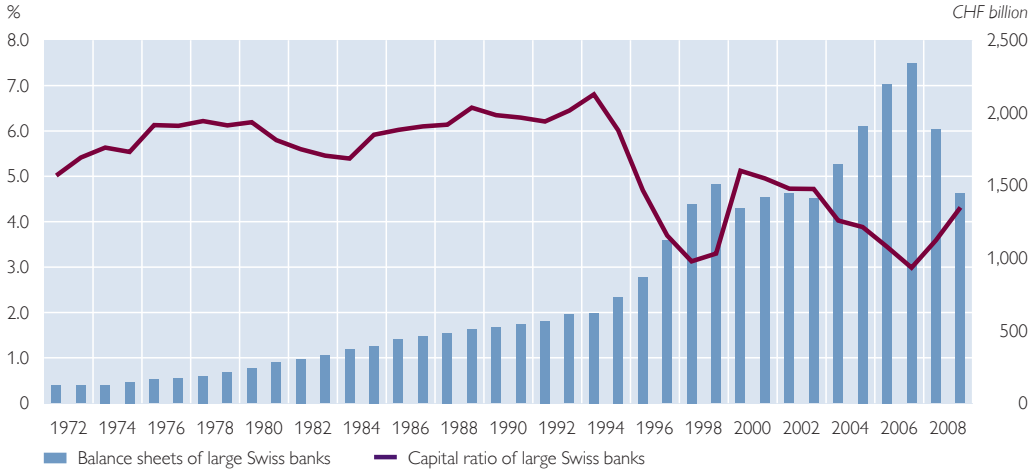
Size is not explicit in the above decision rule, but hidden behind the individual parameters. It seems fair to assume that *b* increases roughly proportionally to the size of the bank. It also seems plausible to assume that collateral damages *c* increases faster, perhaps exponentially, with size

TBTF thus ends in a loop "size–risk–support–growth–size". The limit is only reached when *b* breaks the government's finance. Then *a* bank (or the banking sector, as in the case of Iceland) becomes too expensive to be rescued.

What chart 4 shows is that the implicit guarantee to support a bank during times of crisis is achieving a size that is untenable in the long run, even putting at risk the financial well-being

Chart 4

Balance Sheet and Capital Ratios of Large Swiss Banks from 1972 to 2009



Source: Swiss National Bank.

of the government as a whole. Like banks in other countries, the Swiss banks have grown considerably since the 1970s. Their balance sheets are now several times the size of annual Swiss GDP. Previous financial crises (oil crisis 1973-75, mortgage crisis 1991-94, burst of the internet bubble in

2001-02) have led to occasional bumps, and so has the recent financial crisis. Part of the recent setback was due to changes in derivatives accounting. Swiss banks' capital ratios have been stagnant for the last ten years and reached disturbingly low levels at the outset of the recent crisis. Chart 4 suggests that the TBTF_check will tend to grow in the long term and is likely to reach unaffordable levels.

Measures against TBTF

A number of measures are being discussed, both at a national level and in the international arena. For ease of reference, they can be divided into three main categories (although they do overlap in practice to some extent). The first group (e.g. limit size, split banks, living wills) aims at reducing the cost of a bailout. The second group (e.g. capital charges, liquidity ratios, corrective action) targets the *ex ante* prevention of an insolvency. The third group (international or national insolvency regimes, conditional capital, conditional convertibles) seeks to restore solvency *ex post*.

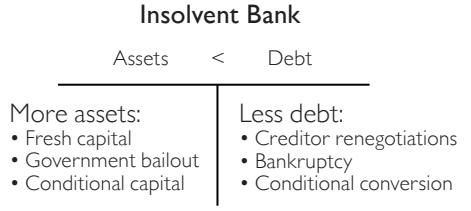
We will, at this point, not discuss the merits of the first two groups, i.e. the measures to make failures less likely or more manageable in size. This is because we argue that no set of measures can ever be reliable without tackling the thorniest problem: that of how to deal with an insolvency *ex post*, once it has occurred. This is because it is unavoidable that some banks fail at some point unexpectedly. We think therefore that the greatest potential for solution of the TBTF problem probably rests with the measures of the third category.

