
**Conference proceedings
2014**

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ISSN 2363-3239
ISBN 978-92-899-1504-5 (e-pub)
978-92-899-1505-2 (PDF)
DOI 10.2866/913542 (e-pub)
10.2866/75546 (PDF)
EU catalogue number QB-BN-14-001-EN-E (e-pub)
QB-BN-14-001-EN-N (PDF)

Contents

Foreword Mario Draghi	5
Programme	6
Navigating Monetary Policy in the New Normal Christine Lagarde	8
Monetary policy in a prolonged period of low inflation Mario Draghi	14
Financial stability, monetary policy, banking supervision, and central banking Martin Hellwig	21
To form a more perfect union Stephen Cecchetti	55
Monetary analysis: price and financial stability Markus K. Brunnermeier and Yuliy Sannikov	61
Monetary policy and financial-stability are different and normally best conducted independently Lars E.O. Svensson	81
Monetary and macro-prudential policies in Turkey Erdem Başçı	90
Banking regulation and lender-of-last-resort intervention Mathias Dewatripont	94
Bank capital regulation and monetary policy transmission Hyun Song Shin	100
Central banking following the crisis Paul Tucker	106
Inflation targets reconsidered Paul R. Krugman	110
Comments on inflation targets reconsidered by Paul Krugman Guido Tabellini	123
Central bank balance sheets: expansion and reduction since 1900 Niall Ferguson, Andreas Schaab and Moritz Schularick	133
Comments on central bank balance sheets: expansion and reduction since 1900 by Niall Ferguson, Andreas Schaab and Moritz Schularick Daniel Cohen	171
Monetary policy and balance sheet adjustment Agustín Carstens	174

Monetary policy and balance sheet adjustment	178
Otmar Issing	
An old school proposal to meet monetary policy requirements in the current financial environment	184
Adam S. Posen	

Foreword

Mario Draghi¹

This volume contains the contributions for the 2014 ECB Forum on Central Banking. This is the first in a series of annual events that will bring together senior central bankers and leading academics from across the world to discuss topics of major relevance to central banks.

The year 2014 is an opportune time to initiate such an event. The environment in which central banks find themselves has changed radically in the aftermath of the financial crisis. The architecture and frameworks of financial regulation and bank supervision are undergoing a major transformation. This is especially true in the euro area, as the ECB takes on its new responsibilities in the fields of banking supervision and macro-prudential policy. In addition, various legacies of the crisis, not least the overhang of public and private debt, will continue to have an impact on the behaviour of economic agents in the years to come. Hence, it is entirely fitting that our first event is focused on two topics: the interaction between monetary policy and financial regulation and the implications of balance sheet adjustment for monetary policy.

Over the next few years this event will continue to be held in Sintra. This is an ideal location for our event. One obvious reason is the beauty of the place: the poet Lord Byron was not exaggerating when he described the area as "in every aspect the most delightful in Europe; it contains beauties of every description natural and artificial". Portugal itself is a natural choice to host an international event such as this. It was a founding member of the euro area. Moreover, its long history of global exploration and trade means that it was an early adopter of globalisation, hundreds of years before the term became fashionable. What better place to act as a bridge between Europe, America and the rest of the world?

In 1493, on his return from his first voyage to America, Columbus caught sight of the Rock of Sintra. This fortunate event enabled him to bring his historic voyage to a safe conclusion. Inspired by this precedent, I hope that the deliberations at this event will help central banks to steer a steady and safer course in the years ahead.

¹ President of the European Central Bank.

Programme

Sunday, 25 May 2014

- 6.30 p.m. Opening reception and dinner**
- Welcome address**
Mario Draghi, President, European Central Bank
- Dinner hosted by the Executive Board of the European Central Bank
- Dinner speech: **Monetary policy in the “new normal”**
Christine Lagarde, Managing Director, International Monetary Fund

Monday, 26 May 2014

- 9 a.m. Introductory speech**
Mario Draghi, President, European Central Bank
- 9.30 a.m. Session 1: Monetary policy in the new regulatory environment**
Chair: Vítor Constâncio, Vice-President, European Central Bank
- Banking supervision and monetary policy**
Martin Hellwig, Director, Max Planck Institute for Research on Collective Goods
Discussant: Stephen Cecchetti, Brandeis University
- Monetary analysis: price and financial stability**
Markus K. Brunnermeier, Princeton University
(with Yuliy Sannikov, Princeton University)
Discussant: Lars Svensson, Stockholm School of Economics
- 11.30 a.m. Coffee break**
- 12 p.m. Panel: Monetary policy in the new regulatory environment**
Chair: Benoît Cœuré, Member of the Executive Board, European Central Bank
Erdem Başçı, Governor, Central Bank of the Republic of Turkey
Mathias Dewatripont, Nationale Bank van België/Banque Nationale de Belgique
Hyun Song Shin, Bank for International Settlements
Sir Paul Tucker, Harvard Kennedy School, Harvard Business School
- 1.30 p.m. Lunch**
- 2.30 p.m. Young economists' poster session**
- 3 p.m. Armchair discussion**
José Manuel Barroso, President, European Commission
Jeroen Dijsselbloem, President, Eurogroup
Moderator: Carlo Bastasin, Non-resident Senior Fellow, The Brookings Institution
- 7 p.m. Young economists' poster session**

7.30 p.m. Reception and dinner

Tuesday, 27 May 2014

- 9 a.m. **Session 2: Monetary policy and balance sheet adjustment**
Chair: Peter Praet, Member of the Executive Board, European Central Bank
- Inflation targets reconsidered**
Paul R. Krugman, Princeton University
Discussant: Guido Tabellini, Bocconi University
- Central bank balance sheets: expansion and reduction since 1900**
Niall Ferguson, Harvard University and Hoover Institution, Stanford
(with Andreas Schaab, Harvard University, and Moritz Schularick, University of Bonn and CEPR)
Discussant: Daniel Cohen, Paris School of Economics, École Normale Supérieure
- 11 a.m. Coffee break
- 11.30 a.m. **Panel: Monetary policy and balance sheet adjustment**
Chair: Peter Praet, Member of the Executive Board, European Central Bank
Agustín Carstens, Governor, Bank of Mexico
Otmar Issing, President, Center for Financial Studies
Adam S. Posen, President, Peterson Institute for International Economics
- 1 p.m. Lunch
- 2.30 p.m. **Armchair discussion**
Mario Draghi, President, European Central Bank
Agustín Carstens, Governor, Bank of Mexico
Moderator: David Wessel, Director of the Hutchins Center on Fiscal and Monetary Policy, The Brookings Institution
- Award ceremony – Young economists’ posters**
- Closing remarks**
- 4 p.m. Group photo
- 7 p.m. Dinner and social event hosted by the Banco de Portugal

Navigating Monetary Policy in the New Normal

Christine Lagarde¹

Good evening. I would like to thank Mario Draghi for inviting me to address you tonight.

I am delighted to be here, at the first ECB Forum on Central Banking, in the company of leading thinkers and policymakers in the field.

Victor Hugo once said: *“Emergencies have always been necessary to progress. It was darkness which produced the lamp. It was fog that produced the compass. It was hunger that drove us to exploration. And it took a depression to teach us the real value of a job.”*

The theme for this Forum is highly topical. The crisis has challenged many of our premises, pushed us outside of our comfort zones, and dramatically altered the landscape for monetary policy. There is immense interest—including across the membership of the IMF—on what the contours of monetary policy will be in a post-crisis world.

Portugal could not be a better venue for such endeavor. Standing on these shores—at the edge of Europe’s frontier before the vast Atlantic, naturally makes you want to explore. Just as it must have been in the 15th century, when brave adventurers like Vasco da Gama wondered what might lie ahead—monster or wonder?

Today again, Portugal looks ahead. It is successfully completing its economic reform program after significant effort and determination. Now, beyond the immediate fire-fighting, it begins to turn the corner of the crisis and build on the gains it has made.

Today, I too would like to look ahead—to the future of monetary policy after the crisis, once economic conditions have settled down to something more “normal”. How do we navigate these seas?

The IMF, along with others, has been thinking hard about this. We are in constant dialogue with central banks of our membership through our regular surveillance, as well as collaboration on more targeted projects. My discussion today draws on the lessons and expertise gained from engaging with this global membership.

It also draws on more recent work that tried to focus the debate on the key questions that monetary policymakers must contend with. We have surveyed the coast-line: how far we can go based on what we know, and how much more there is still to explore—the *terra incognita*. Key questions need to be answered before we can chart our course with certainty.

In that spirit, I would like to share some of our thinking on three main themes:

- (i) The evolving mandate of monetary policy;
- (ii) Monetary policy independence, given a possibly wider mandate for central banks; and
- (iii) The impact of growing financial interlinkages and the challenges these pose for monetary policy, particularly in emerging market and small open economies.

¹ Managing Director (MD) of the International Monetary Fund.

1 The Evolving Mandate of Monetary Policy

Let me begin with the mandate of monetary policy, which is being revisited from various angles.

A key issue here is whether monetary policy should also include financial stability as an objective? Of course, one could also ask whether monetary policy should put more weight on growth, or unemployment. The crisis reminded us that price stability is not always sufficient for output stability. But we need to prioritize, especially before dinner! So I will focus on financial stability.

Let us look at what we know. Broadly, the pre-crisis consensus was that monetary policy should focus on maintaining price stability—understood as low and stable inflation. Price stability, together with “light touch” microprudential regulation, was supposed to also deliver financial stability. Remember, the prevailing belief was that financial markets were resilient.

There was no agreement that monetary policy should “lean against the wind” to fend off surges in credit or asset prices. However, in the case of a crisis, monetary policy would ‘lend a hand’ by cleaning up after the event—such as by lowering interest rates.

The 2008 global financial crisis challenged these basic tenets. It is very clear now that financial crashes can be extremely costly, and their clean-up excessively long and complex.

The crisis has also made clear that financial stability is an essential policy objective, and one that is here to stay. But should that job be given to monetary policy?

The best outcome would be to have dedicated policies and instruments to combat financial risks directly. In the toolkit, these are prudential policies, both macro- and micro-prudential measures, such as loan-to-value limits or countercyclical capital buffers.

Yet, prudential policies may not work as planned. There is relatively limited experience with full-fledged macroprudential frameworks, especially in advanced economies. We do not have a definitive guide. Like the precursor to the chronometer, measuring longitude was an imprecise science.

The IMF’s surveillance experience tells us that in some cases, macroprudential measures have worked well. Take the example of Korea, which was able to reduce banks’ short term external debt by half—to 27 percent—between 2008 and 2013, or Hong Kong which recently saw property prices level off and loan-to-value ratios decline.

Yet, in other countries, such as Israel, Switzerland and Turkey, credit growth and house price inflation remained high despite various macroprudential measures.

What if prudential policies still have shortcomings, despite our best efforts to make them work? In that case, monetary policy may need to lend a hand in securing financial stability, by using interest rates to lean against the wind of emerging financial imbalances.

This is easier said than done. Monetary policymakers will be confronted with a set of new and complex questions.

The first is about the transmission mechanism. Do we know, for instance, how much a 100 basis points increase in interest rates can deliver in terms of financial stability? Do we even agree on how to define financial stability? Should we measure it in terms of credit growth, asset price growth, or leverage?

And what is the link between financial stability and inflation? The current environment in the euro area is a sobering reminder of how weakness in balance sheets can constrain the ability of banks to support credit and investment—ultimately contributing to low inflation.

The second set of questions is about the operating framework, and how financial stability concerns manifest themselves in monetary policy decisions. A delicate tradeoff can arise between raising interest rates to reduce financial stability risks—and lowering them to support growth and inflation. In Sweden, for example, given that financial stability risks are on the rise again, there is less tendency to lower interest rates despite very low inflation.

In sum, we need to continue to strive for improved prudential frameworks for the financial sector so as not to overburden monetary policy. But where macroprudential policies fall short, monetary policy will have a larger role than in the past to maintain financial stability.

2 Monetary Policy Independence, Given a Wider Mandate

Let me now turn to my second theme. If we accept that central banks could have a wider mandate—that is, to help maintain financial stability—and more instruments, can they remain fully independent?

To frame this debate, let us consider the merits of central bank independence.

Looking back, we know that central bank independence has served us well. There is a strong relationship between independence and inflation performance—a relationship that is empirically well-grounded.

Yet, central bank independence cannot be taken for granted. It takes a great deal of confidence to surrender a considerable amount of sovereign power to an unelected body. Though once the decision to delegate is taken, it can go far. Think of the Bundesbank and the remark made by former European Commission president Jacques Delors in 1992: *“Not all Germans believe in God, but they all believe in the Bundesbank.”*

So, what are the foundations of central bank independence? Credibility and accountability—both of which rest on three pillars: a **clear** mandate, **consistent** performance, and **consensus** on objective.

First pillar: **clear mandate**. There should be no ambiguity about the objective, instrument, or transmission mechanism of monetary policy.

Second pillar: **consistent performance**. The public and the government need to be convinced of the central bank’s willingness and ability to deliver on its objective.

Third pillar: **consensus on objective**. There is widespread agreement that low and stable inflation is crucial for economic stability and growth.

Naturally, independence also finds roots outside of the monetary policy framework and institutional structure. Importantly, a responsible fiscal policy is essential to avoid the risk of fiscal dominance.

How would an additional financial stability objective for central banks fare in terms of these criteria? Frankly, it would likely fail on all three counts.

First, the objectives, targets, and instruments of financial stability are still ill-defined.

Second, performance is hard to measure. Financial stability is difficult to observe. Often it takes a crisis to uncover just how unstable the financial system had become. By then, it is too late.

And third, while most people would agree that financial stability is desirable, the path to that objective might encounter conflict and resistance. The general public wins if there is financial stability, but certain groups may stand to lose. Think of a young couple who would find it harder to purchase their first house because of lower loan-to-value limits. They are not likely to cheer for this type of policy any time soon.

So how do we go about factoring financial stability into central banks' mandates? What kind of institutional framework is needed when macroprudential policies are added to the mix?

For one thing, we need an institutional structure that protects the achievement of price stability. In other words, a structure that guarantees that monetary policy will continue to focus on price stability; that it is still able to rest on its three pillars; and that it is operated independently.

It is too early to draw out best practices from cross country experiences. But there are already some promising approaches. One way to do this is to house the monetary and macroprudential policies in different institutions. This is the approach that countries such as Australia, Chile and Mexico have taken. In such cases, committees were created to facilitate information sharing and policy coordination.

It is also possible to house monetary and macroprudential policies under the same roof—in the central bank. In this case, safeguards are needed to protect the independence of monetary policy. The ECB—which is tasked with certain aspects of macroprudential policies—and the Bank of England are good examples, with responsibility for both monetary and macroprudential policy, yet distinct governance structures for the two areas.

3 Monetary Policy Independence in Emerging Market and Small Open Economies

This brings me to my third and final theme. In a world of growing and increasingly complex financial interlinkages, how can emerging market and small open economies retain monetary independence? In other words, how can they cope with the challenges posed by large and volatile capital flows?

The crisis has intensified the debate about these issues. Large swings in capital flows, with sudden surges and stops, often come with large movements in asset prices and exchange rates. In several countries, these flows led to a build-up of financial vulnerabilities—be it through credit booms or increased leverage.

Think of the strong appreciation of currencies while monetary policy was being loosened in advanced economies between January 2009 and May 2013—nearly 50 percent in New Zealand and Australia, and 30 percent in Chile. The picture reversed between May and August 2013, with currency depreciations of nearly 15 percent in Brazil, India and Uruguay.

Or think of the increase in non-resident holdings of domestic currency government bonds in Uruguay. In a little over a year, these holdings surged from 2 percent to 45 percent of the outstanding stock in May 2013. These are very real challenges to any policymaker.

The crisis also raised awareness about the policy trade-offs caused by spillovers. In many countries, policymakers were caught between a rock and a hard place: raising interest rates to tame inflation, only to

find that it stoked capital inflows and further appreciation. Exchange rate flexibility was also not a panacea, as exchange rates often ‘overshot’ on both ends of the capital flow cycle.

How can we mitigate these risks? We see three potential approaches: resilience, response, and cooperation. These are not mutually exclusive. Let me elaborate.

The first is to **enhance resilience to shocks**. This requires policy action in both advanced and emerging economies.

IMF analysis suggests that the recent volatility in emerging market economies reflected both external and internal factors. Advanced economies can help reduce volatility by communicating clearly the course of their monetary policy.

By the same token, good fundamentals also matter. There is no short cut or substitute to sound policies in fending off excessive volatility. Reducing vulnerabilities and reinforcing macroeconomic and financial frameworks should be the order of the day for emerging markets—and indeed for all countries.

The second approach is to **respond using the full policy toolkit**. This means not just monetary and exchange rate policy, but also macroprudential and fiscal policy. In some cases, capital flow management and foreign exchange intervention may be appropriate to contain financial instability—but they should not substitute for necessary macroeconomic adjustment.

In fact, several countries such as Brazil, Uruguay and Indonesia, used some form of capital controls to discourage short term inflows. Other countries, such as India and Peru, intervened directly in the foreign exchange market. These policies helped limit excessive volatility. And as long as they remain targeted and temporary, these policies are not expected to take the steam out of needed adjustments.

Even so, a broader question abides—about the type of world we would live in.

If policies are viewed only from a national perspective, we may end up in a world of ad hoc intervention, less rebalancing, and the potential to export financial instability. This would be a world of possibly large welfare losses in many countries, with not just spillover effects—from advanced to emerging market economies, but also “spillbacks”—feedback effects from emerging market to large advanced economies.

Is this the kind of world we want to live in? I would hope not.

This would make the third approach a more compelling course of policy—that of **international monetary policy cooperation**. I know that this topic has some very vocal skeptics, but also very ardent supporters. As you can imagine, I am a bit biased and I would ask the skeptics to keep an open mind.

As the crisis has taught us, in times of distress, the potential gains from cooperation can be huge. Cooperation essentially reduced the risk of tail events with large international feedback effects.

Think of the coordinated cut in policy interest rates in key countries at the height of the crisis, or the swap arrangements that the Fed instituted with other major central banks. These actions helped preempt financial market dislocation across the globe. The G-20 agreement on expanding the IMF resources is another example where the gains from cooperation were clear.

That said, as we turn the corner of the crisis and conditions normalize, the case for cooperation becomes less compelling. Why? Because there is less urgency, and less clarity, about the gains from monetary policy cooperation in normal times.

But it is precisely this uncertainty that would make us remiss in discounting the gains from cooperation in a post-crisis world. We need a concerted effort to examine the effectiveness of cooperative policy responses, their spillover effects, and their global welfare implications—also in light of the evolution of the financial system.

The IMF can contribute to this effort—directly through our surveillance work and cross-country analysis, and in collaboration with other central banking and academic communities on joint projects.

Let me conclude.

We are here today as part of a global intellectual effort to define the contours of monetary policy in a post-crisis world. In this new environment, several of the basic principles of monetary policy are well worth keeping; others need to be revisited. In that respect, I recognize that I have raised more questions than answers. But I believe the questions are important.

What I can tell you definitively is that the IMF is committed to advancing the frontiers of this debate—this new world for central banking. An example of this is the new lecture series on monetary policy that we have launched in honor of Michel Camdessus—the Fund’s longest serving Managing Director and, before that, Governor of the Banque de France. I am delighted that Janet Yellen has agreed to share her insights at the inaugural lecture on July 2. I hope we can all meet again then.

That meeting—and the meeting tonight—are like islands, where we can congregate to compare notes and maps, as we set sail through uncharted waters.

Like Vasco da Gama, a new age of exploration has begun. Let us navigate together.

Thank you.

Monetary policy in a prolonged period of low inflation

Mario Draghi¹

Summary

In the context of a certain disconnect between economic performance and inflation the monetary policy response has to be carefully considered and precisely designed. We are not resigned to allowing inflation to remain too low for too long. But to understand “what is too low for too long”, we need to answer two questions.

First, why is inflation so low?

Second, once we have a decomposition of inflation, we can ask: how likely is it that it persists over the medium-term? Falling commodity prices have accounted for around 80% of the decline in euro area inflation since late 2011. But there are two factors specific to the euro area that contribute to low inflation: the rise in the euro exchange rate and the process of relative price adjustments in certain euro area countries.

At present, our expectation is that low inflation will be prolonged but gradually return to 2%. Our responsibility is nonetheless to be alert to the risks to this scenario that might emerge and prepared for action if they do. What we need to be particularly watchful for at the moment is the potential for a negative spiral to take hold between low inflation, falling inflation expectations and credit, in particular in stressed countries.

There is a risk that disinflationary expectations take hold. This may then cause households and firms to defer expenditure in a classic deflationary cycle – especially when monetary policy is at the effective lower bound and so cannot steer the nominal rate down to compensate.

On aggregate, euro area firms and households do not seem to be particularly exposed to debt deflation dynamics. But this picture masks the heterogeneity within the euro area. Debt service-to-income ratios tend to be higher in stressed countries. Credit weakness appears to be contributing to economic weakness in these countries. Our analysis suggests that credit constraints are putting a brake on the recovery in stressed countries, which adds to the disinflationary pressures. And heterogeneity becomes a factor in assessing low inflation in the euro area.

In terms of the monetary policy response, the key issue is timing. We have to be mindful of mismatches between the various trends: the rise in demand for credit; the repair of bank balance sheets; and the development of capital markets as a complement to bank lending. At this point of the cycle, these considerations feature prominently in the discussions of the Governing Council members. There is no debate about our goal, which is to return inflation towards 2% in the medium-term, in line with our mandate.

¹ President of the European Central Bank.

Ladies and gentlemen,

When we first thought about launching this forum in the spring of last year, we saw a clear value in setting aside time to withdraw from the pressure of our daily routines and the immediacy of decisions. The idea was to devote time to in-depth reflection on how to address the fundamental challenges facing central banks.

In the event, the opportunity for in-depth reflection has proven as valuable as we expected – but our ability to detach from the pressures of the moment has been less than we thought. We are meeting against the backdrop of a complex economic situation: a slowly consolidating recovery, but one which has been accompanied by a gradual fall in inflation rates. Cyclical developments are also interacting with structural developments, notably the structural deleveraging of the banking system. All this warrants discussion.

To some extent, a disconnect between economic performance and inflation is to be expected in the very early stages of the economic upturn. As households and firms resume their spending plans in the aftermath of a long period of restraint, they tend initially to use existing resources more intensively. This raises measured productivity, but causes employment to return more slowly towards its potential, which reduces price pressures.

In this context, the monetary policy response has to be carefully considered and precisely designed. We do not want to be too reactive to those parts of the disinflationary process that are expected to self-correct. We neither want to be too forbearing towards those factors that, if left unchecked, can lastingly undermine price stability. We are not resigned to allowing inflation to remain too low for too long. But to understand “what is too low for too long”, we need to answer two questions.

First, why is inflation so low? This is essentially a question about the *anatomy* of inflation, meaning the nature of the shocks that are causing inflation to deviate from its intended level.

Second, once we have a decomposition of inflation, we can ask: how likely is it that it persists over the medium-term? This is a question related to the *physiology* of inflation, meaning how current low inflation influences economic behaviour and impacts the economy, notably through the formation of expectations.

Through the filter of these two questions, I would like to use my remarks this morning to discuss the forthcoming decisions facing the Governing Council.

The anatomy of disinflation

Low inflation is not particular to the euro area. Inflation is low across advanced economies, mainly due to the diminishing effect of oil prices on consumer prices. But looking at the *anatomy* of inflation, there are two factors specific to the euro area that contribute to especially low inflation here.

The first is a common factor: the rise in the euro exchange rate and its effect on the price of internationally traded commodities. The second is a local factor: the process of relative price adjustment in certain euro area countries that pulls down aggregate inflation.

Let me explain each of these in turn.

Common factors

Falling commodity prices explain the lion's share of the disinflation the euro area has experienced since the end of 2011. Brent crude oil prices were down by around 7% in euro terms in the first quarter of this year, compared with a year earlier. Food prices were sharply down as well. In fact, these two components have together accounted for around 80% of the decline in euro area HICP inflation since late 2011.

The bulk of the imported downside pressures on euro area consumer prices are explained by the strengthening of the effective euro exchange rate, in particular vis-à-vis the dollar. In the past year or so, oil prices in US dollars have fluctuated – by historical standards – over a relatively narrow range. And they have exhibited no clear downward or upward trend.

This creates a balance of forces that might affect future inflation. On the one hand, lower commodity prices driven by euro appreciation help compensate for the generally weak developments in disposable income in the euro area. Indeed, real disposable income declined at slower pace throughout 2013, and turned slightly positive in the fourth quarter, increasing by 0.6% year-on-year. To the extent that this supports domestic demand in the euro area it will also create upward pressure on inflation.

On the other hand, exchange rate appreciation affects external demand and reduces the competitiveness gains of price and cost adjustment in some euro area countries. This has a countervailing effect on real disposable incomes, while also making disinflation more broad-based. Indeed, if we look at prices of non-energy industrial goods, which are mainly tradable, we see a downward trend across all euro area countries.

Local factors

To add to this, aggregate inflation has been dragged down by local factors linked to the sovereign debt crisis and the process of relative price adjustment in stressed countries. Several euro area countries are currently undergoing internal devaluation to regain price competitiveness, both internationally and within the currency union. The crucial adjustments vis-à-vis other euro area countries have to take place irrespective of changes in the external value of the euro.

This process began hesitantly in the early years of the crisis, largely due to nominal rigidities in wages and prices. The result was that adjustment took place more through quantities – i.e. unemployment – than through prices. Stressed countries thus experienced a protracted period of declining disposable incomes and long-drawn-out price adjustment. In this context, several have seen domestic core inflation – that is, excluding the energy and food price effects I just described – fall well below the euro area average. For example, the recent overall fall in *services* price inflation for the euro area is almost entirely accounted for by price declines in these components in stressed countries.

Nevertheless, in the last few years relative price adjustment has accelerated in stressed countries. While this may also have initially weighed on disposable incomes, by creating a closer alignment between relative wage and productivity developments, it should increasingly support future incomes through the competitiveness channel. Export growth has been impressive in several stressed countries. And indeed, nominal income growth in stressed countries turned positive in the fourth quarter of 2013.

The physiology of disinflation

So to sum up: falling energy and food prices, coupled with the effects of relative price adjustment in stressed countries, explain almost fully the disinflation we have seen in the euro area. We also see that disinflation produces countervailing forces, which may in time cause it to self-correct. To what extent should monetary policy therefore react to these developments?

The answer relates to the *physiology* of inflation: whether or not these factors are likely to persist into the medium-term and therefore enter the horizon of monetary policy. Temporary movements in the exchange rate or relative price adjustments would not normally warrant a monetary policy response. Given the lag in monetary policy transmission, a monetary impulse would hit the economy just when the effect on inflation has faded out and the impulse is no longer necessary.

That said, shocks can change: in certain circumstances temporary shocks can morph into persistent shocks via second-round effects. In particular, a prolonged period of low or even negative inflation rates might destabilise inflation expectations. And we know from international experience this change can happen quite quickly, especially if the objective of monetary policy is not clear. Thus, we have to judge carefully how an apparently temporary shock is spreading through the economy and affecting expectations.

Moreover, the situation is more complex if there are impairments in monetary policy transmission that extend the lag between our decisions and their impact on prices, as we see in the euro area today. In these circumstances, there is a risk that, if a temporary shock turns more persistent, any monetary policy response might arrive too late to prevent a more serious downward shift in expectations. Thus, more pre-emptive action may be warranted.

At present, our expectation is that low inflation will be prolonged but gradually return to close to 2%. Our responsibility is nonetheless to be alert to the risks to this scenario that might emerge and prepared for action if they do. What we need to be particularly watchful for at the moment is, in my view, the potential for a negative spiral to take hold between low inflation, falling inflation expectations and credit, in particular in stressed countries.

Let me explain.

Low inflation, expectations and credit

Remember that countries undertaking relative price adjustments have to adjust relative to the average rate of euro area inflation. Low inflation therefore lowers the “nominal bar” around which such adjustments across countries have to happen. In these circumstances, stressed countries will likely experience a temporary period of very low or negative inflation rates. This is what we see in the euro area at the moment.

But here the common and local sources of disinflation I mentioned earlier interact. The effect of an appreciating exchange rate is to hold down overall euro area inflation. The nominal bar around which adjustment takes place is lower: In particular, we see a rise in inflation in non-stressed countries that is insufficient to raise the euro area average back to 2%. And the downward adjustment in the stressed countries becomes probably harder and certainly longer, especially if nominal rigidities imply that prices and costs cannot adjust quickly.

In this situation, there is a risk that disinflationary expectations take hold. This may then cause households and firms to defer expenditure in a classic deflationary cycle – especially when monetary policy is at the effective lower bound and so cannot steer the nominal rate down to compensate.

In addition, an unexpected period of low inflation and low nominal income results in a higher actual and expected future real debt burden. Unless compensated for by expectations of higher future income, firms may reduce investment and households consumption. Banks may in turn respond to this situation with stricter credit standards, which reinforces disinflationary pressure and hence worsens debt burdens. This is fertile ground for a pernicious negative spiral, which then also affects expectations.

Propagation through the euro area

So do we see any signs that low inflation might propagate through the euro area in this way?

On aggregate, euro area firms and households do not seem to be particularly exposed to debt deflation dynamics. The interest payment burden of euro area firms – the ratio of their gross interest payments to gross operating surplus – has actually fallen from 22% in 2008 to less than 12% at the end of 2013, which suggests that firms are in a stronger position today to withstand a period of low inflation. For euro area households debt service-to-income ratios are similar – around 14% – while the median household holds the equivalent of around two months' income in liquid assets to cushion nominal income shocks.

But importantly, this picture masks the heterogeneity mentioned previously. For firms in some countries the interest payment burden has in fact risen since 2008, in particular for firms based in stressed countries. Debt service-to-income ratios also tend to be higher in stressed countries, implying greater vulnerabilities in these jurisdictions if low inflation persists.

Bank lending also presents a mixed picture. Surveys of bank behaviour show a gradually improving aggregate situation. According to the latest Bank Lending Survey credit conditions generally stabilised at the start of this year, and even improved in some stressed countries. The incremental tightening process that banks reported throughout the crisis seems to have come to a halt.

That said, credit conditions remain very heterogeneous across countries and sectors. According to the latest ECB survey on credit access by small- and medium-sized enterprises (SMEs), supply constraints remain especially strong for SMEs in stressed countries. The percentage of financially constrained but viable SMEs – i.e. those with positive turnover in the last six months seeking a bank loan – varies from a minimum of 1% in Germany and Austria to a quarter of the total population in Spain and as much as a third in Portugal.

Importantly, credit weakness appears to be contributing to economic weakness in stressed countries. To show this, one can undertake a quantitative exercise to compute “normal credit”, similar to the notion of

potential output. The difference between the actual volume of credit and normal credit offers a measure of the “credit gap”, analogous to the output gap. Not surprisingly, this exercise reveals that in non-stressed economies the credit gap is either insignificant or making a very small contribution to economic slack. In stressed economies, the same measure contributes to up to a third of economic slack.

This analysis suggests that credit constraints are putting a brake on the recovery in stressed countries, which adds to disinflationary pressures. You can also see why the heterogeneity becomes a factor in assessing low inflation in the euro area.

Calibrating the policy response

What is the right policy response to these developments?

Essentially, we are confronting three issues that might warrant a response. First, the common effect of exogenous factors, including the exchange rate, on euro area inflation. Second, the asymmetric effect of endogenous developments, such as tight access to credit for parts and sectors of the euro area. And third, the risk that those effects combine to generate a more persistent regime of excessively low inflation.

Let me elaborate on those three issues. First, to the extent that developments in the exchange rate, money or capital markets result in an unwarranted tightening of monetary and financial conditions, this would require adjustment of our conventional instruments, so as to secure the degree of monetary accommodation intended by the Governing Council.

At the other end of the spectrum would be a too prolonged downward departure of inflation and/or inflation expectations from our projected baseline scenario, for example due to the interaction between exchange rate developments and medium-term inflation expectations as I explained earlier. This would call for a more expansionary stance, which would be the context for a broad-based asset purchase programme.

An intermediate situation is one where credit supply constraints interfere with the transmission of monetary policy and impair the effects of our intended monetary stance. This would require targeted measures to help alleviate credit constraints. I would like to dwell shortly on this contingency because it relates to the important question of whether weak credit growth results from low credit demand or supply constraints.

Weak credit demand in the early stages of an economic recovery is not unusual. Credit growth typically lags the recovery by three to four quarters as firms draw down internal funds. But a recovery eventually results in growing credit demand. And at this point, for monetary policy to produce its full effects, there must be no binding constraints on credit supply through the banking system. The more the recovery progresses, the more important it is that supply constraints ease so that the recovery can gather steam. Given where we are in the cycle today, it is highly desirable that banks advance the structural adjustment of their balance sheets, so that they can meet demand for credit as it emerges.

It is in part for this reason that we early on placed a great deal of emphasis on a timely comprehensive assessment of bank balance sheets, in the context of the creation of the Single Supervisory Mechanism. Frontloading bank balance sheet adjustment addresses capital constraints on credit supply. Only banks that have fully accounted for legacy losses and hold sufficient equity can take on risk again and therefore

originate and price loans in normal conditions. The comprehensive assessment, while still ongoing, has already had a catalytic effect on asset revaluation and provisioning and on capital raising. We expect it also to feed through into new credit as it reaches completion.

Meeting credit demand is likewise why we have publicly supported measures to revive high quality securitisation in Europe. This complements the comprehensive assessment by helping remove capital constraints to loan origination. And it supports the development of capital markets, which will be essential to sustain credit supply while the banking system transitions towards a less leveraged, less risky model.

The key issue today, however, is timing. We have to be mindful of mismatches between these various trends: the rise in demand for credit; the repair of bank balance sheets; and the development of capital markets as a complement to bank lending. Credit demand may pick up more quickly than the other trends gain traction.

If, in this context, availability of term funding is a limiting factor on loan origination, then monetary policy can play a bridging role. Term-funding of loans, be it on-balance sheet – that is, through refinancing operations – or off-balance sheet – that is, through purchases of asset-backed securities – could help reduce any drag on the recovery coming from temporary credit supply constraints.

Conclusion

Let me conclude.

What I have laid out today is a decomposition of the factors behind low inflation in the euro area, and how they interact, percolate through the real economy and may affect medium-term price stability.

At this point of the cycle, all three contingencies I have discussed remain topical and feature prominently in the discussions of the Governing Council members.

Certainly, any policy response requires a careful assessment of the costs and benefits of the various tools at hand. But there is no debate about our goal, which is to return inflation towards 2% in the medium-term, in line with our mandate.

Financial stability, monetary policy, banking supervision, and central banking

Martin Hellwig¹

Abstract

The paper gives an overview of issues surrounding the role of financial stability in monetary policy and the relationship between banking supervision and central banking. Following a brief account of developments in the European Economic and Monetary Union since its creation, the paper is divided into four sections: first there is a systematic discussion of how a central bank's operations differ from those of an administrative authority; second, a discussion of how the shift from convertible currencies to paper currencies have affected our understanding of monetary policy and the role of financial stability; third, a discussion of moral hazard in banking and banking supervision as a threat to monetary dominance and to the effective independence of central bank decision-making in an environment in which financial stability is an essential precondition for reaching the central bank's macroeconomic objective, namely price stability; and finally, a discussion of the challenges for the design and policy of institutions, with special attention given to developments in the euro area.

1 Financial stability and monetary policy in the euro area: where have we come from?

At some point in 1997, when I was on the Board of the Banque de France research foundation, I suggested that it might be interesting to promote research on the problems that monetary union would pose for the relationship between central banking, which would be supranational, and banking supervision, which would remain national under the home country principle.² This proposal was turned down on the grounds that banking supervision and central banking have nothing to do with each other: central banking and monetary policy are concerned with price stability, while banking supervision is concerned with the safety and soundness of banks. Any notion that central banking is related to financial stability would generate moral hazard. When I pointed out the fact that, in 1990, Mr Greenspan had found it appropriate to turn monetary policy around in order to avoid a major crisis among US commercial banks, I received the answer that this measure had not harmed price stability.³

On that occasion, and many subsequent ones, I thought that treating the relationship between central banking and banking supervision as a non-issue was a way to pre-empt or defuse any attempts by supranational institutions to challenge the national prerogative in banking. I also thought that this

¹ Max Planck Institute for Research on Collective Goods, Bonn. I am grateful for very helpful comments from Stephen Cecchetti, Christoph Engel, Stephan Luck, Niels Petersen and Martin Summer.

² For a detailed account of my concerns, see Hellwig (2007).

³ On the 1990 crisis, see Bernanke and Lown (1990), and Boyd and Gertler (1994).

objective could be seen behind the promotion of bank mergers, and even mega-mergers, at the national level.⁴

However, the underlying thinking has been more widespread. The Maastricht Treaty names price stability as the objective of monetary policy and makes no mention of financial stability. In academia, before the crisis (and some authors still hold this opinion even today), there was a view that inflation rates, inflation expectations, and the implied relative inter-temporal prices were all that mattered, and no words or modelling efforts were devoted to the role of financial institutions in the monetary system.⁵

For a long time, this thinking was also reflected in the ECB's policy stance, which was based on using the interest rate policy to deal with price stability concerns and using unorthodox measures to deal with financial stability concerns. If one believes that these issues can really be compartmentalised, this may seem like a clear-cut assignment of different instruments to different policy objectives.

However, one must doubt whether the compartmentalisation of issues works as neatly in the real world as in theory. Whereas inflation fears motivated the ECB to raise interest rates in mid-2008, and again in mid-2011, the effects of these interest rates on banks' funding costs may well have contributed to a worsening of the financial crisis in 2011, as well as in 2008.

The crisis of 2011 worked as a catalyst for change. In the summer and fall of that year, worries about the implications of the Greek haircut for bank solvency caused the market funding of European banks to erode. As banks were selling assets to get cash, asset prices declined. This price decline imposed further losses on banks, and confidence in the banks eroded even further. The decision taken at the EU summit in October to impose stricter equity requirements in order to allay the prevailing solvency concerns was initially followed by further deleveraging and further asset price declines. The downward spiral was only stopped when the ECB stepped in with its long-term refinancing operation (LTRO), which provided financial institutions – and markets – with an assurance of reliable and cheap bank funding over a substantial period of time. In contrast to the previous scenario under which objectives and instruments had been compartmentalised, the LTRO involved the use of low interest rates for a financial stability objective.

As a means of stopping the crisis of 2011, the LTRO was very successful. Even so, it has been controversial. Less controversial perhaps than the Securities Markets Programme (SMP) in 2010 and 2011 or the announcement of Outright Monetary Transactions (OMTs) in 2012, but the difference has more to do with legal differences than with the policies themselves. Whereas people who object to the ECB's overall policy stance, or even to the ECB's existence, like to attack the SMP and OMTs on the grounds that they violate the Treaty's prohibition of ECB funding of euro area governments, there is no doubt that the LTRO is fully covered by the Treaty. However, I have read many statements from academics, journalists, and even the Deutsche Bundesbank, saying that the dramatic increase in the quantity of high-powered money and the low interest rates that are associated with the LTRO, as well as other policies of the ECB, carry a risk of high

⁴ For example, the merger of BNP and Banque Paribas in 2000 was strongly supported by political and regulatory authorities. At the time, the President of the Banque de France suggested that it would be even better if Société Générale were to join in the merger as well. In Germany, in 2004, the Federal Chancellor called for the industry to get their act together and form a "national champion". For a discussion of the risks of such a policy, see Monopolkommission (2004), items 30 and 31, and Bundesregierung (2005), items 23 to 25.

⁵ See, for example, Bernanke and Gertler (2001), Svensson (1999), and Woodford (2003). For a critique, see White (2007).

inflation in the future. Even though this risk has not yet materialised, it may be because, as we know from the writings of Milton Friedman, lags in monetary policy are long and variable.⁶

By now, in May 2014, we are of course worrying about deflation rather than inflation. The objections may therefore seem pointless. They still raise the question of what the relationship between price stability and financial stability is. To what extent is there a trade-off and what conceptual framework should we use to think about such a trade-off? Is there a need to change the legal norm so as to encompass an objective of financial stability? Or should we take it for granted that the present formulation already encompasses some key elements of financial stability as part of the requirement that the European System of Central Banks (ESCB) should “define and implement monetary policy” (Art. 127 (2) TFEU)?

And then there is the issue of moral hazard. In the discussion that I mentioned in the introductory paragraph, I emphasised the success of the 1990 turnaround in US monetary policy in preventing a major banking crisis. By lowering short-term interest rates, the Federal Reserve System provided commercial banks with the means to rebuild their equity by playing the yield curve, earning record profits one quarter after another for close to four years. However, as they were betting on the Federal Reserve’s low-interest rate policy, financial institutions took very risky positions, which is one reason why the very moderate policy turnaround in 1994 caused substantial turmoil in the US financial system. More generally, we have come to understand that the so-called “Greenspan put”, an anticipation that the Federal Reserve would neutralise any adverse developments in the financial sector, contributed to the excessive risk taking of many financial institutions in the years before 2007.

The LTRO benefited not only healthy banks but also banks whose health was dubious, perhaps even banks that would have been insolvent if they had been forced to uncover their hidden losses. In fact, the availability of ECB support has been most important for those banks that had the weakest equity positions and the greatest difficulties in obtaining market funding. For these banks, borrowing from the ECB at 1% or less and lending to their own governments at 4% or 5% seemed like a wonderful way to avoid default and rebuild equity.⁷

Policies that benefit banks which are actually insolvent violate the principle that banks’ solvency problems should be dealt with by governments and central banks should only deal with liquidity problems. In the euro area, a decade ago, the various Memoranda of Understanding on how to deal with banks in difficulties provided for a division of tasks according to this principle, with the added provision that liquidity problems of individual institutions should be dealt with by the national central banks, and liquidity problems of the entire system by the ECB.⁸ To the extent that de facto insolvent banks benefited from ECB funding, these principles were violated. However, if banking supervision is in the hands of national authorities and these authorities exercise forbearance towards the solvency problems of “their” banks, there is little the ECB can do about it.

The very determination to preserve financial stability as an important element of monetary stability puts the ECB into a position of weakness. Given the knowledge that the ECB will support the system anyway, the pressure on national governments and national supervisors to clean up their banking systems is that

⁶ See, for example Bundesbank (2012), and Sinn (2012, pp. 193-196, 2013).

⁷ According to Acharya and Steffen (2013), the banks that had the weakest equity positions were most active in this “greatest carry trade ever”. Bundesbank (2012) and Sinn (2013) are very critical of this feature of the ECB’s lending to private banks.

⁸ For a detailed critical discussion of these Memoranda of Understanding, see Hellwig (2007).

much weaker. Some politicians may in fact understand that the very weakness of their banks gives them indirect access to the printing press. After all, with the LTRO, a large part of the money that banks obtained from the ECB was lent to the banks' own governments.⁹

Fear of such moral hazard, on the side of banks and on the side of national governments and national supervisors, seems to have played an important role in the move towards banking union. Certainly, the 2012 decision to create a Single Supervisory Mechanism (SSM) was triggered by the Spanish request for funding by the European Stability Mechanism (ESM) in order to recapitalise Spanish banks and was intended to reduce the moral hazard that ESM involvement might create. However, this move was also strongly supported by the ECB, presumably because it had wanted to get out of a situation where monetary policy was persistently put under pressure by the weakness of financial institutions, a weakness that national governments and national supervisors could not or would not resolve. There is a danger of course that, with banking union, the ECB will be drawn ever more deeply into responsibility for financial stability and that the straitjacket for monetary policy may become even tighter.¹⁰

Legal proceedings, before the German Constitutional Court and soon before the European Court of Justice, must also be seen in this context. These proceedings are not just concerned with the question of whether the OMTs violate the prohibition of central bank funding of governments. At a deeper level, they are motivated by the recognition that monetary policy has strong distributive effects, which gives rise to worries about governance and moral hazard. In the context of the OMT programme, the distributive effects are particularly obvious because it stipulates selective interventions. However, the issue is more general as we also see distributive effects arising from those cheap central bank loans under the LTRO. From the perspective of constitutional law in a democracy, governance of decisions that have such distributive effects is a fundamental issue.

In the following, I will give an overview of the different issues that financial stability concerns raise for monetary policy. I will not be able to settle them, but I hope to provide a comprehensive overview and perhaps a conceptual structure that makes it possible to appreciate what the trade-offs are. Such a structure is important if one wants to avoid shooting from the hip with partial arguments and recommendations that may end up having unintended, costly and destructive consequences.

2 Remarks on Central Banking

I begin with a few remarks on what a central bank actually is and how it differs from other institutions. Political, legal, and academic discussions of the issues sometimes suffer from a lack of attention to institutional and operational detail. To be clear about terminology, even when the central bank is in charge of banking supervision, I use the term "central banking" exclusively for the non-supervisory activities of the institution.

⁹ Acharya and Steffen (2013).

¹⁰ For a more detailed account of the issues involved in the creation of a European Banking Union, see Hellwig (2014a).

Central banks are banks

In contrast to supervision, central banking is mostly a form of banking rather than an administrative activity. Whereas administrative authorities set, interpret and apply statutory rules, most of the activities of central banks involve transactions on a quid pro quo basis, such as taking deposits from banks, granting loans to banks, or buying and selling assets in open markets. Conditions for these transactions are set by the central bank but, with one exception, the counterparties participate voluntarily in these transactions and are not forced to do so by fiat of the central bank or the government. The exception to this rule is given by minimum reserve requirements that force banks to hold cash or deposits with the central bank. Setting minimum reserve requirements is an administrative act. At this point, however, at a level of 1% for deposits with a maturity of less than two years and 0% for higher maturities, minimum reserve requirements are practically irrelevant in Europe.

The fact that a central bank is a bank has two important consequences: first, no matter how it operates, its operation generates windfalls for its counterparties and possibly further windfalls for the counterparties' counterparties. Second, no matter how the central bank operates, it is subject to risk from its activities.

Windfalls to counterparties and moral hazard arising from expectations of the availability of central bank transactions are unavoidable

Given that transactions are voluntary, any counterparty will usually obtain a surplus from them. A private bank that borrows from the central bank and that invests the money elsewhere is likely to earn a margin. If the bank uses the money for loans, the bank's borrowers may benefit as well. Similarly, an investor who sells a security to the central bank is likely to put the proceeds to a use that he considers better than the security that he sells. If the central bank's intervention causes securities prices to rise, all holders of the securities benefit. If the price increases induce the securities' issuers to expand their supplies of securities, the issuers may also benefit.

Such distributive effects from the central bank's activities arise no matter how the central bank operates. They are not limited to cases where the central bank lends to de facto insolvent banks or governments. Nor are they limited to times of crisis.

The question of who will benefit from these distributive effects is therefore unavoidable. As a student, I learnt that open market interventions involve government bonds, rather than private issuer shares or bonds because open market operations involving private issuer shares or bonds would cause discrimination between issuers and thus distort private markets. Today, the same kind of concern is raised about the effects of the selectivity of government bond purchases under OMTs.

Selectivity is discriminatory but so is any form of open market intervention. The selectivity of OMTs is controversial because it collides with the textbook principle that open market interventions should be non-discriminatory. As mentioned, this principle was used to justify why open market interventions should focus on government securities at a time when open market interventions in private issuer securities were considered discriminatory and open market interventions in government bonds were not. With OMTs, we are talking about open market interventions in government bonds that are discriminatory. The distributive effects are easy to pinpoint and highly political.

However, the textbook principle that open market interventions should be non-discriminatory is itself problematic. Even with a single central government, open market operations in that government's bonds are discriminatory and can be a source of distortions. In the United States, over decades, the use of such open market operations for the Federal Reserve's interest rate policy enabled the monetisation of government debt even without an outright regime of fiscal dominance.¹¹

If the central bank avoids open market operations altogether and relies on lending to commercial banks, one can ask why it is lending to commercial banks and not, for example, to investment banks or to hedge funds. One can also ask how it selects the banks to which it lends. In the United States, for example, access to the Federal Reserve's discount window has provided commercial banks with a major competitive advantage over investment banks, an advantage that contributed significantly to the pressures on the investment banks, before and during the crisis.¹²

Moral hazard from central bank intervention and the availability of central bank transactions, to which I referred in the introduction, is also unavoidable, and likely to arise even under the best of circumstances.¹³ If the central bank develops a routine for how to do its business, through open market purchases or through lending to financial institutions, the private and public counterparties to the central bank's business will form expectations about the future availability of transactions with the central bank and will form their own plans accordingly. They will do the same if they do business with a private partner on a regular basis.¹⁴ The problem of moral hazard arising from the availability of central bank transactions must be seen as a problem of degree rather than one of principle.

Therefore the real policy question is not how to avoid producing windfalls for counterparties or selectivity, but how to minimise the distortions from these side effects of central bank activity. This question concerns the choice of counterparties, the preconditions that counterparties must satisfy, and the choice of contracts and securities that the central bank engages in. These choices in turn must be seen in relation to the monetary policy problems that the central banks are faced with. For example, the privileged position of banks may be justified by the central role that bank deposits and payments from and to deposits have in the monetary system.¹⁵

Risks from assets held are unavoidable

Turning to the risks of the central bank's activities, such risks have been the basis for criticising interventions of central banks in the years since the crisis. One example would be the Federal Reserve buying "toxic" assets, such as mortgage-backed securities or collateralised debt obligations (CDOs), as a way of freeing financial institutions from the burden of having such dubious assets on their books. Another

¹¹ For an Overview, see Thornton (1984).

¹² For a discussion of these developments, see Admati and Hellwig (2013), chapters 4 and 5, and the references cited there.

¹³ As discussed by Goodhart (1988), moral hazard on the side of commercial banks has always been a concern for central banks.

¹⁴ In this context, it is worth remembering the systemic effects of the breakdown of wholesale short-term funding markets in September 2008. Many banks had counted on the availability of such funding and were squeezed for liquidity when the implosion of US money market funds in the wake of the Lehman bankruptcy caused these markets to disappear. For a detailed account, see Admati and Hellwig (2013), chapter 5. Hellwig (2014b) names the disappearance of potential trading partners on whom market participants had counted as an important category of systemic risk.

¹⁵ In the case of the selectivity of OMTs, an important question would be whether the deepening fragmentation of monetary and financial systems that we have seen since 2009 requires monetary policy to be targeted at different subsystems separately.

example would be the ECB's and other central banks' loosening of quality standards for the collateral they accept when lending to banks. Since the returns that central banks earn depend on the prices they pay for the assets and the interest rates they charge on loans and these variables affect both the expected returns and the risks of the central banks' portfolios, it is not always possible to distinguish whether the critics are concerned about excessive risks or about excessively low mean returns. In any case, the potential that central banks might end up making substantial losses – or merely earning substantially less than they could – looms large in the discussion.¹⁶

However, central banks may end up making substantial losses on any assets they hold. This is just as true for the most traditional and conventional of central bank assets, such as gold or foreign exchange, as well as for the newfangled assets that figured prominently in the financial crisis. From 1980 to 2001, as the gold price fell from USD 885 per ounce to USD 253 per ounce, a central bank that held gold would have seen the value of its position cut by more than two thirds. And even if the central bank had held on to the gold until its peak of USD 1500, its return since 1980 would have been less than 2% a year, nothing like a market compensation for the risks that were involved. Similarly, foreign reserves cause the central bank to make losses if the currency devalues. As the Bundesbank knows from experience, such losses can be particularly large if the reserves have been acquired with a view to avoiding a revaluation, but if in the end the defence of the old exchange rate is unsuccessful.¹⁷

The asset portfolios of central banks are typically very different from those of private banks,¹⁸ but whatever risks the assets involve must be borne by the central bank and its owners just as a private bank and its owners bear the risks of the bank's asset portfolio. Perhaps therefore, the question of what risks are acceptable for a central bank to bear without parliamentary approval, which has figured prominently in the legal dispute about the OMT programme, should be seen in parallel with the question of what risks are acceptable for a publicly-owned and state-guaranteed bank to bear without parliamentary approval. An example would be Westdeutsche Landesbank, whose costs to taxpayers on losses since 2005 amount to EUR 18 billion, according to the finance minister in charge.¹⁹

¹⁶ See, for example, Bundesbank (2012), Sinn (2013), and Bundesverfassungsgericht (2014).

¹⁷ According to Holtfrerich (1998), in 1969 the Bundesbank experienced speculative capital flows in the order of DM 20 billion into Germany before the revaluation and out of Germany thereafter; with a revaluation of the Deutsche Mark by 9.3 %, these flows imposed a loss of about DM 1.6 billion on the Bundesbank.

¹⁸ As discussed by Goodhart (1988), the difference reflects not only the different tasks of the two types of banks but also the realisation that, in view of the central bank's funding advantage, there would be serious problems if the central bank was to compete with private banks in their domains.

¹⁹ See "WestLB kostet Steuerzahler 18 Milliarden Euro" (West LB costs taxpayers EUR 18 billion), Handelsblatt, 20 June 2012. In this context, it is of interest to observe that, in the state of North Rhine-Westphalia, the owner of Westdeutsche Landesbank, a parliamentary request for information about the Government's involvement in the bank's disastrous investment decision was turned down on the grounds that this information was a "business secret". The German Constitutional Court itself used a similar argument to turn down a request from the federal parliamentary party Die Linke to obtain information (and parliamentary control) concerning massive real estate sales by Deutsche Bahn AG, the government-owned railway company; see Bundesverfassungsgericht (2011).

Central bank debt is not really debt

The central bank does of course differ from other banks because it has been given certain privileges by the government.²⁰ The central bank has the exclusive right to issue money, and the money that it issues serves as legal tender.²¹

In a previous era, bank notes were debt instruments that entitled the bearer to receive specified amounts of gold whenever he wished. Relying on such debt for funding was attractive because, for as long as the notes were in circulation, the issuer could put the funds that he had obtained to some other use. By giving the central bank a monopoly, the government made sure that profits would not be eroded by competition.²² By making bank notes legal tender, it enhanced the central bank's profitability even more.

Even with a monopoly on note issuance, as long as these notes involve a substantive legal obligation, a central bank faces constraints that are similar to the ones faced by private banks: it must manage its activities and its assets so that it can always fulfil the obligations implied by its debt. If bank notes promise their bearers payments in gold, this means that the central bank must manage its gold reserves appropriately.²³ Even if bank notes are not convertible into gold, the same kinds of concerns arise if the central bank is committed to maintaining a fixed exchange rate with some other currency.

However, since the abandonment of the Bretton Woods system of fixed exchange rates, central banks are no longer subject to such constraints. The notes they issue are no longer debt in any meaningful sense of the word. The issue of bank notes does not oblige the central bank to do anything. And the deposit that a private bank might have with the central bank obliges the central bank to give the corresponding amount in notes on demand to the private bank; this is an obligation that the central bank can always fulfil.

Balance sheets of central banks show the central bank's issue of notes and deposits as a liability. However, this is an anachronism, a bookkeeping convention, which hides the fact that the central bank's note issue does not involve any obligation to the acquirers of the notes. If a central bank issues notes or deposits and acquires assets, and if the central bank makes a loss on those assets, there still is no risk that it might default. By the conventional criterion of comparing the value of assets to the value of outstanding debt, a central bank might be deemed to be insolvent but, in contrast to private banks or non-financial firms, this has no practical consequences. The reason is that the central bank's note issue does not oblige it to do anything and the obligations on deposits can always be fulfilled by issuing notes.

There is an exception that proves the rule. If a central bank borrows foreign currency from another central bank or from private parties, for example in order to support its own banks if they have borrowed in that currency, then there is a genuine risk of default. Under a swap agreement, in 2011, the ECB borrowed dollars from the Federal Reserve in order to support European banks whose dollar funding from money

²⁰ Unless the distinction is important, I use the term "government" as referring to both the legislative and executive branches of government.

²¹ The importance of money being legal tender is stressed by Goodhart (1998). For a critical assessment, see Hayek (1977).

²² In England before Peel's Bank Charter Act, bank notes were issued by other banks as well as the Bank of England. In other countries, such as the United States or Switzerland, the creation of the central bank replaced a system of competing bank note issuance by private banks. See Admati and Hellwig (2013), chapter 10, and the references given there, as well as Baltensperger (2012).

²³ Goodhart (1988) observes that the conflict between this business need and whatever other objectives central banks are trying to fulfil has been a constant theme in the history of central banking. Eichengreen (1992) explains how the concern for convertibility damaged the ability of central banks to deal with the problem of the Great Depression. He also points out that, with some central banks, this kind of thinking persisted long after the regime change that would have allowed a change of policy stance.

market funds had vanished. If events had taken an even worse turn than they did, at some point, the question of whether the ECB was able to repay the Federal Reserve might have arisen. After all, the ECB cannot create dollars, only euro.

For obligations that are denominated in euro, however, there is no risk of the ECB defaulting. Nor is there necessarily a risk that losses on assets might impose an obligation on taxpayers; such a risk only arises if the central bank is required to have a minimum amount of equity and if equity is calculated in terms of traditional balance sheet conventions, which treat the central bank's note issue as debt even though it imposes no obligation on the central bank.²⁴

Going beyond legal issues, losses on assets may harm the central bank's credibility and thereby its ability to achieve its policy objectives. If the central bank were to report substantial losses, economic actors might expect it to try to make up for them in some way or other. One way to do so might be to expand its issue of money and invest in assets that earn a positive return. This would be profitable but might also be inflationary. If the central bank wants to maintain the credibility of its anti-inflationary stance, it is therefore well-advised to control the risks that it runs. However, this is a matter of policy judgment rather than legal obligation.

Fiscal implications of central banking are unavoidable

Even though the central bank cannot go bankrupt, the risks arising from the central bank's assets can affect taxpayers. Any profits that the central bank earns and distributes go to its owners. For the owners, therefore, any risks in the central bank's investment policy involve a risk to future profit distributions.

As central banks today are mainly owned by governments, this means that profit distributions from central banks go into the governments' budgets.²⁵ If the central bank makes losses on its assets and if, therefore, its profit distribution to the government is reduced, the government must either reduce some expenditure or raise taxes (or borrow more, which implies lower expenditure or higher taxes in the future).

Much of the legal discussion about the ECB has focused on the need to keep fiscal policy and monetary policy apart. Do the ECB's policies violate the Treaty because they have implications for government budgets? Unless one goes into details, this discussion is meaningless because monetary policy necessarily has implications for government budgets. This follows directly from the fact that governments have a claim to the profits that the central bank earns and distributes.

Democratic legitimacy, fiscal dominance and central bank independence

Do the fiscal implications of central banking warrant or even mandate a subordination of central bank policy to the wishes of democratically elected governments? This has been the view of many governments

²⁴ The link between potential losses on assets and potential demands on taxpayers is thus much less direct than the German Constitutional Court has surmised in *Bundesverfassungsgericht* (2014). It is also much less direct than in the case of the Landesbanken, which have benefited from explicit and unlimited state guarantees of their liabilities, which are indeed legal obligations.

²⁵ As documented in the Appendix to Goodhart (1988), most central banks initially had at least some private shareholders. Some central banks still do so today.

in the past. This view is also implicit in the German Constitutional Court's reference to the need for parliamentary approval of any policies that might carry substantial budgetary risks.

In Germany, of course, the experience with political control over central bank policies has been a reason to make the central bank independent. Twice in the twentieth century, the political authorities have used their influence over central bank behaviour to obtain government funding through the printing press. The seigniorage from the printing of new money, in addition to whatever returns the central bank might earn, provided them with a way to fund expenditures for armaments and wars by means other than taxes. And twice, the result has been a destruction of the currency and a complete expropriation of the holders of nominal assets.

Certainly in Germany the independence of the central bank was imposed from outside, by the Dawes Plan in 1923 and again by the Allies in the period 1948-1951. However, given the experience of the past, the independence of the Bundesbank has always enjoyed strong support among the population, which was more concerned about inflation than about the question of how central bank independence might be compatible with the democratic legitimacy mandate of the constitution.

In other countries, the view that central bank policy must be subordinated to the political authorities has sometimes also led to a regime of fiscal dominance whereby the government's funding needs have determined the central bank's money creation. Under the Bretton Woods regime before 1973, this mechanism was constrained by the need to maintain the exchange rate.²⁶ After 1973, however, it led to substantial money creation and substantial inflation in many countries. Political authorities everywhere tried to avoid hard choices by using money creation and the "inflation tax" as a way to maintain expenditures that were popular with important clienteles without raising explicit taxes.

The experience of the 1970s and 1980s, however, showed that fiscal dominance and inflation may harm economic performance, in particular economic growth. The experience of these two decades also showed that central bank independence provides some protection against the harm from fiscal dominance.²⁷

The problem of time inconsistency

From the perspective of economic theory, the issue is simple: the value of seigniorage that is obtained by issuing money depends on investors' expectations of inflation, which lowers the real rate of return on this money. The issuer should therefore have an incentive to promise that the value of money will remain stable and will not be diluted by new money creation. However, once the money has been created and "sold", the issuer has an incentive to breach his promise and create yet more money. If the issuer is under the influence of the finance minister, the incentive is likely to be even stronger because, unless the system

²⁶ The exception to this rule was the Federal Reserve. Because the dollar was the reference currency for exchange rates, US authorities did not see themselves as being under any obligation to intervene in support of exchange rates. Whereas the Treasury-Federal Reserve Accord of 1951 had given the Federal Reserve the freedom to conduct monetary policy without instructions from the Treasury, it did in fact monetise a large part of the federal debt, usually under the auspices of maintaining low interest rates. See Sargent and Wallace (1981), and Thornton (1984).

²⁷ See Grilli et al. (1991), and Alesina and Summers (1992).

enters into hyperinflation,²⁸ money creation and the inflation that it induces reduce the real burden of the government's debt, which is denominated in units of money.

Decisions about money creation involve a problem of time inconsistency. As a result of this problem, decision-makers may not want to stick to promises or threats they made previously. If the decision-maker is unable to commit to decisions he has previously made, his very sovereignty over decisions may make him worse off because nobody trusts him. By delegating decisions to a third party, such as an independent central bank, he loses sovereignty over those decisions, but this very loss of sovereignty may serve as a mechanism of commitment that enables him to benefit from the trust that such commitment induces. The price stability mandate of the Treaty embodies this commitment.

In the academic literature, the time consistency problem for monetary policy is usually discussed in terms of price stability versus employment concerns. Presumed trade-offs between inflation and unemployment are different depending on whether one is looking at them *ex ante*, before nominal wages have been set, or *ex post*, when nominal wages have been set and any increase in commodity prices lowers real wages and may therefore raise employment. In this argument, the time consistency problem concerns the central bank's ability to commit itself *vis-à-vis* the parties involved in setting wages. *Ex ante*, the central bank may want to convey the impression that inflation will be low so that wage increases are moderate. *Ex post*, however, once wages are given, the central bank, on its own or under pressure from the political system, may want to inflate anyway in order to reduce unemployment. The employment effect is, however, illusory if wage settlements anticipate the subsequent changes in attitudes towards inflationary policy.²⁹

The time consistency problem associated with seigniorage from money creation and with government funding is more fundamental. This time consistency problem arises regardless of how contracting in the economy is organised. This is due to the fact that money is a durable asset and the central bank is a durable goods monopolist. Any durable goods monopolist must deal with the difficulty that the demand for its product today depends on people's expectations of its behaviour tomorrow.³⁰

3 Financial stability and monetary policy

From a historical perspective, the Treaty's unique focus on price stability reflects the situation of the early 1990s and the preceding history. One hundred years earlier, this formulation would have been inconceivable. Stability concerns had an important place in the mandates of central banks even then, but they dealt with the microeconomics of the note issue, interest rates or financial stability, rather than the overall macroeconomy. Today's focus on "stability" in terms of the macroeconomy is a product of the twentieth century.

²⁸ The lag between the collection of taxes and the activities that are being taxed implies that real government revenue is actually reduced if inflation is too high. This is the so-called *Tanzi effect*; see *Tanzi (1969)*.

²⁹ See, in particular, *Barro and Gordon (1983 a, b)*.

³⁰ On durable goods monopolies, see *Coase (1972)*. *Hellwig (1985)* applies *Coase's* argument in the context of money creation.

Stability mandates before the rise of macroeconomics³¹

Central banks have always been political. They have been connected to governments, obtaining public funds as deposits and lending to governments. Moreover, they have worked under government charters and benefited from government-granted privileges such as the monopoly on issuing notes. Sometimes the government has given them explicit stability mandates. The Banque de France, for example, was given the task of stabilising the discount rate.³²

Being political, central banks do not behave like private profit-maximising firms. According to Goodhart (1988), this fact, together with the fact that they are close to their governments, has contributed to them having acquired a central position in the financial system, including having become the banks for other banks. In the course of this development, they took on the role of lender of last resort, providing the other banks with liquidity at times of stress when market funding mechanisms were breaking down.³³ This role came to be enshrined in Bagehot's (1873) famous prescription that central banks should be prepared to lend freely to solvent banks, against good collateral and at penalty rates.

As businesses, however, central banks were unable to just pursue whatever political mandates they had, but needed to take heed of the constraints that markets imposed on them. If the notes you issue are a kind of debt that you must honour, political mandates may not be compatible with the need to avoid default.

From a business perspective, a lender-of-last-resort role can actually be good policy. Having the banks that benefit from this role as customers enlarges the funding base. Intervening to maintain financial stability in times of crisis may help the central bank prevent losses on its own asset portfolio, as well as allowing it to provide support for other financial institutions.³⁴ Moreover, if the conditions are as strict as the Bagehot rule suggests, the intervention itself is likely to be profitable.

Such a congruence of business interests and the stabilisation concerns of the central bank cannot, however, be taken for granted. In the past, there have been recurrent tensions between political desires for stability and the need to maintain convertibility.³⁵ An example is the famous interest rate mechanism under the gold standard. High interest rates might be problematic for the finance minister, for financial institutions or for the overall economy, but they might seem necessary to a central bank that is concerned about its gold reserves. This attitude played an important role in the interwar period and contributed greatly to the extent of the Great Depression of the 1930s.³⁶

³¹ Most of the discussion in this section is based on the comprehensive historical description and analysis in Goodhart (1988). Baltensperger (2012) provides details about the origins of central banking in Switzerland.

³² Goodhart (1988), Appendix on Banque de France, pp. 114-122, especially p. 118.

³³ Goodhart (1988) argues that purely private solutions to the problem of liquidity provision at times of stress had been hampered by the competitive interests of the participating private banks.

³⁴ Policy discussions about the risks of central bank interventions for the central bank's balance sheet typically neglect the fact that abstention from intervention can also be very risky.

³⁵ Goodhart (1988).

³⁶ Eichengreen (1992).

The impact of macroeconomics

The Great Depression of the 1930s had a profound effect on our thinking about the role of central banks. The question of whether central banks could have done anything to prevent or to mitigate the disaster arose even as the depression was going on.

Subsequently, the question of what the role of monetary policy is became a key concern in the newly developing field of macroeconomics. In this context, the focus was no longer on the behaviour of the central bank as a business in the centre of the financial system, but on the role of monetary policy in macroeconomic stabilisation.

Such a shift of focus was possible because convertibility of the currency into gold was no longer an issue, and, for the United States at least, where much of the discussion took place, maintenance of the exchange rate under the Bretton Woods system was not a concern because the dollar was the major reserve currency; maintenance of the exchange rate was an obligation for other countries. And when Mundell (1962) showed that the obligation to maintain a fixed exchange rate imposed constraints on the central bank that harmed or even eliminated its ability to contribute to macroeconomic stabilisation, this finding provided an argument against fixed exchange rates and contributed to the momentum of the movement towards flexible exchange rates that culminated in the 1973 abandonment of the Bretton Woods system.

In the second half of the twentieth century, the major debates about monetary policy have all focused on macroeconomics. Is monetary policy or fiscal policy better suited to stabilising or even permanently increasing aggregate demand? Can an inflationary monetary policy be used to reduce unemployment permanently? To what extent is monetary policy influenced by fiscal policy and by the need to monetise government debt, if the central bank wants to prevent “excessive” increases in interest rates? These are the debates of the 1960s, 1970s and 1980s, reflecting the different experiences of the times.³⁷ They are concerned with aggregate economic activity and growth, unemployment and inflation as ultimate policy objectives but pay little attention to the details of what central banks actually do and how what they do affects those ultimate objectives.

Legal norms, such as the Humphrey-Hawkins Act in the United States, with its reference to maximum employment, stable prices and moderate interest rates, reflect this thinking. So does the exclusive focus on price stability in the Bundesbank Act and in the Maastricht Treaty. The focus is different but the ultimate policy objective of central bank policy is formulated in abstract terms that are far removed from the microeconomics of what the central bank actually does.

This is also true of the debates about intermediate targets of monetary policy, interest rates, monetary aggregates or inflation rates. The microeconomic aspects of what a central bank does and the financial sector do not play much of a role in these debates either. Debates about transmission mechanisms get a bit closer but even these debates rarely provide us with a comprehensive picture. Characteristically, the

³⁷ The debate on monetary versus fiscal policy may have contributed to the mistaken notion that monetary policy does not have fiscal implications. Concerns about the government budget constraint seem to have been no more than a side issue; see, for example, Tobin (1963), Blinder and Solow (1973), and Sargent and Wallace (1981).

dynamic stochastic general equilibrium models that nowadays serve for quantitative analysis typically do not even have much of a banking sector.³⁸

What is “money”?

In the macroeconomic debates about monetary policy, there always is a question as to what we should think of as “money” and “monetary policy”. This question played a prominent role in the early debates about the role of monetary policy in the Great Depression. According to one view, which by now is regarded as obsolete, monetary policy in the Great Depression was expansionary but powerless. This view would be based, for example, on the observation that, in the United States from 1929 to 1933 an increase in the monetary base, i.e. the amount of central bank money, by some 15% could not prevent a decline in nominal income by 53% and in real income by 36%. Against this view, Friedman and Schwartz (1963) observed that, even as central bank money rose by 15%, what they called the “money stock”, the sum of deposits and currency held by the non-bank sector in the economy, fell by 33%. They inferred that monetary policy actually was contractionary and that the monetary contraction was responsible for the economic decline.

As an analytical concept, the concept of the “money stock” is problematic because it mixes elements of central bank policy, bank behaviour and the behaviour of non-banks without providing a proper analysis of how the different actors interact or how the demand and supply of the different components are determined.³⁹ However, this concept provided Friedman and Schwartz with a simple rhetorical device that allowed them to refer to monetary policy as being contractionary when in fact the monetary base was expanding, albeit not enough to compensate for the effects of banks’ and non-banks’ increased desires to hold central bank money.

The semantic issue is very much alive today. In the years since 2007, central banks have increased their money issues considerably, but most of these increases have just counteracted the contractionary effects that had arisen from within the economy. For example, in the euro area, the monetary base rose by approximately 100% from 2008 to 2013, but monetary aggregates rose by much less; M_3 , for example, grew by about 10%, i.e. 2% per year, in line with the ECB’s inflation target. Observers who focus on the monetary base are convinced that these policies were highly inflationary; observers who focus on M_3 assert the opposite.

Behind the discussion, or lack of discussion, about the meaning of the word “money”, there are some important substantive issues. If the ultimate objectives of monetary policy are formulated in terms of variables relating to the overall macroeconomy, which variables provide us with reliable indicators of conditions in the monetary system? And to what extent should the assessment of these indicators take account of changes in the financial sector?

³⁸ For a similar criticism, see Howitt (2012). Even those models that do have a banking sector fail to take account of the fact that asset markets and bank funding markets operate on a different time scale to goods markets and labour markets. Whereas asset markets and bank funding markets operate in real time, goods markets and labour markets, which concern macroeconomic flows rather than stocks, are more usefully analysed with a periodisation of a quarter or a year; see Hellwig (2014b). On the difficulties of integrating different types of markets into one model and of accommodating the different roles of money in this model, see Hellwig (1993).

³⁹ For example, should we think of non-banks as treating currency and deposits as complements or as substitutes? The definition of the money stock M_1 involves the sum of the two, which suggests that they should be seen as substitutes. However, the currency-deposit ratio is treated as a parameter, which suggests that they should be seen as complements.

The empirical evidence seems fairly clear: whereas in normal times the monetary base, i.e. the amount of central bank money in the economy is a reliable indicator of monetary developments, this need not be the case in times of change or of turmoil in the financial sector. The historical account of the Great Depression in Friedman and Schwartz (1963) provides one example, the recent experience another. In the euro area, for example, cumulative inflation in the period from 2008 to 2013 has been about 10%, roughly in line with growth in M_3 and with the ECB's inflation target.⁴⁰ On other occasions, institutional changes that enabled banks to economise on their reserves of central bank money have caused wider monetary aggregates to grow more quickly than the monetary base, inducing inflation at a higher rate than one might have predicted from the growth of the monetary base.⁴¹

Certainly such unreliability of indicators due to structural change must be a concern with any monetary aggregate. For example, in the 1970s in the United States behavioural changes leading private households and firms to substitute demand deposits for shares in money market funds or in interest-bearing accounts implied that standard monetary aggregates were under-predicting inflation. However, this just means that monetary policy must be attuned to the overall development of the monetary and financial system, and should not be mechanically tied to any one indicator.

The common denominator of these observations is that in any assessment of the likely effect of monetary policy on its ultimate macroeconomic targets the central bank must be aware of changes in the financial sector. A central bank that takes its ultimate policy targets seriously must take this into account. The focus on macroeconomic variables as ultimate objectives of central bank policy is a luxury that was made possible by the elimination of convertibility and by the introduction of flexible exchange rates, but this focus is problematic if it makes us forget about the microeconomics of central banking and the transmission mechanism.

Back to financial stability as a concern of monetary policy

At this point, we come back to the financial stability issues that originally held a prominent place in central banking and were somewhat pushed aside by the rise of macroeconomics, to some extent because they were moot in the decades between the 1930s and the 1970s when there were no financial crises. When Friedman and Schwartz (1963) talk about monetary contraction due to changes in the reserve-holding behaviour of banks and in the currency-holding behaviour of non-banks, they are really referring to the banking crises during the Great Depression, to their impact on the "money stock" and on the real economy. The behaviour changes that Friedman and Schwartz (1963) document can certainly be attributed to banks' taking precautions against runs and to non-banks' becoming more suspicious of bank deposits. The latter presumably was a result of non-banks' seeing many banks go into default, the former a result of banks' seeing other banks being subject to runs by anxious depositors.

One may wonder whether the impact on the "money stock" that is discussed in Friedman and Schwartz (1963) properly identifies the transmission mechanism. Today's thinking about the matter seems more

⁴⁰ In this context, Bundesbank (2012) which warns of inflation, suggests that the jury is still out because lags are long and variable, without however explaining why the monetary base would be more appropriate as an indicator of monetary policy than one of the wider monetary aggregates.

⁴¹ An example is given by the experience of Switzerland in 1988 and 1989 when the introduction of electronic interbank clearing and a change in liquidity requirements enabled banks to significantly reduce their reserves of central bank money. See Baltensperger (2007).

strongly influenced by Bernanke's (1983, 1995) interpretation that bank defaults and closures destroyed the information capital that banks had accumulated in dealing with their loan customers is also plausible. The credit channel is taken to be the key to the transmission of monetary policy to the non-financial sector of the economy.⁴² However, the distinction is less important than the common conclusion that banks are an important part of the monetary system and the monetary transmission mechanism, and that bank failures had a strong negative impact on the monetary and financial system in the Great Depression.

The experience of 2007-2009 reconfirms this view. It shows that, despite the more macroeconomic orientation of monetary policy, financial stability concerns remain very relevant for central banking.

Do we need a financial stability mandate?

Given that financial-stability concerns are often not mentioned in the legal mandates of central banks, we must ask whether they should be mentioned. In practice, in recent years, many interventions supporting financial stability have been undertaken without such a mandate, usually on the grounds that these interventions were called for by the given macroeconomic mandates, for example the maximum employment mandate in the United States or the price stability mandate in the euro area (with the presumption that "price stability" requires a prevention of deflation as well as inflation). A special financial stability mandate might therefore seem unnecessary, and might be seen to contribute to moral hazard from the availability of central bank support. However, while this approach has worked in practice, it has also contributed to political controversy about central bank policies, especially since the meanings of the terms "money" and "monetary policy" are ambiguous.

More importantly, there is also a deeper issue. If central bank actions supporting financial stability are justified with a view to the central bank's macroeconomic mandate, actions that endanger financial stability might also be justified with a view to the central bank's macroeconomic mandate. A central bank that sees its macroeconomic mandate endangered because private banks are very cautious might be tempted to ask the private banks to take more risks. For example, if, at the onset of a recession, private banks are becoming cautious in their lending, a central bank that wants to smooth the recession might put pressure on the private banks to be less cautious.⁴³ If lending in bad times is actually risky, such behaviour can contribute to subsequent financial instability. Moreover, this instability is likely to involve problems of bank solvency, not just bank liquidity.⁴⁴

Similarly, if the central bank has a sense that the private banks' desire to hold reserves of central bank money impedes their lending to non-financial firms and indirectly harms the central bank's macroeconomic mandate, pressures to change this behaviour may entail risks for future financial stability, either from the additional lending or from the fact that sources of liquidity other than deposits with the central bank are less reliable.

⁴² See, in particular, Bernanke, Gertler and Gilchrist (1999).

⁴³ Episodes of this sort have been reported in the literature about the Federal Reserve under Alan Greenspan; see, e.g. Woodward (2000).

⁴⁴ As discussed in Hellwig (2014b), a similar conflict can arise in macro-prudential policy: should we think of macro-prudential policy as a policy intended to stabilise the macroeconomy or as a policy intended to stabilise the financial sector? In a recession, encouraging weak banks to lend may contribute to stabilising the macroeconomy while putting the banks even more at risk and endangering financial stability. On this point, see also the discussion in Section 4 below.

Regardless of whether the central bank's macroeconomic mandate is formulated in terms of price stability or in other terms, subsuming financial stability under this mandate is problematic because in some situations the two mandates can be in conflict. It is desirable to bring the conflict into the open.

This consideration suggests that an explicit financial stability mandate would be desirable. Certainly a double mandate, for financial stability as well as price stability, raises questions of accountability. However, these questions must be asked anyway. If the mandate of the central bank is defined solely in terms of price stability, and financial stability concerns enter if and only when the central bank is willing to subsume them under the price stability mandate, accountability is also unclear. If the central bank has a double mandate, it will at least be forced to account for how its policies relate to each of the two dimensions of stability.

What about Bagehot's rule?

We have now come full circle from Bagehot's analysis of the lender of last resort to a more macroeconomic focus on price stability, inflation and in some countries employment, and back to a concern for financial stability, the latter on the presumption that, without financial stability, there is little hope for macroeconomic stability. What about Bagehot's rule then? Lend freely to solvent banks, against good collateral and at penalty rates.

Bagehot's rule addresses three concerns: First, the central bank should invest prudently in order to avoid risks and losses from its assets as far as possible. Second, the central bank should minimise moral hazard from expectations that banks will be bailed out. Third, the central bank should not prevent the closure of insolvent banks.

All three concerns are important but one may wonder why there is no discussion of trade-offs. The benefits from central bank intervention are not mentioned. The prescription to lend freely in a liquidity crisis is motivated by the desire to limit the crisis and is presumably justified by the benefits from doing so. Why then do we not see a trade-off between costs and benefits in the rule?

Putting the question differently: could it be that, in some crises, it might be appropriate to depart from the rule and to lend even to banks whose solvency is in doubt, even against poor collateral and at low rates? This is of course what central banks have done in the recent crisis.

An example from history may illustrate the point.⁴⁵ The German banking crisis of 1931 began with a run on Danat Bank, which was greatly exposed to the fallout from the bankruptcy of Nordwolle, a large textile company. The Reichsbank continued to lend to it through its discount facility even though it must have been clear that Danat Bank was insolvent and even though the collateral no longer satisfied the Reichsbank's usual criteria. At some point, the Reichsbank had to stop doing so because it had hit the limit

⁴⁵ For accounts of the episode, see Born (1967) and Schnabel (2004, 2010). Schnabel emphasises the moral hazard involved in the large banks' reliance on the Reichsbank's discount facility, which was based on a long tradition of preferential treatment for these banks. In contrast, Schnabel, Ferguson and Temin (2004) emphasise that the 1931 crisis involved a macro shock, namely the run on the Reichsmark that was triggered by Chancellor Brüning's call for a moratorium on German reparations. The day-by-day account of the crisis in Born (1967) suggests that the effects of the Brüning speech were subsiding when the Nordwolle bankruptcy reignited the run on Danat and Dresdner Bank. Schnabel's bank-by-bank data analysis also shows that Berliner Handelsgesellschaft, which had more foreign funding than the other banks, was better able to withstand the storm because they had better liquidity and moreover their solvency was not in doubt.

set by the requirement that 40% of its money issue must be covered by gold and foreign exchange. At that point, there was a universal run, and the banks had to be closed. The consequences of the crisis for the overall economy were terrible. Over the six months that followed, the economic depression became much worse.

In this episode, developments in the months after the crisis suggest that it would have been better if the Reichsbank had been able to continue its support of banks. Does that assessment include Danat Bank? Or should the Reichsbank have stopped its support for Danat Bank as soon as the bank's solvency was in doubt? One might argue that, if the Reichsbank had not supported Danat Bank, it would not have hit the 40% limit for the coverage ratio and the peak of the crisis would have been avoided. But that argument merely diverts attention away from the substantive question of whether a financial stability mandate, in particular one that is justified by macroeconomic concerns, might not justify a departure from Bagehot's rule.

If we base our reasoning on the ultimate macroeconomic objectives, the answer seems clear: if the danger of a crisis is very large, then even support for banks whose solvency is in doubt may be warranted because, in terms of the ultimate objectives, the costs of a default might be too large. Concerns about risks and losses from the central bank's intervention, as well as concerns about moral hazard from the availability of central bank transactions, are very important, but these concerns must be present in all central bank decisions and must be treated as a part of the trade-offs that the central bank is facing.⁴⁶ As one is taking account of the trade-offs, the actual decisions will depend on assessments of costs and benefits in the given situation, and, if the situation is serious enough, concerns for damage prevention may justifiably outweigh the concerns about moral hazard and credibility.

In respect of the concern that central bank support should not prevent the closure of insolvent banks, the argument is less clear-cut. By preventing the closure of an insolvent bank, the central bank may avert an immediate crisis, but it leaves an important problem unsolved. Banks that are insolvent or that are on the verge of insolvency create problems for the health of the industry and for the overall economy. If they behave defensively, trying to cover up losses on their assets, they are likely to engage in poor lending strategies, wasting resources and harming economic growth.⁴⁷ If there is excess capacity in the industry, the preservation of insolvent banks keeps the problem alive and may force all banks to pursue excessively risky strategies in order to survive in an intensely competitive environment.⁴⁸ In either case, support from the central bank that allows the solvency problems of banks to persist bears significant risks for the longer run, for financial stability and for the ultimate macroeconomic objectives of monetary policy.⁴⁹

⁴⁶ In this context, it is worth noting that concerns about risks and losses on assets are less serious in a paper money regime with flexible exchange rates than in a regime in which the central bank's notes are genuine debt and the central bank itself might be in danger of defaulting.

⁴⁷ This effect has figured prominently in the Japanese crisis of the past two decades. See Hoshi and Kashyap (2004, 2010). Caprio and Klingebiel (1996, 1997) show that generally delays in the resolution of banking problems can be very costly and very damaging.

⁴⁸ An example of this effect can be found in covered bond finance after the 2005 change in legal rules in Germany, which facilitated entry. In subsequent years, competition in this segment of the industry was so intense that participants could only survive by engaging in extreme maturity transformation for the funding of the excess coverage. Banks such as Dexia and Hypo Real Estate, which did not have much of a deposit base, had to do this through wholesale markets and were therefore extremely vulnerable to problems in these markets.

⁴⁹ For a comprehensive treatment, see ASC (2012).

4 Moral hazard and prudential supervision

Moral hazard and other forms of malfunctioning in the financial sector should in principle be contained by prudential regulation and supervision. Ex ante, prudential supervision should help contain the build-up of risks. Ex post, when risks have materialised, the supervisors should help contain the damage. In particular, they should make sure that solvency problems are promptly dealt with.

The problem of hidden insolvencies

However, to deal with solvency problems, one must first identify them. This may be difficult because, unlike default, insolvency is a theoretical concept which is difficult to verify in practice. By a standard criterion, a firm is insolvent if the value of its assets is less than the value of its liabilities. If this criterion is met, we infer that, at some point, the firm will not be able to pay its debts, and we conclude that the situation should be remedied right away. Early intervention would avoid further damage that might arise because borrowers facing a prospect of bankruptcy have highly distorted incentives.⁵⁰

But comparing the values of assets and liabilities is anything but clear-cut. What is the value of assets when there are no market prices? For example, what is the value of an assembly line in an automobile factory? As a going concern? In liquidation? And what is the value of a loan in a bank's books? Even if market prices are available, should we take them seriously? Or should we say that these valuations are depressed by panic and fire sales?⁵¹ If Lloyds Bank found it appropriate to sell a portfolio of shipping loans at a 50% discount, should we require that all banks apply such a discount to their shipping loans?⁵² Or should we accept the view that the shipping crisis will soon be over and, if these loans are held to maturity, losses will be much smaller?⁵³

In the absence of market prices, valuations require forecasts, and these forecasts involve an element of discretion. Incumbent managers and owners tend to use this discretion to their advantage, claiming that "appropriate" asset values are high, and the firm has no solvency problems. By this procedure, they may keep the firm going until it actually defaults because it no longer has the cash to meet its commitments.

In the case of a bank, default may come quite early because the bank's short-term funding may disappear if creditors are afraid that the bank might be in trouble. The bank's managers may then assert that the bank has only a liquidity problem and appeal for emergency liquidity assistance to overcome this problem, which it claims is just temporary. The central bank must then ask itself how justified the appeal is. For this purpose, it needs an assessment of what the bank's assets actually are. This is where the supervisors come in.

⁵⁰ For a detailed account of problems resulting from hidden insolvencies, see Admati and Hellwig (2013), Chapter 3.

⁵¹ This was a key issue in the discussions about fair-value accounting in 2008/2009. See IMF (2008).

⁵² Reported by Handelsblatt, 20 April 2013.

⁵³ This was the view of the state of Hamburg in 2013 when it asked the legislature to approve an increase in the Government's second-loss guarantee for HSH Nordbank from EUR 7 billion to EUR 10 billion. For a critique, see Hellwig (2013).

Forbearance and procrastination

If the bank in question is small and if there is a prospect that the problems can be eliminated without further repercussions, the supervisors are likely to deal with the matter very promptly. A typical example would be a regional bank of moderate size that can be sold to a larger bank, which is happy to use the occasion to expand its deposit base.

The matter is different if the bank in question is important in size, has systemic relevance or political influence, and if the supervisor sees no way of dealing with the problem without generating major turmoil. In this case, the supervisor may well join the bank's managers in assessing its assets, e.g. non-performing loans as being more valuable than they really are. Closing one's eyes to the fact that the creditworthiness of loan customers and collateral values are questionable may be a convenient way to avoid disagreeable and costly interventions. From the perspective of the central bank, which is expected to act as the lender of last resort, this is a second layer of moral hazard, now at the level of supervisory activity.

There are several reasons for this moral hazard. First, intervention is always costly. If a bank is in serious trouble, dealing with the matter by a recapitalisation requires money, and a resolution may bring turmoil to the economy. Moreover, governments and supervisors must deal with public scandal as people ask why the problems have been allowed to arise and why they have not been dealt with before. Kicking the can down the road and hoping for the best may therefore seem like an attractive alternative.

If the banks in question are extremely large or if there are very many of them, the problem may also be too big to handle because the public funds needed to avert the negative fallout from the crisis may exceed the government's fiscal capacity. Thus when the Swedish government intervened very promptly to clean up the banking system in 1992, it lacked the fiscal capacity to also smooth the recession (which however was short, thanks to the clean-up of the banking sector and to the trade effects of currency devaluation). Limited fiscal capacity has also played a major role in the handling of banking problems in some countries in the euro area since 2010.

Second, banks are political. This is especially true of public banks like the German Landesbanken, whose lending policies are often tailored to the interests of the regional governments that own them. More generally, many political authorities (and their voters) think of banks as institutions that should serve to fund their policies, promoting the government's industrial policy or simply funding the government itself.⁵⁴ In some cases, governments' industrial policies have been focused on the banks themselves, using financial institutions that attract funds from the rest of the world and invest funds in the rest of the world as a tool for creating high-paying jobs very quickly.⁵⁵ With such a policy stance, governments are not likely to engage in active interventions that would force the banks to lay open their losses and either recapitalise or retrench their activities. And the supervisors are likely to be pressured into taking a passive stance towards these banks.

Forbearance and procrastination are likely to be reinforced by fiscal concerns if a government is financially squeezed and a recapitalisation of weak or insolvent banks would impose a large fiscal burden. This effect is even stronger if the government expects the central bank to step in, providing commercial banks with

⁵⁴ For a more detailed discussion, see Chapter 12 in Admati and Hellwig (2013).

⁵⁵ This has been the experience of Iceland, Ireland and Cyprus. More traditional financial centres, such as the United Kingdom or Switzerland, have also seen economic growth fuelled by promoting the financial sector as an export industry but their dependence on this sector has been somewhat less pronounced.

cheap loans in order to support the monetary system. And, as mentioned in the introduction, the effect is stronger yet if central banking is supranational and banking supervision national so that the costs of central bank intervention are partly borne by others.⁵⁶

Light-touch regulation and supervision ex ante

These concerns about supervision are not limited to forbearance ex post. Similar concerns arise with respect to supervisory behaviour ex ante, at a time when the risks are building up. According to a well-known saying, it requires courage to take away the punch bowl while the party is going on. This saying applies to supervision as well as the monetary policy that may have fuelled the build-up.

As a matter of principle, supervisory intervention that puts a brake on new business developments may seem contrary to the principles of a market economy, which require that private sector institutions be allowed to innovate, which is inherently risky. In some countries, this concern has a legal dimension. If new practices have not been explicitly prohibited, the supervisor may not have the legal authority to do anything about them.⁵⁷

Even if supervisors do have the requisite legal authority, their governments may prevent them from using it. In the years before the financial crisis, “light-touch regulation” was a major selling point by which some countries built up their financial industries. This light-touch regulation contributed significantly to the risky practices that banks in those countries pursued – and also contributed significantly to the problems these countries have experienced in 2008 and subsequently. Even in countries that did not pursue this kind of industrial policy, political concerns for politically important banks seem to have affected supervisory behaviour in the years before the crisis, with significant consequences for the extent of damage caused during the crisis.

Systemic risk and macro-prudential supervision

At a deeper level, in the past a supervisory perception of problems ex ante has been hampered by a focus on individual institutions that characterises traditional micro-prudential supervision. Such a focus is natural because regulation and supervision are the activities of an administrative authority, which imposes certain requirements on individual financial institutions, monitors these institutions and takes administrative decisions as to what they can and cannot do. However, as one is looking at risks in individual institutions, one may not see the forest for the trees. Specifically, one may miss the fact that similar exposures at different institutions are creating a risk of a systemic crisis due to a macro shock that affects all institutions simultaneously. One may also overlook the systemic risks that arise from correlations between counterparty credit risks and underlying risks in a complex and highly interconnected system of risk

⁵⁶ For an extensive discussion of such externalities in the euro area, see Hellwig (2014a).