How to Restore Solvency: Some Simple Accounting Arithmetic

As the chart 5 shows, there are six different ways how a bank in trouble can restore solvency. Basically, there are two main approaches: (i) assets can be increased (via fresh capital, a government bailout, or conditional capital), or (ii) debt can be reduced (via creditor renegotiation, bankruptcy or conditional conversion). In theory, any of this can be done (a) voluntarily, (b) through government intervention or (c) under contractual obligations.

Chart 5

Possibilities of Banks' Restoration of Solvency



Source: Authors' compilation.

Voluntary measures have their limits. If a bank is in real trouble, the supply of fresh capital dries out. On the

other side of the balance sheet, a voluntary agreement by creditors might even be in their common interest, but in the case of banks the sheer number of creditors precludes any Chapter 11 style agreements. The government solution would be a bailout (the very thing to avoid) or a bankruptcy procedure. Bankruptcy procedures destroy most of a bank's wealth and are mostly avoided. A better alternative is a restructuring of the balance sheets, i.e. the conversion of debt into equity (D-E), if law permits. In many countries the legal basis for a D-E-conversion does not exist, or, if it exists, it cannot be applied without considerable international legal conflict or complications.

Debt-Equity Conversion

For the above reasons, contract based D-E conversion may be the only viable option to restore bank solvency. Conversion would be based on the principles of an *ex ante rule* and contain an objective trigger. Conditional convertible bonds are hybrid securities that convert from debt to equity if certain conditions are met or when a pre-agreed trigger is reached (see, for example, Flannery, 2005). In this way, such bonds provide a transparent yet effective mechanism for un-levering the bank, should the need arise. Academic support for such instruments comes, for example, for the influential Squam Lake working group (Squam Lake, 2009). Bankers themselves have called it "a powerful new way to recapitalize financial institutions using a bank's own money, rather than that of tax payers" (Calello and Ervin, 2010). In Switzerland, the commission of experts, in its interim report to the government (Expertenkommission, 2010), also mentions to such instruments as worth investigating.

While the market for conditional convertibles as still relatively untested, there are at least two banks that have issued them in the last two years. In the UK, Lloyds TSB issued so-called enhanced capital notes for the first time in 2009. These convert to equity if the bank's Tier 1 capital ratio should fall below 5%. In the Netherlands, Rabobank issued in 2010 contingent notes that get a 75% haircut should the bank's Tier 1 core capital ratio fall below 7%. Capital ratios are not the only trigger that can be used. Other possibilities are assets/deposit ratios, CDS spreads, supervisory announcement and more (e.g. Hart and Zingales, 2009; Pennacchi, 2010).

The attraction of instruments such as contingent convertible bonds is that they remedy the need for government support, yet they offer a solution for reducing banks' likelihood of financial distress. This comes at some cost for the bank. Investors unlike tax payers do not take risk for free. However, if implemented correctly, such instruments can take away the option to free-ride on taxpayers' future promise to make up for the bank's loss.

From a financial stability perspective, contingent convertible bonds have possibly two advantages. *Ex post*, they can assist in removing the threat of insolvency. *Ex ante*, their yields reflect market players' assessment of a bank's riskiness, and thus such bonds offer an additional tool to price risk. Contingent convertible bonds thus help to restore market discipline which has been undermined by TBTF expectations. One can argue that the mandatory issue of a sufficient amount of conditionally convertible debt alone is not a sufficient solution to the TBTF problem. Yet, it is hard to see a solution to the TBTF problem that would not have the issue of conditionally convertibles at its core.

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Urs Birchler was born in 1950 and grew up in Switzerland. He received his Doctorate at the University of Bern in 1980. In 2001, he got his Ph.D. in Economics from the University of Bern. Birchler is Professor of Banking at the University of Zurich (Switzerland). Previously, he worked at the Swiss National Bank (SNB), most of the time as a head of the Financial Stability Unit. He also represented the SNB at the Basel Committee of Banking Supervision and he built up the Committee's Research Task Force. He has teaching experience at the Universities of St. Gallen, Zurich, Bern, Lausanne and Leipzig (Germany). He is author of several academic papers as well as of a textbook on Information Economics (with Monika Bütler). He is married and has three children.