⁵⁷ For example, the German supervisor has claimed that it lacked the legal authority to prohibit the regulated banks’ providing large liquidity guarantees to their off-balance-sheet special purpose vehicles that enabled them to hold vast amounts of asset-backed securities (ABS) and CDOs without equity; by the letter of the law, such guarantees did not come under existing large-exposure rules because their maturities were less than a year; never mind that the assets that needed to be funded had longer maturities. Given the German tradition of administrative law, which is hostile to extensive exercises of judgment on the part of administrative authorities, the supervisor’s assessment of the legal situation may actually have been correct. Such country-specific legal traditions may cause problems for the Single Supervisory Mechanism, which in the area of European Directives applies the national laws that implement these directives, presumably subject to national judicial review. See Hellwig (2014a).

management through derivatives and other hedges. For example, financial institutions and their supervisors seem to have overlooked the fact that, if the credit risks from ABS CDOs were hedged by credit default swaps and if the insurers who provided the hedges had lots of such positions, the underlying credit risks might merely be transformed into the counterparty risk that the insurers might not be able to pay. Needless to say, these counterparty credit risks were highly correlated with the underlying risks.⁵⁸

We can hope that this blind spot will disappear with the further development of macro-prudential supervision.⁵⁹ However, macro-prudential supervision requires quite a different perspective. Even if one takes that perspective, one may find it difficult to see new systemic risks that are developing as the financial sector is trying out new strategies. Whereas in the 1970s and 1980s, it might have been enough to observe the parallel exposures of different institutions to conventional macro shocks, from interest rates, exchange rates or the macroeconomy, in the 2000s, much of the macro risk was hidden in a complex network of contracts, where individual institutions and their supervisors overlooked the role of the correlations discussed in the preceding paragraph. And everybody overlooked the systemic risks from fire sales and asset price declines imposing losses on all banks that were holding the same kinds of assets.

The very distinction between micro-prudential and macro-prudential supervision is a problem. This distinction may be unavoidable because, as mentioned, on the ground, supervision concerns the individual institution, the micro-level. However, if different institutions are subjected to the same regulatory rules and supervisory practices, these rules and practices have a macro-prudential and macroeconomic dimension. The distinction between micro-prudential and macro-prudential supervision should not lead us to overlook this macro-prudential dimension of micro-prudential supervision. This is a challenge that we have not yet come to terms with. The challenge is made more difficult by the fact that, as different institutions are involved in micro-prudential and macro-prudential supervision, the discussion about semantics is also a discussion about turf.

The danger for monetary dominance

The weakness of financial institutions puts the central bank on the spot. If the central bank takes its monetary policy mandate seriously and if it takes account of the role of financial institutions in the monetary system, it has hardly any alternative to a policy of neutralising the effects of adverse financial developments, which often means providing support to financial institutions or financial markets. In this situation, the independence of the central bank is undermined, not because of any explicit challenge but because a central bank that takes its mandate seriously finds itself in a straitjacket.

Monetary dominance, a regime in which the other actors take the central bank's policy as a given and adapt their behaviour accordingly, is then replaced by what I would like to call financial dominance.⁶⁰ By this I mean that central banks take the situation of the financial system as a given and adapt their policies accordingly. Sometimes, financial dominance involves a form of hidden fiscal dominance, a situation where the weakness of private banks is a result of them having been and being pressured into funding

⁵⁸ A comprehensive account of systemic effects in the financial system is given in Hellwig (2014b).

⁵⁹ Interestingly, the counter-cyclical provision of the Banco de España, which has become the paradigm for macro-prudential regulation seems to have been introduced initially for reasons of monetary policy, i.e. to fight inflation when entry into the currency union caused interest rates to fall dramatically, rather than prudential concerns.

⁶⁰ The term was suggested to me by Hans-Helmut Kotz.

their governments and where central bank support provides these governments with indirect access to the printing press.

In practice, the distinction between financial dominance and hidden fiscal dominance is often moot because problems in the financial sector and in government finances are linked. In the euro area in recent years, we had both: banking crises that caused sovereign debt crises and sovereign debt crises that caused banking crises. In some countries, for example Greece, old-fashioned sovereign debt crises, which had been caused by the failures of political systems to set priorities so as to make ends meet, spilled over into the financial sector because sovereign default imposes large losses on creditors, and sovereigns had used their powers to induce “their” banks into funding them. In other countries, for example Ireland, equally old-fashioned banking crises that had been caused by boom-and-bust developments in real estate markets caused sovereign-debt crises when the fallout from the banking problems exceeded their fiscal capacities.⁶¹

Under the Memoranda of Understanding for how to deal with banks in difficulties that were concluded in the early 2000s, solvency problems of banks in the euro area were to be handled by national governments, liquidity problems of individual institutions by the national central banks, and liquidity problems of the entire system by the ECB.⁶² In a situation where both government finance and the banking system are in trouble, this assignment of responsibilities prevents a clean-up in the financial sector. At the national level, the incentives for forbearance and procrastination that I discussed earlier are then particularly strong. If at the same time national governments and supervisors appreciate that those weak banks’ access to central bank funding enlarges their own funding capacity, there is little that the central bank can do about it.

5 Challenges for institution design and policy

Must supervision be in the domain of central banks?

Institutional arrangements for the relationship between central banking and bank supervision have forever been a subject of debate. Goodhart (1988) argues that the supervisory functions of the central bank arose naturally from the central bank’s role in stabilising the financial system and, if necessary, acting as the lender of last resort. The potential for moral hazard on the side of private banks that was thereby induced was recognised early on, and supervision was introduced as a means of containing this moral hazard. However, Goodhart also notes that, in some countries, central banking and supervision have been kept separate from the beginning.

Over time, attitudes to this issue have shifted back and forth. The United Kingdom separated central banking and financial supervision in the 1990s and joined them again very recently. In Germany, when BaFin was created in 2001, the government initially proposed to take all supervisory activities away from the Bundesbank; yet faced with strong resistance from the Bundesbank, the government kept the previous system of having separate institutions, with BaFin in charge of actual decision-making, but inspection

⁶¹ For detailed accounts of the different kinds of crises, see Hellwig (2011, 2014a).

⁶² For a critical discussion, see Hellwig (2007).

activities carried out jointly by the two institutions.⁶³ Subsequently, in 2009, the incoming government proposed that all supervisory activities should be transferred to the Bundesbank, but the Bundesbank itself demurred when it realised that this task might threaten its independence. Since the crisis, there has been a trend for putting financial supervision into the central banks although there is no evidence that the scope and effects of the financial crisis were any different in countries where banking supervision was with the central bank and in countries where banking supervision was in the hands of a separate authority.

In the euro area, originally the fact that central banking is supranational and banking supervision national implied that the two were separate as a matter of course. As we are now moving to a banking union, the ECB will be in charge of the Single Supervisory Mechanism. As far as I can tell, this is not the result of conscious deliberation, but a consequence of the fact that the decision-makers at the euro area summit in June 2012 wanted to avoid a Treaty change, which would have delayed the whole procedure. The SSM was created under the auspices of Art. 127 (6) TFEU. Under this article, the ECB can be given specific tasks in banking supervision by a Council Regulation.⁶⁴

Even though the outcome has been determined, it is worth discussing its merits. The following considerations seem relevant: first, given the importance of financial institutions in the monetary system, the central bank must have the best possible information as to what the state of the financial system actually is. This is an argument for having the two activities in one institution. If one has them in separate institutions, one must make sure that the requisite information flows are not unduly impeded by flawed incentives, e.g. concerns about turf or desires to hide bad developments. If the institutions are separate, it seems important to organise the actual inspections so that they are done by both institutions jointly, as is the case with BaFin and the Bundesbank.⁶⁵

Second, to protect the substance of central bank independence, it is important to reduce the scope for moral hazard to erode that independence. As discussed in the preceding section, such moral hazard comes not only from the financial institutions themselves but sometimes also from political authorities. This is an argument for making financial supervisors independent of political authorities, as is done in Art. 19 of Council Regulation (EU) No 1024/2013, the regulation that created the SSM. If one fears that a separate supervisory authority might also develop its own agenda, this is also an argument for having supervision directly in the central bank.

However, the substance of central bank independence may also be threatened if the central bank is in charge of supervision and is held responsible for any problems that might arise in the financial sector. In this case, the central bank itself might delay the resolution of banking problems, hoping that the problems might disappear on their own if enough time is allowed to pass. The 1990 turnaround in US monetary policy provides an example, moreover one where a policy of delay and support to the system was successful. However, as mentioned above, delays are not always the best strategy and one must fear that

⁶³ Technically, inspectors are from the staff of the Bundesbank but BaFin has the ultimate say. In a report written for the Federal Ministry of Finance after the financial crisis, Hartmann-Wendels et al. (2010) analyse how this procedure actually works. It seems that, before BaFin actually gets to see the inspectors' reports, a lot of pre-filtering of information takes place within the Bundesbank. On the resistance of the Bundesbank in 2001, see http://www.bundesbank.de/Redaktion/EN/Downloads/Press/Pressenotizen/2001/2001_01_25_statement.pdf?__blob=publicationFile

⁶⁴ As an outsider to the legal community, I was somewhat amazed to see that a norm that allows the ECB to be given "specific tasks in banking supervision" would be sufficient for putting it fully in charge.

⁶⁵ See Hartmann-Wendels et al. (2010).

some of the incentive distortions that bias such decisions will affect central bankers as well as supervisors in separate institutions. Indeed, the distortions can be larger if the central banker puts more weight on the immediate macroeconomic and monetary situation and discounts the costs to future financial stability.

These concerns are particularly relevant if the central bank is tempted to use its power over financial institutions to make these institutions take actions that may seem desirable from the central bank's own macroeconomic perspective but are problematic for the institutions' safety. Above, I discussed this problem in the context of the relationship between the central bank's macroeconomic mandate and financial stability. Even if the central bank has a financial stability mandate, there is a problem relating to how it manages the trade-off when the two mandates are in conflict. This problem is particularly pronounced if the pressure that the central bank can put on market participants derives not only from its own market power but also from its power as the administrative authority in charge of supervision.

This brings me back to a point I made in the very beginning. Central banking is a form of banking, not an administrative activity. Supervision is an administrative activity. Putting the two under the same roof raises questions about culture as well as procedure. An administrative activity involves the imposition of statutory authority on individuals and institutions under given legal norms, presumably subject to judicial review.⁶⁶ By contrast, central bank policies are implemented by market transactions where counterparties are in principle free to decide whether they wish to participate or not. These are two very different modes of procedure. If integration of the two activities is all too complete, it might happen that, by threats or by promises, administrative practices become part of the "exchanges" of the central bank with its counterparties in the financial sector. As shown by the experience of the United States with the "Greenspan put", such "exchanges" bear the risk of corrupting the governance of both supervision and monetary policy.

To avoid these risks from having central banking and supervision under the same roof, it is important to develop institutional arrangements and procedures that maintain the requisite separation of administrative activities from central banking activities while making sure that the central banking side of the institution gets all the information it needs about the state of the financial system. In particular, relationships between the supervisor and individual institutions must be immunised against any influence that is based on how well the institution is playing along with the central bank's monetary policy objectives.

The regulation creating the SSM provides for some such separation. However, the experience with "Chinese walls" in other institutions suggests that this may be a major challenge. Chinese walls are not effective just because they are in the rules but because the institution is willing to live by those rules. This is ultimately a problem for the institution's leadership.

What place for macro-prudential supervision?

Institution design is complicated by the distinction between micro-prudential and macro-prudential regulation and supervision. The concept of macro-prudential regulation and supervision has been

⁶⁶ Council Regulation (EU) No 1024/2013 does not seem to say anything on the subject of judicial review of administrative decisions. This may be a problem, especially since much of the supervisory activity takes place under national law implementing the European Directives.

introduced in order to fill the gaps that appeared because traditional micro-prudential regulation and supervision were focused on individual institutions and paid little attention to the overall system. As yet, however, the scope and objectives of macro-prudential regulation and supervision are unclear.

As discussed in Hellwig (2014b), the term “macro-prudential regulation and supervision” encompasses (i) Crockett’s (2000) notion that we must be worried about correlated exposures of different institutions to macro shocks, (ii) the use counter-cyclical provisioning as carried out by the Banco de España in the years before the crisis, and (iii) a view that a better understanding of systemic risk and macro risk might have led to better policies in the years before the crisis. “Systemic risk” is sometimes identified with risks from the financial system to the macroeconomy, sometimes with risks from the macroeconomy to the financial system, and sometimes with risks of shock propagation within the financial system. As yet, however, we do not yet have an encompassing conceptual framework to understand how these different concerns fit together and how they relate to either micro-prudential regulation and supervision or monetary policy.

Macro-prudential supervision involves two distinct activities. One concerns the observation of systemic risks in the economy. This activity differs from both micro-prudential information collection and monetary analysis. In contrast to micro-prudential information collection, the analysis of systemic risk focuses on interdependence between financial institutions or between the financial system and the rest of the economy, rather than individual institutions. In contrast to monetary analysis, the analysis of systemic risk focuses on the microstructure of the financial system, rather than broad aggregates. Because patterns of interplay and interdependence in the financial sector are forever changing, the analysis of systemic risk cannot start from any fixed model of how risk in the financial sector is allocated and how participants in the financial sector interact. Instead, the analysis of systemic risk must start each new day with the question of what the “story” behind current developments in risk allocation is. Conceptually, this approach is closer to monetary analysis than to supervision, but even so, it is a far cry from working with well-established quantitative models with fairly rigid structures⁶⁷.

The other part of macro-prudential supervision concerns the use of macro-prudential tools such as rules for counter-cyclical capital or liquidity buffers, loan-to-value ratios in real-estate lending, or haircuts and margin requirements. Technically, these rules differ from micro-prudential rules only in that they fluctuate over time in accordance with the macro-prudential authorities’ assessments of the situation. As a practical matter, these rules may even be implemented by the micro-prudential authorities that are in charge of dealing with the individual institutions.

The relationship between macro-prudential supervision and micro-prudential supervision raises the following questions:

- How do the macro-prudential institutions get the information they need? The clear distinction between macro-prudential and micro-prudential supervision creates a danger that activities will be compartmentalised and that the macro-prudential authorities will not have access to the information about individual institutions that is available to the micro-prudential supervisors. Yet, understanding

⁶⁷ From my own experience, I would say that the closest analogue is in competition policy where each case must be studied on its own terms, without any preconception about the mode of competition in the particular markets under consideration. Look at the data, see what they imply for abstract concepts such as marginal cost curves or, for systemic risk analysis, risk shifting between parties, reflect upon which model or set of models might be useful, consider the implications of different models for observables, and go back to the data to check. If necessary, try to collect additional data. Also, if necessary, repeat the procedure a few times.

the risk allocation “story” behind current developments in markets usually requires some information on how individual institutions take risks, hedge risks and see the risks they are exposed to.

- How do the macro-prudential supervisors make sure that micro-prudential supervisors do not counteract their policies? As micro-prudential policies are applied to all affected institutions at the same time, these policies necessarily have a macroeconomic dimension. Unless the decisions of the different authorities are coordinated, there is a danger that micro-prudential policies might neutralise macro-prudential measures.

The relationship of macro-prudential supervision with central banking and monetary policy raises the following concerns:

- What is the objective of macro-prudential supervision? Is it to stabilise the macroeconomy by immunising it from the vagaries of the financial sector? Or is it to promote financial stability, by, for instance, immunising the financial system against shocks from the macroeconomy? As was discussed above, financial stability objectives and macroeconomic stability objectives need not always coincide. If the banks are weak and the economy is in a recession, do we want the banks to continue lending, so as to reduce the credit crunch, or do we want the banks to clean up their balance sheets, so as to reduce risks to financial stability?

Some might say that there is no conflict: if the economy goes more deeply into a recession, the weakness of banks will become even greater. Alternatively, if we do not get the banks out of the mess they are in, we cannot expect to achieve a sustained macroeconomic recovery. Seeing these arguments side by side, one appreciates that the question really concerns the dynamics of stabilisation policy. Forbearance with respect to the banks’ problems may reduce a credit crunch and recession today but bears the risk of an even bigger credit crunch and recession in the future. A clean-up of the financial system today may deepen the recession but bears some hope of a healthy resumption of lending once banks are properly recapitalised.⁶⁸

- How do the administrative activities of macro-prudential supervision go together with central banking? The issues are basically the same as for micro-prudential supervision. Whereas central banking and monetary policy are focused on day-to-day policy choices that are mostly implemented through transactions with counterparties on a quid pro quo basis, macro-prudential as well as micro-prudential supervision involves the imposition of administrative rules by government fiat, presumably. These are two very different modes of operation.

In substantive terms, I see a certain danger that, if macroeconomic stability and monetary policy goals dominate, the powers of macro-prudential as well as micro-prudential supervision might be used to impose on banks for monetary policy purposes. Such an approach is problematic, especially if, for monetary policy purposes, banks are encouraged to take additional risks.

As yet, we do not have a clear conceptual framework for dealing with these issues. However, we need such a framework if we are to make sense of institution design.

⁶⁸ The two alternatives may loosely be described as the Swedish and the Japanese strategies for dealing with the crisis of 1992. The Swedish authorities intervened promptly to clean up their banking system; the cost was a very sharp recession, while the return was a quick recovery. In contrast, the forbearance exercised by the Japanese authorities towards their banks contributed greatly to the long period of low growth in Japan. See, for example, Hoshi and Kashyap (2004, 2010).

Resolution as the elephant in the room

Whereas some of the concerns about moral hazard in supervision that I raised above are related to politics, in particular national politics, the issue of how to deal with banks in difficulties poses a serious problem and a threat to central bank independence no matter how supervision is organised. The most careful and most professional supervisor is helpless if there is no practical way of dealing with problem banks.⁶⁹ The Lehman experience has made us all very sensitive to this issue. We learnt that “too big to fail” is not a myth: letting a bank fail can indeed have catastrophic consequences, and can be much costlier than a bailout.

Since the Lehman crisis, authorities worldwide have been torn back and forth between two concerns: on the one hand, the desire to avoid a repetition of the post-Lehman panic; on the other hand, the desire to develop procedures for dealing with problem banks that would avoid the kind of tsunami that we saw in September 2008. In the European Union, the Bank Recovery and Resolution Directive (BRRD) and the Single Resolution Mechanism (SRM) are part of this programme.

However, I am not convinced that the changes in resolution procedures that we have had are really likely to make resolution viable. Many of the reforms that have been instituted, such as the Dodd-Frank Act in the United States or the German Bank Restructuring Act of 2010, are likely to prove impractical if we get into another crisis. The BRRD and SRM are hardly better.

I have three main concerns. First, for banks with systemically important operations in different countries, multiple entry resolution with different procedures in each country, where there are legally independent subsidiaries, destroys the viability of operating procedures that presume integration. In the case of Lehman Brothers, with integrated cash management, the UK authorities found that there was no cash in the London subsidiary because all its cash had gone to New York at the previous close of business. As a result there was no way to even temporarily maintain systemically important functions (market making) in London. I am told that integrated IT systems may pose even more serious problems.

Second, the BRRD and SRM pay hardly any attention to the need to maintain funding. Any maintenance of systemically important operations requires funding. Market funding, however, is likely to vanish unless creditors are given guarantees that they will not be harmed. In ordinary insolvency law, the problem is solved by giving new creditors priority over pre-insolvency creditors. However, this only works if (i) freezing the old creditors has no dramatic systemic effects and (ii) the need for new funding is small enough for the new funding to be relatively safe if it is given priority. In the case of banks with enormous amounts of funding from wholesale short-term creditors such as money market funds and with enormous derivatives positions neither condition is satisfied. As the experience of the Reserve Primary Fund and other money market funds after the Lehman bankruptcy has shown, systemic effects from a freeze of short-term claims can be disastrous, with a run on money market funds forcing these funds to withdraw their own funding of banks and making all participants scramble for cash.

The BRRD tries to avoid such consequences by exempting certain liabilities from “bail-in”, i.e. the assignment of losses to creditors in resolution. In particular, collateralised liabilities and derivatives (up to the value of the collateral) as well as very short-term liabilities to other financial institutions are exempt. Presumably the legislators hope that these exceptions will preclude runs in resolution. I do not share this

⁶⁹ ASC (2012), Sapir et al. (2012).

hope. If a bank is put into a resolution regime, short-term creditors may decide to run even though they are exempt from bail-in. Money market funds may be forced to do so because otherwise their own customers might run, as happened in September 2008. Or they might fear that, through abuses of re-hypothecation and the like, the collateral for their claims might not be sufficient.

The various resolution and restructuring funds that are being instituted cannot provide much help with the funding problem. Maintenance of funding requires guarantees in the order of hundreds of billions of euro. These amounts are much larger than the amounts considered for the various European funds. In the United States, the problem is solved by providing the authority with access to loans from the Treasury. In the European context, however, the fiscal backstops that are in place or under consideration are too weak to provide investors with the assurance they will require.

Third, whereas the numbers involved in solvency problems are likely to be much smaller than funding needs, I still have doubts about the scale of the backstops that are in place or under consideration. I also have doubts whether bail-ins will be as effective as is presumed in the new legislation. In the savings and loan crisis of the 1980s in the United States, the industry was in such difficulty that it could not bear the costs of the crisis; the Federal Savings and Loans Insurance Corporation (FSLIC) became insolvent and was merged with the Federal Deposit Insurance Corporation (FDIC). Out of USD 153 billion of losses, in the end the industry paid USD 29 billion and taxpayers USD 124 billion.⁷⁰

This example may be seen as atypical in that most savings and loan funding in the United States had come from deposits, which were federally insured. Thus there was little room for clawbacks or bail-ins of creditors. One may therefore hope that ultimate losses in bank resolution will be smaller if more creditors are bailed in, i.e. if more creditors are forced to participate in losses as they would have to do if the bank entered a bankruptcy or insolvency procedure. On this point, however, I am not very hopeful, despite the fact that the new legislation contains a "bail-in tool". The Lehman crisis and the post-Lehman bailouts have created a strong lobby against any creditor liability. Forcing creditors to bear losses, we are told, entails a danger of systemic risks from domino effects, as those creditors themselves may be too weak to absorb those losses, or as the realisation that creditor liability must be taken seriously hurts the funding conditions of other banks.

Given these concerns about resolution, I fear that the problem of forbearance and procrastination in dealing with banks in difficulties will not be resolved by the SSM and the integration of supervision into the ECB. If such decisions are within the purview of the central bank, they will not be subject to the same distortions as they have been so far. However, they will be subject to different distortions. The reasons may be different, but the temptation to kick the can down the road will be there as long as we do not have a resolution procedure that we can trust. In the end, the ECB may be in an even tighter straitjacket than it was before the introduction of the SSM.

Of the problems I have mentioned, the multiple entry problem will only be solved if we have an international accord in favour of single entry. However, this would presume an agreement on how to share losses that gives the participating countries sufficient confidence that their interests will not unduly suffer in the procedure. Unfortunately, such an agreement seems far away.

⁷⁰ See Curry and Shibut (2000).

The funding problem can easily be handled by the central bank itself if it has the assurance that any losses will be covered by a fiscal backstop. In the medium run, I believe that banking union will require some Europeanization of fiscal responsibility for banks. This would somewhat defuse the issue of loss sharing in dealing with banks with systemically important operations in different countries, making single entry resolution more palatable.⁷¹ It would also protect the ECB if it were to provide support for funding in resolution.

Most importantly, a Europeanization of fiscal responsibility is necessary for the protection of monetary policy. As long as the assignment of fiscal responsibilities prevents a clean-up of the financial system, the independence of the central bank's monetary policy is undermined by the weakness of the financial sector.

Fiscal responsibility and independence

In many countries banking supervision has traditionally been the domain of the finance minister. In the euro area, this has now changed because, under the SSM, all supervisory authorities are independent. This independence may give rise to legal controversy in the future.

The previous arrangement could be justified on the grounds that, if banks that are too big, too systemic or otherwise too important to fail, ultimately, the risks of poor banking supervision are borne by the taxpayer, and therefore the finance minister should be in charge. However, if we look at the actual record of how banking supervision was carried out under the authority of finance ministers, a good case can be made for independence.⁷² As discussed above, governments have all too often seen their banks as a source of funding rather than a source of risks, using them as both tools and objects of costly industrial policies without much concern for the potential costs to taxpayers. Moreover, in the monetary union, national political sovereignty over financial supervision induces serious distortions if national politicians expect the costs of their actions to be at least partly borne by the central bank.

As a matter of constitutional law, however, the new arrangement, with the independence of supervisory authorities, may be questionable. Certainly there may not be much of a problem if we take the view that never again will taxpayers be called upon to bail out a failing bank. However, as was discussed above, I do not share this view. Even if I leave the funding problem aside, if solvency problems are large enough and if these problems affect the entire industry, a choice will have to be taken between a bailout with taxpayer money or an intervention that may entail substantial risks for the financial system and the overall economy. One might try to avoid the problem by keeping the affected banks going without doing anything, relying on central bank funding and hoping for a better future, but then the ugly choices may merely be delayed. Once the ugly choice between a recapitalisation at the taxpayers' expense and a systemic crisis has to be taken, the question of how the independence of supervisory authorities squares with the risks to taxpayers will be on the agenda again. I consider it all the more important that the assignment of fiscal responsibilities and fiscal capacities be speedily reformed and that this be done in a way that actually works rather than one that is merely proclaimed to work.

⁷¹ Without the United States and the United Kingdom, this would only be a small step, but one that is nevertheless worthwhile.

⁷² For a detailed discussion of this point see Hellwig (2011).

6 References

- Acharya, V.V. and Steffen, S. (2013), "The 'Greatest' Carry Trade Ever? Understanding Eurozone Bank Risks", *CEPR Discussion Papers*, No 9432, Centre for Economic Policy Research.
- Admati, A.R. and Hellwig, M.F. (2013), *The Bankers' New Clothes: What's Wrong with Banking and What to Do about It*, Princeton University Press, Princeton, N.J.
- Alesina, A. and Summers, L.J. (1992), "Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence", *Journal of Money, Credit and Banking*, Vol. 25 (2), pp. 151-162.
- ASC (2012), *Forbearance, resolution, and deposit insurance*, Report No 1 of the Advisory Scientific Committee of the European Systemic Risk Board.
- Baltensperger, E. (2007), "The National Bank's monetary policy: evolution of policy framework and policy performance", in *The Swiss National Bank 1907-2007*, Neue Zürcher Zeitung Publishing, Zurich, pp. 569-597.
- Baltensperger, E. (2012), *Der Schweizer Franken: Eine Erfolgsgeschichte*, Neue Zürcher Zeitung Publishing, Zurich.
- Barro, R.J. and Gordon, D.B. (1983a), "A Positive Theory of Monetary Policy in a Natural Rate Model", *Journal of Political Economy* Vol. 91 (4), pp. 589-610.
- Barro, R.J. and Gordon, D.B. (1983b), "Rules, Discretion, and Reputation in a Model of Monetary Policy", *Journal of Monetary Economics*, Vol. 12 (1), pp. 101-122.
- Bernanke, B.S. (1983), "Nonmonetary Effects of the Financial Crisis in Propagation of the Great Depression", *American Economic Review*, Vol. 73 (3), pp. 257-276.
- Bernanke, B.S. (1995), "[The Macroeconomics of the Great Depression: A Comparative Approach](#)", *Journal of Money, Credit and Banking*, Vol. 27(1), pp. 1-28.
- Bernanke, B.S. and Lown, C.S. (1991), "The Credit Crunch", *Brookings Papers on Economic Activity*, No 2, pp. 205-248.
- Bernanke, B.S., Gertler, M. and Gilchrist, S. (1999), "The financial accelerator in a quantitative business cycle framework", in Taylor, J.B. and Woodford, M. (eds.) [Handbook of Macroeconomics](#) Vol. 1, Ch. 21, pp. 1341-1393, Elsevier. .
- Bernanke, B.S. and Gertler, M. (2001), "Should Central Banks Respond to Movements in Asset Prices?", *American Economic Review*, Vol. 91 (2), pp. 253-257.
- Born, K.-E. (1967), *Die deutsche Bankenkrise 1931: Finanzen und Politik*, Piper, Munich.
- Boyd, J.H. and Gertler, M. (1994), "The role of large banks in the recent U.S. banking crisis", *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 18 (1), pp. 2-22.
- Blinder, A.S. and Solow, R.M. (1973), "Does fiscal policy matter?", *Journal of Public Economics*, Vol. 2 (4), pp. 319-337.
- Bundesregierung (2005), *Stellungnahme der Bundesregierung zum Fünfzehnten Hauptgutachten der Monopolkommission 2002/2003*, Bundestag document 15/5819.
- Bundesverfassungsgericht (2011), *Entscheidung vom 22. November 2011, 2 BvE 3/08*.
- Bundesverfassungsgericht (2014), *Beschluss vom 14. Januar, 2014, 2 BvR 2728/13*.

- Caprio, G. and Klingebiel, D. (1996), "Bank Insolvencies: Cross-Country Experience", *Policy Research Working Paper 1620*, World Bank, Washington, D.C.
- Caprio, G. and Klingebiel, D. (1997), "Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking?", in *Annual World Bank Conference on Development Economics 1996*, pp. 79-104.
- Coase, R.H. (1972), "Durability and Monopoly", *Journal of Law and Economics*, Vol. 15 (1), pp. 143-149.
- Crockett, A. (2000), "Marrying the micro- and macro-prudential dimensions of financial stability", *BIS Review* 76, pp. 1-7.
- Curry, T. and Shibut, L. (2000), "The Costs of the Savings and Loan Crisis: Truth and Consequences", *FDIC Banking Review*, Vol. 13, No 2, pp. 26-35.
- Deutsche Bundesbank (2012), *Stellungnahme gegenüber dem Bundesverfassungsgericht zu den Verfahren mit den Az. 2 BvR 2728/13*.
- Eichengreen, B.J. (1992), *Golden fetters*, Oxford University Press, Oxford, UK.
- Ferguson, T. and Temin, P. (2004), "Comment on The German Twin Crises of 1931", *Journal of Economic History*, Vol. 64 (3), pp. 872-876.
- Goodhart, C.A.E. (1988), *The evolution of central banks*, MIT Press, Cambridge, MA.
- Goodhart, C.A.E. (1998), "The two concepts of money: implications for the analysis of optimal currency areas", *European Journal of Political Economy*, Vol. 14, pp. 407-432.
- Friedman, M. and Schwartz, A.J. (1963), *A Monetary History of the United States, 1867-1960*, Princeton University Press, Princeton, N.J.
- Grilli, V., Masciandaro, D. and Tabellini, G. (1991), "Political and Monetary Institutions and Public Financial Policies in the Industrial Countries", *Economic Policy*, Vol. 6 (13), pp. 341-392.
- Hartmann-Wendels, T., Hellwig, M.F. and Jäger-Ambrozewicz, M. (2010), *Die Arbeitsweise der Bankenaufsicht vor dem Hintergrund der Finanzkrise*, IW Analysen: Forschungsberichte aus dem Institut der deutschen Wirtschaft, No 63, Cologne.
- Hayek, F.A. (1977), *Denationalisation of Money*, Institute of Economic Affairs, London.
- Hellwig, M.F. (1985), "What do we know about Currency Competition?", *Zeitschrift für Wirtschafts- und Sozialwissenschaften*, Vol. 105, pp. 565-588.
- Hellwig, M.F. (1993), "The Challenge of Monetary Theory", *European Economic Review*, Vol. 37, pp. 215-242.
- Hellwig, M.F. (2007), "Switzerland and Euroland: European Monetary Union, Monetary Stability and Financial Stability", in *The Swiss National Bank 1907-2007*, Neue Zürcher Zeitung Publishing, Zurich, pp. 741-780.
- Hellwig, M.F. (2011), "Quo Vadis Euroland? European Monetary Union Between Crisis and Reform", in Allen, F., Carletti, E. and Corsetti, G. (eds.), *Life in the Eurozone: With or Without Sovereign Default?*, FIC Press, Wharton Financial Institutions Center, Philadelphia, pp. 59-76.
- Hellwig, M.F. (2013), *Stellungnahme zur Anhörung des Haushaltsausschusses der Bürgerschaft der Freien und Hansestadt Hamburg über die Wiedererhöhung der Ländergarantie für HSH Nordbank am 30. April 2013*, Max Planck Institute for Research on Collective Goods, Bonn.

Hellwig, M.F. (2014a), "Yes, Virginia, There Is a Banking Union! But it May Not Make Your Wishes Come True", paper presented at *Toward a European Banking Union: Taking Stock – 42nd Economics Conference of the Oesterreichische Nationalbank, 12-13 May 2014*, mimeo, Max Planck Institute for Research on Collective Goods, Bonn.

Hellwig, M.F. (2014b), "Systemic Risk and Macro-Prudential Policy", paper presented at the *High-Level Seminar on Macro-Prudential Policy, De Nederlandsche Bank, 10 June 2014*, mimeo, Max Planck Institute for Research on Collective Goods, Bonn.

Hoshi, T. and Kashyap, A.K. (2004), "Japan's Financial Crisis and Economic Stagnation", *Journal of Economic Perspectives*, Vol. 18 (1), pp. 3-26.

Hoshi, T. and Kashyap, A.K. (2010), *Why Did Japan Stop Growing?*, National Bureau of Economic Research, Cambridge, MA.

Howitt, P. (2012), "What have central bankers learned from modern macroeconomic theory?", *Journal of Macroeconomics*, Vol. 34 (1), pp. 11-22.

International Monetary Fund (2008), *Global Financial Stability Report: Containing Systemic Risks and Restoring Financial Soundness*, April.

Monopolkommission (2004), *Wettbewerbspolitik im Schatten 'Nationaler Champions': Fünfzehntes Hauptgutachten 2002/2003*, Bundestag publication 15/3610.

Sapir, A., Hellwig, M.F. and Pagano, M. (2012), "A contribution from the Chair and Vice-Chairs of the Advisory Scientific Committee to the discussion on the European Commission's banking union proposals", *Reports of the Advisory Scientific Committee of the European Systemic Risk Board No 2*, October.

Sargent, T.J. and Wallace, N. (1981), "Some Unpleasant Monetarist Arithmetic", *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 5 (3), pp. 1-17.

Schnabel, I. (2004), "The German Twin Crisis of 1931" *Journal of Economic History*, Vol. 64 (3), pp. 822-871.

Schnabel, I. (2009), "The Role of Liquidity and Implicit Guarantees in the German Twin Crisis of 1931", *Journal of International Money and Finance*, Vol. 28 (1), pp. 1-25.

Sinn, H.-W. (2013), *Verantwortung der Staaten und Notenbanken in der Eurokrise: Gutachten im Auftrag des Bundesverfassungsgerichts, Zweiter Senat, Verfassungsbeschwerden 2 BvR 1390/12, 2 BvR 1439/12 und 2 BvR 1824/12 Organstreitverfahren 2 BvE 6/12*, mimeo, CES-ifo Group, Munich, June.

Sinn, H.-W. (2012), *Die Target Falle*, Carl-Hanser-Verlag, Munich.

Svensson, L. (1999), "Inflation targeting as a monetary policy rule", *Journal of Monetary Economics*, Vol. 43 (3), pp. 607-654.

Tanzi, V. (1969), *The Individual Income Tax and Economic Growth*, Johns Hopkins University Press, Baltimore.

Thornton, D. (1984), "Monetizing the Debt." *Federal Reserve Bank of St. Louis Review*, December, pp. 30-43.

Tobin, J. (1963), "An Essay on the Principles of Debt Management", in Commission on Money and Credit (ed.), *Fiscal and Debt Management Policies*, Prentice Hall, Englewood Cliffs, N.J.

White, W. (2007), "Is Price Stability Enough?", in *The Swiss National Bank 1907-2007*, Neue Zürcher Zeitung Publishing, Zurich, pp. 647-677.

Woodford, M. (2003), *Interest and prices: Foundations of a theory of monetary policy*, Princeton University Press, Princeton, N.J.

Woodward, B. (2000), *Maestro: Greenspan's Fed and the American Boom*, Simon & Schuster, New York.

To form a more perfect union

Stephen Cecchetti¹

Over the past few years, we have discovered that financial stability in a common currency area requires more than just monetary union. If there is to be a truly integrated financial market, a financial union in every sense, there must be other unions as well. The first is a banking union. And the foundation of a true banking union is a number of other unions; the union of regulation, the union of supervision, the union of resolution and the union of deposit insurance. Now, these unions may themselves require further unions. To ensure the homogeneity of broad money in the currency union, deposit insurance will require sufficient common funding; funding that is jointly and severally guaranteed by the members of the union.² A deposit insurance union creates increased fiscal interdependence, which then creates a need for some degree of fiscal union. I could go on, but the focus of my comments is narrower; I wish to discuss the organisation of banking supervision.

But before I do, it is important to recall the situation in which we find ourselves. The key challenge for the euro area today is to reverse the fragmentation that took hold several years ago. One measure of the extent of this is the fact that by August 2012, the balances in the TARGET2 system exceeded EUR 1 trillion. The key deficit countries being Greece, Italy and Spain, who were in debt to Finland, Germany, Luxembourg and the Netherlands. For Greece, the TARGET2 deficit was equal to 24.6% of the assets of their monetary financial institutions (MFIs); for Portugal it was 12.7%; Spain 12.0%; and Italy 6.8%. For Finland, Germany and Luxembourg, the numbers were relatively large as well, representing 9.6%, 8.6% and 11.4% of their MFI assets respectively (see Table 1).

In the past two years, this situation has improved, but not much. By March 2014, the most recent period for which data are available, the equivalent figures for the deficit countries were: Greece 11.4%, Spain 7.3%, Portugal 11.7% and Italy 4.8%. For the surplus countries, they were: Finland 3.7%, Germany 6.3% and Luxembourg 11.3%. Overall, the balances are down to EUR 700 billion.

The size of these surpluses and deficits represents the fact that people lost faith not only in their country's banks, but in the ability of their government to make the banks whole in the event of a collapse. As a consequence, depositors came to believe that there was a difference between a deposit in Frankfurt or Amsterdam and one in Madrid or Rome. The speculative attack has been stopped, but the legacy remains.³

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² In these short comments, I do not have the space to discuss the issue of resolution. What I will say is that it is essential that the system be set up so that banks fail in a way that their bondholders truly risk losses. And, so that cross-border issues be resolved in such a way as to reduce the push towards deglobalisation of finance that would come otherwise.

³ See Cecchetti, McCauley, and McGuire (2012).

Table 1 – Ratio of TARGET2 balance to MFI assets

	August 2012	March 2014
Belgium	-3.0%	-1.5%
Germany	8.6%	6.6%
Ireland	-7.8%	-5.2%
Greece	-24.6%	-12.8%
Spain	-12.0%	-7.4%
France	-0.1%	-0.6%
Italy	-6.8%	-4.7%
Cyprus	-7.6%	-8.0%
Luxembourg	11.4%	11.3%
Netherlands	4.9%	1.8%
Austria	-4.2%	-4.2%
Portugal	-12.7%	-11.2%
Finland	9.6%	2.8%

Sources: TARGET2 data are from <http://www.eurocrisismonitor.com>, MFI data are from the ECB.

Complementary to the challenge of fragmentation is the fact that the health of bank balance sheets continues to diverge along country lines. Looking at the ratio of market capitalisation to bank book equity, we see that France and Germany continue to lag well behind other countries with the price-to-book ratio remaining at close to 0.5.⁴ And finally, I will simply note that putting in place solutions to the underlying causes of these problems must take account of the fact that banks are a more important source of finance in some euro area member countries than in others.

The implication of all of this that the construction of the single European financial system remains incomplete. One critical aspect of this is governance. How should regulation, supervision, resolution and deposit insurance be organised? Specifically, what should their relationship to the central bank be?

At this point, I wish to digress and discuss a series of short essays that I wrote in November 2007. At the time, I thought of them as lessons from the crisis. This was before Bear Stearns, before Lehman, and before I joined the BIS. It is fair to say that the essays reflect the hubris of an academic who had not spent enough time inside the community of central bankers and supervisors. For today, I will focus on the two essays that examine the consequences of the 14 September 2007 run on Northern Rock: “Deposit insurance and the lender of last resort” and “Why central banks should be financial supervisors”.⁵

These are contributions to two related pre-crisis debates, one on whether you need deposit insurance if you have a lender of last resort, and the other on whether the supervisor should be inside or outside the central bank. On the first, I concluded that deposit insurance is essential to financial stability. Discount lending requires discretionary evaluations based on incomplete information during a crisis, and hence on the decisions of inevitably fallible people. By contrast, deposit insurance is based on a set of pre-

⁴ See the chart in Cecchetti and Schoenholtz (2014b).

⁵ All four essays, which appeared between 26 November 2007 and 3 December 2007, can be found at <http://www.voxeu.org/person/stephen-cecchetti> under the heading “Subprime Series”.

announced rules that are then simply put into practice. The lesson I took away from this is that if you want to stop bank runs – and I think we all do – rules are better.

But the presence of a deposit insurance scheme does not obviate the need for a lender of last resort. As Paul Tucker describes clearly in his remarks at the BIS on 15 May 2014, if we are going to have institutions that offer liquidity insurance – what I think of as the key role of a depository bank – then we need a liquidity reinsurer.⁶ And, the only institution that can guarantee liquidity in all states of the world is the central bank, so it is naturally their role. So long as we have fractional reserve banking – and without it I do not see how we have a stable basis for private lending – then we will need a lender of last resort.⁷

This brings me to my primary question: should central banks be supervisors? Again, this question has been debated for some time. There are two primary arguments for separation. The first that there is a conflict of interest – there may be times when the central bank's interest rate decisions are made to protect banks' balance sheets rather than benefit the public at large. Second, separation reduces the chances that poor supervisory performance will damage the reputation of the central bank in its conduct of monetary policy.

The argument for inclusion is about efficiency in the production and use of timely information; the ability to internalise the trade-off between prudential and monetary policy; and the fact that as the lender of last resort, the central bank has to know his or her customer. Starting with information, separation leads quickly to something akin to the children's game of "Chinese whispers" or "telephone", where a message is whispered from one child to the next, getting slightly distorted at each step until it becomes unrecognisable. Timely and accurate information requires bureaucratic barriers to be minimised.

The second reason to insist that supervision be in the same institution as monetary policy is the need to ensure consistency of macro-prudential and monetary policy. These have quite similar transmission mechanisms. They both influence the willingness of lenders to supply credit and the inclination of borrowers to take it on. That is, they are both directed at aspects of the supply and demand for loans, influencing both prices and quantities.⁸ This means that monetary and prudential tools can come into conflict.⁹

The experience since 2007 leads me to the third argument for putting supervision into the central bank: know your customer. If the central bank is the lender of last resort, it is critical that liquidity support be provided only to solvent borrowers. There are three reasons that a central bank should strive not to lend to a bankrupt institution. First, by lending secured to an insolvent commercial bank, the central bank further subordinates bondholders and depositors (or the deposit insurer). It does this both by allowing short-term depositors to run and also by inserting itself ahead of others in the queue for claiming repayment when failure inevitably comes. As Paul Tucker writes, "it is quite simply wrong for anyone knowingly to lend secured to a firm with negative net assets, as the lender is making others worse off".¹⁰

Second, lending to an insolvent institution in itself does not put an end to fragility. Ultimately, the institution must be liquidated or re-capitalised regardless of whether it obtains a loan from the central

⁶ See Tucker (2014a).

⁷ For recent discussions of on this point, see Cecchetti and Schoenholtz (2014a) and Tucker (2014b).

⁸ For a comprehensive discussion of this relationship, and its implications, see Brunnermeier and Sannikov (2014).

⁹ See for example Cecchetti and Kohler (2014).

¹⁰ See Tucker (2014b).

bank. And by postponing resolution, the resulting mix of uncertainty and poor incentives damages both the financial system and the economy.

Third, when it becomes known that the central bank is willing to lend to insolvent banks – and people will find out – banks that borrow will be suspected of being bankrupt. The resulting stigma will impair the functioning of the lender. In the end, only those that are bankrupt will borrow and the central bank's lending facility will become useless.

Solvency support is the province of the elected government, not an independent central bank.

How are central bankers to know if a potential borrower is solvent? How can they be sure they know their customer? They can never be certain; but to ensure that they know as much as anyone, they should be the supervisor.¹¹ It does not matter how many memoranda of understanding there are, or agreements for meetings and information exchange. During a crisis, it is essential for the lender of last resort to have a good sense of who is solvent and who is not. This means that the central bank is de facto involved in supervision. It is really just a matter of degree.

As every good bureaucrat knows, information is power. And when disaster strikes the financial system, information is at its most valuable and time is short. I firmly believe that it is unwise to rely on generosity in those circumstances. It is only when everyone is in the same institution, when supervisors are in the central bank working for the same person or group of people, that hesitancy to exchange sensitive information can be quickly overcome.

By maintaining that monetary and prudential (micro and macro) policy should all be in the central bank, I am arguing for the creation of a very powerful, independent and technocratic institution. This raises two complementary issues. First, how can we moderate the power of individuals inside the organisation? And second, what do we do to create democratic accountability and ensure that the institution serves the public good?

On the former, we see two solutions in practice today: overlapping committees and duplication of responsibilities. The first is exemplified by the structure in the Bank of England. There are three committees: the Monetary Policy Committee (MPC) has nine members (five internal, four external), the Financial Policy Committee (FPC) has ten members (five internal, five external), and the Prudential Regulation Authority Board (PRA) has seven members (four internal, three external). The MPC and FPC have three members in common, the FPC and the PRA share four members, and overall, the Governor and the Deputy Governor for Financial Stability are on all three. The idea behind this arrangement is to internalise the spillovers of one group of policy decisions to the other two while guarding against the risk that a single individual, or even a group, will come to dominate all decisions.

Duplication of responsibilities is an alternative to a system of interlocking committees. This is the structure in the United States, where the Federal Reserve System is a supervisor, as is the deposit insurer, the Treasury and each of the states. Every bank is examined by at least two of these 53 authorities.¹² Having

¹¹ Central banks must follow a version of the "Know Your Customer" (KYC) rule. That is, they have to know who they are doing business with. But unlike a private intermediary, the central bank has to abide by a broader version of KYC. Not only must they ensure that they are not facilitating criminal activity, and have balance sheet knowledge, they must know the counterparty's management practices in making a judgment on lending.

¹² Kohn (2014) provides a very complete description of how the two systems are organised.

more than one supervisor clearly addresses problems associated with concentration of power; at the same time it mitigates the potential for conflicts of interest. And, regardless of how it is organised, the lender of last resort will be a supervisor either de facto or de jure.

With such a powerful institution, one that concentrates monetary, macro-prudential and micro-prudential policy all inside a single body, we need to develop strong mechanisms for transparency and accountability. Central bank independence is fundamentally at odds with representative democracy.¹³ How can we give so much power to unelected technicians? For conventional monetary policy, we have found an answer: clear, easily monitored objectives. And the result has been price stability. This is surely one of the main reasons that the popularity of inflation targeting endures, especially in emerging markets. We need to work on finding an analogous framework for financial stability, one with something akin to a price index.¹⁴

Before concluding, it is worth making a short comment about the unique structure of the European Central Bank (ECB) and the national central banks (NCBs). The legal mandate for independence is far stronger in the case of the ECB than for an NCB. While I firmly believe that the ECB should be the supervisor, it almost surely should not be the resolution manager. Since it involves the use of public funds, resolution is a fundamentally fiscal function. To put that into the ECB, would put enormous fiscal powers in the hands of a virtually untouchable group of technicians.

Returning to where I started, creating an economic and financial union of sovereign states is extraordinarily difficult. People often look at the United States as an example of a success of sorts. But it is important to keep in mind that what you see today is not where things started. The Articles of Confederation and Perpetual Union were agreed among the original 13 states in 1781. They left substantial sovereignty with the individual states, creating a central authority only for the purposes of defence and diplomacy. The Confederation served as the basis for fighting the Revolutionary War, but in the end was too weak to provide for adequate governance of the new country. So, in 1789, it was replaced by the Constitution of the United States; which, as its preamble states, was established “to form a more perfect union”. Importantly, over the succeeding 200 years, the Constitution has been tested, amended and reinterpreted.

As I write, European Economic and Monetary Union is in its 15th year. Granted, it has been a bumpy ride. But I believe that those managing the Eurosystem, as well as the leaders of the members of the union, understand where the problems lie. They know what to do to form a more perfect European union, one that promotes general welfare through a common and unified financial system. They know that it is essential for the monetary union to be complemented and supported by other unions. The banking union is the first. In the end, this will mean that the member countries will need to cede the regulatory and supervisory powers that they have over all their financial institutions and financial markets to a common authority inside the common central bank. To be as clear as possible, this means that the supervision of all banks, insurance companies, asset managers and securities dealers in the euro area must somehow be placed inside the ECB and, as is the case with the Single Supervisory Mechanism, under the control of the Governing Council of the ECB.

¹³ For a more detailed discussion of these issues, see Cecchetti (2013).

¹⁴ There is the hope that mechanisms, such as stress tests, will deliver for financial stability what inflation targeting delivered for price stability.

And, finally, I believe that the leaders of Europe and the people of Europe have not forgotten what those who brought us monetary union understood when they set out on this road. To quote Helmut Kohl (1996), “*The policy of European unification is in reality a question of war and peace in the 21st century*”. And, as tensions in Europe continue to wax and wane, we can see the importance of the project in ensuring that Europe is a robust union of consequence, not a frail group of irrelevant individual states.

References

- Brunnermeier, M.K. and Sannikov, Y. (2014), “Monetary Analysis: Price and Financial Stability”, *Monetary policy in a changing financial landscape – ECB Forum on Central Banking, May 2014*, European Central Bank, Frankfurt am Main.
- Cecchetti, S.G. (2013), “Central bank independence: a path less clear”, *International Conference to commemorate the 20th anniversary of the autonomy of Banco de México, Mexico City, 14 October*, BIS Management Speeches, Basel.
- Cecchetti, S.G. and Kohler, M. (2014), “When capital adequacy and interest rate policy are substitutes (and when they are not)”, *International Journal of Central Banking*, Vol. 10 (3), pp. 205-.
- Cecchetti, S.G., McCauley, R.N. and McGuire, P.M. (2012), “Interpreting TARGET2 balances”, *BIS Working Paper Series*, No 393, Basel.
- Cecchetti, S.G. and Schoenholtz, K.L. (2014a), “Narrow Banks Won’t Stop Bank Runs”, available at <http://www.moneyandbanking.com>, 28 April.
- Cecchetti, S.G. and Schoenholtz, K.L. (2014b), “ECB AQR: Nervous Banks Make Banking Safer”, available at <http://www.moneyandbanking.com>, 15 May.
- Kohl, H. (1996), “The Significance of European Integration”, *Speech on the occasion of the conferral of his Honorary Doctorate by the Catholic University in Leuven*, Belgium, 2 February.
- Kohn, D. (2014), *Institutions for Macroprudential Regulation: The UK and the U.S.*, Brookings Institution, Washington, DC, 17 April.
- Tucker, P. (2014a), “The lender of last resort and modern central banking: principles and reconstruction”, in *Re-thinking the lender of last resort*, BIS Paper No 79b, Basel (September 2014).
- Tucker, P. (2014b), “The Only Game in Town? A New Constitution for Money (and Credit) Policy”, *Myron Scholes Global Markets Forum – The Initiative on Global Markets*, Booth School of Business, University of Chicago, 22 May, (mimeo), available at http://www.igmchicago.org/wp-content/uploads/2014/10/Tucker_OnlyGameInTown_May2014.pdf.

Monetary analysis: price and financial stability

Markus K. Brunnermeier and Yuliy Sannikov¹

Abstract

In a world with self-generated, endogenous risk and time-varying risk premia, price stability and financial stability are inseparable. A monetary analysis based on the distribution of liquidity mismatch across sectors provides valuable information about the build-up of vulnerabilities in tranquil times and helps to identify balance sheet impaired sectors in volatile times. When the monetary transmission mechanism becomes “sectorally impaired”, monetary policy action disproportionately favours issuers of government and large corporation debt over small and medium-sized enterprises (SMEs). Reviving a prudently designed asset-backed securitisation market for SME and consumer loans would alleviate this discrepancy and establish a pan-European intermediation market.

1 Introduction

The monetary policy framework of the European Central Bank (ECB) stands on two pillars. The first pillar, economic analysis, aims to identify risks for price stability at short to medium-term horizons. It relies on a wide range of economic data and the new area-wide (DSGE) model. The second pillar, monetary analysis, originates from the fundamental long-term relationship between monetary aggregates and prices. Importantly, it also includes a sectoral analysis of various monetary and credit aggregates.

This paper starts by drawing a sharp contrast between the monetary textbook view and the finance view. Monetary economics made large strides by emphasising the importance of expectations within fully dynamic models. The expected future short-term interest rate, which pins down the long-term yield via the expectations hypothesis, lies at the heart of this analysis. Price and wage rigidities are the key frictions. However, financial markets function perfectly. In contrast, the empirical finance view stresses that most asset price movements are driven by changes in risk premia rather than news about future cash flows. The expectations hypothesis fails miserably in empirical tests. Moreover, surprise interest rate cuts by the Federal Reserve System shift the ten-year real yield in the Treasury Inflation-Protected Securities (TIPS) market. It is difficult to argue that prices are sticky for ten years.

In “The I Theory of Money” (Brunnermeier and Sannikov 2012), risk premia vary over time and most of the risk is endogenous. The paper also highlights the close links between price stability, financial stability, and fiscal stability. Indeed, the framework can be seen as a generalisation of the fiscal theory of the price level (FTPL). Unlike standard FTPL models, government debt and money have different maturities, and money creation and credit extension by the financial system are endogenous. Monetary policy redistributes wealth to the ailing sector by changing the relative value between government debt and money in order to stabilise the overall economy. Ex post monetary policy avoids unnecessary endogenous risk due to liquidity spirals and Fisher deflationary spirals. However, trade-offs between price stability and financial stability can arise, when deflationary pressure is offset by inducing banks to take on more risk. Ex ante monetary policy can be seen as an insurance scheme that partially “completes” markets. Financial

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instability affects numerous key factors – real growth, the formation of endogenous risk, the risk-bearing capacity of the financial system, the creation of inside money – and hence cannot be separated from price stability. Monetary policy and macro-prudential policy tools are closely intertwined, as they induce or restrict financial sector risk taking. Congruency of the two policies thus forms a key conceptual element.

In a world with financial frictions the most dangerous risk is endogenous, created by the system itself, and so are the movements in risk premia. Endogenous risk is most evident if it involves multiple equilibria. This paper argues that in such a world a sectoral analysis of aggregates provides valuable indicators of the vulnerability of the economy to sharp shifts, beyond the information contained in risk premia alone. The division of the economy into sectors should be such that capital is easily redeployable within, but not across, sectors. Expertise in holding certain asset classes segments the markets.

Traditionally, two schools of thought fought over the importance of two prime quantities: credit aggregates versus money aggregates. Credit is on the asset side of banks' balance sheets, while money is on the liability side. This paper takes a dynamic risk perspective based on "The I Theory of Money". It argues that sector-specific quantities, especially the build-up of imbalances, the mismatch of the liquidity of assets and liabilities, and the concentration of risk are important indicators of the economy's vulnerability to sudden shocks and risk dynamics. In tranquil times imbalances are more likely to build up due to the "volatility paradox" (Brunnermeier and Sannikov 2014). Also, since specific triggers vary from crisis to crisis, while amplification mechanisms exhibit similar patterns across episodes, it is more sensible to focus on the build-up of imbalances instead of looking for signs of shocks that can trigger a crisis.

Quantities provide useful information both in tranquil times, and in volatile times after a crisis has erupted. Policy interventions – in a world with balance sheet impaired sectors and debt overhang – must follow the "bottleneck approach". Quantity information helps identify the ailing sectors. Moreover, relying on price signals alone is suboptimal, especially since their informational content might decline as markets freeze.

Monetary policy should be used to stem further amplification and to avoid undesired redistributive effects. Leaving balance sheet problems unaddressed leads to liquidity spirals, along with the associated fire sale losses and Fisher disinflation. These processes redistribute additional wealth away from the distressed indebted sectors. The damage inflation or deflation causes depends on whether it redistributes wealth towards or away from the distressed sectors. A single integrated inflation index cannot capture this.

In models with financial frictions the monetary transmission mechanism can be impaired in many ways, which unlike the standard zero lower-bound problem cannot be alleviated by simply lifting the inflation target. Indeed, the monetary transmission mechanism can be "sectorally impaired"; for example, lending to small and medium-sized enterprises (SME) is disadvantaged compared to sovereign government debt. Monetary policy should not favour national sovereign debt and large corporate debt issuers over SMEs and households. With a revived, more transparent securitisation market for SMEs this discrepancy would be reduced. Moreover, the launch of a prudently designed asset-backed securities market focused on consumer and SME loans could be seen as an opportunity to establish a truly integrated European market. Dipping into a global investor pool, with USD 26 trillion in global pension savings alone and strong interest in long-term fixed income products, can provide enough risk-bearing capital to fund the currently credit-constrained parts of the economy. As a side benefit it would also reduce the diabolic loop that makes the prices of sovereign risk and bank credit risk move in lockstep. The paper also sketches the implications of such an SME securitisation scheme for monetary analysis.

The paper is organised in the following way. After briefly outlining the historical evolution of the ECB's monetary analysis, we discuss the current textbook treatment of monetary economics and contrast this view with empirical evidence from finance. Section 3 makes the case that quantities can serve as informative vulnerability indicators and hence help to predict sudden shifts in risk premia and risk dynamics. Section 4 illustrates the usefulness of quantity information during volatile times. Section 5 argues in favour of a prudently designed asset-backed securities market in order to avoid "sectoral impairment" of the monetary transmission channel. Finally, Section 6 concludes.

1.1 Historical evolution of the ECB's monetary analysis

One can divide the evolution of the ECB's monetary analysis into two different phases. In the first phase, which lasted from the introduction of the euro in 1999 until 2003, the ECB followed the approach of the Bundesbank by assigning a prominent role to money growth. The intent of continuing the successful Bundesbank monetary policy framework was to extend the Bundesbank's excellent reputation as an inflation fighter to the ECB (ECB 1999a). It was also thought that proper attention to monetary developments in medium-term price movements would provide an antidote against the pitfalls of exceedingly forward-looking rules, such as inflation (forecast) targeting (Issing 2002, 2006). Money growth – in particular the growth of M3 – was the reference value of the "monetary pillar". The objective was to ensure price stability in the short and medium term, building on the premise that in the long term the quantity theory of money holds. However, as M3 growth overshoot projections, the prominent role of money growth in the ECB's monetary policy framework resulted in big communication challenges in the first years of European Economic and Monetary Union.

During the second phase from 2003 to 2007, the ECB's monetary policy framework played down the role of money growth. Research that highlighted empirical and theoretical limitations of money-based indicators, notably Bordes et al. (2007) from the Banque de France; and Alves et al. (2007) from the Banco de Portugal, supported these developments. After a review of the ECB's monetary policy framework in 2003 the 1st and 2nd pillars became the "economic analysis" and the "monetary analysis". The latter was assigned only a cross-check role. The ECB relied on the monetary analysis to extract long-run inflationary signals from monetary aggregates, to cross-check the information from the economic pillar. The emphasis shifted first to M3 and credit growth, which were also seen as early warning indicators of financial imbalances (ECB 2004), and then to a broad range of monetary and financial variables. The search for a new approach became evident in a high-level conference organised in 2006 (see Stark 2006).

Starting from 2007, with the onset of the financial crisis, liquidity provision became the ECB's focal point. This provided further challenges to monetary analysis as traditional results were more difficult to interpret. At the same time the ECB had started a comprehensive research programme aimed at strengthening the analytical underpinnings of its monetary analysis (see Papademos and Stark 2010).

2 Prices: interest rates and spreads

2.1 Textbook monetary model

In recent decades, monetary economics has focused on and made huge strides towards incorporating expectations in a fully dynamic context (see, for example, Woodford, 2003). However, monetary

aggregates and credit are de facto pushed into the background in the current textbook model.² Instead, the central focus is “the” equilibrium interest rate, together with the rule that governs its evolution, e.g., the Taylor rule. The expected future short-term interest rates also pin down long-term rates via the expectations hypothesis. Risk premia are assumed to be constant or to change gradually.

The implicit assumption underlying most of these models is that money markets function perfectly all the time. Markets are complete and all contracts are enforceable. Credit counterparty risk is absent and hence no collateral is needed. In addition, there are no frictions in the interbank and reserves markets. The central bank can always provide sufficient liquidity, i.e. adjust the money supply in the market for reserves, to ensure that the policy rate is implemented. Liquidity provision ensures that the policy rate can be separated from the target policy rate. In short, a separation principle between setting a policy rate and supplying liquidity can be applied.

Price and wage rigidities can cause the interest rate to deviate temporarily from the long-run Wicksellian “natural” rate, the rate that would prevail in the absence of any frictions and rigidities. The exclusive focus on the interest rate is often attributed to Knut Wicksell (1898), which is ironic since he was an unwavering advocate of the quantity theory of money.³

In the monetary textbook model, no imbalances in the form of bubbles or other excessive lending can emerge. These models typically also abstract away from credit risk. Default and counterparty credit risk are not a concern. Hence, the central bank does not need to apply any collateral requirements. Often government debt and bank loans are lumped together with other debt instruments in a “bond market”.⁴ There is also no place for the central bank’s worries that their aggressive liquidity provisioning might prop up zombie banks.

There is no liquidity spread, whereas in reality, financial institutions are active in liquidity and maturity transformation. This exposes them to a serious risk of a run due to the mismatch in liquidity of assets and liabilities. Overall, the analysis focuses on the first moments, and on stocks and flows. The risk dynamics, i.e. the endogenously time-varying aspect of volatility, plays at most a minor role. Likewise, non-linearities and jumps due to multiple equilibria are absent from textbook models.

2.2 Textbook finance view

The current empirical view in finance could not be more different. Modern finance considers changes in risk premia, and not news of future cash flows, to be the primary driver of asset price movements. This is probably most clearly summarised in Cochrane (2011). The disagreement within finance is not about whether, but only about why risk premia vary so much over time. During episodes of low risk premia, bubbles emerge, whereas high risk premia see depressed asset prices. Some researchers attribute changes in risk premia to financial frictions, while others favour behavioural theories in which agents have distorted expectations.

² For a straightforward treatment see King (2001).

³ See, for example, <https://research.stlouisfed.org/publications/mt/20050301/cover.pdf>

⁴ Bernanke and Blinder (1988) break away from the trend of grouping all debt together in a “bond market”, which is then suppressed via Walras’ Law.

The term premia also vary over time. Long-run rates are not simply driven by expected future short rates. The expectations hypothesis embedded in most textbook New Keynesian models fails dramatically. Researchers such as Shiller (1979), Fama and Bliss (1987), Campbell and Shiller (1991), Cochrane and Piazzesi (2005) and Cieslak and Povala (2013) have documented that excess returns on long-term bonds are highly predictable, with an R-squared exceeding 45% on a one-year horizon. Changes in term premia (as opposed to innovations in expected short-term rates far in the future) account for roughly 70% of price movements in distant forward contracts.

These empirical results also hold for real bonds with very long maturities. Specifically, monetary policy decisions affect risk premia. Hanson and Stein (2013) document that a surprise interest rate cut by the Federal Reserve System leads to a sizable decline in the ten-year real yield on TIPS. Without assuming that prices or wages are sticky for very long horizons (which is arguably unrealistic), this finding is difficult to reconcile with models of constant risk premia. Gertler and Karadi (2013) combine a high-frequency identification approach with vector autoregressions to analyse output in combination with inflation and a variety of interest rates.

The credit default risk premium of corporate bonds can also vary over time. Gilchrist and Zakrajšek (2012) develop a new credit spread index and break it down into two components: one part which captures movements in default rates (cash flow news) and the other documenting the excess bond premium caused by time-varying risk premia (stochastic discount factor news). They show that the excess bond premium is a good predictor of future economic activity.

Liquidity risk premia are captured by interest rate spreads, such as the LIBOR-OIS spread. Moreover, the VIX seems to be a very good “fear gauge” as it commoves substantially with credit and liquidity risk premia. A rise in the VIX indicates that investors are withdrawing from various arbitrage trading strategies.

These empirical findings are consistent with models, such as “The I Theory of Money”, in which financial frictions are the key drivers and in which a reduction in the effective risk-bearing capacity of the financial sector is accompanied by an increase in various excess risk premia. The contraction of credit supply leads to a negative impact on the real economy. As a countermeasure, for example, an interest rate cut leads to a “stealth” recapitalisation of the financial sector, strengthening its net worth and risk-bearing capacity. This lowers the long-term real yield, possibly in a non-linear way. The effects can be even more dramatic in the presence of multiple equilibria. Moreover, Quantitative Easing (QE) affects asset prices and can therefore be used to recapitalise sectors that suffer from debt overhang problems or impaired balance sheets. For example, purchasing mortgage-backed securities in the United States lowered mortgage rates and supported house prices. This in turn helped the undercapitalised household sector.

3 Quantities as vulnerability indicators in tranquil times

In a world with financial frictions, one of the main objectives of monetary policy is to reduce endogenous, self-generated systemic risk. Cutting out avoidable risk reduces the required risk premia: the hurdle rates for real investments and consumption. Policies that reduce endogenous risk and avoid sharp rises in risk premia are welfare enhancing – their effects are particularly visible if they reduce the probability that the economy will jump into a bad equilibrium outcome (in a multiple-equilibrium setting).

It is important to ask whether quantities such as monetary and credit aggregates provide information about the build-up of potential endogenous risk? And if so, which quantities merit the most political and regulatory capital? One might be tempted to draw the conclusion, for example from the empirical findings of Gilchrist and Zakrajšek (2012), that it suffices to focus exclusively on the time-varying component of risk premia. Is it therefore sufficient to simply modify existing models to include exogenous time-varying “risk premium wedges”? After all, prices and shadow prices reflect the scarcity and abundance of quantities.

In fact, quantitative aggregates can be extremely useful as indicators of vulnerabilities before they appear in spreads and risk premia. Otherwise, the vulnerability of the economy to abrupt changes may be hard to assess. Prices often follow a trend and are prone to large corrections: they move little and then suddenly act erratically. Quantities can give us some indication about the likelihood of such shifts in prices and jumps in volatility. This is especially the case when imbalances are building up in the background. In short, quantity aggregates are useful indicators for answering the question: “how close is the system to the cliff?”.

The vulnerabilities and amplification mechanisms are often strikingly similar across crises. However, the actual triggers – the subprime market, the internet bubble, etc. – vary from crisis to crisis. Hence, it may be more sensible to study commonalities that explain the vulnerability of the system to spiralling amplification effects and runs, instead of watching out for particular events that may trigger a sharp downturn. Triggers that prompt adverse spirals may be distinct, but the build-up is invariably common.

Central bankers should be particularly interested in these amplification mechanisms for another reason. Not only may amplifications lead to high volatility environments, but the associated sharp drops may also impair the monetary transmission mechanism, which is described below.

3.1 Impairment of monetary transmission mechanism

From a monetary policy perspective, it is important to use quantities to better predict possible erratic shifts in the economy because (i) monetary policy actions only become effective with a lag and (ii) the monetary transmission mechanism might become impaired, especially in times of financial instability. Figuratively speaking, the central bank might then end up trying to “push on a string”. There are several reasons why monetary policy might lose its punching power and fail to overcome deflationary or inflationary pressures.

First, by now there is a large literature, which points out that the policy rate cannot be pushed far below zero. If the short-term interest rate is set far enough below zero, then agents will store their wealth in cash notes at zero interest. This limits the central bank’s conventional toolset. The literature offers a host of unconventional monetary policy tools that help at least partially to soften this constraint. One of them is “forward guidance”, which requires that a central bank have some credible commitment power.

Second, a central bank’s space to manoeuvre is limited when the economy is vulnerable to runs or eruptions of illiquidity triggered by sunspots.⁵ These events are possible after a sufficient build-up of liquidity mismatch. The economy can end up in a scenario in which multiple equilibria are possible. Then, any news can trigger a jump to the bad equilibrium. In such circumstances, the central bank has to be very

⁵ Runs can be credit-supply driven, when creditors refuse to rollover their debt. They can also be debtor driven. That is the case, when some debtors start fire-selling their assets thereby depressing collateral values of all debtors who are then forced to join the fire sale.

careful. An interest rate cut could be interpreted as a weak signal about the economy and may be used as a coordination device to start a run. Even the perception of an increased risk of jumping to the bad equilibrium could undermine the goal of a particular policy measure. Note that a higher inflation target is not a panacea for this second form of impairment of the monetary transmission mechanism.

Third, the central bank might be constrained since monetary policy measures may bring about undesirable responses from some financial institutions. First, the reaction may be heterogeneous, differing from institution to institution. Second, weak, zombie banks might react in an undesirable way by gambling for resurrection. Jimenez et al. (2014) use Spanish data to document that weak banks take on excessive risk. Interestingly DeNicolo et al (2013) come to a different conclusion using a different data set. A trade-off between price and financial stability might emerge. Accommodative monetary policy that helps to fend off deflationary pressure has the potential to compromise financial stability.

Importantly, the monetary transmission mechanism can work differently across various regions and sectors in the economy. This can lead to sectoral or regional impairment of the monetary transmission mechanism. For example, it may be difficult to reach SMEs and certain households without overstimulating other parts of the economy. Sections 4.1 and 5 will zoom in on this aspect and provide some possible remedies for it.

3.2 Credit vs money dispute

Two schools of thought have fought over the two different prime quantities: credit aggregates and monetary aggregates. The two schools are sometimes referred to as the “credit view” and the “money view”. The goal of the money view is to determine the price level, ignoring risk premia. In the credit view, risk premia play an indirect role, but less attention is given to how vulnerabilities affect shifts in risk and risk premia, and how those affect overall output and money creation.

Tobin and Brainard’s (1963) portfolio balancing approach focuses on credit on the asset side of banks’ balance sheets, hence the name the “credit view”. Banks may shift their asset and loan allocation, for instance in times of crisis they may be unwilling to provide credit and instead park their funds in safe assets. The credit view is also reflected in the literature on the bank-lending channel, as emphasised by Bernanke and Blinder (1988) and Bernanke and Gertler (1995).

In contrast, monetarists, following Friedman and Schwartz (1963), focus on the liability side of banks’ balance sheets. This “money view” offers a simpler theory, which argues that it is primarily the link between (broad) money supply and inflation that matters. This view focuses on the transaction role of money, while the “credit view” emphasises the role of money as a store of value.

“The I Theory of Money” incorporates both elements, i.e. both sides of the intermediaries’ balance sheets. It reflects the fact that the “output” of financial intermediaries, including shadow banks, is two-sided: on the asset side, intermediaries create credit, while on the liability side they create (inside) money. Viewed from this perspective, it is clear that funding is not an input – an aspect that distinguishes financial institutions from other corporations.

In the I Theory, just as in the portfolio balancing approach, the intermediaries’ asset composition plays an important role. At the same time, as described in the “money view”, (inside) money creation from banks’

liabilities determines the price level. Both elements are endogenously driven by the health of the financial system. The health of the financial sector also affects endogenous risk and risk premium dynamics, which in turn affect the banks' willingness to extend credit to the real economy and to create money.

The I Theory goes beyond stocks and flows as captured by flow of funds data and derives endogenous risk dynamics. The model also stresses the importance of continued uncertainty, especially in a recession. Papers that study the amplification effects after a one-time unanticipated shock implicitly assume that agents know that the economy will recover back to its steady state after the shock. In reality, market participants do not know this for certain. They face great uncertainty about the length of the downturn and the possibility of continued adverse shocks. With weakened balance sheets, agents' behaviour becomes especially erratic and sensitive to further shocks. This anticipation of uncertainty results in significant amplifications, counteracting the Kocherlakota (2000) critique that the calibrated impact of financial frictions has to be small.

The distinction between credit and money in a simple stylised economy with a representative banking sector is fairly straightforward. Credit is on the asset side, arguably including lending to the government sector. Money, on the other hand, is on the liability side of the banks' balance sheets. Things get more complicated in a world characterised by long intermediation chains, a web of contracts, and cross-holdings among various financial institutions. Then, the distinction between credit and money is less obvious and the aforementioned balance sheet definitions are less meaningful.

Going beyond the I Theory model, an important distinguishing feature of money in a complex world of instruments is that it is a standardised IOU for which the counterparty does not matter. In other words, short-term IOUs with very limited credit and liquidity risk are a defining characteristic of money. Money has the convenient property that opposing positions can be easily netted without any controversy. Money is not informationally sensitive: no one (except possibly the government) should have an informational advantage about the value of the money.⁶ Moreover, credit can be transformed into money through collateralisation, by removing default and liquidity risk. Repos are a classic example of this transformation.

An overarching definition of money is made elusive by the changing views of market participants on securities that can be treated as substitutes for money. Prior to the crisis, financial market participants treated AAA-rated securities as close substitutes of money. During the crisis, the situation changed drastically: when volatility rose there was a severe scarcity of credit contracts that could be considered closely substitutable with money. Even inside money might lose its "moneyness" in crises.

On the other hand, there exists a portfolio rebalancing effect in crises: as credit becomes more short-term, it is officially classified as money (rather than credit). This effect leads to artificial distortions in statistics: M3 growth becomes artificially overstated. There may be also an accompanying shift to safer forms of savings, which shows up as an increase in M2. Implicitly, the ECB has already modified its monetary growth decision criteria by resolving to ignore M3 growth in 2001-2003. In contrast, after 2004, M3 growth correlated more strongly with credit expansion, and more weight was put on M3 growth. In a sense, the ECB indirectly applied a "modified" M3 growth criterion during that period.

⁶ There are many other distinguishing features of money, such as, for example, the anonymity of physical cash.

3.3 Liquidity mismatch and its topography

The vulnerability of the financial system depends on the degree of leverage in the economy as well as on its liquidity mismatch: the difference between the difficulty of selling assets in a crisis, and the reliability of access to funding in such times. Credit aggregates are important from a financial stability perspective as they reflect the aggregate leverage in the economy. Since money is short-term debt, monetary aggregates also reflect the maturity mismatch in the economy. However, for a number of reasons, neither money nor credit is an ideal measure.

Liquidity has many dimensions. A proper measure should take into account the mismatch between technological illiquidity of holdings on the asset side of balance sheets and funding liquidity on the liability side. For physical assets, technological illiquidity depends on (i) the duration of physical investment, and (ii) the redeployability and reversibility of the physical project. If a factory is built to operate for 30 years and, owing to its specificity, it cannot be redeployed for other uses, then the liquidity of the factory is very low. In the case of fire sales triggered by adverse shocks, the prices of illiquid physical assets drop significantly. A similar argument holds for financial assets, which are claims on cash flows generated by physical capital or other financial assets. The prices of illiquid financial assets drop significantly in crises.

Holders of physical or financial assets may be pushed to fire sales if they cannot roll over existing debt on account of the short-term nature of their financing. Wholesale funding, defined as the short-term funds provided by money market investors, is one of the most fleeting sources out there in terms of liquidity provision.

Liquidity mismatch is the discrepancy between the technological illiquidity of assets and the funding liquidity of liabilities, i.e. the maturity structure and reliability of funding. An important measure of reliability is the sensitivity of margins/haircuts to market conditions. For example, if someone buys a financial asset on a margin of 10% and this margin can jump overnight to 70%, then he has effectively funded 60% of the asset purchase with overnight debt.

Furthermore, the market illiquidity of assets depends on the availability of natural buyers willing to step in and purchase assets without a significant discount. The existence of potential buyers depends on the distribution of liquidity mismatch across the economy, and it is a key determinant of the system's susceptibility to liquidity spirals and runs. If investors with similar expertise are all exposed to a similar liquidity mismatch, then they will absorb liquidity after an adverse shock, instead of providing it.

Therefore, for a coherent analysis, it is essential to define sectors based on their expertise for holding certain assets or asset classes. Expertise segments markets. Expertise also has a regional dimension; often the knowledge of local culture and language is crucial for successful operation in a given region. Proper analysis has to identify the liquidity mismatch within each sector to map out the overall mismatch topography. Such an analysis goes far beyond simple aggregate credit and money supply measures or simple flow of funds arithmetic in order to identify risk concentrations and risk pockets.

It should not come as a surprise that focusing on net positions in a representative economy grossly underestimates risk. The simple fact that net debt in a closed economy is zero – for each euro lent out, there is a euro borrowed – clearly shows the importance of a sectoral analysis. A traffic analogy might make this point even more striking. We would certainly consider it unreasonable to study traffic patterns by netting out the number of people who commute from A to B against the people who commute in the

opposite direction. Such an analysis would grossly underestimate total traffic volume and accident rates. A similar observation is true about risky credit, as default and liquidity risk are impossible to net out. Overall, an economy-wide risk topography analysis is needed, as outlined in Brunnermeier, Gorton and Krishnamurthy (2013).

Special attention should be paid to the financial and government sector. The financial sector is typically part of any episode of excessive debt levels in the economy. This may well be for strategic reasons, as times of crisis often see losses being pushed onto the financial sector, providing it is well capitalised. The government sector is unique because it can fund itself through taxes. Taxes can even be levied on as yet unborn generations. If government debt is primarily held by the domestic banking sector, the government sector and the banking sector are inextricably linked. As government debt levels become unsustainable, banks suffer losses on their bond portfolios. They cut back their credit, lowering real economic activity. This, in turn, lowers the government's tax revenue, which makes the official debt level even less sustainable.

3.4 Risk build-up phase

How does the mismatch in liquidity build up over time? Credit bubbles which are accompanied by liquidity mismatches are much more detrimental than equity financed bubbles. Credit growth is closely linked with asset price growth and an increasing probability of a subsequent financial crisis. Schularick-Taylor (2012) document this based on a cross-country study using historical data. While the bursting of the technology (asset) bubble (which was not financed by credit) starting in 2000 caused large wealth destruction, its implications on the real economy were minor compared to the bursting of the recent credit-financed housing bubble.⁷

Liquidity mismatch can build up over time in three different ways:

- 1 Excessive short-term debt financing
- 2 Extension of the duration of physical projects
- 3 Increased specificity and specialisation of physical capital

The first reason is an increase in short-term credit financing. The ideal breeding ground for lending booms and credit bubbles is an environment with low volatility. High loan to value (LTV) ratios or equivalently low margins and haircuts allow market participants to lever up. When levering up with short-term debt, each individual investor only takes into account that he might not be able to roll over his own debt and might be forced to sell off his assets at fire-sale prices. However, he does not take into account the pecuniary externality that his selling depresses the price for other investors as well. In addition, increased volatility raises margins and haircuts for all levered investors, as in Brunnermeier and Pedersen (2009). Moreover,

⁷ Similarly, the run-up in stock prices during the "roaring 1920s" was to a large extent based on margin trading, i.e. finance with short-term loans. This credit-fed boom ultimately led to the Great Depression with hardships felt in all parts of the economy. The Scandinavian crisis in the early 1990s and the Japanese lost decade were also preceded by lending booms that had led to excessive asset prices. Arguably, financial liberalisation made credit and asset prices more important drivers of economic fluctuations. It is the simultaneous emergence of both excessive credit growth and unwarrantedly high asset prices that make the dangerous cocktail.

credit-financed real estate bubbles are often accompanied by increases in consumer spending. Their bursting therefore also affects aggregate consumption, especially that of durable goods.

These inefficiencies led Borio and Drehman (2009) and Drehman (2013) to propose the aggregate debt-to-GDP ratio as an early warning signal for the build-up of imbalances. However, significant credit growth is not a sign of instability per se. Credit growth that leads to productivity enhancements can reflect a financial deepening and a weakening of financial frictions. On the other hand, short-term credit flows that target sectors with low total factor productivity are worrisome, see, for example, Gorton and Ordonez (2014). Brunnermeier and Reis (2014) show that the capital flows in the 2000s from the core to the periphery of the European economy did not lead to any growth in total factor productivity (TFP) in the periphery. The increase in GDP in the periphery before the crisis was mostly driven by an increase in factor input, in the form of additional capital and labour rather than an increase in productivity. Subsequent financial instability has been further exacerbated by the fact that most of these credit flows were in the form of short-term wholesale funding within the banking sector.

Excessive credit can build up in different sectors, highlighting the importance of sectoral analysis.⁸ Part of the liquidity mismatch can be concentrated in the corporate sector, as long-run investments are largely financed with short-term debt, often in foreign currency. In Japan the business sector became overleveraged in the 1980s, while in the United States and Spain in the 2000s it was the household sector that borrowed too much. See, for example, Brunnermeier and Sannikov (2012).

The second form of build-up occurs when firms shift to physical investment projects whose cash flows materialise far into the future. Each individual firm does not internalise that by investing in a project with longer duration; its increased urge to fire-sell after an adverse shock also adversely affects other investors. Investors are typically willing to accept longer-term investments when they expect that the real interest rate and overall volatility will remain low for an extended period of time. This second form of liquidity mismatch build-up resonates with the ideas from the Austrian school of economics. Low interest rates flatten and stretch the “Hayekian triangle”. As the time costs of capital decline, the production process becomes stretched into more stages and takes longer to complete.⁹

An increase in specialisation is the third way in which liquidity mismatch can build up. As the specificity of investments increases, price drops in fire sales become larger. Each individual agent does not fully take into account that a higher degree of specialisation also reduces his ability to absorb possible fire sales from others when they face negative shocks. In other words, by specialising more he worsens his potential to become a liquidity provider for others. This applies to investment not only in physical capital but also in human capital. As sectors become more specialised – as they use more special physical capital and become more reliant on industry-specific human skills – liquidity problems worsen. As an economy climbs the development ladder, it becomes more specialised and its sector structure becomes more granular.

⁸ Special attention should be devoted to credit lines. They provide early indications that a crisis may be around the corner, since firms have an incentive to draw on outstanding credit lines as their financial outlook worsens and as access to new credit dries up. As a consequence, credit seems to expand or to remain strong, while in reality the economic situation worsens. Ivashina and Scharfstein (2010) provide empirical evidence of these phenomena in the United States in 2008. It might therefore be informative to look at newly extended credit lines to predict the onset of problems.

⁹ However, unlike in the teachings of the Austrian school, the lengthening of the duration of investment projects in present day economies does not necessarily occur as a result of an increase in the number of production stages, as nowadays production processes are streamlined with just-in-time supply chains.

3.5 Monetary policy and macro-prudential policy: an integrated view

In the spirit of clear accountability it might be tempting to separate and classify “quantity rules” as macro-prudential rules to ensure financial stability, and “interest rate rules” as monetary rules to ensure price stability. Treating them separately from each other and assigning them to two separate agencies – a regulatory authority and central bank, respectively – seems appealing.

However, the I Theory outlined in Brunnermeier and Sannikov (2012, 2013) questions this “separation view” and stresses the importance of spillover effects that link the various stability concepts. For example, financial instability prompts financial intermediaries to shrink their balance sheets and create less inside money. Consequently the money multiplier collapses and Fisher deflation pressure emerges. This increases the real value of banks’ liabilities and worsens financial instability. Financial institutions may “corner” central banks by threatening contagion (financial dominance) if they are not bailed out – possibly through lax monetary policy.

It is also difficult to explain why certain quantity restrictions belong to the monetary policy toolbox while others are macro-prudential instruments. For example, reserve requirements are typically classified as a monetary policy tool, while many consider their close cousin, liquidity requirements, to be a macro-prudential tool. Central banks set collateral requirements, while leverage requirements are macro-prudential, and so on.

Importantly, macro-prudential regulation has direct implications on price stability. Tightening capital requirements leads to less credit extension and money creation and hence causes downward pressure on inflation. Counteracting this with loose monetary policy might not be an optimal policy mix. This calls for a close cooperation between monetary policy and macro-prudential measures. Such cooperation might be challenging if the two different authorities disagree. Imagine a situation in which the macro-prudential authority is reluctant to lean against the build-up of imbalances that may have the potential to impair the monetary transmission mechanism. In such circumstances should the central bank compensate for macro-prudential inaction with interest rate policy?

4 Quantities in volatile times

So far, we have made the case that monetary analysis should include quantities, such as the topography of liquidity mismatch, in order to prevent potential future financial and price instability. Ex ante crisis prevention is essential for central banks in order to avoid being cornered later and forced to conduct ex post redistributive monetary policy. In the worst case, we might enter a regime of “financial dominance”, in which the financial industry corners central banks, forcing them to take measures that restrict their freedom to conduct the proper monetary policy. Hence, it is insufficient to restrict attention to current interest rates only: quantity aggregates have to be closely watched and acted upon as well to prevent the build-up of imbalances that make the economy vulnerable to sudden shifts.

This section focuses on volatile times after the crisis has erupted and makes the case for programmes that support prudentially designed asset-backed securities (ABS) in order to avoid sectoral imbalances. Central banks have to figure out which sectors suffer from impaired balance sheets and debt overhang problems. The key question is: where is the bottleneck in the economy? Quantity measures, in addition to various interest rate spreads and implied volatility measures, provide critical information. Typically all these

measures shoot up in tandem. However, price movements in these situations are mostly driven by news concerning political decisions, in particular, bailout expectations, rather than economic fundamentals. Even worse, markets might freeze or totally break down, and hence market price signals can become unusable as their informational content becomes diminished.

In this section we first argue that monetary policy can be used to avoid further amplification and redistributive effects due to endogenous risk. The monetary transmission mechanism can become “sectorally impaired” as banks find it less advantageous to lend to SMEs rather than hold sovereign government debt. With regard to the recapitalisation of the financial sector as a whole, there are two fundamentally opposed strategies. On one hand, the temporary monopoly strategy tries to recapitalise the struggling sector, say the banking sector, through increased earnings. Future earnings are enhanced if one restrains competition among banks. On the other hand, the exact opposite strategy is to invite new risk-bearing capital into the sector. This enhances competition in the undercapitalised sector and eases credit flow to the rest of the economy. One way to increase the sector-wide risk-bearing capital is to launch and establish prudentially designed ABS markets. Such a securitisation scheme would also reflect the ongoing shift away from traditional banking and the increased importance of asset management. By including all sectors and all regions in the economy into the securitisation scheme, it is possible to avoid the “sectoral (and regional) impairedness” of the monetary transmission mechanism.

4.1 Monetary policy: “sectorally impaired” transmission mechanism

The I Theory suggests the application of a “bottleneck monetary policy” in times of crisis. Whenever a major sector in the economy suffers from debt overhang problems, typically the financial sector is also in bad shape.

Leaving the balance sheet problems unaddressed leads to liquidity spirals, with associated fire-sale losses and the Fisher deflationary spiral. These processes/spirals redistribute additional wealth away from the distressed sectors with high debt levels. Monetary policy has to lean against liquidity and deflationary spirals – especially if fiscal policy measures cannot be implemented in a timely manner. Monetary policy that slows the flight of wealth away from these undercapitalised sectors, for example from borrowers to savers, reduces the required risk premia and the level of endogenous (self-generated) risk.

A purely inflation-focused monetary policy only tries to reduce the impact of the Fisher deflationary spiral, and stops short of ensuring that the financial sector extends sufficient credit to the real economy. It does not target the bottleneck, i.e. the core of the inefficient distortions that arise from impaired balance sheets.

Aggregating various forms of inflation to a single index can obscure valuable information for optimal monetary policy. For example, inflation driven by an increase in wages and other input prices is anti-stimulus if corporations suffer from debt overhang problems. This type of inflation also undermines the international competitiveness of corporations. If, on the other hand, it is primarily the households’ balance sheets that are impaired, then moderate wage inflation might be helpful to overcome the bottleneck in the household sector.

Unconventional monetary policy can only be effective if there exists the right set of assets through which the central bank can intervene. The recent set of quantitative easing measures of the US Federal Reserve

has focused on mortgage products. One could make the case that these measures aimed to stabilise the housing market in order to ease the balance sheet problems of a large part of the housing sector.

So far, the ECB's unconventional monetary policy measures have focused on various forms of government debt. From 2012 onwards the ECB's communication strategy, which suggested potential interventions in the sovereign debt market, was extremely effective in reducing the funding costs for sovereign governments. A spillover effect of this policy has been the lowering of corporate yields, which has helped large enterprises.¹⁰ However, due to the lack of an effective securitisation market for SME and household loans, the impact of monetary policy on SMEs and households has been limited.

The monetary transmission mechanism is thus "sectorally impaired". Within the current financial structure, the central bank is forced to choose between leaving the SMEs' funding problems unaddressed, or overcorrecting on the sovereign debt market (leading yield observers to suspect a bubble in sovereign debt). Both alternatives are suboptimal and unbalanced, as the central bank's policy may have to be too loose for some sectors in order to at least partially alleviate the pressure on other sectors. Of course, the transmission mechanism might in addition be "regionally impaired". One potential solution to this dilemma is to develop a standardised and prudentially designed asset-backed securitisation market. We will return to this point in Section 5 after discussing some other recapitalisation strategies.

4.2 Recapitalisation strategy through monopoly rents and forbearance

One strategy to recapitalise impaired balance sheets, for example those of the banking sector, is to grant them temporary monopoly rents. If a whole sector is less well capitalised, firms in this sector retreat and compete less fiercely with each other. This boosts their profit margins and future earnings. This, in turn, lifts their franchise value and current stock price, thereby relaxing the funding constraints. This strategy only works for sectors that are critical for the functioning of the economy and not easily substitutable. The classic example is the financial sector. A higher concentration of banks within the financial sector might be tolerated. Regulation, such as a restricted issuance of bank licences, can make it difficult for potential new entrants to enter and compete with the incumbent banks. From an ex ante perspective the possibility of granting this monopoly power can be seen as an insurance scheme that the real economy extends to the financial sector.¹¹

However, this strategy comes with at least two major drawbacks. First, preventing others from entering the market also limits the number of potential buyers of legacy assets. To avoid liquidity spirals due to forced fire sales, this recapitalisation strategy is typically accompanied with generous forbearance arrangements. Losses are hidden and not realised. In addition, banks continue to rollover zombie loans in the process of "evergreening".

The second even bigger problem of this "temporary monopoly strategy" is that the reduced competition can hurt other sectors in the economy more than it benefits the distressed sector. For example, the induced reduction in new lending by the financial sector might cause a sharp decline in real economic

¹⁰ The Spanish and Italian ten-year yields trade below 3%, the Portuguese around 3.65% and the Bank of America Merrill Lynch Euro High Yield Index fell significantly below 5%.

¹¹ For a formal analysis within an international context, see Brunnermeier and Sannikov (2014b).

activity, which makes other outstanding loans more risky. Ultimately, if the feedback effects are sufficiently large the indirect costs could outweigh the benefits.

The second effect is less of a concern for regulators if the reduction in new lending occurs abroad, outside their jurisdiction. In the 1980s policy-makers pursued a strategy of forbearance for international banks that had overextended loans to Latin America. Instead of restructuring Latin American debt, international banks were “saved” and given time to rebuild their balance sheets through the 1980s Paris Club negotiations. This strategy led to international spillovers and dismal economic growth in Latin America for many years. In contrast, the credit crunch experienced in Japan during the 1990s was inflicted on its own economy and resulted in two lost decades.

4.3 Attracting new risk-bearing capital

An alternative strategy is to invite new risk-bearing capital and open up new funding channels. The inflow of additional risk-bearing capital enhances competition within the banking sector and restores credit. Ignoring indirect general equilibrium effects, profit margins typically suffer, which explains why incumbent firms tend to oppose such a strategy.

There are different ways to attract new capital. For example, one could allow foreign firms with similar expertise to enter the market. Korea followed this alternative strategy in the late 1990s,¹² but local banks arguably had to sell assets at fire sale prices to the entering foreign institutions.

Another simple form of attracting new capital is to force banks to issue new equity capital. Existing firms are reluctant to issue equity on their own, owing to the stigma associated with the action. Firms try to signal their strength to withstand the crisis by refraining from issuing additional equity. One of the main purposes of the ECB’s Asset Quality Review (AQR) is to evaluate the solvency of major banks in order to reduce inefficiencies resulting from asymmetric information. This review should make it less costly for healthy banks to raise new equity, and potentially lead to an earlier closure of insolvent zombie banks.

A third way to attract new funding is to increase the efficiency of direct lending arrangements, for instance via the corporate bond market or private debt. This opens up a new funding source for large corporations.

Finally, one could also revitalise the shadow banking system, as was done in the US in 2009 through various programmes by the Federal Reserve and the US Treasury.

Importantly, as long as it is unclear whether a country is following a recapitalisation strategy through granting temporary monopoly rents or through inviting new risk-bearing capital and closing down zombie institutions, new investors may be reluctant to enter as they are uncertain whether they should support the incumbents or the new entrants.