Michael Bordo

Michael Bordo obtained his bachelor's degree at McGill University in 1963 and earned a M.Sc. from the London School of Economics in 1965. In 1972, he received his Ph.D. at the University of Chicago. He has held academic positions at the Carleton University in Ottawa, Canada (1969–1981) and at the University of South Carolina (1981–1989). In 1989 Bordo became Professor of Economics and Director of the Center for Monetary and Financial History at Rutgers University, New Brunswick (New Jersey). He has been a

visiting Professor at the University of California Los Angeles, Carnegie Mellon University, Princeton University, Harvard University and Cambridge University – where he was Pitt Professor of American History and Institutions. He has been a Visiting Scholar at the IMF, Federal Reserve Banks of St. Louis and Cleveland, the Federal Reserve Board of Governors, the Bank of Canada, the Bank of England and the Bank for International Settlement (BIS). He also is a Research Associate of the National Bureau of Economic Research in Cambridge, Massachusetts. He has published many articles in lead-

ing journals and ten books in monetary economics and monetary history. He is the editor of a series of books for Cambridge University Press: *Studies in Macroeconomic History*.

Elena Carletti

Elena Carletti is Professor of Economics at the European University Institute in Florence, and Associate Professor at the University of Frankfurt. She holds a Ph.D. in Economics from the London School of Economics, a Doctorate in Economics from the University of Bologna, and a Master in Economics from Bocconi University in Milan. Between 1997 and 1998, Carletti worked as an economist at the Italian Antitrust Authority in Rome. In 1998, she became Research Assistant at the Financial Markets group of the London School of Economics. In 1999, she was appointed Tutorial Fellow in Finance, also at the London School of Economics. Carletti held both these positions till 2000, when she moved to Germany and started to work as Assistant Professor of Economics at the University of Mannheim. Between 2004 and 2008, she had the position as Post-doctoral Researcher at the Center for Financial Studies of the University of Frankfurt. In 2008, she started to work at the European University Institute in Florence and the University of Frankfurt. Her research interests are in the areas of financial intermediation, financial regulation, corporate governance and Antitrust. In 2004, she got a Grant of the FDIC's Center for Financial Research (CFR) for her project Market Power and Institutional Structures in Bank Merger Control: Cross-Country Evidence (with Philipp Hartmann and Steven Ongena) and in 2002, she received the CEPR/European Summer Institute Prize for the Best Central Bank Research Paper (with Philipp Hartmann). In 2008, she got the *Ladislao Mittner Prize* from the Deutsche Akademischer Austausch Dienst (German Academic Exchange Service). Carletti has been the co-organizer of a number of conferences, published widely in numerous journals and acts as referee for well- known magazines such as *Journal of Finance, Review of Economic Studies, Review of Financial Studies, Journal of Financial Intermediation and Economic Journal*.

Giovanni Carosio

Giovanni Carosio was born in Galatina (Lecce) on 1 August 1945. He is Deputy Director General of Banca d'Italia since 11 January 2007. He represents Banca d'Italia in leading international financial organizations; he is Chairman of the Committee of European Banking Supervisors, member of the Basel Committee on Banking Supervision and member of the Financial Stability Board. After graduating summa cum laude from the University of Rome in 1967 with a thesis on Public Finance under Professor S. Steve, he completed military service between 1968 and 1969. On a Bonaldo Stringher fellowship from the Bank of Italy he then attended postgraduate courses at King's College, Cambridge, under the supervision of Professor Joan Robinson. He

joined the Economic Research Department of the Bank of Italy in 1970, working at first mainly on banking activity and then on the setting of monetary policy objectives and the planning of policy measures. In 1985 he was assigned to the Regulations and Interventions on Prudential Returns Department of the Banking Supervision Area, heading the division in charge of banks' prudential reports and analysis. He lead the Bank of Italy working group that took part in the reform of the law on the accounts of banks, directed work on the reform of the prudential reporting system and on the new approach to prudential supervision based on risk assessment. From 1993 to 2004, he was head of the Banking Supervision Department and from March 2004 to April 2006, Managing Director for Central Banking and Markets, in charge of open market operations, emergency liquidity assistance, management of the Bank's investment portfolios, and market supervision. From April 2006 to January 2007, he held the post of Managing Director for Banking and Financial Supervision, responsible for the regulation and on-site and off-site supervision of banks and financial intermediaries.