5 Prudently designed asset-backed securities markets

Launching a prudently designed asset-backed securitisation market deserves special attention especially in the light of the global shift away from a bank dominated finance landscape to one in which asset

¹² See for example, Shin and Hahm (1998).

management and other forms of finance play a more prominent role. Pension funds and insurance companies are searching for longer-dated fixed income products in order to hedge their long-duration liabilities. They are also willing to assume some limited amount of credit risk if they can, in exchange, lower their duration risk. Global savings of pension funds alone is about USD 26 trillion.¹³

A standardised and transparent securitisation programme that transforms relatively illiquid loans to SMEs, real estate firms and consumers into an asset class with high market liquidity is appealing for several reasons.

First, in the short-term this could stimulate credit and overcome the ongoing weakness of credit provisioning by banks. Some of the credit risk could be transferred to other financial institutions outside traditional banking. Given the strict standards applied to newly granted loans at the moment, the overall credit risk should be manageable especially for asset management firms with healthy balance sheets.

Second, this new prudently designed asset class would ensure that any unconventional monetary policy is more “sectorally balanced”. Monetary policy should not favour national sovereign debt and large corporate debt issuers over SMEs. With an active SME securitisation market, this problem could be avoided. If the ECB were to intervene in the sovereign debt market again, it would crowd out private investors who then might find it attractive to shift into this new prudently designed asset class. This would improve SMEs’ funding conditions. Moreover, the ECB could directly become active in this market as part of an unconventional monetary policy measure.

Third, securitisation designed on a euro area-wide scale would create a new European asset class. It would re-establish cross border financial intermediation inside the euro area, with sounder economic fundamentals than wholesale short-term interbank lending. It would also ensure that the monetary transmission channel is not only “sectorally”, but also “regionally” more balanced.

Fourth, the senior component of ABS can serve as stable and high-quality collateral and take on the role as a European safe asset.¹⁴ It can take on a stabilising function in times of crises when flight to safety capital flows from the periphery to the core or the euro area surge.

Fifth, establishing this asset class is an opportunity to launch a truly European market that does not suffer from the diabolic loop, i.e. the link between sovereign and bank credit risk. Note that the value of ABS only depends on the underlying securities.

There exist several technical and legal hurdles. While the statistical properties of default rates for consumer loans, especially for car loans, are by now well understood and stable, the reaction of the value of an SME loan portfolio to various risk factors is less known. As a consequence, tranching of SME loans has to be more conservative. In addition, securitisation has to be designed in a way that minimises asymmetric information problems. Pooling should ideally diversify away any soft informational advantage the initial

¹³ About half of global pension savings of about USD 26 trillion are in the United States. The following highest pension savings are in Japan, the United Kingdom, Australia and Canada. As a share of GDP, the Netherlands has the highest rate of pension savings at 136%, while France and Italy have the lowest rates, both with less than 5% of GDP. See OECD data, available at <http://www.oecd.org/pensions/pensionsataglance.htm>

¹⁴ The Euro-nomics group has proposed a similar form of bond structuring involving the pooling and tranching of sovereign debt. The senior bonds, called ESBies, would form the European safe asset.

issuer of the SME loans might have. From a legal perspective, a harmonised bankruptcy law would be desirable but is not necessary.

Advanced standardisation and transparency is essential for the success of the asset class. If the ECB were to embark on a private asset purchase programme, it would have an opportunity to set the framework for the future development and standardisation of securitisation in the euro area. Currently, it does not have this power with its collateral policy, as it is constrained by the need to provide liquidity and does not directly influence the price of the securities taken as collateral. In contrast, if the ECB were to buy these new assets, it has to take a view on the price. That gives the ECB very strong leverage on the design and structure of securitised assets. This offers a unique opportunity to shape the market in the long run.

One of the key design issues is whether or not this new prudent securitisation should involve some maturity transformation in addition to pooling and possibly tranching. There are strong arguments in favour of staying away from maturity transformation. The absence of any maturity and liquidity mismatch removes the endogenously created risk of a run. As mentioned above, a large set of natural investors to purchase long-dated assets precludes the need to attach a maturity transformation element to this product. More generally, the fact that a world full of long-term savings and funding needs continues to be served by a financial system that relies mostly on short-term funding remains a paradox.¹⁵

Important undesirable complications arise if the securitisation scheme were to involve some maturity transformation, i.e. if the issued ABS were to be short-term, while the underlying assets were long-term. This has implications for the ECB's monetary analysis, policy, and financial regulation. The private sector's built-in incentives for excessive maturity and liquidity transformation would provide a big challenge. Securitisation would produce "money-like" assets that would serve as a store of value and a medium of exchange. The monetary analysis has to take into account that this asset class also contributes to liquidity mismatch. The surveillance of traditional monetary aggregates should be adjusted on account of the complexity arising from portfolio substitution effects. Importantly, the new asset class would be subject to "run risk". Hence, tranching should be even more conservative owing to the potential for a build-up of liquidity mismatch to appear. Ultimately, whether the ECB should extend its lender of last resort function to this asset class, and, if so, what supervisory and regulatory steps the ECB has to adopt, remains an important question.

6 Conclusion

This paper tries to put forward a potential conceptual underpinning for the deepening of the monetary analysis within the ECB. To a large extent, the reasoning is based on more formal analysis developed in "The I Theory of Money". Importantly, in this framework risk premia vary over time and risk is endogenous, i.e. self-generated by the system. Both risk premia and risk can be mitigated with the appropriate monetary policy and macro-prudential policy. In this framework price stability, financial stability and fiscal stability are interconnected and difficult to separate.

¹⁵ There are various economic theories that justify this fragile arrangement using primarily short-term debt. For example, Calomiris and Kahn (1991) as well as Diamond and Rajan (2001) make the case that the possibility of runs acts as a disciplinary device for debtors. In Brunnermeier and Oehmke (2013) short-term funding is excessive due to an inefficient maturity rat race.

Quantity aggregates at a sectoral level provide valuable information. Ideally, one would like to map out the topography and concentration of the liquidity mismatch in the whole economy. This helps to identify the build-up of imbalances and vulnerabilities in tranquil times and figure out the bottlenecks in volatile times.

As a result of missing asset markets, the monetary transmission mechanism may be unable to reach certain sectors (or regions) in the economy. Monetary policy should not favour national sovereign debt and large corporate debt issuers over SME and consumer loans. The paper makes the case for launching a prudently designed asset-backed securities market, which transforms illiquid SME and consumer loans into a liquid asset class, as a way to broaden the transmission mechanism of monetary policy. This would also establish a lasting intermediation market for this segment in the euro area.

References

- Abreu, D. and Brunnermeier, M.K. (2003), "Bubbles and Crashes", *Econometrica*, Vol. 71, No 1, pp. 173-204.
- Alves, N., Robalo Marques, C. and Sousa, J. (2007) "Is the euro area M3 abandoning us?" *Banco de Portugal Working Paper*, No 20/2007.
- Bernanke, B.S., Gertler, M. and Gilchrist, S. (1999), "The financial accelerator in a quantitative business cycle framework", in Taylor, J.B. and Woodford, M. (eds.), *Handbook of Macroeconomics*, Elsevier, Amsterdam, pp. 1341-1393.
- Bordes, C., Clerc, L. and Marimoutou, V. (2007), "Is there a structural break in equilibrium velocity in the euro area?", *Banque de France Working Paper*, No 165.
- Borio, C. and Drehmann, M. (2009), "Assessing the risk of banking crises – revisited", *BIS Quarterly Review*, March, pp 29-46.
- Borio, C. and Lowe, P. (2004), "Securing sustainable price stability: should credit come back from the wilderness?", *BIS Working Paper*, No 157.
- Brunnermeier, M.K. (2009), "Deciphering the Liquidity and Credit Crunch 2007-08", *Journal of Economic Perspectives*, Vol. 23, No 1, pp. 77-100.
- Brunnermeier, M.K., Gorton, G., and Krishnamurthy, A. (2012), "Risk Topography", in Acemoglu, D. and Woodford, M. (eds.), *NBER Macroeconomics Annual 2011*, pp. 149-176.
- Brunnermeier, M.K. and Pedersen, L. (2009), "Market Liquidity and Funding Liquidity", *Review of Financial Studies*, Vol. 22, pp. 2201-2238.
- Brunnermeier, M.K. and Oehmke, M. (2013), "The Maturity Rat Race", *Journal of Finance*, Vol. 68, No 3, pp. 483-521.
- Brunnermeier, M.K. and Sannikov, Y. (2012), "The I Theory of Money", *Princeton University working paper*, available at <http://www.princeton.edu>
- Brunnermeier, M. K. and Sannikov, Y. (2014), "A Macroeconomic Model with a Financial Sector", *American Economic Review*, Vol. 104, No 2, pp. 379-421.
- Brunnermeier, M. K. and Sannikov, Y. (2014b), "International Credit Flows, Pecuniary Externalities and Capital Controls", *Princeton University working paper*, available at <http://www.princeton.edu>

- Calomiris, C.W. and Kahn, C.M. (1991), "The Role of Demandable Debt in Structuring Optimal Banking Arrangements", *American Economic Review*, Vol. 81, No 3, pp. 497-513.
- Campbell J.Y. and Shiller R.J. (1991), "Yield Spreads and Interest Rate Movements: A Bird's Eye View", *Review of Economic Studies*, Vol. 58, No 3, pp. 495-514.
- Cieslak, A. and Povala, P. (2013), "Expected Returns in Treasury Bonds", *Princeton University Civitas Foundation Finance Seminar*, available at <http://www.princeton.edu>
- Cochrane, J.H. (2011), "Presidential Address: Discount Rates", *Journal of Finance*, Vol. 64, No 4, pp. 1047-1108.
- Cochrane, J.H. and Piazzesi, M. (2005), "Bond Risk Premia", *American Economic Review*, Vol. 94, No 1, pp. 138-160.
- Diamond, D.W. and Rajan, R.G. (2001), "Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking", *Journal of Political Economy*, Vol. 109, No 2, pp. 287-327.
- Drehmann, M. (2013), "Total credit as an early warning indicator for systemic banking crises", *BIS Quarterly Review*, June, pp. 41-45.
- ECB (1999), "The stability-oriented monetary policy strategy of the Eurosystem", *ECB Monthly Bulletin*, January.
- ECB (2004), *The monetary policy of the ECB*, Second edition, European Central Bank, Frankfurt am Main.
- ECB and Bank of England (2014), "The impaired EU securitisation market: causes, roadblocks and how to deal with them", *short paper*, available at <http://www.ecb.europa.eu>
- Euro-nomics group (2012), "European Safe Bonds (ESBies)", available at www.euro-nomics.com
- Fama, E.F. and Bliss, R.R. (1987), "The Information in Long-Maturity Forward Rates", *American Economic Review*, Vol. 77, No 4, pp. 23-49.
- Friedman, M. and Schwartz, A. (1963), *A Monetary History of the United States, 1867-1960*, Princeton University Press, Princeton, NJ.
- Gertler, M. and Peter Karadi, P. (2013), "Monetary Policy Surprises, Credit Costs and Economic Activity", *NBER Working Paper Series*, No 20224.
- Gilchrist, S. and Zakrajšek, E. (2012), "Credit Spreads and Business Cycle Fluctuations", *American Economic Review*, Vol. 102, No 4, pp. 1692-1720.
- Gorton, G. and Ordóñez, G. (2014), "Crises and Productivity in Good Booms and in Bad Booms", *PIER Working Paper*, No 008.
- Jiménez, G., Ongena, S., Peydró, J. and Saurina, J. (2013), "Hazardous Times for Monetary Policy: What do 23 Million Loans Say about the Impact of Monetary Policy on Credit Risk-Taking?", *Econometrica* (forthcoming).
- Hanson, S. and Stein, J. (2013), "Monetary policy and long-term real rates", *Harvard University Working Paper*, available at <http://www.hbs.edu>
- Ivashina, V. and Scharfstein, D. (2010), "Bank Lending During the Financial Crisis of 2008", *Journal of Financial Economics*, Vol. 97, No 3, pp. 319-338.
- King, M. (2002), "No money, no inflation – the role of money in the economy", *Bank of England Quarterly Bulletin*, summer, pp. 162-177.

- Kocherlakota, N.R. (2000), "Creating Business Cycles Through Credit Constraints", *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 24, No 3, pp. 2-10.
- Papademos, L. and Stark, J. (2010), *Enhancing monetary analysis*, European Central Bank, Frankfurt am Main.
- Schularick, M. and Taylor, A.M. (2012), "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises", *American Economic Review*, Vol. 102, No 2, pp. 1029-1061.
- Shiller, R.J. (1979), "The Volatility of Long-Term Interest Rate and Expectations Models of the Term Structure", *Journal of Political Economy*, Vol. 87, No 6, pp. 1190-1219.
- Shin, I. and Hahm, J.-H. (1998), *The Korean Crisis – Causes and Resolutions*, Korean Development Institute.
- Stark, J. (2006) "The role of money – money and monetary policy in the twenty-first century", in Beyer, A. and Reichlin, L. (eds.), *Fourth ECB central banking conference, 9-10 November 2006*, ECB, Frankfurt am Main, 2008.
- Stark, J. (2007) "Enhancing the monetary analysis", *The ECB and its Watchers IX conference*, available at <http://www.ecb.europa.eu>
- Stark, J. (2010) "Enhancing the ECB's monetary analysis – what have we learnt?", *The ECB and its Watchers XII conference*, available at <http://www.ecb.europa.eu>
- Stein, J. (2012), "Monetary Policy as Financial Stability Regulation", *Quarterly Journal of Economics*, Vol. 127, No 2, pp. 57-95.
- Tobin, J. (1969), "A General Equilibrium Approach to Monetary Theory", *Journal of Money, Credit and Banking*, Vol. 1, No 1, pp. 15-29.
- Tobin, J. (1980), *Asset Accumulation and Economic Activity: Reflections on Contemporary Macroeconomic Theory*, Basil Blackwell, Oxford, UK.
- Tobin, J. and Brainard, W.C. (1963), "Financial Intermediaries and the Effectiveness of Monetary Controls", *American Economic Review (Papers and Proceedings)*, Vol. 53, No 2, pp. 383-400.
- Wicksell, K. (1898), *Geldzins und Güterpreise*, Kessinger Publishing, Whitefish, MT, 2010 reprint.
- Woodford, W. (2003), *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton University Press, Princeton, NJ.

Monetary policy and financial-stability are different and normally best conducted independently

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Abstract

The I Theory of Money argues that price stability and financial stability, and hence monetary policy and financial stability policy, are inseparable. But monetary policy and financial stability policy are different and distinct, in the sense that they have different objectives and different suitable instruments, even when the same authority is in charge of both. As is the case for fiscal policy and monetary policy, in normal times monetary and financial stability policies are most likely best conducted independently, but with each taking the conduct of the other policy into account. Sweden provides a bad example of aggressive leaning against the wind, with high costs in terms of excessively low inflation, overly high unemployment and a higher real debt burden for households.

1 The I theory of money

According to Brunnermeier and Sannikov (2014), in their I Theory of Money, price stability and financial stability are inseparable. Consequently, monetary policy and financial stability policy would be inseparable. This is very different from a more conventional view, according to which monetary policy and financial stability policy (micro and macro-prudential policy) are separate policies, with different objectives, different suitable instruments and, depending on the economy in question, different authorities in control of the instruments and accountable for achieving the objectives.

Furthermore, as far as I can see, the I Theory of Money is not yet fully developed to deal with the standard issues in monetary policy, for instance, how monetary policy affects inflation and unemployment. In particular, the version of the I Theory that I have seen has flexible prices and wages, whereas in the conventional view of monetary policy, stickiness of prices and wages is essential for a realistic and relevant view of the transmission mechanism.

2 How to distinguish between monetary policy and financial stability policy?

When we discuss different economic policies, we distinguish policies according to their objectives, instruments and the authorities controlling the instruments and being responsible for achieving the objectives. For instance, fiscal policy and monetary policy have distinct and different objectives, instruments and responsible authorities. Still there is considerable interaction, in that the objectives of fiscal policy are affected by monetary policy and vice versa. Therefore, good fiscal policy has to take the effects of monetary policy on the fiscal policy objectives into account, and vice versa. But they are clearly separate policies. Similarly, financial stability policy and monetary policy are separate policies, although with some interaction, sometimes considerable.

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Regarding monetary policy, for flexible inflation targeting, the objective is price stability and real stability. More concretely, the objective is to stabilise inflation around an inflation target and resource utilisation around a long-run sustainable rate. The instruments are, in normal times, the policy rate and communication. The latter includes publishing forecasts of the target variables, such as inflation and unemployment, and possible forward guidance, such as publishing a policy rate path, a forecast for the policy rate. In crisis times, the set of instruments include balance sheet policies, such as asset purchases (quantitative easing), fixed rate lending at longer maturities, and foreign exchange interventions. The authority controlling the instruments and responsible for achieving the objectives is the central bank.

Regarding financial stability policy, the objective is financial stability. The definition of financial stability is not as clear and obvious as the definition of price stability. A definition that I prefer is that the financial system can fulfil its three main functions (transforming saving into financing, providing risk management and transmitting payments) with sufficient resilience to disturbances that threaten these functions. The crucial part of the definition is arguably sufficient resilience. In the future there will be unavoidable disturbances and shocks to the financial system, very likely from unexpected directions and of unexpected kinds. The crucial thing is then that there is sufficient resilience to disturbances.

The instruments of financial stability policy are, in normal times, supervision, regulation and communication, including capital and liquidity requirements, loan-to-value (LTV) caps, financial stability reports, and so on. In crisis times, further instruments include acting as lender of last resort, variable rate lending at longer maturities (credit easing), guarantees, bank resolution, capital injections, asset purchases, and so on.

The authority or authorities controlling the instruments vary across countries and may include the financial supervisory authority, the central bank, the ministry of finance, the national debt office, a separate bank resolution authority, and so on.

3 Monetary policy and financial policy are different and distinct

Clearly, from the above perspective, monetary policy and financial policy are different and distinct policies. This is also the case when the same institution, the central bank, is in charge of both policies.

Importantly, price stability does not imply financial stability. Monetary policy can achieve price stability, but it cannot achieve financial stability. There is no way monetary policy can achieve sufficient resilience of the financial system; there is obviously no way monetary policy can ensure that there is sufficient capital and sufficient buffers in the financial system.

Furthermore, financial stability policy cannot achieve price stability. Financial stability policy can achieve financial stability, but it cannot stabilise inflation around the inflation target and unemployment around a long-run sustainable rate.

Thus, both policies are needed to achieve both monetary policy objectives and financial stability objectives.

Still, there is interaction between the two policies. Financial stability policy affects financial markets, spreads between different interest rates and lending by banks. This way it indirectly affects inflation and resource utilisation. Monetary policy affects resource utilisation, credit losses and assets prices. This way it

indirectly affects balance sheets and leverage. Thus, there is interaction between the two policies, as there is interaction between fiscal policy and monetary policy.

My view is that, in normal times, it is best to conduct monetary policy and financial stability policy independently, with each policy taking the conduct of the other policy into account in order to best achieve its objectives. This is similar to how monetary policy and fiscal policy are conducted. In game theory terms, it corresponds to a Nash equilibrium rather than a cooperative equilibrium. Bean (2014) provides a thorough discussion of why and how monetary policy and financial stability policy can achieve a good outcome by focusing on their own respective objective.

4 What if monetary policy posed a threat to financial stability?

There could arise situations when monetary policy might pose a threat to financial stability even when it fulfils the monetary policy objectives. Normally, the financial stability authority should be able to contain such threats with its available instruments. But how should a situation be handled when the threat cannot easily be contained?

The August 2013 forward guidance by the Bank of England's Monetary Policy Committee (MPC) provides an example of how to handle such a situation (Bank of England, 2013). The MPC agreed its intention not to raise the policy rate until the unemployment rate had fallen to a threshold of 7%, subject to three "knockouts" not being breached. The third knockout was the Financial Policy Committee (FPC) judging that the stance of monetary policy posed a significant threat to financial stability that could not be contained by the substantial range of mitigating policy actions available to the FPC, the Financial Conduct Authority and the Prudential Regulation Authority in a way consistent with their objectives.

Thus, according to this example, the financial stability authority should warn the monetary policy authority if monetary policy poses a threat to financial stability that the financial stability authority cannot contain with its available policy instruments. Then the monetary policy authority may choose to adjust monetary policy, tightening, that is, leaning against the wind, or loosening, depending on the situation. This clarifies the responsibility of each authority and makes it possible to hold them accountable.

So, is there any role for monetary policy in maintaining financial stability? If financial policy is ineffective or inappropriate, monetary policy may have to be adjusted (to be tighter or looser, depending on the situation). This means using monetary policy, as a last line of defence, when the first line of defence, financial stability policy, is failing. But normally, that defence is unlikely to be needed.

5 Sweden, a bad example of leaning against the wind as a first line of defence

Sweden provides a bad example of aggressive leaning against the wind as a first line of defence against perceived risks from household debt.

The background is that Swedish households' debt has risen, and the debt-to-disposable income ratio, the debt ratio, is high. But assets have risen at least as much as the debt, so the ratio of debt to assets is not high. Asset prices, including house prices, are in line with fundamentals. The ratio of debt service to disposable income is low.

One may discuss what risks the current situation poses, but, in any case, Finansinspektionen (the Swedish financial supervisory authority), has taken several actions. It issues a regular mortgage market report (Finansinspektionen, 2014), where it uses individual data on new borrowers to show that lending standards are high and that borrowers' debt-service capacity is good. In particular, it uses the individual data to conduct stress tests. It has concluded that that borrowers' resilience to disturbances, in the form of mortgage rate increases, house price decreases and income losses due to unemployment, is sufficient. Furthermore, Finansinspektionen introduced an LTV cap of 85% on mortgages in October 2010. Since then the household debt ratio has stabilised. The average LTV ratio for new mortgages has also stabilised, at around 70%, so the average equity is as high as 30%. Finansinspektionen has also increased the risk weights on mortgages to 25%, increased capital requirements to 16.4% CET1 for systemically important banks and recommended that lenders suggest individually adapted amortisation plans to borrowers. Clearly, Finansinspektionen has done a lot. It judges that current actions are sufficient to contain any risks, but it is monitoring the situation closely and is prepared to take further action if justified.

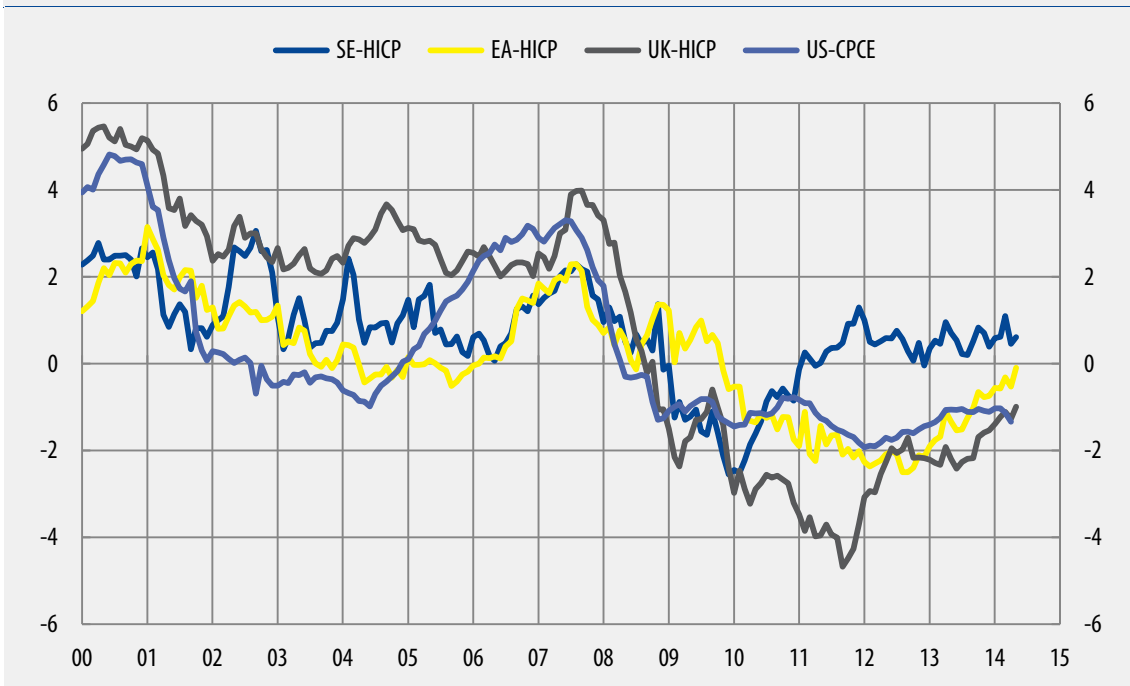
Sveriges Riksbank started to tighten monetary policy in the summer of 2010. The policy rate was raised steadily from 0.25% in July 2010 to 2% in July 2011. Sveriges Riksbank did this in spite of the actions of Finansinspektionen, and in spite of an inflation forecast in July 2010 that was below target and an unemployment forecast that was much above the Riksbank's estimated long-run sustainable rate (Svensson, 2011).

As a result of this tightening, CPI inflation has been zero or even negative over the last two and a half years, much below the 2% target for CPI inflation. The unemployment rate has remained high at around 8% and long-term unemployment has increased. Furthermore, the household debt burden has become higher, since the real value of nominal debt has become about 5% greater in the last two and a half years than it would have been if inflation had been on target.

Recently, Sveriges Riksbank published its own calculations on the impact of a higher policy rate on household debt. According to these calculations, a higher policy rate has a very small and uncertain impact on household real debt and the debt ratio, and the effect on any risks with household debt are even smaller (Sveriges Riksbank, 2013, 2014). As discussed in Svensson (2014), the Riksbank's estimates imply that the benefit of a higher policy rate, expressed in terms of a lower expected future unemployment rate, due to lower probability and less depth of a future crisis, is only about 0.4% of the cost in terms of higher unemployment over the next few years. Furthermore, the Riksbank's calculations and discussion disregard the fact that a lower price level than expected has actually increased the household debt burden.

Figure 1 illustrates the dramatic tightening made by Sveriges Riksbank in 2010. It shows real policy rates for Sweden, the United Kingdom and the United States, and the real EONIA rate for the euro area. We see that the central banks lowered their real rates in 2008 and 2009 to negative numbers, the ECB a little slower than the others. But from the beginning of 2010 to the end of 2011, the real policy rate in Sweden increased from minus 2.5% to plus 1% at the end of 2011, an increase of a full 2.5 percentage points. This increase was due to both the Riksbank's increase in the policy rate and the fall in inflation.

Figure 1 – Real policy rates for Sweden, the United Kingdom and the United States; real EONIA rate for the euro area



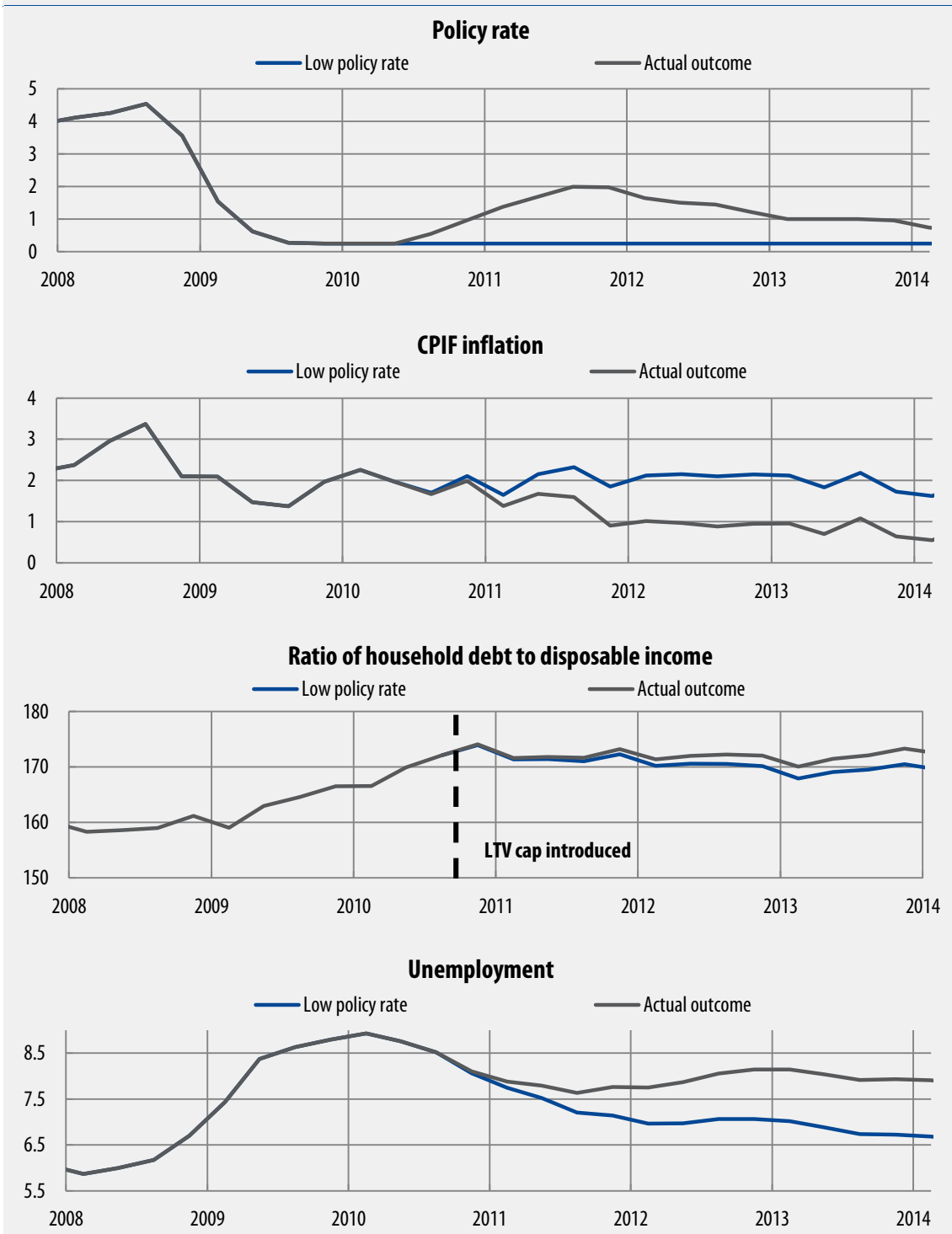
Source: Datastream.

Notes: Real interest rates are constructed as nominal rates minus HICP inflation for the euro area, Sweden and the United Kingdom, and as the nominal rate minus core PCE inflation for the United States.

In Figure 2, the grey lines show the actual outcome for the policy rate, CPIF inflation (CPI inflation excluding the effect of changes in the mortgage rate on housing costs), the unemployment rate, and the household debt-to-income ratio. The introduction of the 85% LTV cap is marked as a vertical dashed line in the panel for the household debt ratio.

The blue lines in Figure 2 shows a counterfactual outcome under the assumption of a policy rate held at 0.25% since July 2010. The counterfactual outcome for CPIF inflation and unemployment is calculated using the Riksbank's main model, the DSGE model Ramses. In the counterfactual outcome, CPIF inflation would have remained close to 2% and the unemployment rate during 2013 would have been about 1.2 percentage points lower. The cost of the Riksbank's actual policy in terms of higher unemployment and lower inflation is substantial.

Figure 2 – Actual and counterfactual outcome in Sweden for the policy rate, CPIF inflation, the unemployment rate and household debt-to-disposable income ratio (percentages)



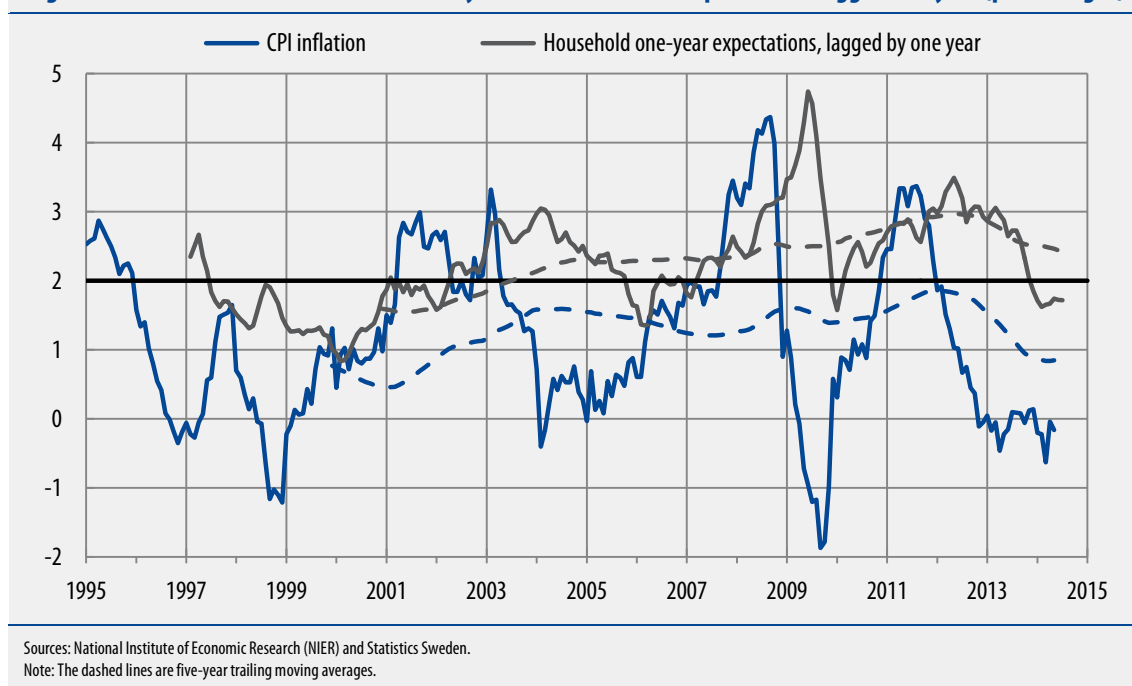
Sources: Sveriges Riksbank and Svensson (2013b).

The outcome for the household debt ratio is calculated using the model in Svensson (2013a), where mortgage debt is sticky and adjusts slowly. Then a lower policy rate increases nominal disposable income faster than it increases nominal debt, in which case the debt ratio falls rather than increases. The difference between the debt ratios at the end of 2013, which are about 174% for the actual outcome and about

170% for the counterfactual, is, however, too small to have any effect on any risks associated with household debt.

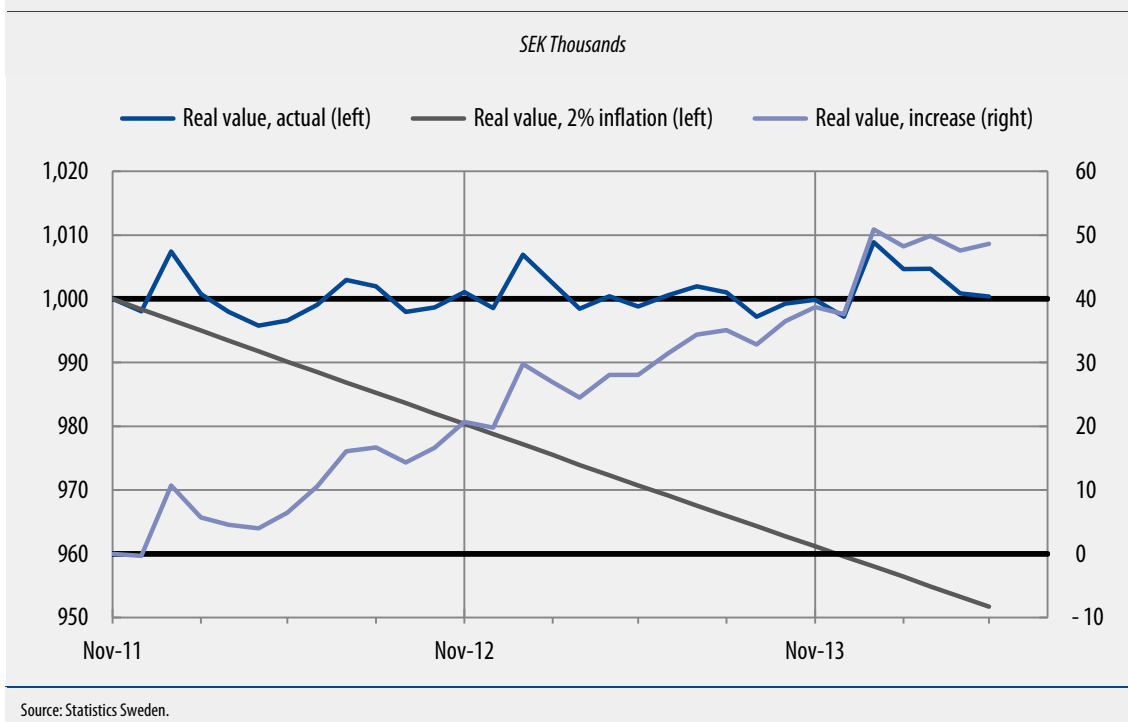
Figure 3 shows CPI inflation (the blue line) and household one-year-ahead inflation expectations lagged (the grey line). Thus, the gap between the blue and grey lines shows how much realised CPI inflation has deviated from household expectations. In the last few years, actual inflation and the actual price level has fallen substantially below the previously expected inflation and price level. This means that household real debt has become substantially larger than expected.

Figure 3 – CPI inflation and household one-year-ahead inflation expectations lagged one year (percentages)



In Figure 4, the grey line shows the real value of a loan of SEK 1 million taken out in November 2011, if inflation had been 2% (left axis). Then the real value of the loan would have fallen by 2% per year and been around SEK 950,000 in May 2014, two and a half years later. The dark blue line shows the actual real value of the loan. Since inflation has been about zero, the actual price level was about the same in May 2014 as in November 2011. The real value of the loan in May 2014 was hence still about SEK 1 million. The light blue line shows the difference between the dark blue and the grey lines, that is, the increase in the real value of the loan compared to if inflation had been 2% (right axis). In May 2014, the real value of the loan was SEK 50,000 higher than if inflation had been at 2%. A 5% increase in the real value of the loan over two and a half years is a substantial increase in the real debt burden of households.

Figure 4 – The real value of a loan of SEK 1 million taken out in November 2011, actual and if inflation had been 2%



6 Conclusion

In the I Theory of Money, Brunnermeier and Sannikov (2014) argue that price stability and financial stability, and hence monetary policy and financial stability policy, are inseparable. But monetary policy and financial stability policy are different and distinct, in the sense that they have different objectives and different suitable instruments, even when the same authority is in charge of both. Monetary policy cannot achieve financial stability, and financial stability policy cannot achieve price stability. Monetary policy is needed to achieve price stability, and financial stability policy is needed to achieve and maintain financial stability. As is the case for fiscal policy and monetary policy, in normal times monetary and financial stability policy are most likely best conducted independently, but with each taking the conduct of the other policy into account. If the monetary policy stance in a given situation poses a threat to financial stability that the financial policy authority cannot contain with its available instruments, the financial stability authority may warn the monetary policy authority about this, in which case the latter authority may choose to adjust monetary policy.

Sweden provides a bad example of aggressive leaning against the wind, in an attempt to restrict household indebtedness, in spite of low inflation forecasts, high unemployment forecasts and strong actions by the financial policy authority to contain any risks associated with household debt. Sveriges Riksbank's policy has indeed been quite costly. It has led to inflation substantially below the target rate and unemployment substantially above a long-run sustainable rate. Furthermore, since it has led to a price level substantially below what was expected, it has led to a substantially higher real debt burden than if inflation had been kept on target. Thus, if anything, it has increased any risks associated with household debt.

References

- Bank of England (2013), "Monetary Policy Trade-offs and Forward Guidance", August 2013, available at <http://www.bankofengland.co.uk>
- Bean, C. (2014), "The Future of Monetary Policy", *speech given at the London School of Economics*, 20 May 2014, available at www.bankofengland.co.uk/publications/Pages/speeches/default.aspx
- Brunnermeier, M. and Sannikov, Y. (2014), "Monetary Analysis: Price and Financial Stability", *Monetary Policy in a Changing Financial Landscape – ECB Forum on Central Banking, May 2014*, European Central Bank, Frankfurt am Main.
- Finansinspektionen (2014), *The Swedish Mortgage Market 2014*, available at <http://www.fi.se>
- Svensson, L.E.O. (2011), "Practical Monetary Policy: Examples from Sweden and the United States", *Brookings Papers on Economic Activity*, Fall 2011, pp. 289-332
- Svensson, L.E.O. (2013a), "'Leaning Against the Wind' Increases (Not Reduces) the Household Debt-to-GDP Ratio", working paper, available at <http://www.larseosvensson.se>
- Svensson, L.E.O. (2013b), "Unemployment and monetary policy – update for the year 2013", blog post, available at <http://www.larseosvensson.se>
- Svensson, L.E.O. (2014), "Why Leaning Against the Wind Is the Wrong Monetary Policy for Sweden", *NBER 25th Annual East Asian Seminar on Economics, Unconventional Monetary Policy, 20-21 June 2014*, available at <http://www.larseosvensson.se>
- Sveriges Riksbank (2013), "Financial Imbalances in the Monetary Policy Assessment", *Monetary Policy Report*, July, Stockholm.
- Sveriges Riksbank (2014), "The Effects of Monetary Policy on Household Debt", *Monetary Policy Report*, February, Stockholm.

Monetary and macro-prudential policies in Turkey

Erdem Başçı¹

Thank you for inviting me to this excellent Forum and for giving me the opportunity to talk about monetary and macro-prudential policies in Turkey.

The main problem in the Turkish economy since the global financial crisis has been rapid credit growth. With reference to what Lars Svensson said this morning, if we have to tighten, we should use monetary policy or macro-prudential policy. We have used both of these as the circumstances have warranted.

I will start my talk by mentioning a structural change which I think has happened since the global financial crisis. The Fisher curve has not only shifted downward, but also its slope has come down since the crisis. This has many explanations. Before the Lehman crisis the reaction of the interest rate to inflation changes in Turkey was quite strong. It was actually more than one to one – the coefficient was around 1.5. More specifically, if inflation went up by one percentage point we would hike the rates by 1.5 percentage points. By inflation I refer to actual inflation, not to expected inflation. This approach was extremely hawkish in order to gain some credibility and to lay the groundwork for full-fledged inflation targeting.

Right after the Lehman crisis, the output gap widened and the Treasury's benchmark interest rate fell, together with some policy rate cuts. Interest rates descended to unprecedentedly low levels. Then we experienced a sharp recovery, but afterwards the recovery benchmark interest rates still remained at these relatively low levels compared to pre-Lehman periods. This case is not specific to Turkey; rather it is a global phenomenon. Indeed, real interest rates dropped significantly across all emerging market economies. In Turkey, the slope of the Fisher curve came down and the coefficient declined to 0.37. This was partly due to the flexible inflation targeting and the credibility that had been built while reacting to actual as well as expected inflation. Moreover, the use of macro-prudential measures also had an impact on the decline of the slope. Without the macro-prudential measures we would not have been able to keep the rates as stable and as low as they are right now.

Turkey has been experiencing a disinflation process since 2002. The Turkish Government changed the law in 2001 after the country's financial crisis and the Central Bank was given legal independence. Moreover, the Government started producing quite significant primary budget surpluses. First, we had implicit inflation targeting between 2002 and 2005. The inflation rate came down along with the target rate. In 2006 we began full-fledged inflation targeting and since then year-end inflation has remained in single figures for all but two years. The average inflation rate has been around 8% and the target average has been approximately 6% throughout the full-fledged inflation targeting period. Currently the target inflation rate is 5% and the year-end inflation rate was 7.4% last year.

Inflation fluctuations are high in Turkey. These fluctuations are largely due to the volatility of international capital flows. The exchange rate impact on inflation is relatively high. The exchange rate pass-through to inflation has been estimated to be between 10% and 15%. Therefore, when there is a sharp depreciation in the domestic currency, then we do feel the effects on inflation. Basically, this is one of the reasons why we

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deviated from the target recently. However, economic agents have understood that this is temporary and hence long-term inflation expectations are following a more stable course.

As for the real side of the economy, the post-Lehman recovery in Turkey has been quite remarkable. During the initial phase, the recovery featured double-digit growth, at 11%. This was unsustainable. The world is not growing fast, thus external demand was weak. If you grow fast as a result of domestic demand only, you have to run an external deficit. The external deficit reached 10% of GDP in 2011, and was around 6% of GDP before the global crisis, so we started to tighten mostly by using macro-prudential instruments. Furthermore, we used monetary policy occasionally, as well. As a consequence of conducting the macro-prudential measures we will be able to bring the deficit down to around 5% or 6% of GDP by the end of this year. This has not been easy. A global environment of low interest rates has reduced savings. We have an open capital account and chose not to use any capital flow measures. The only instrument employed besides monetary policy has been macro-prudential policy.

Another main determinant of inflation volatility is the credit cycle. The credit cycle has also been quite volatile. Before the Lehman crisis and during the post-Lehman recovery we have seen a peak credit growth rate of 40% for consumer loans. We have taken two rounds of macro-prudential measures which were coordinated by the Undersecretariat of Treasury and the Central Bank in coordination with the Capital Markets Board, the Banking Regulation and Supervision Agency and the Savings Deposit Insurance Fund. These institutions form the Financial Stability Committee, which is quite similar in structure to the Mexican Financial Stability Council. The Financial Stability Committee is chaired by the Deputy Prime Minister in our case because of the fiscal aspects of macro-prudential policy. All in all, we undertook two rounds of macro-prudential tightening measures. The first round basically had an impact on all types of loans without any distinction. However, the second round of measures which was quite recent, effectively implemented in February of this year, targeted credit cards and consumer loans only. These measures worked. This is the first time that the speed of consumer loan growth in Turkey has been below the growth rate of business or commercial loans. We are quite happy with this result, because it helps disinflation and at the same time it helps the external balance.

Consequently, inflation expectations remain quite stable but the problem is that inflation expectations for 12 months ahead and 24 months ahead are 2 and 1.5 percentage points above the target respectively. Nevertheless, people do believe in disinflation and expectations for 24 months ahead are always below the expectations for 12 months ahead. So the Central Bank has some credibility there, but we are not at the target yet. So we have to show that we can achieve a rate of 5% in 2015 and keep inflation at around that level afterwards.

The interest rate dilemma makes macro-prudential measures necessary. To achieve price stability you have to have currency stability and credit stability to some extent. For currency stability in the current global environment we need rates that are compatible with low global interest rates, while credit stability requires higher domestic rates than global interest rates. How do you resolve this dilemma? The resolution in the Turkish case is to keep interest rates lower than they would otherwise be and to keep macro-prudential policy tighter than it would otherwise be. So our macro-prudential stance is much tighter than the international minimum standards. At the same time, interest rates are relatively low compared to the closed economy equilibrium.

Real interest rates for two-year Treasury bonds have come down from more than 10% during the pre-Lehman period to below 2% recently. Excessively rapid credit growth was curbed by using only one instrument, the nominal interest rate, before the Lehman crisis. After using all these macro-prudential measures we have been able to keep interest rates low, fluctuating around 2% in real terms. So we can keep them at this level, still continue with internal balance and continue to move towards external balance.

The macro-prudential measures we used include loan-to-value measures, loan-to-income restrictions, higher risk weight and levies on consumer loans, general provisioning requirements and reserve requirements.

The loan-to-value ratio for housing loans is 75% in Turkey. Although it is quite strict compared with many European countries, it is not as strict as in many Asian countries. Singapore, for instance, imposes 20% loan-to-value restrictions on households' third property.

Loan-to-income restrictions have recently been implemented for credit cards. The credit card debt balance must not exceed four months' worth of income of the card holder. This measure started to be implemented in February of this year. It is very effective. Since February, the net credit card debt balance has come down.

The bank regulator applies higher risk weights on consumer loans vis-à-vis business loans. They are around 150%-200% depending on the maturity, while loans to small and medium-sized enterprises have a risk weight of 75% and housing loans have a risk weight of 50%. In this respect, Turkey's approach is somewhat tighter than the minimum standard approach of applying a 35% risk weight on mortgages. The Ministry of Finance has also increased the levy on consumer loans.

General provisioning requirements is another macro-prudential measure in our toolset. The IMF asked for this to be doubled from 0.5% to 1% before Turkey graduated from the Fund's programmes in 2008. Recently, the bank regulator raised the general provisioning requirement to 4%.

In order to use reserve requirements as a macro-prudential instrument we have stopped remunerating reserves so as to increase effectiveness and have also hiked the reserve requirements of banks quite significantly to 10%.

Since then, the Central Bank has used reserve requirements mainly as a structural instrument for the following purposes. In order to increase the maturity of deposits, we have used maturity-based reserve requirements. Likewise, to reduce liability dollarisation, we have used currency-based reserve requirements. Moreover, to improve the banks' risk indicators, we have recently started to use leverage-based reserve requirements. We have also introduced the Reserve Options Mechanism (ROM), which enables banks to hold their domestic currency reserve requirements at the central bank in the form of foreign currency. This is an automatic stabiliser of international capital flows, especially debt flows.

Aside from the ROM, we have also used monetary policy instruments as cyclical stabilisers. The previous macro-prudential tools were basically structural, automatic stabiliser measures. We have also used some discretionary instruments. These discretionary tools are the policy rate (one-week repo rate), the interest rate corridor, Turkish lira liquidity management and foreign currency liquidity management. These instruments have been used in addition to macro-prudential policy tools.

The Central Bank has used the interest rate corridor and Turkish lira liquidity policy by taking the internal and external conditions into consideration. This is in line with the advice of Professor Charles Goodhart:

“But even when interest rates are above the zero bound, there is a range of freedom to operate liquidity management independently. This margin of freedom may now, perhaps, be greatly augmented by the generalized adoption of the “corridor” system for managing short-term interest rates. In principle at least, the corridor system could be so managed that liquidity policy and interest rate policy could be varied in a largely independent fashion. Thus, for example, official interest rates could be raised to counter speculative attacks on the exchange rate, while at the same time the liquidity of the domestic financial system could be maintained, or even enhanced, leaving market rates at the lower edge of the corridor.”²

He also suggests that “treating these parameters as a constant would be a waste of a good instrument.”³

When we need to tighten, we widen the corridor to the north and accompany this with a temporarily tighter liquidity policy. When we want an expansionary phase, then we widen it to the south. Both of these actions work through the exchange rate in particular. When we widen the corridor to the north and tighten liquidity policy, it helps stabilise the currency and also it makes a noticeable contribution to slowing down credit growth. For example, after the announcement of “tapering” by the Federal Reserve System’s Federal Open Market Committee we tightened via liquidity policy. Then after the beginning of tapering in the December-January period, which coincided with some political uncertainties in Turkey, we also hiked the one-week repo rate quite significantly.

All in all, our policy measures are working to stabilise credit growth, currency developments and inflation expectations.

² Goodhart, C. (2010), “The Changing Role of Central Banks”, *BIS Working Paper Series*, No 326, November.

³ Goodhart, C. (2009), “Liquidity Management”, *Financial Stability and Macroeconomic Policy – Federal Reserve Bank of Kansas City Economic Policy Symposium 20-22 August 2009*, Jackson Hole, Wyoming, November.

Banking regulation and lender-of-last-resort intervention

Mathias Dewatripont¹

I would like to focus my remarks in this Panel on Monetary Policy in the New Regulatory Environment on the impact of banking regulation on the role of central banks as lenders of last resort. I shall consider in turn two aspects of banking regulation that have evolved since the recent financial crisis: liquidity regulation and bail-in provisions.

1 Liquidity regulation

In the aftermath of the Lehman Brothers failure, central banks have had to play a decisive role in order to avoid the implosion of the financial system. This is because, next to insufficient capital buffers, the liquidity position of many banks – which had excessively relied on short-term wholesale funding – was clearly insufficient too. This explains why the Basel Committee devised the Liquidity Coverage Ratio (LCR), which requires banks to hold a buffer of High-Quality Liquid Assets (HQLA) to resist a short-term liquidity stress scenario, and the Net Stable Funding Ratio (NSFR), which addresses more structural liquidity mismatches. The (simple) idea is that enhanced self-insurance by banks will make financial markets more resilient, and reduce their “free-riding” on central banks, which should remain lenders of last resort and not become lenders of first resort.²

Over time, several worries have surfaced about the unintended consequences of these liquidity ratios, especially in the euro area and especially with respect to the LCR:

- 1 the potential negative consequences on (long-term) lending to the real economy;
- 2 the potential lack of “usability” of the HQLA buffer in crisis times, owing to stigma effects (if markets realise that a bank needs to start using its buffer);
- 3 the incentives it gives banks to “park lower-quality assets” (that is, assets that do not qualify as HQLAs for the LCR liquidity buffer) as collateral at the central bank in order to obtain funds.

The worry about threats to long-term lending seems at first paradoxical, since the LCR time horizon is only one month. Why would the LCR create a disincentive for banks to lend for a horizon of, say, twenty rather than five years, as is claimed by some banks? The argument could however make sense when looking at the overall risks faced by banks: very long-term lending creates significant interest rate risk, and therefore requires swaps to hedge such risk; this in turn creates counterparty risk and therefore collateral requirements, which mobilise HQLAs. In my view, this reasoning³ (whose importance should ideally be assessed quantitatively) is not necessarily a reason to adjust regulation, since one could argue that the LCR

¹ I thank Luc Aucremanne, Jurgen Janssens, Jo Swyngedouw and Thierry Timmermans for comments. National Bank of Belgium and Université Libre de Bruxelles (ECARES and Solvay Brussels School). The views expressed here are solely my own.

² On such free-riding, see Fahri and Tirole (2012).

³ I became aware of this thanks to Jeroen Lamoot.

simply restores a more correct price for liquidity. But it may mean that we should think of ways to help long-term lending.

As for usability of the buffer in crisis times, it is essential of course; otherwise we will just have managed to turn (highly) liquid assets into illiquid ones. Goodhart (2010) highlights this point by making the comparison with a taxi station, which, by requiring one taxi to always be available for customers has in fact made it useless. On the other hand, managing an “orderly” usability of liquidity buffers, that is, without triggering adverse market anxiety, is challenging. Some interesting avenues have been explored by the Basel Committee in order to promote usability by adding crisis-time central bank-based second lines of defence (such as Restricted-Use Committed Liquidity Facilities, see BCBS, 2014), but this key area is still largely untested and certainly worth further investigation.

The question of usability is connected to the questions of central bank eligibility and of bank reliance on central bank lending. Since central bank-eligible assets do constitute a safe way to access liquidity, why do they not automatically count as part of the LCR HQLA buffer? The answer given by the Basel Committee is “because the LCR is about market liquidity”. Indeed, the point of the LCR is to promote self-insurance by banks, not potential reliance on central banks. Moreover, since central bank eligibility is down to the central bank’s choice, there was a fear of a gradual weakening of the liquidity standard by individual central banks feeling pressured to “help” their banking sectors. This debate was made more difficult because of the differing situations of the Basel jurisdictions: in a euro area in crisis, a 100% LCR does not make sense, usability is instead indicated. This fact helps explain the 2013 Basel compromise. i.e. starting in 2015 with an LCR of 60%, which is increased only gradually to 100%, in the hope that in a few years’ time the crisis will have receded.

The various objections to the LCR we have just discussed do have some validity. One should however be careful not to go too far in weakening the liquidity standard, especially since the dynamics of international regulatory negotiations, where the status quo was no liquidity regulation, has naturally led to gradual softening. It is therefore important, in the EU translation of the standard, to avoid significant further weakening, if one wants to avoid making the standard irrelevant. Let us remember in particular that European Banking Authority data point to: (i) an average LCR in June 2013 of 104% for large banks (as compared to 83% one year earlier); (ii) an aggregate gross shortfall relative to a 100% LCR down to only EUR 262 billion at that date, relative to assets of EUR 31.7 trillion; and (iii) only one bank (out of a sample of 41) under 60%.

One should thus be careful not to forget why we wanted to introduce the LCR, especially given that liquidity concerns could be heightened by the current debate on bail-in, to which we now turn.

2 Capital requirements and bail-in

We are now witnessing a paradox in the aftermath of the financial crisis:

- 1 On the one hand, Basel III has strongly stressed: (i) the need to increase not only the quantity of capital banks hold but also its quality (this means a preference for equity, which has proved much better at absorbing losses during the crisis than hybrid securities or junior debt); and (ii) the distinction between micro-prudential and macro-prudential regulation, and in particular the need to

make the banking system safer against negative macroeconomic shocks (e.g. through the counter-cyclical capital buffer).

- 2 On the other hand, the current “bailout fatigue” has now led to a “bail-in fashion”, with a desire to vastly enlarge the set of bank claim holders who are meant to be “held responsible” in the case of resolution, regardless of whether or not we are facing systemic stress.

This paradox can be explained by the fact that politicians and the general public do not feel that Basel III has required banks to hold sufficient capital to protect taxpayers from bailouts. While this feeling is probably right, one should however be careful to ensure that the envisaged solution, namely bail-in, does not lead to an even bigger cost for the taxpayer, which could easily happen were it to lead to financial instability. In my view, this is a particularly relevant concern in relation to the EU and its recently approved Banking Recovery and Resolution Directive (BRRD).

In order to comment on this Directive, let me start with four quotes from answers to Frequently Asked Questions on the EU Commission website (See European Commission, 2014):

“Other tools (than bail-in) can be used to the extent that they conform to the principles and objectives of resolution set out under the BRRD. In circumstances of very extraordinary systemic stress, authorities may also provide public support instead of imposing losses in full on private creditors. The measures would nonetheless only become available after the bank’s shareholders and creditors bear losses equivalent to 8% of the bank’s liabilities and would be subject to the applicable rules on State Aid.”

“Bail-in will potentially apply to any liabilities of the institution not backed by assets or collateral. It will not apply to deposits protected by a deposit guarantee scheme, short-term inter-bank lending or claims of clearing houses and payment and settlement systems (that have a remaining maturity of seven days), client assets, or liabilities such as salaries, pensions, or taxes. In exceptional circumstances, authorities can choose to exclude other liabilities on a case-by-case basis, if strictly necessary to ensure the continuity of critical services or to prevent widespread and disruptive contagion to other parts of the financial system, or if they cannot be bailed in in a reasonable timeframe.”

“The write down will follow the ordinary allocation of losses and ranking in insolvency. Equity has to absorb losses in full before any debt claim is subject to write-down. After shares and other similar instruments, it will first, if necessary, impose losses evenly on holders of subordinated debt and then evenly on senior debt-holders.” ... “Deposits from SMEs and natural persons, including in excess of EUR 100,000, will be preferred over senior creditors.”

“Depending on their risk profile, complexity, size, interconnectedness, etc., all banks should maintain (subject to on-going verification by authorities), a percentage of their liabilities in the form of shares, contingent capital and other unsecured liabilities not explicitly excluded from bail-in. The Commission, upon a review by EBA, could specify further criteria to ensure similar banks are subject to the same standards.”

As illustrated by these quotes, the BRRD:

- 1 insists on a bail-in of 8% of a bank’s unweighted balance sheet (including equity), even under “very extraordinary systemic stress”, as of 1 January 2016;

- 2 beyond secured liabilities, exempts from bail-in only very short-term debt, that is, with remaining maturity of up to seven days;
- 3 respects the priority of claims in bankruptcy, except that it introduces a priority for natural persons and SMEs over other senior debt holders;
- 4 at this point, does not impose hard targets for bail-in-able securities (called MREL, or minimum requirements for own funds and eligible liabilities in the BRRD; the Financial Stability Board talks instead of GLAC, or gone-concern loss absorbing capacity) as a percentage of bank balance sheets.

The first point reflects the political attractiveness of preventing bailouts under all possible circumstances. Note, however, that 8% of (unweighted) bank balance sheets is a sizable number, if you compare it with the 3% leverage ratio (even if the latter does take some off-balance sheet operations into account, so that it could well amount to, say, around 3.5% of straight bank liabilities for a typical bank). And 1 January 2016 represents a very short transition period, when compared to the deadlines applicable to the two solvency requirements (the capital ratio and the leverage ratio) and the two liquidity requirements (the LCR and the NSFR).

Of course, the BRRD does include attempts to counter the risk of financial instability that a bail-in could entail. This is why the second point exempts from bail-in securities whose remaining maturity is shorter than seven days. This extremely short maturity reflects a reluctance to enlarge the set of bank liabilities that would de facto become explicitly insured. Note however that this can create an incentive for banks and their depositors to favour, next to secured funding, very short-term funding, which is exactly what the LCR is trying to avoid. And, by granting retail deposits a priority over other senior debt holders, as stressed in the third point, one is in fact raising the risk faced by those depositors who typically “run faster”, as the calibration from the LCR stress scenario underscores.

Those considerations explain the fourth point, which invites EU supervisors, the EBA and the European Commission to require banks to hold a “sufficient” amount of bail-in-able securities. I think this is really crucial to ensure financial stability. More specifically, I think that it would be highly desirable to require a minimum of 8% of long-run junior liabilities (equity, hybrids and junior debt) in order to foster financial stability.

Table 1 considers the very simple example of a bank without off-balance sheet operations whose liabilities have been normalised to 100. Assume a situation of “very extraordinary systemic stress” where authorities think a bailout of this bank is the best way to deal the situation, and in particular to limit eventual taxpayer losses. Under the BRRD, such a bailout cannot occur before 8% of the balance sheet has been bailed in. Where will this 8% have to come from?

Table 1

Secured + very short-term liabilities	25.0
Retail deposits	40.0
Other bail-in-able senior liabilities	30.0
Junior liabilities	1.5
Capital	3.5
Total liabilities	100.0

For this bank, equity and junior liabilities will serve as the “first line of defence”, and will absorb losses of up to 5% of the balance sheet. The remaining 3% will have to come from the 30% of the balance sheet called “other bail-in-able senior liabilities”. Indeed, in this example, 25% of the balance sheet is explicitly exempted from bail-in.⁴ Moreover, retail deposits enjoy priority over these other bail-in-able senior liabilities, and they do not have to contribute to reach the 8% that is needed: a 10% loss shared equally among all these “other senior liabilities” will be required before a bailout can be considered, since $3/30 = 10\%$.

“Spreading the pain” across 35% of the bank’s claim holders does involve financial stability risks, especially with volatile wholesale deposits (some of which have a remaining maturity as short as eight days). In this case it would be safer to require the bank to hold – as well as 3.5% of its liabilities as equity – 4.5% of its balance sheet in the form of long-term junior liabilities. The crisis told us that equity was the best claim as far as loss absorbency is concerned. This is so for two reasons: (i) equity is the most junior of all claims, being therefore fully loss-absorbent before other claims start being at risk; and (ii) equity is “stuck” in the bank, and therefore cannot “run away”. These two reasons make junior long-term debt (and hybrids) the next best claims. And while one could object and argue that there may not be enough of a market for these claims to satisfy the 8% requirement by 1 January 2016,⁵ one must face the fact that “including” senior claims in an 8% MREL requirement is in a sense irrelevant because it does absolutely nothing to protect the other senior bail-in-able wholesale claim holders, due to the proportional burden-sharing rules applicable in resolution. Finally, let us stress that the point is not to say that senior claims should never faces losses, but simply that there could be systemic stress situations where it might make sense to allow authorities to decide between imposing such losses or going for a bailout.

3 Conclusion

Current aversion to bailouts is perfectly understandable: the crisis has been very costly to the taxpayer, and bailouts do create significant moral hazard.

One should not forget, however, the cost of financial instability: the costliest bank failure for taxpayers in the last ten years was the failure of Lehman Brothers, despite the lack of a bailout, while some bailouts, such as the Troubled Asset Relief Program (TARP) in the United States, have almost been fully repaid (more than USD 400 billion out of USD 428 billion as of May 2013 for TARP)⁶. And while part of the cost of the

⁴ For simplicity, we count in this 25% only the value of the collateral of the secured debt.

⁵ Especially since financial stability considerations make it desirable for banks not to hold one another’s junior liabilities.

⁶ For more on the relative costs of bailouts and financial instability, see, for example, Dewatripont (2014).

Lehman collapse resulted from the fact that it came as such a surprise, one should remember that “orderly” resolution will not prevent depositors from running if they can and feel their money is at risk.

Financial stability considerations therefore make a case for requiring banks to: (i) hold sufficient liquidity buffers, and (ii) hold sufficient long-term junior claims to absorb bail-in, in order to reassure senior claim holders. Such requirements will in turn help central banks by limiting the need for their lender-of-last-resort function.

4 References

BCBS – Basel Committee on Banking Supervision (2014), *The Liquidity Coverage Ratio and Restricted-Use Committed Liquidity Facilities*, Basel, January.

Dewatripont, M. (2014), “European Banking: Bailout, Bail-in and State Aid Control”, *International Journal of Industrial Organization*, Vol. 34, pp. 37-43.

European Commission (2014), “EU Bank Recovery and Resolution Directive (BRRD): Frequently Asked Questions”, available at http://europa.eu/rapid/press-release_MEMO-14-297_en.htm

Fahri, E. and Tirole, J. (2012), “Collective Moral Hazard, Maturity Mismatch, and Systemic Bailouts”, *American Economic Review*, Vol. 102, pp. 60-93.

Goodhart, C. (2010), “How Should We Regulate Bank Capital and Financial Products? What Role for ‘Living Wills?’”, in Turner, A. et al., *The Future of Finance: The LSE Report*, London School of Economics and Political Science, London.

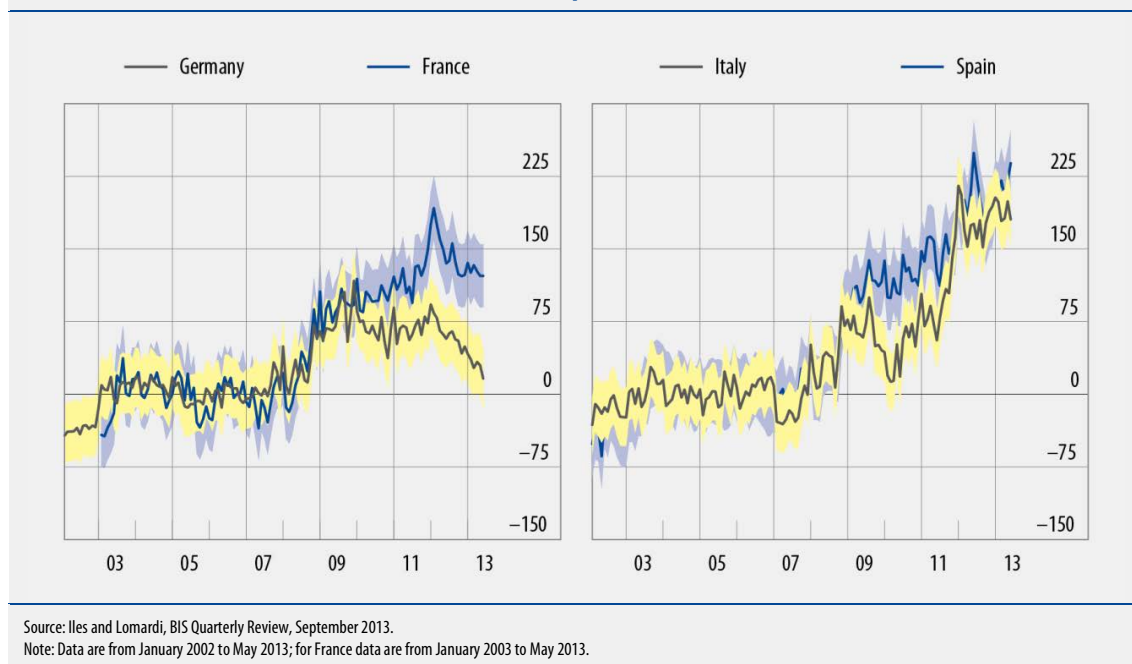
Bank capital regulation and monetary policy transmission

Hyun Song Shin¹

The importance of bank capital adequacy for ensuring bank solvency is well understood. Bank capital is a loss-absorbing buffer that protects depositors and taxpayers against potential losses resulting from bank insolvency.

However, bank solvency is not the only reason why central bankers should be concerned about adequate bank capital. Bank capital is the basis of the bank's lending activity, and bank capital that ensures solvency may not be enough to ensure adequate lending. For central bankers, adequate bank capital therefore takes on an importance that extends well beyond their role (if any) as prudential regulators. Well-capitalised banks are essential for the transmission of monetary policy. Bank capital is therefore a matter of effective monetary policy, not just the prudential regulation of banks.

Figure 1 – Spread between actual loan rate to non-financial firms and predicted rate from pre-crisis data (basis points)



To illustrate the point, Figure 1 shows the spread between the actual loan interest rate to non-financial firms and the predicted rate based on a pre-crisis sample up to August 2008 from a cointegrating model of interest rates. The charts come from Iles and Lomardi (2013)², and the bands indicate 90% confidence intervals. We see that lending rates to non-financial firms rose above their historical levels relative to other

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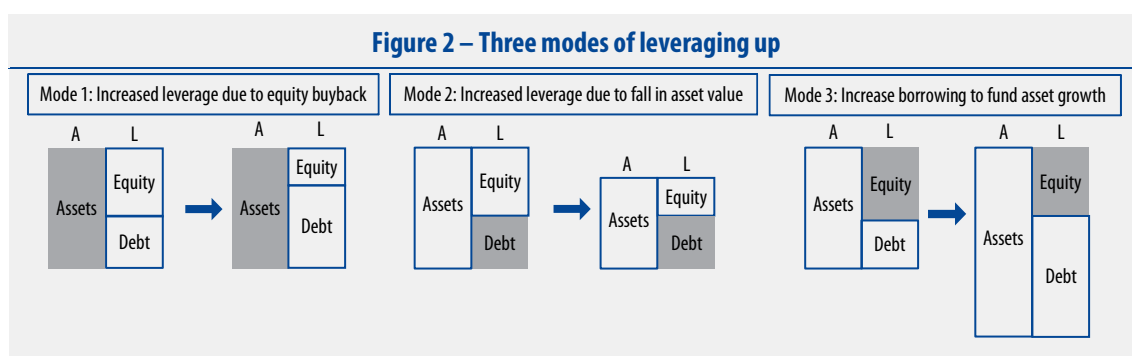
² Iles, A. and Lomardi, M. (2013), "Interest rate pass-through since the financial crisis", *BIS Quarterly Review*, September.

interest rates in the economy with the onset of the 2008 crisis. The left-hand panel shows that lending rates in Germany began to come back in line with the historical average from 2012, but those in France remained stubbornly high. Most notably, the lending spreads in Italy and Spain continued to rise above historical levels.

To understand the role of bank capital in banks' lending decisions, we need to understand more fully the balance sheet decisions of banks. The role of bank capital as a loss-absorbing layer is well understood. However, more relevant for monetary policy is the bank's lending decision. For this, we need to understand the determination of bank leverage.

Basics of the corporate finance of banking

Assuming that leverage is defined as the ratio of total assets to the equity of a firm, Figure 2 shows three ways that a firm (financial or otherwise) can increase its leverage. In each case, the grey shaded area represents the balance sheet component that does not change.

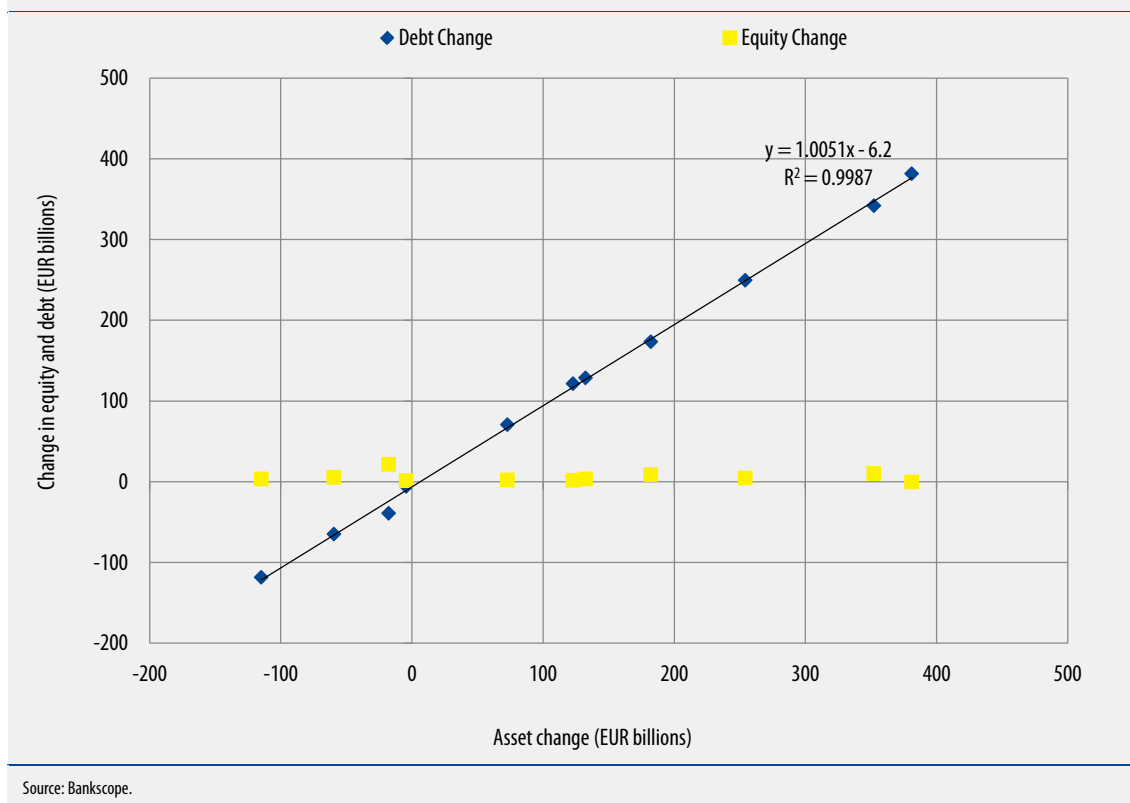


Mode 1 on the left is the case typically dealt with in MBA textbooks on corporate finance. It depicts a financial operation where the firm issues debt and buys back equity financed with the proceeds of the debt issue. The assets of the firm are unchanged. This is the way, for instance, that a private equity fund would acquire a target firm.

Mode 2 depicts the consequences of a drop in the value of assets of the firm – say, through a dividend paid to shareholders financed by an asset sale. The leverage goes up because the notional debt remains unchanged, but the firm's assets shrink in value. The shrinking of the asset value could reflect just a decline in the price of the assets, so that the increase in leverage is the result of market value changes.

For banks, however, neither Mode 1 nor Mode 2 turns out to be the right picture. Banks adjust their leverage as in Mode 3, where new assets are financed by issuing new debt, with equity remaining much less variable.

Figure 3 – One-year change in assets, equity, debt and risk-weighted assets of a large euro area bank, 1999-2010



Source: Bankscope.

Figure 3 shows the scatter plot of the change in total assets of a large euro area bank where we plot the annual changes in assets (in billions of euro) against annual changes in equity, as well as annual changes in assets against changes in debt. This plot is typical of banks irrespective of jurisdiction and level of development.³

The fitted line through the scatter plot between the change in assets and change in debt has a slope that is essentially equal to 1, meaning that the change in assets is almost all accounted for by the change in debt, just as in Mode 3. Consequently, total lending by the bank is determined by its leverage decision given a fixed, exogenous level of equity. Credit supply conditions are governed by the same forces that determine the bank's leverage.

A useful analogy that drives home the point is that of a building and its foundations. The bank's equity is like the foundations of a building. The leverage of the bank is the height of the building that stands on the foundations. The total size of the building, as measured by its volume is the total lending done by the bank. The scatter chart above suggests that the foundations of the building are established exogenously, and what changes is the height of the building that stands on those foundations. The higher the building, the higher the leverage and the greater the amount of lending done by the bank.

³ See Adrian, T. and Shin, H.S. (2014) "Procyclical Leverage and Value-at-Risk", Review of Financial Studies, Vol 27 (2), February, pp. 373-403.

During boom times, the volume of the building increases by the bank adding new floors to the existing building. In other words, the bank increases its total assets by increasing its leverage with the equity being exogenous. The boom is associated with greater availability of credit and lower measures of risk.

Figure 4 – Sutyagin house in Archangel, Russia



Figure 4 is the celebrated Sutyagin House in Archangel in Russia, reputed to be the tallest wooden structure in the world when it was completed. The building's multi-layered architecture suggests that the builder added new floors to the existing structure as the construction progressed. The turret at the top seems very much to be the final flourish of the builder, added on top of an already precarious structure. The analogy would be with the subprime mortgage securitisations that came late in the credit boom.

The problem comes during the downturn. At this point, the bank wishes to reduce lending by reducing leverage. In terms of our analogy, this is akin to the bank wishing to reduce the size of the building by demolishing existing floors. However, contractions in lending are associated with reduced credit supply, tighter credit conditions and a refusal to lend even to solvent borrowers with the capacity to service their debt. As supply conditions tighten, the spread in bank lending remains stubbornly high, just as in Figure 1.

The availability of credit and how credit varies over the business cycle are clearly matters of great importance. Some cyclical variation in total lending is to be expected, even in a frictionless world, as there are more positive net present value (NPV) projects that need funding when the economy is strong than

when the economy is weak. The question is whether the fluctuations in lending are larger than would be justified by changes in the incidence of positive NPV projects.⁴

In any case, whatever the correct explanation for the pro-cyclical nature of bank lending, one thing is clear. In the analogy that suggests bank capital is the foundation of the building, anything that chips away at the foundations will weaken bank lending capacity and reduce credit supply to borrowers that are wholly reliant on bank lending (such as small and medium sized enterprises).

Dividends would be one way in which the bank's equity can be dissipated, reducing the size of the building's foundations. In practice, however, banks in the euro area have been paying dividends that are a large proportion of the existing common equity of the banks.

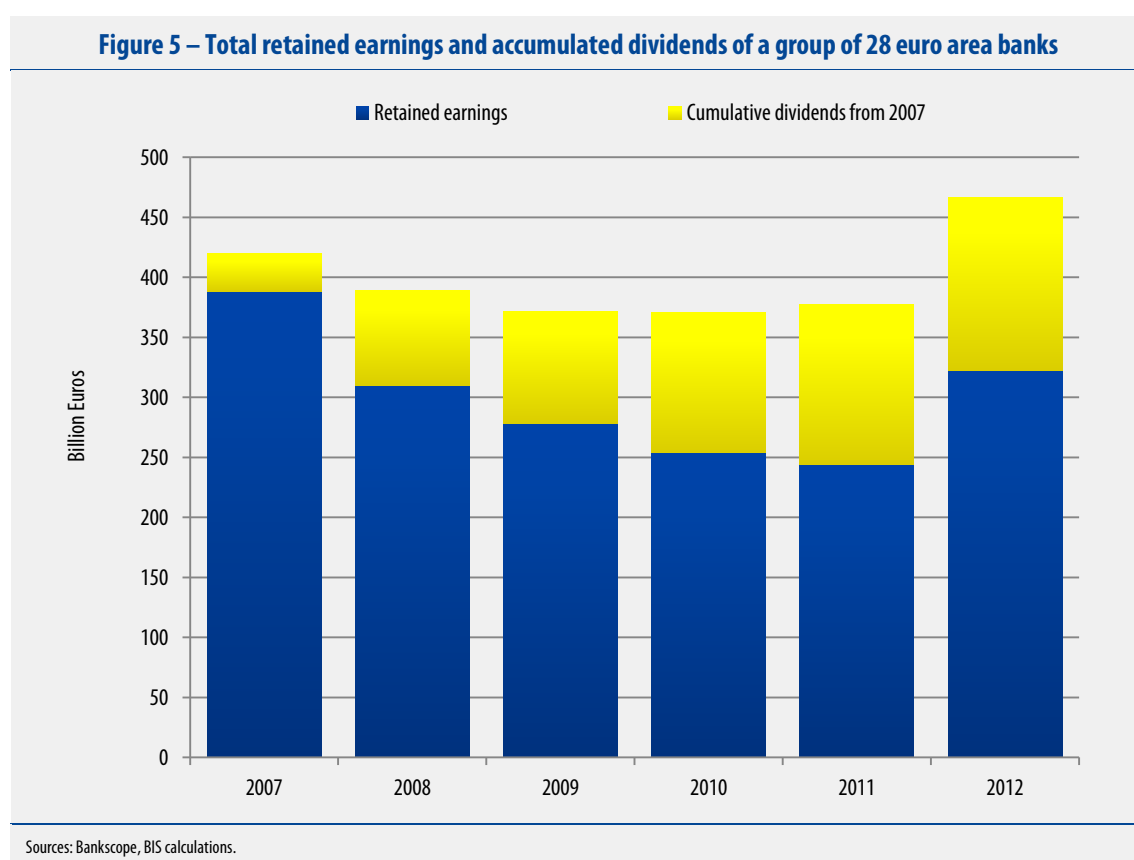


Figure 5 plots the total retained earnings and accumulated dividends from 2007 of a group of 28 euro area banks⁵

⁴ Adrian and Shin (2014) delve deeper into the reasons for the pro-cyclicality of leverage and document the important explanatory role played by measured risks through the banks' value-at-risk figures.

⁵ BNP Paribas, Crédit Agricole S.A., Société Générale, Commerzbank AG, Deutsche Bank AG, Dexia, Deutsche Postbank AG, UniCredit S.p.A., Alpha Bank A.E., Banco Comercial Português, Credit Mutuel, Bank of Ireland, BPCE S.A., Banco Popular Espanol S.A., Eurobank Ergasias S.A., Erste Group Bank AG, Banco Espírito Santo de Investimento S.A., Landesbank Hessen-Thüringen Girozentrale – HELABA, ING Groep N.V., KBC Groep N.V., Banca Monte dei Paschi di Siena S.p.A., National Bank of Greece S.A., Raiffeisen Zentralbank Oesterreich AG – RZB, Intesa Sanpaolo, Banco Santander S.A., RBS Holdings N.V., Millennium bcp S.A. and Banco Bilbao Vizcaya Argentaria S.A.

Retained earnings are a stock that represents the accumulated value of retained earnings during the life of the bank. Retained earnings are the most important component of common equity.

We see from Figure 5 that the accumulated dividends paid from 2007 to 2012 add up to around EUR 150 billion, which represents around 50% of the retained earnings (or common equity) of the banks in the sample.

The dissipation of common equity due to dividends will be exacerbated by any equity buyback activity of the banks in the sample, meaning that the common equity of the banks would have been substantially higher had dividends and equity buybacks been suspended at the beginning of the crisis.

Figure 5 does not address the distribution of common equity across strong and weak banks, as it only plots the total. However, to the extent that interbank claims will help to cushion the impact of bank deleveraging pressures, any loss of bank capital of strong banks may contribute indirectly to the shrinking lending of weaker banks.

Some lessons

The following are lessons of relevance for the relationship between bank capital adequacy and monetary policy transmission.

Dividends and share buybacks in the aftermath of a crisis should meet higher standards of capital adequacy than simply the solvency of the bank concerned. The externalities associated with the lending capacity of the banking system should be an important consideration.

Policies to conserve bank capital during the downturn will mitigate the contraction of lending. For contingent convertible bonds, conversion at higher thresholds of capital adequacy will help to replenish the going concern capital of banks and will mitigate the contraction of lending.

Most importantly, bank solvency is not the only issue when considering bank capital adequacy. A solvent bank may nevertheless refuse to lend. For central banks, solvency is only the first step. Bank capital is the basis for the bank's lending activity, and adequate lending is the cornerstone of the effective transmission of monetary policy to the economy as a whole.

Central banking following the crisis

Paul Tucker¹

Thank you Mario and Benoît for inviting me to this conference. And my congratulations on your decision to hold it before rather than in the middle of the summer holidays: that might give you a competitive edge in the years to come.

In her remarks yesterday evening, Christine Lagarde provided me with a linking theme for what I am going to say. It was nice of her to describe central bankers as heroes. I would agree; I think she is right that the innovations by each of the major central banks have made a huge difference over the past few years in keeping a great depression at bay and in regaining a semblance of stability.

Nevertheless, as central bankers, you should be deeply disturbed if you are the only game in town. More important, citizens will be deeply concerned if you – independent, powerful, but unelected – are the only game in town. My remarks are, therefore, going to be largely about political economy, not positive economics. If there is one key point it is that for unelected, independent, powerful agencies to have legitimacy, the regimes within which you operate need to be clear. That means that they might need to be better articulated given what we have learned or, in some areas, had to rediscover about central banking policy during the crisis.

I think that central banks could face a slow-motion problem of legitimacy if, when the crisis is eventually behind us, the regimes for three parts of central banking are not clearer: the lender of last resort (LOLR), using the balance sheet to implement “credit policy” and macro-prudential policy. Some of those issues are probably more pressing outside the euro area. But the general issue has salience for the ECB because, as I shall briefly summarise, persistent flaws in the design of EMU raise the probability of recurrent crises.

A durable monetary union requires at least two things of the economy’s money. First of all, by definition, base money has to be homogenous – and, of course, it is. But secondly, broad money – the private money of bank deposits – has to be homogenous as well. Deposit money – most of the money we all use – needs to be regarded as safe. That means that it has to be “information insensitive”, so that there are no returns to be made from ferreting out information on some or other bit of deposit money. That can in principle be delivered by a regulatory regime. But in fact, notwithstanding moves towards banking union, retail deposit money will still not be homogenous across the euro area.

To be clear, good things are being done. Moving prudential supervision to the centre is sensible and necessary, not least because it will help to overcome problems – real or perceived – of capture in a number of capitals. Further, putting prudential supervision within the ECB is sensible given that banking stability is part of broader monetary stability; it is not a branch of consumer protection.

Nevertheless, I do believe that the resolution regime – the most important part of which comes via the directive giving Member States a hugely enriched toolkit – is definitely a considerable improvement. So on resolution, I am much closer to Mathias than to Martin. In fact, the resolution arrangements being introduced can do something quite profound, which is to separate banks’ monetary liabilities from their

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other liabilities by making the bonds that they issue information sensitive – *by making them risky*. If that does not happen, the monetary union and all other currency areas are in very deep trouble indeed. But I think we can escape that: as and when the G20 authorities deliver in this area, one great benefit is that it will be possible for retail deposits to be safe without exacerbating moral hazard.

Having said that – and I think Steve Cecchetti made this point earlier – I am afraid that the euro area deposit insurance regime is still flawed, and is fundamentally inadequate for a sustainable monetary (and banking) union. The insurance in one country is not the same as in another. These arrangements stand in the way of having homogenous broad money across the monetary union. Only a collective deposit insurance scheme can deliver that. It should be funded by the banks themselves, in order to ensure defaulters contribute something. A funded scheme can also shield the taxpayer somewhat. I recognise that that would be a step towards some kind of fiscal union. But without that step, the monetary union will remain fragile: an incipient fracture in the credit system will persist, even when the current crisis has finally passed.

You, as representatives of the central bank, should be deeply dissatisfied with that. I do not doubt that you are unable to do anything about it in the short run. But it ought to be something – and I am sure it will be – that you will want to come back to as the years pass, again and again if necessary. The initial sin of not addressing the fault lines in the monetary union should not be repeated.

What then about the three areas of innovation during the crisis: LOLR operations, balance sheet policy, and macro-prudential policy?

First, the LOLR. On both sides of the Atlantic there are people who – rightly or wrongly – say that central banks have been providing solvency support to fundamentally bust firms. Even if this were quite wrong, it could gnaw away at the legitimacy of the central banks, unless it is consigned to history. Effective, credible resolution regimes are fundamental to setting central banks free from such accusations in the future. Bust firms can go into resolution. The lender of last resort role can then be seen to be pursued with integrity, because it means that central banks can be liquidity providers and not closet providers of solvency support.

Central banks should, therefore, be the greatest champions of effective resolution regimes, because they will enable them to make the lender of last resort function the necessary adjunct to monetary policy that it should be, rather than a perceived branch of fiscal policy.

Second, balance sheet policy more generally, where perhaps I should make it clear that I am going to say nothing conjectural whatsoever.

When this crisis has eventually passed, it would be quite surprising if there were not a much greater demand for reserves than before. That will partly be because of the liquidity coverage ratio, and regulation more generally. But it will also partly be because, even in the absence of regulation, banks have realised – and for a while will remember – that they are in the liquidity insurance business, and therefore self-insuring by holding some high-quality liquid assets is sensible, common prudence. And the most liquid assets of all are, of course, central bank reserves. So demand for reserves will likely be higher than in the past.

This, I think, presents you – as representatives of the ECB – with an interesting question. When the economy and financial system eventually emerge out of the crisis, do you really want to keep reserve requirements? And, if you do, what are they for? Since you moved to paying interest (at more or less your

policy rate) on reserves, you have not actually needed to set reserve requirements. You could allow banks themselves to choose their reserves target for each maintenance period, with the resulting aggregate target varying from one maintenance period to another.

If you were to keep reserve requirements, then I think your institution, in common with other central banks, effectively has three operational instruments: the short-term policy rate; the size of the balance sheet, determined by the reserves requirement; and the composition of assets, i.e. how risky they are, their maturity, whether they are held outright or on repo, etc. So there are three regimes you will need to specify. The second and third are related because, to the extent that you use your choice of assets to pursue a credit policy, your chosen reserves requirement would determine the scale – and so the force – of your intervention in credit markets. Some of this has been done, of course, but it probably needs refreshing for peacetime: what operations will be employed routinely, what will be held back for contingencies and what will be placed out of bounds.

But, before discussing central banks' asset/credit policy, I want first to stress that the balance sheet policy regime needs to be somehow aligned with the macro-prudential policy regime, since that is also a set of interventions in banking and credit markets.

I think of macro-prudential policy as a branch of inter-temporal stabilisation policy. Given the importance of broad money to stability in a monetary economy, the stability of the money credit system needs to be maintained. Of course, the base requirements for making the system resilient are set in a potentially timeless way. But from time to time a credit cycle becomes more exuberant and poses risks greater than those that are factored into the *static* regime. In those circumstances policy is adjusted *dynamically* in order to maintain the *same* desired degree of resilience. That may affect the upswing itself, but the core goal is to leave the system able to weather the bust, avoiding the implosion of the credit system and moderating the macroeconomic downturn.

Employing macro-prudential policy in that way and with that explicit goal is preferable to turning to monetary policy as the main means of avoiding financial crisis. And it is preferable to a central bank using its balance sheet to try to drive up risk premia in order to contain a boom, although in theory that is also potentially available if macro-prudential policy proved ineffective and a major threat remains.

But I have to say that it is not yet clear exactly what the macro-prudential regime for the euro area is. I know what the macro-prudential regime for the EU is. It is based on national macro-prudential regimes with a constraint of not undermining the EU's single market. For the euro area, the monetary regime is clear of course, and the new *micro*-prudential regime is too. But, for example, it is not yet clear, at least to me, whether there will be a *macro*-prudential policy for the euro area as a whole and who would set any such policy. This is something that will need to be clarified as the ECB beds down its new responsibility for micro-prudential supervision.

Against that background, I can return to balance sheet policy. First of all I think that in normal circumstances – so, again, thinking beyond this crisis – it is better to operate via repos – i.e. collateralised lending – than outright purchases, because that reduces the exposure to loss and it reduces the extent to which the central bank is in the credit allocation business, both of which shade into fiscal policy.

But to the extent that, during the crisis and beyond, asset purchases are employed, I think that this central bank, like other central banks, needs somehow to resolve a dilemma around what kind of assets to

purchase. Should a central bank prefer purchases of government bonds – in the euro area according to the capital key – or is that off limits because it threatens to *look like* monetary financing, and therefore threatens to *look like* fiscal dominance, even if the scale of the monetary injection is 100% under the control of the central bank? Or should central banks prefer purchases of private sector assets, which would avoid that set of risks but actually gets into credit allocation and the risk of loss, which of course would be transferred to governments and taxpayers (if only via lower seigniorage income). Put like that, the second course amounts to a difficult choice of a central bank avoiding the risk of perceived fiscal dominance, but only by getting into fiscal policy more directly itself. And if a central bank were ever to opt for that course, should it get the consent of elected politicians – in the ECB's case, the Council of Ministers or the European Parliament – in order to underpin the democratic legitimacy of its policy regime?