Martin Čihák

Martin Čihák is a Deputy Division Chief in the Monetary and Capital Markets Department of the International Monetary Fund (IMF) in Washington, D.C. In his work, he has been focusing on issues relating to financial stability, financial sector regulation and supervision, and financial system reforms. He has covered these topics in numerous IMF and World Bank missions and a range of publications. He has been one of the editors of the IMF–World Bank *Financial Sector Assessment Handbook*. Before joining the IMF in 2000, Martin Čihák was a chief analyst in a commercial bank, a university lecturer, and an advisor to a minister. He received a Ph.D. in Economics from the Center for Economic Research and Graduate Education,

Prague and an MA in Law from Charles University, Prague. For further information on his recent work, see for instance *www.ssrn.com/author=735014*.

Dietrich Domanski

Dietrich Domanski is Head of the Secretariat of the Committee on the Global Financial System (CGFS) at the Bank for International Settlements (BIS) in Basel, Switzerland. He joined the BIS as Senior Economist in 2000 from the Bundesbank, where he headed the capital markets group in the Economics Department. Dietrich also worked as IMF Advisor to the Bank of Indonesia during the Asian crisis. At the BIS, Dietrich was in charge of the macroeconomic analysis unit before taking over the CGFS Secretariat in September 2007. Dietrich has worked on a broad range of CGFS initiatives related to the financial crisis, including studies on procyclicality, the development of macroprudential policy, the implications of the crisis for international banks and central bank liquidity operations during the financial crisis. Dietrich has published on financial stability

issues in German and English. His main research interests include the interaction of monetary policy, financial markets and the real economy, and the role of financial intermediation in economic development.

Wolfgang Duchatczek

Wolfgang Duchatczek has been serving as Vice Governor of the Oesterreichische Nationalbank (OeNB) since 2003. He joined the OeNB in 1976 and the Office of the Governor in 1978. He was appointed Chief of the Office of the Governor in 1982 and Deputy Executive Director of the Foreign Research Department in 1987. In addition, he served as Representative of the OeNB on the EC Integration Committee of the Austrian Federal Government. Mr. Duchatczek was appointed Director of the Area International Relations of the OeNB in 1992 and represented the OeNB during Austria's EU accession negotiations. He was nominated Chairman of the European Commission's Committee on Monetary, Financial and Balance of Payments Statistics (CMFB) and served as the OeNB's Second Alternate on the Committee of Alternates of the European Monetary Institute (EMI). In 1997, he was appointed to the OeNB's Board of Executive Directors as Deputy Chief Executive Director of the Liquidity and Portfolio Management and Internal Services Department, and in 1998 he joined the OeNB's Governing Board as Executive Director of the Money, Payment Systems and Information Technology Department. Mr. Duchatczek holds a doctorate in economics and social sciences and has been awarded the Grand Decoration of Honor in Gold for Services to the Republic of Austria.

Werner Faymann

Werner Faymann is the Federal Chancellor of Austria and was sworn in by the Federal President Heinz Fischer on 2nd December 2008. Before taking on this current position, he had already played a significant role in Viennese and Austrian politics. Werner Faymann was born 4 May 1960 in Vienna. From 1984 until 1994, he was the provincial chairman of Socialistic Youth Vienna (Sozialistische Jugend Wien). Between 1985 and 1988, he served as a consultant at the Zentralsparkasse (now Bank Austria). In 1988, Faymann became the director and provincial chairman of the Viennese Tenants' counselling. His political career took flight between 1994 and 2007, when he was a member of the Viennese state parliament and municipal council; executive city councillor for housing, housing construction and urban renewal; president of the Viennese Fund for Provision of Property and Urban Renewal (Wiener Bodenbereitstellungs- und Stadterneuerungsfonds – WBSF) and vice president of the Viennese Business Agency (Wiener Wirtschaftsförderungsfonds – WWFF). In 2007, he was appointed as the Federal Minister for Transport, Innovation and Technology (BMVIT), which he stayed till 2nd December 2008. Faymann has been the executive chairman of the Social Democratic Party of Austria (SPÖ) since

June 2008. He is married and has two children.

Ernest Gnan

Ernest Gnan has been head of the Economic Analysis Division of the Oesterreichische National Bank in Vienna since 1999. He is a member of the European Central Bank's Monetary Policy Committee, and is also an adjunct professor at Webster University in Vienna, teaching courses on economic analysis. During 1998, Ernest Gnan served as deputy head of the Foreign Research Division of the Oesterreichische National Bank, and from 1995 to 1997, as an economist in the Secretariat of the Foreign-Exchange Policy Sub-Committee at the European Monetary Institute (a forerunner of the European Central Bank). He is a former national expert in the Directorate General for Monetary and Financial Affairs at the European Commission in Brussels, and a former investment fund manager at Genossenschaftliche Zentralbank in Vienna. Ernest Gnan received a master's degree in commercial sciences and a Ph.D. in Economics at the University of Economics and Business Administration in Vienna.