Now, I do not know the answer to those questions, which I suppose might justifiably vary from one polity to another. But I do think, as we look ahead a few years, central banks everywhere will have to stake out where they are on all of those issues, and ensure that elected representatives are content. Just as proved to be the case with monetary policy, framing regimes is vital to both credibility and legitimacy.

Inflation targets reconsidered

Paul R. Krugman¹

Over the course of the 1990s many of the world's central banks converged on an inflation target of 2%. Why 2%, rather than 1% or 3%? The target was not arrived at via a particularly scientific process, but for a time 2% seemed to make both economic and political sense. On one side, it seemed high enough to render concerns about hitting the zero lower bound mostly moot; on the other, it was low enough to satisfy most of those worried about the distortionary effects of inflation. It was also low enough that those who wanted true price stability – zero inflation – could be deflected with the argument that official price statistics understated quality change, and that true inflation was in fact close to zero.

And as it was widely adopted, the 2% target also, of course, acquired the great advantage of conventionality: central bankers could not easily be accused of acting irresponsibly when they had the same inflation target as everyone else.

More recently, however, the 2% target has come under much more scrutiny. The main reason is the experience of the global financial crisis and its aftermath, which strongly suggests that advanced economies are far more likely to hit the zero lower bound than previously believed, and that the economic costs of that constraint on conventional monetary policy are much larger than the pre-crisis conventional wisdom. In response, a number of respected macroeconomists, notably Blanchard (2010) and, much more forcefully, Ball (2013), have argued for a sharply higher target, of say 4%.

But do even these critics go far enough? In this paper I will argue that they do not – that the case for a higher inflation target is in fact even stronger than the critics have argued, for at least three reasons.

First, recent research and discussion of the possibilities of “secular stagnation” (Krugman, 2013; Summers, 2013) and/or secular downward trends in the natural real rate of interest (IMF, 2014) suggests not just that the probability of zero lower bound episodes is higher than previously realised, but that it is growing; an inflation target that may have been defensible two decades ago is arguably much less defensible now.

Second, there are actually two zeroes that should be taken into account in setting an inflation target: downward nominal wage rigidity is not as hard a constraint as the interest rate zero lower bound, but there is now abundant evidence that cuts in nominal wages only take place under severe pressure, which means that real or relative wage adjustment becomes much harder at low inflation. Furthermore, we now have reason to believe that the need for large changes in relative wages occurs much more frequently than previously imagined, especially in an imperfectly integrated currency union like the euro area, and that such adjustments are much easier in a moderate-inflation environment than under deflation or low inflation.

Finally – and this is the main new element in this paper – there is growing evidence that economies entering a severe slump with low inflation can all too easily get stuck in an economic and political trap, in which there is a self-perpetuating feedback loop between economic weakness and low inflation. Escaping from this feedback loop appears to require more radical economic policies than are likely to be

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forthcoming. As a result, a relatively high inflation target in normal times can be regarded as a crucial form of insurance, a way of foreclosing the possibility of very bad outcomes.

This paper begins with a brief review of the standard arguments for a higher inflation target, then deals in turn with each of the further arguments I have just sketched out. I conclude with some speculation about the unwillingness of many central bankers to consider revising the inflation target despite dramatic changes in our information about how modern economies behave.

1 The two zeroes

If you polled the general public about what rate of inflation we should target, the answer would probably be zero – full price stability. Some economists and central bankers would agree: either they view any erosion of the purchasing power of money as illegitimate, in effect a form of expropriation, or they argue that even mild inflation degrades money's role as a unit of account. There is even a case for persistent deflation: Milton Friedman's optimal quantity of money paper famously argued that prices should fall at the rate of time preference, so that the private cost of holding cash to add liquidity matches its zero social cost.

In practice, however, the great majority of both economists and central bankers advocate modest positive inflation. Why? Because of the two zeroes.

The first zero is a hard one: nominal interest rates cannot fall below zero (except for trivial deviations involving transaction costs or the role of bills as collateral), because people always have the option of holding currency. This in turn sets a lower bound on the real interest rate, which cannot fall below minus the expected rate of inflation.

Meanwhile, central banks are trying to stabilise their economies, which means trying to set policy interest rates at the Wicksellian natural rate, the rate consistent with more or less full employment. The problem is that the real natural rate of interest clearly fluctuates over time, rising during investment booms (whether these booms are well-grounded in fundamentals or reflect bubbles) and falling when economies face adverse shocks. If expected inflation is low, this raises the possibility that there will be periods in which the central bank cannot cut rates to the natural rate, leading to output below potential and excess unemployment.

A positive expected rate of inflation reduces the size of this problem, because it allows real interest rates to go negative; and the easiest way to ensure that expected inflation is positive is to pursue a monetary policy that keeps inflation stable at a modestly positive rate.

The question then becomes, how high does expected inflation have to be to make encounters with the zero lower bound rare and relatively harmless? Before the 2008 crisis, the general belief, bolstered by several statistical studies, was that 2% inflation was sufficient – that it would reduce the probability that the zero lower bound would be a constraint in any given year to 5% or less, and that even in such cases the likely damage from such episodes would be small.

Events have, however, rendered this optimism obsolete. Consider the case of the United States. The Federal Reserve System effectively hit the zero lower bound with the collapse of Lehman in fall 2008; at this point most members of the Federal Open Market Committee expect the first rise in the Federal

Reserve's funds rate off zero to take place in 2015. If we bear in mind that the United States entered an era of relatively low inflation in the mid-1980s, this will mean that for seven out of 30 years – roughly a quarter of that time – the zero lower bound will in fact have been binding. Moreover, the US economy appears to have experienced very large output gaps for most of this zero-rate era. A “maximum likelihood” assessment of the zero lower bound problem would therefore be that at 2% inflation it remains a quite common occurrence with major costs; overall, it is at least an order of magnitude greater than the consensus view that prevailed a decade ago.

The second zero is the extreme reluctance of employers to demand, or workers to accept, cuts in nominal wage rates. Yet the economy is always experiencing shocks, and in any given year the equilibrium real wage for at least some workers surely falls. As Akerlof, Dickens and Perry (1996) pointed out long ago, this in turn implies that at low inflation the long-run Phillips curve is not vertical, because some workers who “should” (in a market-clearing sense) be receiving reduced wages will not, leading to unemployment. However, when they investigated this effect in a simulation model calibrated to more or less match actual experience, they found only small effects as long as inflation was in the 2%-3% range. In effect, their analysis provided an argument against seeking full price stability, rather than an argument for raising the inflation target above 2%.

Has experience in recent years suggested a change in this assessment, comparable to the changed assessment of the risk of zero lower bound events? In the United States, the answer is a definite maybe: Daly and Hobijn (2014) show a sharp increase in the number of US workers receiving zero wage increases since the onset of the Great Recession, but it is not entirely clear whether this translates into a higher average unemployment rate. But as I will lay out at greater length later, downward nominal wage rigidity has become a very major problem within the euro area, an imperfectly integrated currency union that turns out to require much larger adjustments in relative wages than anyone imagined pre-crisis.

The bottom line here is that the arguments used in the 1990s to support a positive inflation target rather than literal price stability now tell a significantly different quantitative story from what they used to suggest. Pre-2008, those arguments suggested that 2% inflation was probably enough to eliminate most of the damage caused by the two zeroes; that is no longer true.

But was the case for 2% wrong even in the 1990s, or has it become wrong thanks to structural changes in advanced economies? The answer, I would suggest, is both: even in the 1990s we should have realised that zero lower bound episodes could be much worse than anything that had happened recently, and also that the euro project would create a situation in which downward nominal wage rigidity was a much more important factor than it had been up to that point. But there are also good reasons to believe that the underlying situation has changed in a way that makes a higher inflation target more desirable now than it was a decade or two ago.

2 Secular changes in the real natural rate of interest

The global financial crisis and its aftermath show that zero lower bound episodes are both much more likely and much more damaging than the previous consensus view. But does this represent a change? And is this change likely to continue, so that such episodes will become still more common and damaging if we continue to have low inflation targets?

A number of economists have recently suggested that such a change is indeed happening. In the process they have revived Hansen's (1939) famous concept of secular stagnation – see, for example, Krugman (2013). The new secular stagnation hypothesis received a major boost in prominence when Larry Summers (2013) made an eloquent case for its relevance at the IMF's 2013 Annual Research Conference. It has also received a boost from IMF research (IMF, 2014) suggesting a secular downward trend in real interest rates.

In evaluating the new secular stagnation hypothesis, it is helpful to distinguish between two propositions. First is the case Summers made – that even before the financial crisis struck, say during the 2001-2007 business cycle, advanced economies were depression-prone, that they were only able to achieve more or less full employment when asset and debt bubbles were inflating. Second is the argument that changes since 2007, in particular slowing growth in the working age population, have reduced the real natural rate of interest substantially below its previous level.

There is a good case for both propositions.

On the first proposition, consider Figure 1, which shows the ratio of US household debt to GDP. There has been a severe deleveraging shock since 2007, which was arguably both the principal driver of the Great Recession and a major reason for the slow recovery that has followed. What is immediately obvious, however, is that an end to deleveraging would not be sufficient to restore the status quo ante: while the Great Moderation may have been marked by relatively stable growth in GDP, underneath this surface stability lay an unsustainable growth in household debt, with an average annual increase of 3.9% of GDP over the course of the 2001-2007 business cycle. Yet this rise in debt was not accompanied by either rising inflation or high real interest rates. Figure 2 shows the Federal Reserve's funds rate minus the rate of core inflation, and includes averages across the last three business cycles; this real rate was low on average during the 2001-2007 cycle, and negative during the first few years of that cycle, even though the 2001 recession was fairly mild.

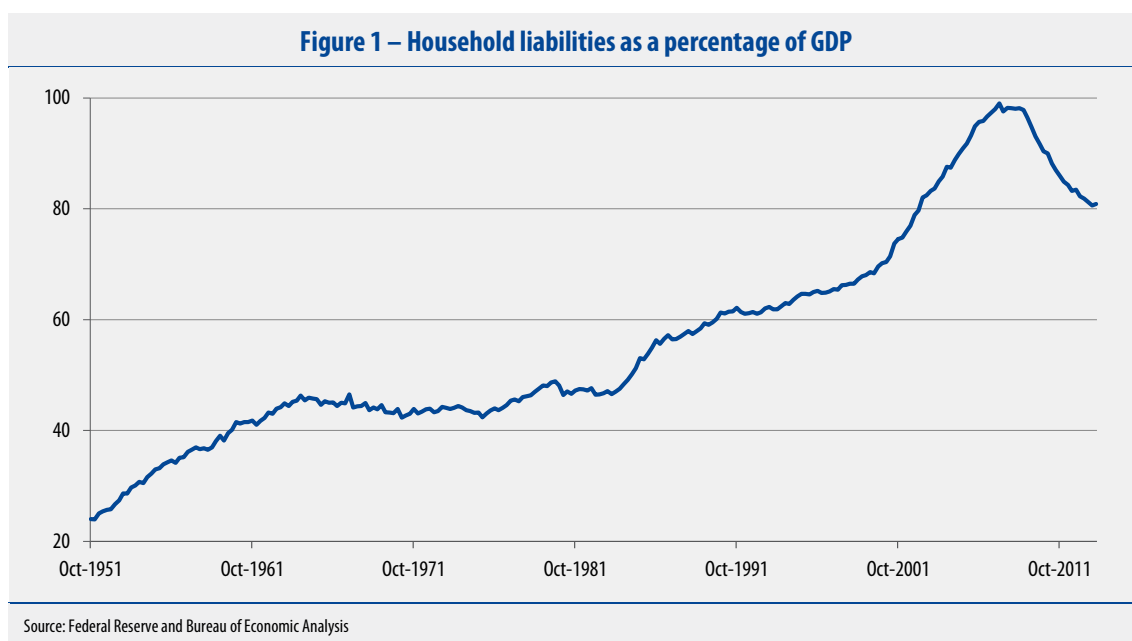
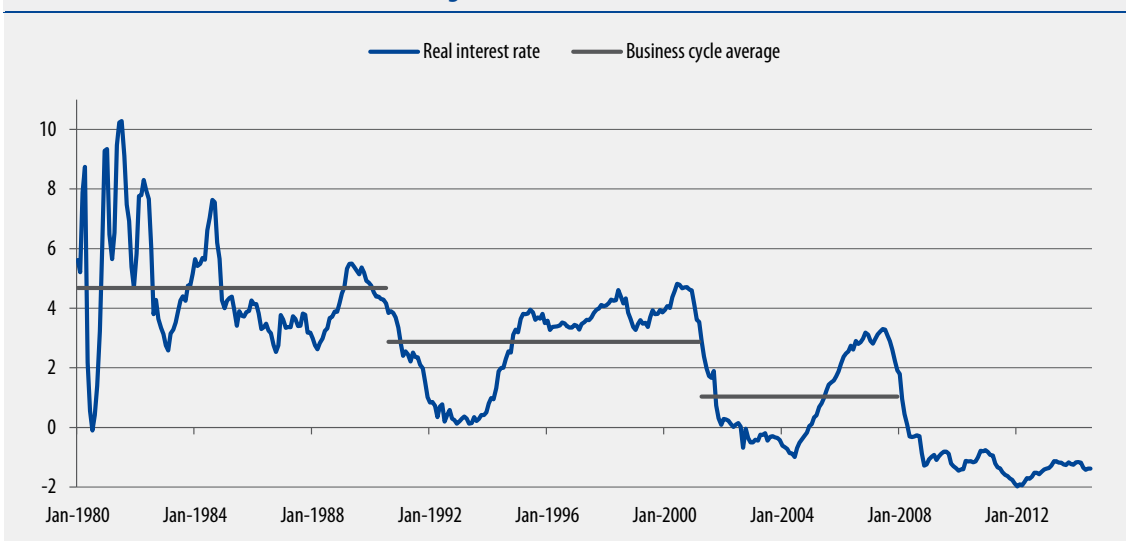


Figure 2 – Real interest rate

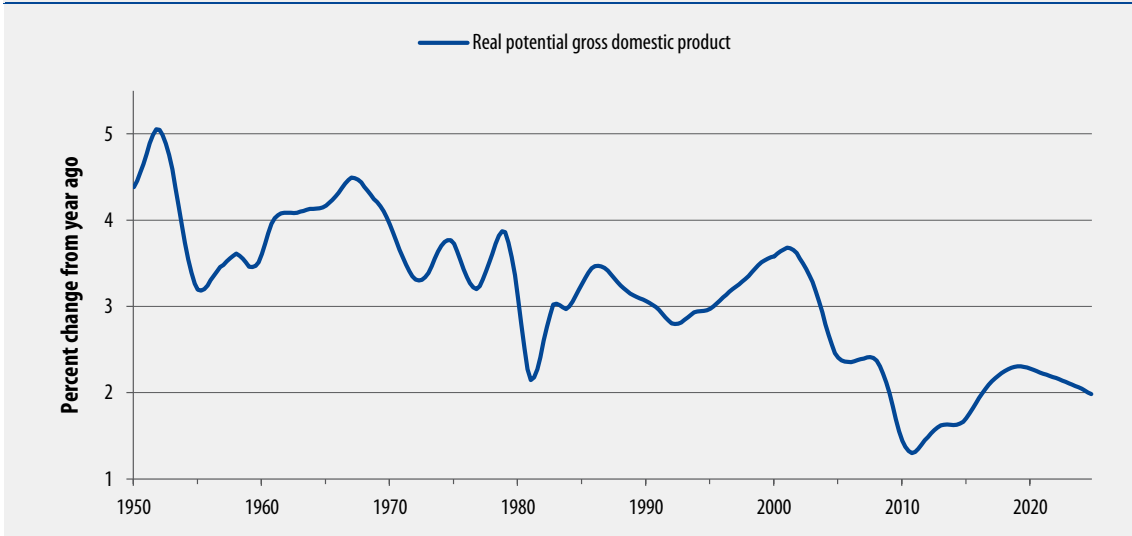


Source: Federal Reserve and Bureau of Labor Statistics

Suppose, then, that deleveraging comes to an end but that we do not return to the rapid debt growth of the recent past. This would, other things equal, subtract close to 4% of GDP from aggregate demand, implying a substantially lower natural real interest rate on average – and therefore substantially negative real interest rates in the face of even moderate-sized negative shocks. In other words, the pre-2008 economy was arguably already prone to zero lower bound episodes, with this propensity masked by an unsustainable growth in household debt.

What about the case for a further decline in the real natural rate? Consider a simple accelerator model of investment, under which the desired stock of capital at any given real interest rate is proportional to real GDP. In that case, normal investment spending as a share of GDP at a given real interest rate will be equal to the capital-output ratio times the rate of growth of potential output. In 2007 the US capital-output ratio was approximately 3. Meanwhile, Figure 3 shows the Congressional Budget Office's (CBO) estimates and projections of US potential growth; these projections call for a decline in potential growth of more than 1% from the growth rate during the 2001-2007 cycle, which implies a decline in investment demand of more than 3% of GDP.

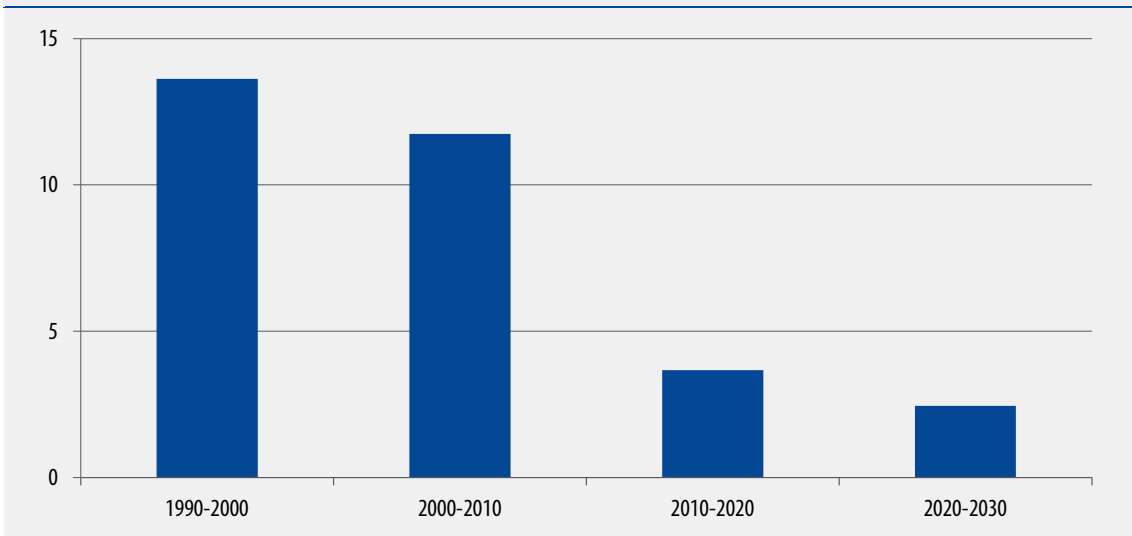
Figure 3 – Percentage change in real potential GDP



Source: U.S. Congress, Congressional Budget Office

Of course, projections of potential growth are highly uncertain, since they depend in part on projected rates of productivity growth. However, the main factor behind the CBO estimates is relatively solid: a sharp decline in the growth of the working age population, now that baby boomers have begun to retire en masse; Figure 4 shows projected growth in the US population aged 20-64. It is worth noting that concerns about the effect of slow population growth underlie Hansen’s fears of secular stagnation – and this time it is really happening.

Figure 4 – Percentage change in working age population (people aged 20-64)



Source: US Census

Suppose that we combine these two effects: 4% of GDP subtracted from demand because we will not return to an era of ever-growing leverage, plus another 3% subtracted due to the accelerator effects of

slowing potential growth. This implies a hit to demand of 7% of GDP compared with the 2001-2007 business cycle, which was already marked by low average real rates and several years of negative real rates. If we apply typical estimates of the effect of budget deficits on real interest rates – for instance, Laubach (2003) estimates that a 1% of GDP rise in the budget deficit raises real rates by 20 to 40 basis points – this could easily reduce the natural real interest rate by 2 or more percentage points. The clear implication is that continuing with a 2% inflation target would leave the economy highly vulnerable to future zero lower bound episodes, to a much greater extent than in the past.

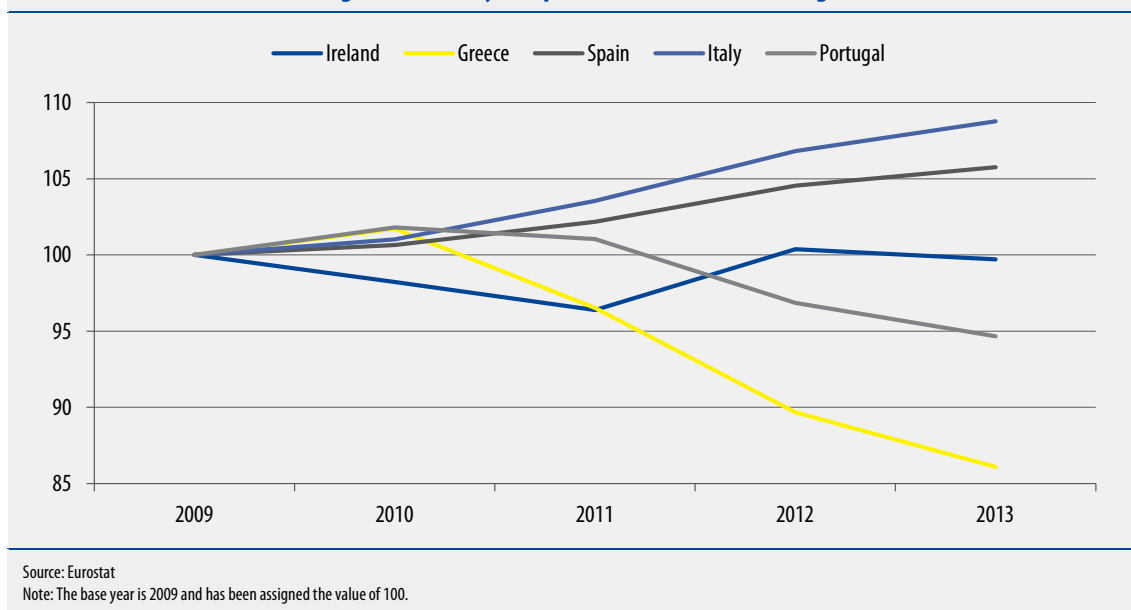
3 Downward nominal wage rigidity, revisited

Downward nominal wage rigidity – the extreme reluctance of employers to cut nominal wages, presumably rooted in turn in worker opposition to such cuts, and the adverse effects of such cuts on worker morale – is one of those propositions that is true in practice even if it is hard to justify in theory. The signature of downward nominal wage rigidity is clear in micro data, which clearly show a spike in the distribution of wage changes at zero, with very few wage cuts. Moreover, not only is there a spike at zero, but the concentration of wage changes at zero rose substantially in the aftermath of the financial crisis.

Within the euro area the signature of downward nominal wage rigidity is also clear in the macro data. The euro crisis, I would argue along with others, is best seen as a classic sudden stop: large capital flows to peripheral European nations that led to large real appreciation, then came to an abrupt halt, requiring these nations to achieve large internal devaluations, reducing their wages relative to core economies. Since internal devaluation takes time, however, the intermediate-run effect is to force current account adjustment through economic contraction and import compression.

What is striking, given this story, is how little of the adjustment has so far taken place via nominal wage cuts. Figure 5 shows nominal compensation in manufacturing in euro area debtor nations (I use manufacturing to limit the compositional effects that arise, for example, from the drastic decline in Spain's low-wage construction sector). With the exception of Greece, none of the debtor countries has seen a significant fall in compensation, despite extremely high unemployment rates. Nor is it easy to cast blame for this lack of adjustment on structural rigidities: Ireland, which was widely praised for its flexibility before the crisis, has been as resistant to wage cuts as Spain and Portugal. The same is true of other countries that have been praised for their flexibility; Blanchard et al. (2014) find essentially no decline in Latvian private sector wages.

Figure 5 – Hourly compensation in manufacturing



In the euro area context, then, downward nominal wage rigidity imposes costs by making the process of internal devaluation more difficult, prolonging the period of severely depressed output in debtor nations. This is a somewhat different mechanism from the one envisioned in Akerlof et al. (1996), although it is clearly related. The key point, however, is that it suggests that the supply-side costs of low inflation remain significant even at rates well above 2%.

To see why, let us approximate the process of euro area adjustment with the following model: there is an initial large fall in output in the peripheral nations, large enough to roughly balance their current accounts, followed by internal devaluation taking place entirely through rising wages in the core, and a gradual recovery in peripheral output. How long does this process take? It depends on the size of the required internal devaluation and the rate of increase in core wages, which in turn is linearly related to the currency area's inflation rate.

Consider a stylised but roughly realistic numerical example. Assume that the euro periphery is one third of the euro area's GDP, and requires a 20% internal devaluation against the core. Assume also that inflation in the euro area is equal to the average wage increase minus 1%. Assume, finally, that the initial output loss in the periphery relative to potential, before internal devaluation can occur, is 12% of GDP, or 4% of the whole area's GDP. Then Table 1 shows how the time taken to adjust and the cumulative output loss, in point years of GDP, depend on the underlying inflation rate.

Table 1 – Years taken to complete the current account adjustment and cumulative output loss depending on the inflation rate

Inflation	Average wage growth	Core wage growth	Years to adjust	GDP loss
1	2	3	6.7	13.3
2	3	4.5	4.2	8.4
3	4	6	3.3	6.6
4	5	7.5	2.7	5.4

Source: author's calculations

We can see, then, that a higher inflation rate smooths the path of adjustment. Furthermore, this effect is significant even at between 3% and 4% inflation.

Now, we do not know how often we should expect events like the current euro crisis and aftermath. Nonetheless, the example suggests that in an imperfectly integrated currency area – one that lacks the fiscal integration and high labour mobility that traditional theories of optimal currency areas call for – moderate inflation can be a crucial aid to the adjustment mechanism, and low inflation can impose significant losses.

4 Low-inflation traps I: economics

Up to this point I have suggested that a 2% inflation rate may be too low, both because it may not leave enough room for interest rate cuts in the face of negative demand shocks, and because it may create supply-side difficulties because of downward wage rigidity. I have, however, written as if the central bank can be sure of maintaining 2% inflation if that is its target. In reality, this is far from clear. Core inflation has recently been running consistently below target in both the United States and the euro area, and Japan is still struggling to exit many years of slow deflation.

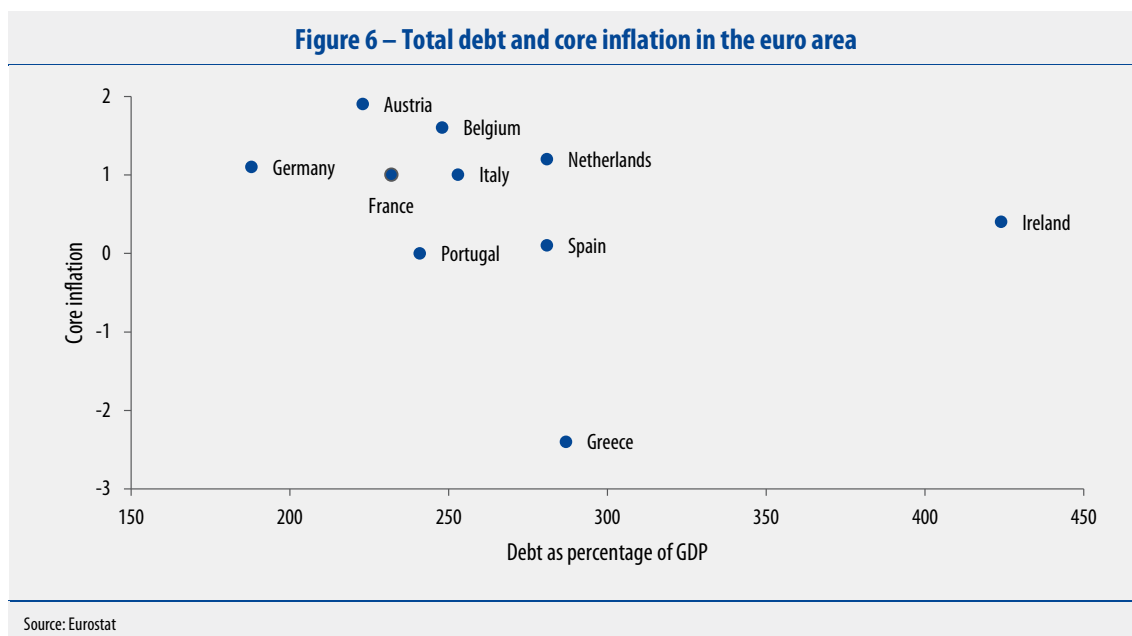
It is not hard to see why this happens. If historical inflation has been at 2% and the natural real rate falls below -2%, the central bank cannot cut rates sufficiently to prevent a sustained slump – and a sustained slump will, in general, further reduce the rate of inflation, and possibly even lead to deflation.

The obvious concern in such cases is that falling inflation will itself deepen the slump. That is, if an economy with low inflation experiences a severe negative demand shock, its central bank may find it difficult to avoid a self-reinforcing process that drives the economy into a low-inflation or deflation trap.

The most famous analysis of such a self-reinforcing process remains Irving Fisher's discussion of debt deflation, which was widely disregarded by the economics profession for several generations but has come back into its own since the global financial crisis. Recall Figure 1, showing how the crisis corresponds to a shift from rising leverage to deleveraging; deflation, or even lower than expected inflation, raises real debt levels relative to what they would have been with stable inflation, and can therefore create an economic drag that further reduces inflation.

Like the problem of downward nominal wage rigidity, this is an especially acute issue within the euro area, where the legacy of a debt bubble must be dealt with under conditions of imperfect integration. Figure 6 compares debt levels (public and private) with core inflation within the euro area. As you might expect,

countries with high debt – the legacy of the housing and capital-flow bubble from 2000 to 2007 – are also countries experiencing low inflation or deflation, because they are being forced into internal devaluation. As a result, debt deflation within the euro area is a stronger force than one might realise looking only at euro area-wide inflation.



In addition to potentially causing Fisherian debt deflation, low inflation can become self-reinforcing through expectational effects: in an economy at the zero lower bound, falling inflation means rising real interest rates, which can depress the economy and reduce inflation still further. Until the coming of Abenomics, real interest rates in Japan were significantly higher than in the United States, even though both countries had zero nominal rates, simply because expectations of deflation were deeply embedded in the Japanese economy.

The point, then, is that inflation may well have a “stall speed” – if inflation is too low in good times, central banks may find themselves unable to prevent a tailspin when adverse shocks come along.

And the inherent economic difficulty of fighting such a tailspin is all too likely to be reinforced by what we might call the political economy of low inflation.

5 Low inflation traps II: political economy

Much of the modern literature on both the zero lower bound and the risks of deflation has its origins in the Japanese experience in the 1990s, which led a number of economists (notably Ben Bernanke, Lars Svensson, Michael Woodford and myself) to worry that something similar could happen to advanced western economies – which has in fact happened. One characteristic of that early literature was that it involved quite a lot of hectoring, in the sense of western economists lambasting the Bank of Japan for its inadequate response to low growth and deflation. Bernanke memorably declared that the Bank of Japan needed to start showing “Rooseveltian resolve”.

However, a funny thing happened a decade later: western central banks also proved diffident in their response to poor economic performance. It seems that entering a slump with low inflation does not simply leave economies vulnerable to an economic trap; it also seems to set central banks up for several kinds of political economy traps, in which officials who promised to act to maintain 2% inflation lose their resolve to act when inflation actually drops toward zero.

At the risk of possibly being too cute, let me characterise the various ways in which resolve fails as the complacency trap, the credibility trap and the timidity trap.

The complacency trap: Central banks were extremely forceful when dealing with the “hot” period of the financial crisis, the roughly seven months following the fall of Lehman when the financial system was in evident danger of imploding. Later, the ECB proved willing to take strong action to stabilise European bond prices when the euro seemed at risk of collapse. Emergencies bring decisive action.

The problem of low and sliding inflation, however, does not manifest itself as an emergency. Recent history has not involved any high-speed deflationary spirals like those of 1929-1933. Even Japanese deflation has been a slow crawl rather than a rapid affair, and in most episodes of protracted economic weakness the slowing of inflation stops short of outright deflation.

This absence of catastrophe is, of course, a good thing – but it can also undermine the determination of policy officials to act. As long as prices remain stable, some officials will argue that monetary policy is doing its job, that any remaining economic difficulties must be addressed with structural reform – that is, by someone else. Long-time Japan watchers are familiar with the process of rationalisation; first declarations that there is no problem because it is not really deflation, then declarations that only the prices of goods with rapid technological progress are falling, etc.

And let us be blunt: there are already visible tendencies towards a similar loss of resolve in Europe – for example, declarations by monetary officials that low inflation is not really a problem because it is mainly driven by needed adjustments in debtor nations. (As I argued above, the concentration of deflationary pressure in the debtors actually reinforces the case that inflation is too low.)

One way of thinking about the complacency trap is that it is the mirror image of the “slippery slope” argument often made about higher inflation targets – the notion that if you accept 4%, it will be too easy to start accepting 6%, and so on. It is not at all clear that this really happens – but the slide from 2% targets to more or less passive acceptance of 1% or less, and maybe eventually -1%, is a very real phenomenon.

The credibility trap: The complacency trap I have just described does not just mean that central banks can lose their resolve to fight excessively low inflation. It also means that they will have a hard time convincing markets that they are in fact resolved to get inflation back up to target.

Long ago, analysing the problems of Japan, I declared that to get traction in a liquidity trap a central bank needed to “credibly promise to be irresponsible” – that is, promise that it would in fact allow inflation to rise, not snatch away the punch bowl just as the party gets going. It is very hard to credibly commit to inflationary policies in general; it is especially hard when a significant number of policy-makers seem fairly comfortable with low inflation or even mild deflation.

The timidity trap: Finally, once an economy is both depressed and at the zero lower bound, getting it out may require more than a resolve by the central bank to get inflation back up to a 2% target. In fact, the target may have to be set higher to have any chance of working.

Why? Suppose that the economy is suffering from chronic shortages of demand and that fears of secular stagnation turn out to be justified. In that case, inflation targeting can only work if it successfully creates a self-fulfilling prophecy: investors expect inflation, which makes them willing to spend more, which pushes the economy to full employment, which then generates the inflation investors expected.

The trouble here is that this process will not work unless the expected inflation is in fact high enough to yield full employment; and we have already seen that 2% may well not be enough. If the target is not high enough, then even if investors believe the central bank's promises for a while, actual economic developments will come up short, and the whole effort will sputter out.

This is a very real concern for Japan, where Abenomics represents a bold break with past policies – but the inflation target is still the conventional 2%, which is quite likely to prove insufficient.

The point is that even bold policies in principle can be undone if the inflation goal is too timid – and the continuing force of convention over 2% inflation makes such timidity hard to avoid.

6 Conclusion: we are all Japan

I am well aware that any proposal for a rise in the inflation target is greeted with extreme scepticism by central bankers – and this includes relatively dovish officials as well as inflation perma-hawks. The achievement of low inflation after the experience of the 1970s was hard-won, and officials fear that changing the now-conventional target would damage their credibility.

But this resistance is, in a sense, just a further illustration of why it is so important not to go into a prolonged slump with too low an inflation rate. The intense resistance of central bankers to regime change even after more than five years at the zero lower bound shows that the kind of policy stasis that afflicted Japan for almost two decades is a more or less universal phenomenon. In other words, escaping from a low inflation trap is extremely hard.

This in turn tells us that we should take extra precautions to avoid getting into such a trap – and a higher inflation target in good times is the best precaution available.

References

Akerlof, G.A., Dickens, W.T. and Perry, G.L. (1996), "The Macroeconomics of Low Inflation", *Brookings Papers on Economic Activity*, No 1, pp. 1-52.

Ball, L. (2013), "The case for 4% inflation", *Central Bank Review*, Issue 13/2, Central Bank of the Republic of Turkey, pp. 17-31.

Blanchard, O., Dell'Ariccia, G. and Mauro, P. (2010), "Rethinking Macroeconomic Policy", *IMF Staff Position Note*, No 10/03, February.

Daly, M. and Hobijn, B. (2014), "Downward nominal rigidities bend the Phillips curve", *Working Paper Series*, No 2013-08, Federal Reserve Bank of San Francisco.

Hansen, A. (1939), "Economic progress and declining population growth", *American Economic Review*, Vol. XXIX, March.

Laubach, T. (2003), "New evidence on the interest rate effects of budget deficits and debt", *Finance and Economics Discussion Series*, No 2003-12, Federal Reserve Board, Washington, DC.

IMF (2014), *World Economic Outlook*, April.

Krugman, P. (2013), "Bubbles, regulation, and secular stagnation", *The New York Times*, 25 September.

Summers, L. (2013), "Economic Forum: Policy Responses to Crises", *Fourteenth Jacques Polak Annual Research Conference*, 7-8 November 2013, International Monetary Fund, Washington, DC.

Comments on inflation targets reconsidered by Paul Krugman

Guido Tabellini¹

Paul Krugman has written a very timely paper. It discusses an old issue that has become very relevant again. My comments address two questions. First, should inflation targeting be reconsidered? Here my answer is a clear and resounding yes. Inflation targeting has performed very well in the fight against inflation and in stabilising inflation expectations. But now, even leaving issues of financial stability aside, monetary policy is faced with different challenges. Second, which features of the inflation targeting framework should be changed? Here I argue that other aspects of the framework are more important than the numerical value of the target. In addressing these questions, I review Paul Krugman's arguments, agreeing with many but not all of them.

1 The economics and politics of a low inflation trap

Krugman's last argument for revisiting inflation targets is what he calls the "low inflation trap". This argument is very important and convincing. There are two aspects to consider. One is the economics of the low inflation trap. It is not a novel point (see Krugman, 1998), but it deserves to be stressed and repeated because sometimes it is not well understood. We are used to thinking that the traditional credibility problem in monetary policy arises because expected inflation is too high and the central bank lacks the credibility to bring it down. In this traditional setting, higher expected inflation shifts the aggregate supply curve upwards and to the left, inducing lower output and higher actual inflation.

As explained for instance by Eggertsson and Giannoni (2013), however, when the nominal interest rate is at the zero lower bound, output is typically demand-determined and expected inflation is too low rather than too high. Raising future expected inflation here helps, because it shifts aggregate demand to the right, leading to higher output and possibly higher inflation. Aggregate supply may shift up as well with expected inflation, but this does not eliminate the positive output effect of a higher aggregate demand, because output is demand-determined.

The surge in future expected inflation is ex post suboptimal, however, because once the zero lower bound is no longer a binding constraint, the central bank would prefer inflation to remain low. Hence here too we have a credibility problem, operating in reverse: the economy needs a higher future expected inflation, but the central bank does not have the credibility to deliver it. Simulations of the traditional new Keynesian model suggest that this credibility problem can be quantitatively relevant. If monetary policy operates under commitment, the most severe implications of the zero lower bound on the nominal interest rate can be escaped quite easily. But under discretion, the threat of a liquidity trap is more worrisome – see for instance Coibion et al. (2012).

There is also a political side to the low inflation trap. As Krugman has stressed, the costs of excessively low inflation are mainly indirect. They operate through general equilibrium effects and by constraining what

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monetary policy can do to stimulate aggregate demand. It is plausible that public opinion is not fully aware of these costs, resulting in complacency by policy-makers. To substantiate this point, Figure 1 depicts the US inflation rate, together with the percentage of New York Times articles that contain the word inflation, in the post-war and in the inter-war periods. When inflation reaches 5%-6%, it clearly becomes an issue in the press. But an inflation rate around zero, or as low as -2% or -3%, does not seem to attract the attention of the media, despite its possibly very high costs on the economy through a highly constrained monetary policy.

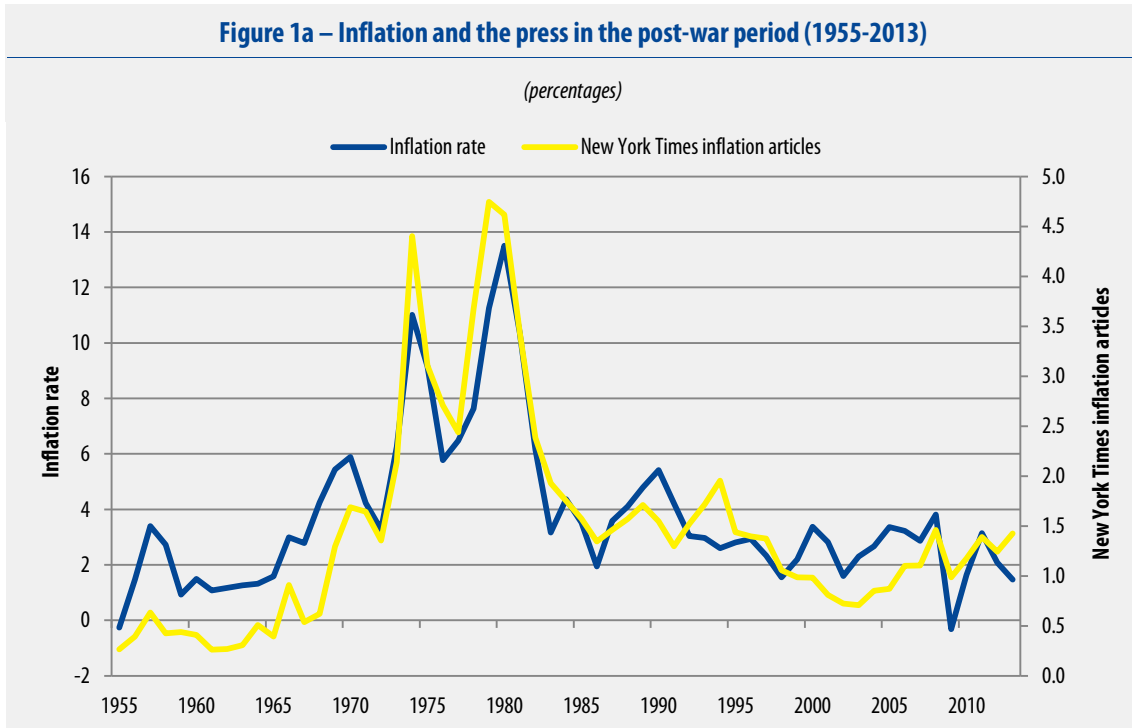
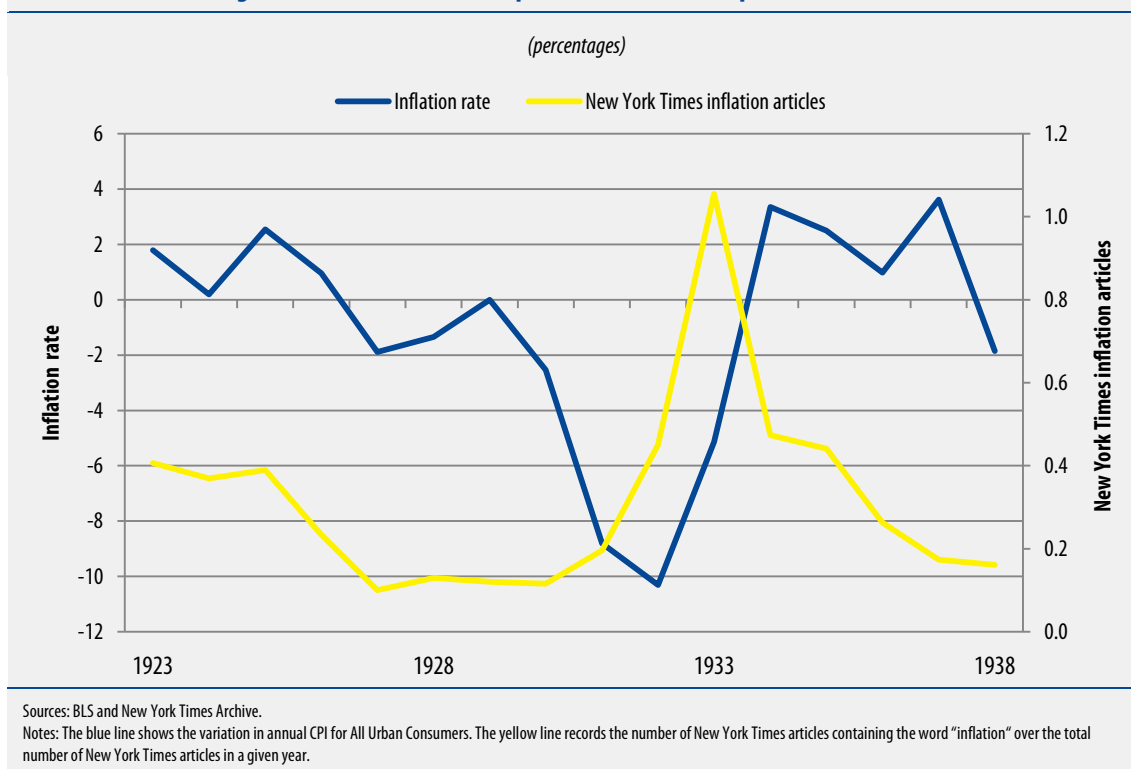


Figure 1b – Inflation and the press in the inter-war period (1923-1938)



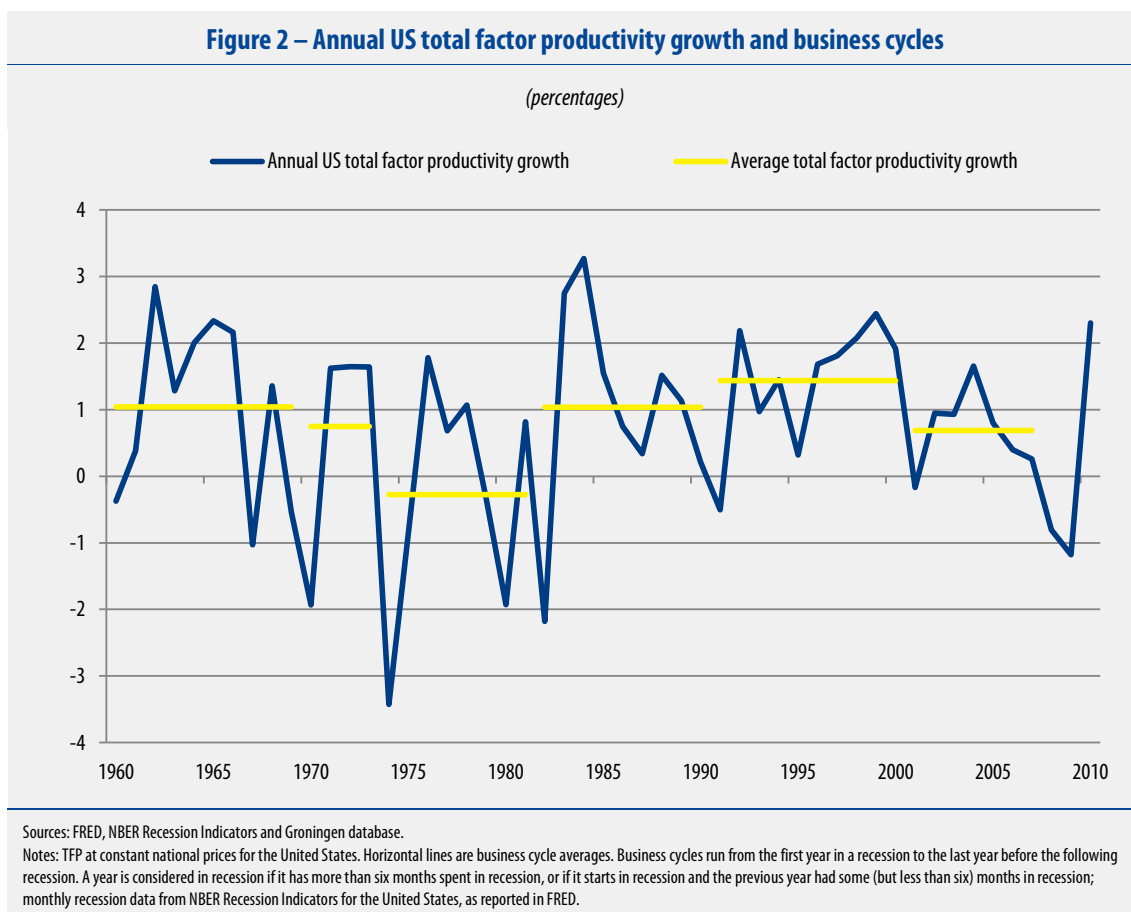
In the euro area, there is an additional problem that makes the politics of the low inflation trap even more relevant. Because of the large heterogeneity in the macroeconomic situation of different euro area countries, conflicting national interests reverberate inside the ECB Governing Council. Since often monetary policy decisions are taken by consensus or by large majorities, this creates a dangerous status quo bias in monetary policy.