Petra Geraats

The Dutch economic Petra Geraats received her bachelor and master's at Tilburg University in the Netherlands, where she studied between 1991 and 1995. She earned her Ph.D. in economics at the University of California Berkeley in 2000. Immediately after this, she became an university lecturer at the Faculty of Economics of the University of Cambridge (U.K.), a position she still holds today. Her field of research includes international finance and behavioral economics, with a special interest in transparency of monetary policy. Geraats has been a visiting lecturer at the Tel Aviv University, the University of Munich and at the College of Europe in Bruges. She has been a visiting scholar at a number of institutions, such as Sveriges Riksbank, Norges Bank, the International Monetary Fund and the Federal Reserve Bank of New York. She has published articles in leading journals, as well as many working papers on central banking and transparency in monetary policy. In 2006, Geraats was awarded the

Klaus Liebscher Award of the Oesterreichische Nationalbank, for excellent scientific research by a young European economist.

Stefan Gerlach

Swedish-born Stefan Gerlach did his bachelor of philosophy at the University of Lund and the University of Gothenburg. In 1978, he moved to Switzerland and received his master's and Ph.D. in international economics at the University of Geneva (1978–1983). In 1983, he became assistant professor of Economics at the Brandeis University in Waltham (U.S.A.). Between 1992 and 2001, he worked for the Bank for International Settlements (BIS) as head of Monetary Policy and Exchange Rates. Stefan Gerlach then started to work in Hong Kong. In 2001, he was appointed director of the Hong Kong

Institute for Monetary Research, a subsidiary of the Hong Kong Monetary Authority (HKMA) that promotes research on Hong Kong and Asian economic and financial issues. In 2004 he became head of the economic research department of HKMA, member of the Chief Executive's Committee (the HKMA's management committee) and member of the (foreign) Reserve Management Committee. In 2005, he moved back to Switzerland, as he became head of the Secretariat of the Committee on the Global Financial System (CGFS) to the BIS. Gerlach held this position until 2007, when he became Professor of Monetary Economics at the University of Frankfurt. Other positions he currently holds include: member of the Monetary Experts Panel of the European Parliament's Committee on Economic and Monetary Affairs, research professor at Deutsche Bundesbank, board member of the International Centre for Monetary and Banking Studies (Geneva) and external member of the Monetary Policy Committee at Bank of Mauritius. Stefan Gerlach has lectured widely and has been a visiting professor at a number of institutions, such as INSEAD at Fontainebleau and Harvard University. He has published many articles and papers and also acts as referee for numerous journals. He is married and has five children.

Andreas Ittner

Andreas Ittner is a Member of the Governing Board of the Oesterreichische Nationalbank (OeNB). He studied economics and social sciences at the Vienna University of Economics and Business Administration between 1976 and 1980. Mr. Ittner started his professional career with the Ittner retail business in Vienna in 1978. In 1983, he joined the OeNB and began to work in the Banking Analysis and Credit Supervision Office. In 1997, he became head of the Secretariat for the President in the OeNB and in 1987, Andreas Ittner was appointed Director of the Financial Stability and Bank Inspections Department of the OeNB. Mr. Ittner is among other engagements an Acting Member of the Banking Supervision Committee of the ESCB, Vice President of the Centre for Secure Information Technology, Member of the Supervisory Board of the Austrian Financial Market Authority as well as Member of the Financial Market Committee established under the Austrian Banking Supervision Act.

Wolfgang Münchau

Wolfgang Münchau is associate editor and European economic columnist of the Financial Times. Together with his wife, the economist Susanne Mundschenk, he runs *eurointelligence.com*, an internet site for the euro area, offering daily comment and analysis. He was one of the founding members of Financial Times Deutschland, the German language business daily, where he served as deputy editor from 1999 until 2001, and as editor-in-chief from 2001 until 2003. FT Deutschland has a daily circulation of more than 100,000 copies sold. Previously, Münchau served as foreign correspondent for the Financial

Times and the Times of London in Washington, Brussels and Frankfurt. He was awarded the Wincott Young Financial Journalist of the Year award in 1989. He holds the degrees of Diplom-Betriebswirt (Reutlingen), Diplom-Mathematiker (Hagen), and MA in International Journalism (City University, London). Mr. Münchau has published three German-language books. His book *Vorbeben*, on the financial crisis, has received the GetAbstract business book award in 2008. Wolfgang Münchau lives in Brussels and has two sons.

Ewald Nowotny

Ewald Nowotny is the Governor of the Oesterreichische Nationalbank (OeNB) and a Member of the Governing Council of the European Central Bank (ECB). Before taking on his current position in September 2008, Ewald Nowotny held a number of high-level positions in financial institutions. He was CEO of the Austrian BAWAG P.S.K. banking group from 2006 to 2007, served as Vice President and Member of the Executive Board of the European Investment Bank (EIB) in Luxembourg from 1999 to 2003 and, between 1971 and 1979, he was a Member and then President of the Governing Board of Österreichische Postsparkasse (P.S.K.). Moreover, from 1992 to 2008 Ewald Nowotny served as member of the supervisory board of several banks and corporations and was a member of the OeNB's General Council from 2007 to 2008. Ewald Nowotny was born in Vienna, Austria, in 1944. He studied law and government sciences at the University of Vienna and economics at the Institute of Advanced Studies in Vienna. In 1967, he received his doctorate in law from the University of Vienna. After working as assistant to Professor Kurt W. Rothschild at the Economics Department of the University of Linz, Austria, from 1968 to 1973, Ewald Nowotny received his postdoctoral qualification (Habilitation) in General Economics and Public Economics in 1973 and subsequently held research tenures and professorships at Harvard University, Technische Universität Darmstadt, Germany, and the University of Linz, Austria. From 1981 to 2008, Ewald Nowotny served as Full Professor at the Vienna University of Economics and Business, where he also held the position of Vice Rector from 2003 to 2004.

In 2008, Ewald Nowotny received a honorary doctorate in Social and Economic Sciences from Alpen-Adria Universität Klagenfurt, Austria. Ewald Nowotny has published numerous articles in refereed journals. He is also the author or coauthor of nine books; the fifth edition of his internationally renowned textbook "Der öffentliche Sektor – Einführung in die Finanzwissenschaft" was published in 2008. Ewald Nowotny was an elected Member of the Austrian Parliament from 1979 to 1999 and served as chairman of the parliamentary Finance Committee

from 1985 to 1999. Ewald Nowotny is married and has a son.

Inke Nyborg

Inke Nyborg studied at the Queen Mary & Westfield College (University of London), where she received her Bachelor of Science in 1994. In the same year, she started working for the

Bank of England as an analyst of the Banking Supervision Division, for Business Finance and the Domestic and International Regulatory. In parallel, Inky Nyborg studied at Birkbeck College (University of London) to receive her Master of Arts in 2005. Between 2007 and 2009, she worked as a project coordinator for the Norwegian School of Economics & Business Administration in Bergen, Norway. Currenty, Inke Nyborg is working as a research associate for the University of Zurich.

Josef Pröll

Josef Pröll was born in 1968 in Stockerau, Lower Austria. In 1993, he finished his studies at the University of Natural Resources and Applied Life Sciences in Vienna. As his field of study he chose agriculture, with agricultural economics as a main subject. He started his career as official at the Chamber of Agriculture of the Federal Province of Lower Austria. In 1998, he became Official in charge of economic policy at the Austrian Farmers' Federation and Assistant to Agnes Schierhuber, Member of the European Parliament. A year later, Pröll was also appointed director of the Vienna Farmers' Federation. All of these positions, he held till 2000, when he became Head of the Cabinet of Federal Minister Wilhelm Molterer at the Federal Ministry of Agriculture, Forestry, Environment and Water Management. Between 2001 and 2003, he served as director of the Austrian Farmers' Federation. On 28 February 2003, he became the youngest member of the Cabinet as Federal Minister of Agriculture, Forestry, Environment and Water Management. Since 29 September 2008, Pröll is Acting Chairman of the Austrian People's Party. December 2nd 2008, he was appointed Vice Chancellor and Federal Minister of Finance. Pröll is married and has three children.

Anne Sibert

Anne Sibert is Professor and Head of the School of Economics, Mathematics and Statistics at Birkbeck College, University of London. Her main interests are central bank design, the economic and political aspects of economic and monetary union in Europe, and the political economy of structural reform. She finished her bachelor degree in mathematical economics at Brown University (1977), earned her master at Carnegie-Mellon University in 1979 and got her Ph.D. in 1982, also at Carnegie-Mellon University. She then started to work as an economist for the Board of Governors of the Federal Reserve System (Division of International Finance). Between 1986 and 1993, Anne Sibert worked for the University of Kansas, first as Assistant Professor and later as Associate Professor of Economics. In 1993, she was appointed As-

sociate Professor at the Virginia Polytechnic Institute in Blacksburg, in 1995, she moved to London, where she became Reader at the University of London. She still works for the University of London, now as Professor and Head of the School of Economics, Mathematics and Statistics at Birkbeck College. She is also a member of the Monetary Policy Committee of the Central Bank of Iceland, a fellow of the Centre for Economic Policy Research, the CESifo Research Network, the Kiel Institute for World Economy and the European Economic Association. She is a member of the Panel of Economic and Monetary Experts for the Committee for Economic and Monetary Affairs of the European Parliament and a founding contributor to VOX. Sibert has frequently held visiting positions, for example at the Hong Kong Monetary Authority, the Federal Reserve System, the Institute for International Economic Studies in Stockholm, the University of Munich and the University of Frankfurt. She received the ESCR ROPA Award (together with Willem Buiter) for her paper *The Ins and Outs of Staggered Economic and Monetary Union in Europe*.

Jean-Claude Trichet

Born in Lyons, Jean-Claude Trichet is an Inspecteur général des Finances and Ingénieur civil des Mines. He is a graduate of the Ecole nationale supérieure des Mines de Nancy, of the Institut d'études politiques de Paris, of the Université de Paris (in economics) and of the Ecole nationale d'administration. He worked in the competitive sector from 1966 to 1968. He was appointed to the Inspection générale des Finances in 1971. He was assigned to various posts at the Ministry of Finance in the General Inspectorate of Finance and later in the Treasury Department, where in 1976 he became Secretary General of the Interministerial Committee for Improving Industrial Structures (CIASI). Jean-Claude Trichet was made an adviser to the cabinet of the Minister of Economic Affairs (René Monory) in 1978, and then an adviser to the President of the Republic (Valery Giscard d'Estaing) in the same year. In this capacity, he worked on issues relating to energy, industry, research and microeconomics from 1978 to 1981. He subsequently became Deputy Director of Bilateral Affairs at the Treasury Department from 1981 to 1984 and Head of International Affairs also at the Treasury and was Chairman of the Paris Club (sovereign debt rescheduling) from 1985 to 1993. In 1986, he directed the Private Office of the Minister of Economic Affairs, Finance and Privatisation (Edouard Balladur), and in 1987 he became Director of the Treasury. In the same year, he was appointed Censor of the General Council of the Banque de France and Alternate Governor of the International Monetary Fund and the World Bank. He was

Chairman of the European Monetary Committee from 1992 until his appointment as Governor of the Banque de France in 1993. He was the Chairman of the Monetary Policy Council of the Banque de France as of 1994, a

member of the Council of the European Monetary Institute from 1994 to 1998 and thereafter a member of the Governing Council of the European Central Bank. At the end of his first term as Governor of the Banque de

France, he was reappointed for a second term. Jean-Claude Trichet was elected Chairman of the Group of Ten (G10) Governors on 29 June 2003. He was appointed President of the European Central Bank on 16 October 2003 by common accord of the Governments of the Member States that have adopted the euro at the level of Heads of State or Government for a term of office of eight years starting on 1 November 2003. He was named "Person of the Year" by the Financial Times (2007), "Policy maker of the year" twice by The International Economy magazine (1991 and 2007), and has received a number of awards, including the "Zerilli Marimo" prize from the Académie des Sciences morales et politiques (1999), the international "Pico della Mirandola" prize (2002), the "Prix franco-allemand de la Culture/Deutsch-Französischer Kulturpreis" (2006) and the "Ludwig Erhard Memorial Coin in Gold" (2007). He has been awarded honorary doctorates by a number of universities. Jean-Claude Trichet is a Commandeur de la Légion d'honneur and has been awarded several foreign honours.

The Economics Conference hosted by the OeNB is an international platform for exchanging views on monetary and economic policy as well as financial market issues. It convenes central bank representatives, economic policy decision makers, financial market players, academics and researchers. The conference proceedings comprise the papers of the conference.

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