2 Secular stagnation?

Next, consider the idea that there is a threat of secular stagnation, and it was already apparent before the Great Recession. This is an important issue, because secular stagnation implies a lower natural real rate of interest (i.e. the interest rate at which the economy operates close to full employment, given existing microeconomic distortions). If so, the zero lower bound is likely to remain an important threat for future monetary policy.

Secular stagnation is an interesting conjecture that certainly deserves attention. But I think it is too early for this to provide a sound basis for redesigning our monetary institutions. Consider first the argument that there is secular stagnation in the US economy. In standard new Keynesian models, the equilibrium real natural rate of interest is an increasing function of the rate of growth of total factor productivity (TFP). Hence, if indeed there were signs of secular stagnation already before the financial crisis, we should have observed a pronounced slowdown in TFP growth. But this is not the case. Figure 2 depicts the growth of TFP in the United States; the horizontal lines correspond to the business cycle averages (measured from

the first year in recession to the last year before the following recession).² There is a slight deceleration of TFP growth between 2001 and 2007, but this is mainly because TFP growth was unusually high in the previous decade, and TFP growth before the recent financial crisis is not out of line with the post-war experience.



Given world integration, perhaps secular stagnation is a global phenomenon. Indeed, in an integrated world the equilibrium real interest rate is determined by global forces, and there is evidence that real interest rates have declined throughout the world (see IMF, 2014). This is unlikely to be due to a slowdown in investment, however. The IMF points out that, since the beginning of the new millennium, the slowdown in investment in advanced economies has been more than offset by the acceleration of investment in emerging markets, so that global investment has actually increased as a fraction of world GDP. Moreover, up to the recent financial crisis, the rate of return on capital in advanced economies remained high by historical standards (cf. IMF, 2014).³ Hence, if equilibrium real interest rates have declined, this must be because of an increase in global savings even larger than the increase in global investments. This is the celebrated global savings glut hypothesis, on which much has been written.

² A year is considered in recession if it has more than six months spent in recession, or if it starts in recession and the previous year had some (but less than six) months in recession.

³ The rate of return on capital is measured alternatively by the growth rate of profits or by profit relative to the capital stock. Profits are measured as corporate gross operational surplus.

The question is how lasting this increase in global savings is likely to be. I am sceptical that it is likely to be very long lasting. Part of the increase in savings by emerging countries reflects their reaction to the Asian financial crisis of the 1990s, which increased the demand of their monetary authorities for foreign reserves. But this increase in foreign reserves cannot go on forever. Moreover, the surge in savings by emerging economies is also explained by an acceleration in their growth rate. If growth were to slow down, this is likely to be associated with a lower savings rate. China in particular has very low consumption relative to GDP, and sooner or later the Chinese savings rate will drop.

Finally, it is not obvious that population aging in advanced economies is about to induce a decline in the natural rate of interest. This might be a steady state effect, but we are still not in steady state. Current demographic trends largely reflect an increase in life expectancy: we are living much longer than in the past. But it is not at all obvious that this change was fully anticipated decades ago. Moreover, retirement age has not fully adapted to the higher life expectancy. Hence, at least during a possibly long transition phase, population aging is associated with dissavings by a larger population of retirees not fully compensated by the higher savings of younger cohorts. Indeed, attempts to estimate how demographic trends have an impact on asset prices in advanced economies do not suggest an imminent decline in equilibrium interest rate as a result of demography (cf. Favero et al., 2013).

Thus, I doubt that the conjecture of secular stagnation has strong implications for future monetary policy. Nevertheless, there are several other reasons to believe that the zero bound on nominal interest rates will remain a very relevant concern.

First, recent estimates suggest that the natural real rate of interest in the US economy was below -4% in the last three recessions, and not just in the latest one. The main difference between the latest Great Recession and the previous two business cycle troughs is not by how much the natural interest rate fell, but rather that in the latest episode the natural interest rate remained so low for so long (cf. Cùrdia et al., 2014; Barsky et al., 2014). But with expected inflation at 2%, a negative real rate of -4% is not attainable.

Second, the debt overhang associated with banking and financial crises typically implies a very slow recovery. Reinhart and Rogoff (2014) point out that, in a sample of over 100 episodes of financial crisis, on average it takes more than eight years to return to the pre-recovery peak of GDP per capita (and obviously it would take much longer to return to the pre-crisis upward sloping trend). Given the constraints on aggregate demand management, it is already clear that economic recovery in southern Europe will take much longer than eight years.

Third, and perhaps most important of all, a major lesson of the Great Recession is that modern economies are highly vulnerable to sudden stops and financial crises. To avoid the devastating effects of these crises, monetary policy should have adequate room to reduce interest rates.

For all these reasons, and even discarding the hypothesis of secular stagnation, I agree with Paul Krugman's main conclusion. The zero lower bound on interest rates will remain a major concern in the conduct of future monetary policy, much more so than previously realised. It would be surprising if this concern did not have relevant implications for the design of monetary institutions. This is the issue to which I turn next.

3 Inflation targeting reconsidered

Inflation targeting is practiced in different ways in different countries. But almost all inflation targeting frameworks have a combination of the following four features.

First, the nominal anchor is the rate of inflation (rather than the price level path, or the path of nominal income).

Second, whenever there is a trade-off between different goals, inflation often receives a disproportionate weight compared to output stabilisation. This is Rogoff's (1985) "conservative" central banker idea to overcome time inconsistency and gain credibility. In the euro area, price stability is the almost exclusive goal of the ECB.

Third, the central bank loss function implicitly assigns a greater penalty for upwards deviations of inflation from its target than for downwards deviations. This is the idea of a linear tax on inflation implied by the optimal contract literature applied to central banking (cf. Walsh, 1995; Persson and Tabellini, 1993), and it is consistent with the communication of many inflation-targeting central banks at least before the Great Recession.

Fourth, as stressed by Paul Krugman, the numerical goal for inflation is generally 2%.

I now discuss each of these features.

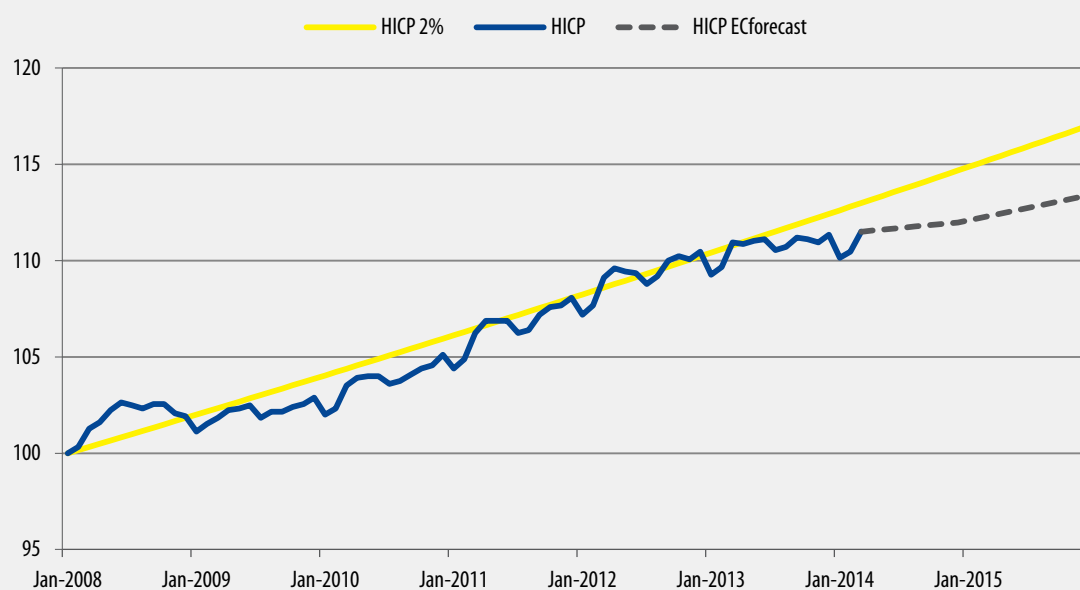
3.1 Price level vs inflation targeting

Consider first the choice of a nominal anchor, and in particular the issue of inflation vs price level targeting. It is not a novel issue, but it has become relevant again. As explained above, one way to relax the zero bound on nominal interest rates is to raise expected inflation. This is done automatically if the central bank targets a path for the price level rather than the rate of inflation (cf. Svensson, 2001; Eggertson and Woodford; 2003). Hence, under the threat of the zero lower bound, a price level path is a much better nominal anchor than inflation.

The relevance of this simple point for the euro area is illustrated in Figure 3. From the onset of the crisis in 2008 until late 2012, euro area inflation tracked the 2% goal remarkably well, and the price level remained very close to the 2% growth path corresponding to the straight line in Figure 3. By the end of 2012 and onwards, however, inflation began to undershoot the 2% goal. As a result, according to the ECB's own forecasts illustrated as the dotted line in Figure 3, by the end of 2015 the euro area price level will be about 3% below the price level path corresponding to 2% inflation.⁴ If the ECB continues to target inflation at 2%, this gap will not be filled, and the price level will eventually resume its growth around a 2% path that will remain forever below the original one. With a price level target, instead, the ECB would want the price level to return towards the original 2% path. Of course, this would imply a temporarily higher inflation rate, and this is precisely what is needed now to relax the zero lower bound.

⁴ The ECB forecasts a yearly inflation rate, rather than monthly variations. In drawing Figure 3, I assumed a uniform monthly rate of inflation corresponding to the ECB yearly forecasts during the relevant forecast period.

Figure 3 – Euro area price index



Sources: Eurostat and the ECB's Monthly Bulletin from June 2014.

Notes: Monthly Harmonised Index of Consumer Prices (HICP) for all items in the euro area (considering countries using the euro in any given year) from Eurostat. HICP 2% shows the theoretical path of inflation growing at an average annual rate of 2%. HICP forecast is the hypothetical future path of inflation growing at the annual rate forecasted by the ECB for the euro area for the years 2014-2015, as formulated in the Monthly Bulletin of June 2014.

Note that a target expressed as a price level path is equivalent to a corresponding inflation target over an infinite horizon (except that it can be monitored in continuous time). The ECB often stresses that its 2% inflation target is a medium-run goal. Hence the logic of a price level target is consistent with the ECB's own interpretation of its price stability mandate. In the current circumstances, targeting medium-run inflation calls for a rate of inflation above 2% in the future. The overshoot of future inflation above 2% should be larger and longer the more current and past inflation undershoots 2%, and the closer we are to full price level targeting (i.e. the longer the medium run in the ECB's own definition of price stability is). Announcing that monetary policy aims for a future inflation above 2% would be stabilising in the current circumstances, indirectly through a lower real interest rate, and directly through a likely exchange rate devaluation. By refraining from this kind of communication, the ECB is making its own task harder than necessary.

A common objection to price level targeting is that it forces a more aggressive monetary policy response to supply shocks, because upwards deviations in prices have to be fully offset, and this may increase output volatility. There are several responses to this objection. First, supply shocks are relatively infrequent in advanced and diversified economies – cf. the evidence in Justiniano et al. (2013) on the United States. Second, by targeting core prices (as many central banks already do with regard to inflation), many supply-side shocks can be incorporated as contingencies that do not require a direct monetary policy response. Third, to avoid excessive output volatility, the central bank could target a path for nominal income, rather than for prices alone.

3.2 A distorted loss function?

Next, consider the idea that the central bank loss function should be distorted relative to that of society, to enhance its credibility in fighting inflation. This idea presumes that the central bank has a systematic incentive to raise inflation above the social optimum. But as Krugman has convincingly argued, optimal monetary policy is time inconsistent also at the zero lower bound, in the opposite direction. Moreover inflation close to or below zero can be very costly, particularly in a high debt environment, although public opinion may be unaware of these costs. This suggests that a distorted loss function for the central bank is unjustified, both with regard to the relative weight on price vs output stability, and with reference to upwards vs downwards implicit penalties for missing the nominal target.

In the euro area there is an additional reason to abandon the pursuit of distorted objectives. As explained by Krugman, at the zero lower bound for nominal wage growth, any relative wage adjustment requires a costly internal devaluation in southern Europe. Because of the asymmetric nominal wage rigidity, the output loss in southern Europe is not fully compensated by higher output growth in northern Europe. In other words, at the zero lower bound on wage growth, relative wage adjustment is associated with an output loss for the euro area as a whole. A larger weight on output (vs price) stability would make monetary policy more tolerant of the higher inflation rate that is needed to smoothly achieve the relative weight adjustment.

3.3 Raising the numerical inflation target above 2%?

As forcefully argued by Krugman, raising the inflation target above 2% is a simple and direct way to raise expected inflation and strengthen the central bank incentives to avoid the low inflation trap. I agree with this conclusion. There is no compelling reason other than convention for setting the target precisely at 2%, and a higher numerical target, say 3%, would be a step in the right direction. Nevertheless, there are several normative and positive reasons for being cautious and avoiding a much higher inflation target.⁵

The first and most compelling reason is that higher actual and expected inflation is helpful only at the zero lower bounds (on the interest rate and on nominal wage growth), whereas the costs of higher inflation are borne all the time. These unnecessary costs of high inflation can be quantitatively important. Coibion et al. (2012) calibrate a standard new Keynesian model with microfoundations where monetary policy can be constrained by the zero lower bound on the nominal interest rate. Optimal steady state inflation obviously depends on the frequency with which this constraint binds. The main conclusion of this study is that it is very difficult to raise optimal inflation much above 2%. If the zero lower bound is met every 20 years, and then it lasts for two years, when trend inflation is 2%, then the optimal inflation rate is below 2%. In the standard version of the model, a 3% trend inflation becomes optimal only if the zero lower bound is met once every seven or eight years, a frequency that probably even Paul Krugman would find implausible. Changing other features of the model, such as the details of how prices are set, implies a higher optimal inflation rate. But not much higher.

⁵ These issues are discussed at length in the useful survey by Ascari and Sbordone (2014)

A second concern is that, both in the data and in standard new Keynesian theoretical models, there is a positive association between the level of inflation and its volatility. And of course inflation volatility is costly, arguably more so than the level of inflation itself.

Moreover, if inflation increases by much, the private sector reacts through the indexation of wages and other contracts. And this in turn would reduce some of the benefits of high inflation – for example on relative wage adjustments.

Last but not least, although we are very ignorant of what the optimal steady state inflation is, we know from past experience that it is very costly to bring high inflation down, once it gets entrenched in expectations and economic behaviour. This is a very important argument for being careful not to abandon the current environment of low and stable inflation expectations.

Besides these normative arguments for being cautious in raising the inflation target much above 2%, there is also a simple positive argument suggesting that it would be politically difficult to do so in the euro area. The benefits of higher inflation accrue mainly to southern Europe, while its costs would mainly be felt in northern Europe which has de facto veto power. This point is best illustrated with the simple example on relative wage adjustment in Krugman's paper (cf. his Table 1). Consider his same numerical exercise, but suppose that, rather than two groups of countries (southern Europe and core Europe), there are three groups of equal size: southern Europe, core Europe (i.e. France, Belgium and a few other small countries), and northern Europe (mainly Germany). Suppose further that core Europe wage and inflation performance coincides with the euro area average. Then wage growth and inflation in northern Europe would have to be higher than in Krugman's example in order to achieve the same relative wage adjustment with the southern countries. How much higher? Inflation in northern Europe would have to reach 7% for more than three years just to achieve 3% average inflation in the euro area. I doubt that this would be politically feasible in Germany.

Of course this is just an overly simplistic numerical exercise. But the point is general. Given the heterogeneity of the euro area and the size of the cumulated misalignments, it would be politically very difficult to compress the necessary adjustments in a short amount of time, either through higher inflation in the north or through higher deflation in the south. Whether we like it or not, the adjustment will be very protracted in time, and the slump in southern Europe will probably last more than a decade.

4 Concluding remarks

Despite a few reservations, I agree with the main conclusions of the paper. The current monetary policy framework needs to be reconsidered. This is particularly true in the euro area, where the case for higher inflation is overwhelming, and where the need to reduce the debt overhang is an even more compelling reason than relative wage adjustment. More generally, the low inflation trap is a real danger, for economic and political reasons. Our monetary institutions should recognise this fact, and strengthen the incentives of the central bank to avoid excessively low inflation.

An inflation target somewhat higher than 2% is a simple and direct way to address these concerns, and would have few disadvantages. But an even more important consideration is that other features of the inflation targeting framework should be reconsidered. In particular, there is no valid reason why the central bank should pursue a distorted loss function. Monetary policy can and should stabilise output fluctuations,

and this should be fully reflected in their mandate. Moreover, the price level path, or the path of nominal income, would provide better nominal anchors than the rate of inflation.

References

- Ascari, G. and Sbordone, A.M. (2014), "The macroeconomics of trend inflation", *The Journal of Economic Literature*, forthcoming.
- Barsky, R., Justiniano, A. and Melosi, L. (2014), "The natural rate of interest and its usefulness for monetary policy", *American Economic Review*, Vol. 104, No 5, pp. 37-43, May.
- Coibion, O., Gorodnichenko, Y. and Wieland, J. (2012), "The optimal inflation rate in new Keynesian models: should central banks raise their inflation targets in light of the zero lower bound?", *Review of Economic Studies*, Vol. 79, No 4, pp. 1371-1406, October.
- Curdia, V., Ferrero, A., Ng, G.C. and Tambalotti, A. (2014), "Interest rate rules in DSGE models: tracking the efficient real interest rate", *Journal of Monetary Economics*, forthcoming.
- Eggertsson, G. and Giannoni, M.P. (2013), "The inflation-output trade-off revisited", *Federal Reserve Bank of New York Staff Reports*, No 608, March.
- Eggertsson, G. and Woodford, M. (2003), "The zero bound on interest rates and optimal monetary policy", *Brookings Papers on Economic Activity*, The Brookings Institution, Vol. 34, No 1, pp. 139-235, June.
- Favero, C.A., Gozluklu, A.E. and Yang, H. (2013), "Demographics and the behavior of interest rates", *Warwick Business School Working Papers*, No 13-10, October.
- International Monetary Fund (2014), *World Economic Outlook – Recovery Strengthens, Remains Uneven*, Washington, DC, April.
- Justiniano, A., Primiceri, G.E. and Tambalotti, A. (2013), "The effects of the saving and banking glut on the U.S. economy", *Federal Reserve Bank of Chicago Working Papers*, No 2013-17, November.
- Krugman, P. (1998), "It's baaack: Japan's slump and the return of the liquidity trap", *Brookings Papers on Economic Activity*, The Brookings Institution, Vol. 29, No 2, pp. 137-206.
- Persson, T. and Tabellini, G. (1993), "Designing institutions for monetary stability", *Carnegie-Rochester Conference Series on Public Policy*, Vol. 39, No 1, pp. 53-84, December.
- Reinhart, C.M. and Rogoff, K.S. (2014), "Recovery from financial crises: evidence from 100 episodes", *American Economic Review*, Vol. 104, No 5, pp. 50-55, May.
- Rogoff, K.S. (1985), "The optimal degree of commitment to an intermediate target", *Quarterly Journal of Economics*, Vol. 100, No 4, pp. 1169-1189, November.
- Svensson, L.E.O (2001), "The zero bound in an open economy: a foolproof way of escaping from a liquidity trap", *Monetary and Economic Studies*, Institute for Monetary and Economic Studies, Bank of Japan, Vol. 19, Tokyo, pp. 277-312, February.
- Walsh, C.E. (1995), "Optimal contracts for central bankers", *American Economic Review*, Vol. 85, No 1, pp. 150-167, March.

Central bank balance sheets: expansion and reduction since 1900

Niall Ferguson, Andreas Schaab and Moritz Schularick¹

Abstract

In this paper we study the evolution of central banks' balance sheets in 12 advanced economies since 1900. We present a new dataset assembled from a wide array of historical sources. We find that balance sheet size in most developed countries has fluctuated within rather clearly defined bands relative to output. Historically, clusters of big expansions and contractions of balance sheets have been associated with periods of geopolitical or financial crisis. This explains the co-movement between the size of central bank balance sheets and public debt levels in the past century. The biggest of these crises, in terms of the impact on central bank balance sheets, were World War II and the global financial crisis. We show that large balance sheet expansions have on average taken a long time to unwind. Central banks have rarely reduced the size of their balance sheets in nominal terms. Reductions are predominantly achieved relative to output by holding nominal positions stable for long periods. On the basis of the historical evidence presented here, there are good reasons to expect the contraction of central bank balance sheets in our time to be slow and to take place relative to GDP rather than nominally. Relative to the size of the financial sector, moreover, central bank balance sheets had shrunk dramatically in the three decades preceding the global financial crisis. By that yardstick, their recent expansion partly marks a return to earlier levels. Some of the recent increase could therefore prove to be permanent if the financial sector maintains permanently higher liquidity ratios. The link between central bank balance sheet growth and inflation has loosened considerably in most advanced economies since 1980 and the inflation risks from the recent balance sheet expansion appear limited in the near term. However, we also note that large-scale purchases of government bonds have implications for public finance, even when debt management is not the primary objective of the purchases, because depressing bond yields reduces government debt service costs, especially when the public debt is relatively high. Fiscal considerations may well be adduced as another reason for proceeding cautiously with balance sheet reduction. History suggests that the threat to long-run price stability is a real if slow-acting one when fiscal deficits persist and central bank independence is compromised.

1 Introduction

Central bank balance sheets around the world expanded dramatically during and after the global financial crisis. While some banks have already successfully wound down their balance sheet operations, others are still engaged in or are only beginning to terminate asset purchase programmes at the time of writing. Some market participants even expect another round of balance sheet expansion by major central banks to ward off deflationary tendencies. Asset purchase programmes nevertheless remain controversial on both sides of the Atlantic (Borio and Disyatat 2009). We are far from having a consensus on exactly how they work, what their long-run consequences may be and how long they should be continued.

¹ Harvard University and Hoover Institution, Stanford – Harvard University – University of Bonn and CEPR. We are grateful to Lorenzo Bini-Smaghi, Michael Bordo, Benjamin Friedman, Alexander Kriwoluzky, Kenneth Rogoff, Alan Taylor and Paul Tucker for helpful comments and suggestions. Lukas Gehring provided excellent research assistance. Schularick gratefully acknowledges financial support from the Volkswagen Foundation.

In this paper we study the evolution of central bank balance sheets in 12 advanced economies since 1900. We take a closer look at the 20th and 21st centuries' major balance sheet expansions and reductions in order to understand better the implications of large balance sheets and to contextualise what may lie ahead.

To that end we have put together a new dataset on historical central bank balance sheet positions, drawing on numerous historical records and annual central bank reports. Section 2 describes our dataset. In much of this paper, we explore these data and describe the historical facts. We show that, on average, central bank balance sheet size has fluctuated between roughly 10% and 20% of gross domestic product (GDP). Only a few important economic and political events have pushed balance sheets outside this range. There are large clusters of expansion-contraction cycles around the World Wars, during the Great Depression and during the recent financial crisis. Both World War I and World War II were followed by deep and protracted periods of balance sheet reductions. But in terms of expansion, only World War II bears comparison with recent experience since 2007. However, the drivers of balance sheet expansions differed in the two cases. While war finance represented a major money supply shock with inflationary consequences, central bank balance sheet expansions in the recent crisis were at least partly reactions to a major money demand shock during the crisis.

Our aggregate balance sheet size series displays striking similarities to the aggregate public debt series over the same time period. We infer from this observation that the fiscal and monetary authorities have largely acted in concert when faced with major economic or political crises. This has important implications for today, when it is conventional to emphasise central bank independence and the separation of monetary and fiscal policy-making. History makes clear that the separation of monetary and fiscal policy is a contingent commitment; in times of emergency, the distinction becomes harder to maintain (Goodfriend 2011).

Section 3 also discusses historical trends in the composition of central bank balance sheets. Importantly, we find that, relative to the size of the financial sector, central bank balance sheets and in particular bank deposits at central banks had become very small in the years preceding the global financial crisis. Our long-run data suggest that, to some extent, the post-crisis growth of central bank balance sheets represents a return to levels seen in the 1970s, before the explosive growth of the financial sector. The crucial question is whether or not banks will target permanently higher reserves. A related question is whether or not reserve requirements can and should make a comeback, as proposed by Reinhart and Rogoff (2013).

We also study the relationship between balance sheets and inflation. Analysing low frequency correlations between balance sheet size and inflation, we generally find a positive correlation for most of the 20th century, as the quantity theory implies. Yet we also show that, in line with the results of Sargent and Surico (2012), the relationship has become weaker in recent decades, thereby providing more nuance to the original results of Lucas (1980).

In Section 4, we take a closer look at a total of 23 large expansions and 17 large contractions in central bank balance sheet size since 1900. We explain our identification methodology and propose a classification framework for expansion episodes. In Section 5, we discuss what seems to us to be the most instructive expansion and contraction episode in our sample, the period during and after World War II in the United States.

We draw broader lessons from these historical episodes in Section 6, asking how central banks have historically achieved large balance sheet contractions. In particular, we show that most reductions have been realised only relative to GDP. Only very few central banks have normalised their balance sheets after large expansions through nominal reductions in their positions. We then argue that in those instances where central banks did achieve nominal contractions, balance sheet composition was key. In all such cases, banks have successfully unwound their positions by letting short-term lending programmes phase out or by letting short-term assets roll off. We have not recorded a single incident in which a central bank has primarily sold long-term government (or private market) securities to unwind a large expansion in nominal terms.

Section 7 asks just how genuinely “unconventional” recent balance sheet operations have been in historical perspective. Drawing on our new data, we show that, in some respects, the central bank balance sheet expansion occasioned by World War II can be regarded as a precedent. Clearly, the intention of policy in the two cases was quite different. But the functional consequences – in particular the effect on interest rates and the fiscal implications of that effect – had much in common. In that sense balance sheet normalisation poses challenges for central banks (and finance ministries) that are not wholly novel.

In the final section we draw four main conclusions. First, while balance sheets have grown considerably, current levels are neither historically unprecedented nor do they appear unmanageable. In contrast, the recent growth also reflects a catching-up of the size of central banks’ balance sheets in relation to a much bigger financial sector. Put differently, central banks’ balance sheets had become small relative to financial sector assets and total lending. Like most of the academic community, central banks had largely ignored the build-up of leverage in Western financial systems and the thin foundation of liquidity on which the modern financial edifice was built. Since 2008 this trend has been partly reversed and could result in permanently larger balance sheets and higher deposits of commercial banks at central banks.

Second, we find little historical evidence that large balance sheets pose an imminent risk to price stability. The link between balance sheets and inflation was relatively close for most of the 20th century, but has weakened considerably in the past 35 years. Whether this reflects the increased credibility of central bank independence and price stability policies, or other factors, remains a matter for debate.

Third, studying historical episodes of balance sheet reduction relative to GDP, we find that outright nominal reductions of balance sheets are rare. Historically, reductions have typically been achieved by keeping the growth rate of assets below the growth rate of the economy. The post-World War II unwinding of war finance provides the most telling historical parallel to today’s situation. Between 1947 and 1966, the Federal Reserve System’s balance sheet shrank by 14 percentage points relative to GDP – a prolonged process of incremental reduction. In the same period, total assets grew from USD 50 billion to USD 68 billion in nominal terms.

We conclude with some reflections on the relationship between monetary and fiscal policy. Large-scale purchases of government bonds have implications for government finance, even when government finance is not the primary objective of the purchases, because depressing bond yields reduces government debt service costs, especially when the public debt is relatively high. Ending such purchases may therefore also have fiscal implications, as was true in the late 1940s. An important lesson of that period is that fiscal considerations are not easy to ignore. Although Federal Reserve independence appeared to be restored under the 1951 Treasury-Federal Reserve “Accord”, in practice the Federal Reserve remained

susceptible to political pressure. History suggests that the threat to long-run price stability is a real if slow-acting one when fiscal deficits are persistent and central bank independence is compromised.

2 The data

Our dataset contains central bank balance sheet data for 12 advanced economies from 1900 to 2012. The countries in our sample are Australia, Canada, Finland, France, Germany, Italy, Japan, Norway, Sweden, Switzerland, the United Kingdom and the United States. After 1999 we consider aggregated balance sheet data for the European System of Central Banks (ESCB) in lieu of the euro area countries Finland, France, Germany and Italy. These data were collected primarily from central banks' annual reports and historical archives. Only a few partial aggregate series existed and had previously been made public.

On the asset side, we have total assets and their decomposition into domestic and foreign assets, gold, as well as government debt (securities and other) held by the central bank. On the liability side, we have total liabilities and their decomposition into domestic and foreign liabilities, notes in circulation, as well as total and bank deposits. Table 1 summarises the data coverage by country and variable. More detailed information about country coverage is provided in the appendix.²

Table 1 – Dataset

	Total assets	Foreign assets	Gold	Gov. debt	Total liabilities	Foreign liabilities	Notes	Total deposits	Bank deposits
AUS	102	102	49	102	102		75	98	80
CAN	79	49		79	79	60	79	79	79
CHE	107	107	105		107	51	105	105	105
DEU	96	96	97	97	96	96	97	97	96
ESCB	15	15	15	15	15	15	15	15	15
FIN	99	99	99	99	99	99	99	99	99
FRA	78	61	78	61	78		75	78	
ITA	99	99	99	99	99	99	99	99	99
JPN	114	79	55	114	114	35	112	112	80
NOR	113	106	99	103	113	59	112	112	
SWE	110	110	108	98	108	74	108	94	108
UK	114		112	114	112		112	112	49
US	100	100	100	100	100	98	100	100	100
Total	1226	1023	1016	1081	1222	686	1188	1200	910

We draw on work by Schularick and Taylor (2012) and Jordà, Schularick and Taylor (2013) and use their dataset of historical macroeconomic variables from 1870 to 2012. Their dataset includes annual figures for

² We encountered problems with the decomposition into domestic and foreign currency assets and liabilities for some central banks, especially when statistical publications we drew on did not make the distinction and we were unable to obtain relevant historical sources. The decomposition of the domestic portfolio into holdings of government debt and other securities was not universally available either.

credit aggregates, interest rates and equity prices, as well as a large number of “real” variables for all 12 countries for the entire 20th century.

In our analysis we study balance sheet size relative to GDP. The key variable of interest in subsequent sections will be total assets over GDP, which we view as the most helpful measure of central bank balance sheet size. Whenever we subsequently refer to changes in the size of a central bank’s balance sheet, we should be understood as referring to percentage point changes of total assets relative to GDP. We shall explicitly point out when we are referring to changes in nominal asset holdings.

We report summary statistics and our number of observations, as well as the number of years with positive and negative growth for this variable in Table 2. These summary statistics show that countries have, on average, experienced roughly equal numbers of years with balance sheet growth and decline relative to GDP. We also observe cross-country differences in the variability of balance sheet size over time. The Bank of Canada stands out with the lowest variation in its total asset holdings over time. The Swiss National Bank has the highest standard deviation; fluctuations of foreign asset holdings in the 1930s played an important role here. The Swiss National Bank also experienced the largest one-year growth in balance sheet size relative to GDP, with a near 20 percentage point increase in 1936 when the country left the gold standard. The Norges Bank undertook the deepest one-year contraction after World War II in 1947.

Table 2 – Summary statistics for changes in central bank balance sheet relative to GDP

	Mean	Median	Standard Deviation	Min	Max	Number of observations	Years positive	Years negative
AUS	-0.23	-0.03	1.69	-9.02	3.36	89	43	46
CAN	-0.13	-0.09	0.43	-1.51	1.38	66	21	45
CHE	0.51	-0.18	3.59	-7.91	19.85	104	51	53
DEU	0.03	0.04	0.89	-2.00	2.92	74	40	34
ESCB	0.81	0.37	3.43	-7.43	7.17	14	9	5
FIN	-0.06	0.03	2.69	-13.16	11.93	98	50	48
FRA	-0.24	-0.24	1.87	-7.34	7.43	74	32	42
ITA	-0.02	0.07	2.67	-13.77	6.82	98	54	44
JPN	0.31	0.06	2.54	-8.24	13.49	102	52	50
NOR	-0.69	-0.32	3.39	-15.91	12.84	104	41	63
SWE	0.00	-0.25	2.59	-13.01	15.07	95	41	54
UK	0.14	0.00	1.51	-4.46	10.54	111	54	57
US	0.18	-0.10	1.40	-3.79	8.86	97	40	57

3 Central bank balance sheets since 1900

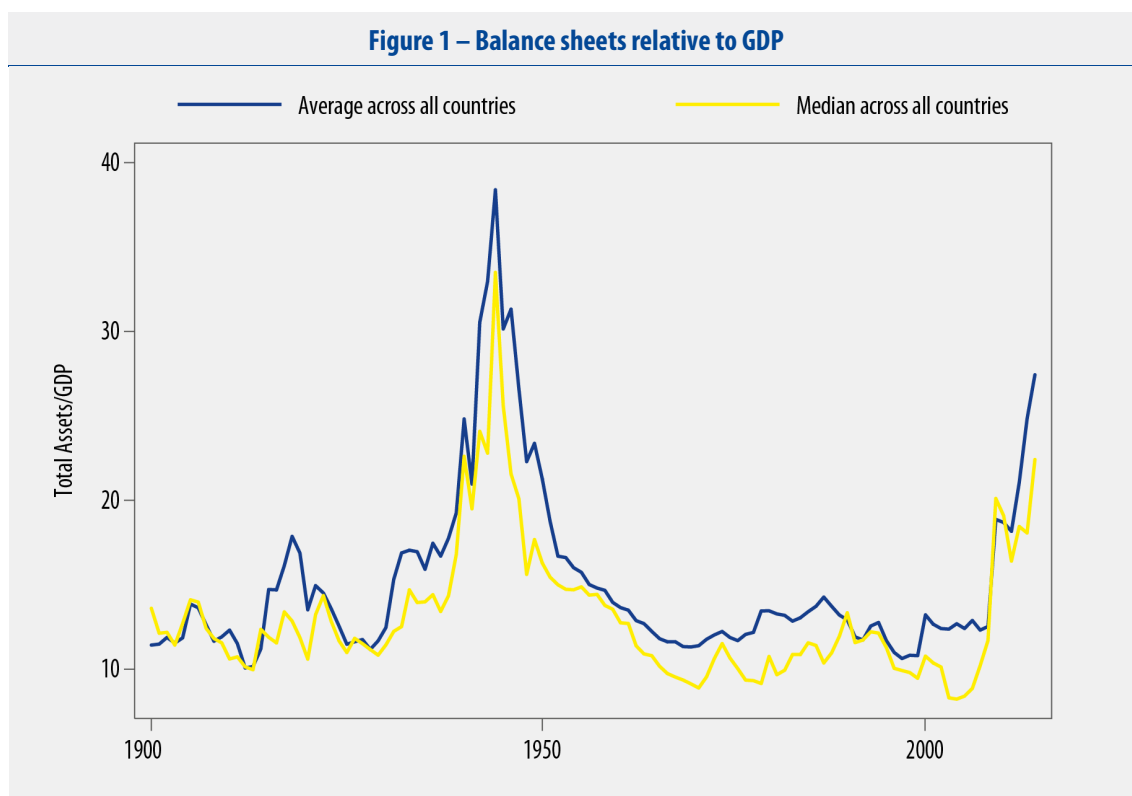
In this section, we report a series of historical facts about the evolution of central bank balance sheets in the aggregate during the past century. The history of central bank balance sheets since 1900 has been governed by a handful of important events.

We start by plotting the annual mean and median aggregate balance sheet size relative to GDP for all countries and for the full time-period in Figure 1. The graph shows that, until recently, and with the

exception of World War II, central bank balance sheets have ranged, on average, between 10% and 20% of GDP. The most striking feature in the data are two large spikes in aggregate balance sheet size, during World War II and since 2007, as well as a third smaller spike around World War I. It is true for most central banks that balance sheet size has remained within a rather clearly defined band, moving outside this band during only a few episodes.

One of the most interesting historical facts visible here is the prolonged balance sheet reduction that followed World War II. Shared by all central banks whose balance sheets were not destroyed during the war or affected by post-war currency reforms, this episode began in 1946 and lasted for some countries until the late 1960s. On average, balance sheet size normalised to pre-war levels, with an overall decline of almost 20 percentage points relative to GDP. From the late 1960s balance sheets stabilised, on average, at around 10% of GDP.

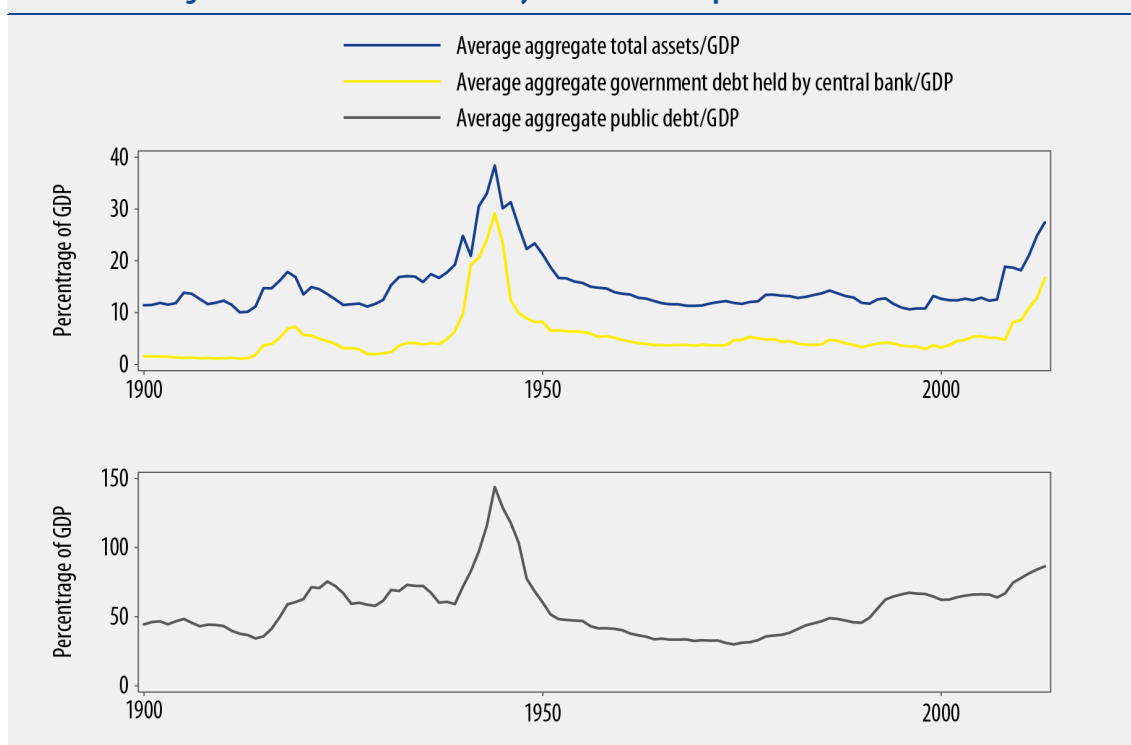
The graph also makes clear that central bank balance sheets today have reached a level that was altogether unparalleled in the 20th century except during World War II. The eight central banks in our sample and the euro area central banks experienced a significant increase in their balance sheets after 2007. On average, balance sheets have grown by almost 20 percentage points relative to GDP. The expansion leading up to and during World War II was also around 20 percentage points, though a direct comparison of magnitudes is difficult as we lack data for some countries during the war.



Another important insight emerges when we plot the average annual public debt-to-GDP ratio over the same time period in the lower panel of Figure 2. The upper panel again plots average balance sheet size across central banks as well as their holdings of government debt. The co-movement between these series

is striking. Public debt has exhibited the same patterns since 1900 that we described in the previous paragraph. Its fluctuations have been larger in magnitude, ranging from a minimum of 30% to a maximum of almost 150% of GDP. The public debt expansion during World War I lagged behind that of central bank balance sheets on average, and public debt did not normalise fully after the war. Central bank balance sheet size increased by relatively more during the Great Depression. Both series register an unprecedented rise during World War II and feature the same contraction pattern after the war. The most obvious deviation in the series' co-movement is that public debt, on average, gradually increased from the mid-1970s onwards while central banks' balance sheet size remained relatively stable. We conjecture that growing political and intellectual support for central bank independence during the time period may help explain this finding. Finally, while central bank balance sheets have experienced an expansion since 2007 that is only paralleled by that during World War II, public debt has not risen quite as strongly in relative terms.

Figure 2 – Government debt held by central bank and public debt relative to GDP

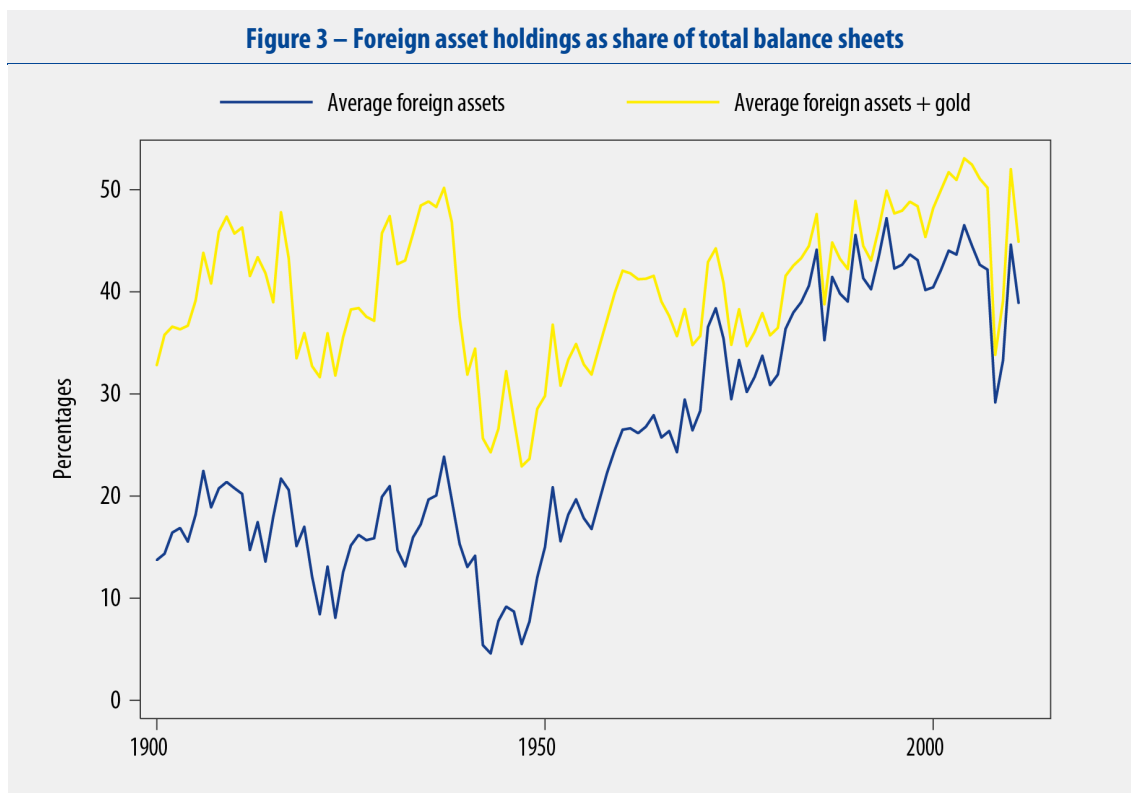


3.1 Balance sheet composition over time

We continue our discussion of aggregate balance sheet trends with the composition of balance sheets over time. We will first look at foreign assets and government debt holdings before turning to the liability side to study the evolution of commercial bank reserves.

3.1.1 Foreign assets

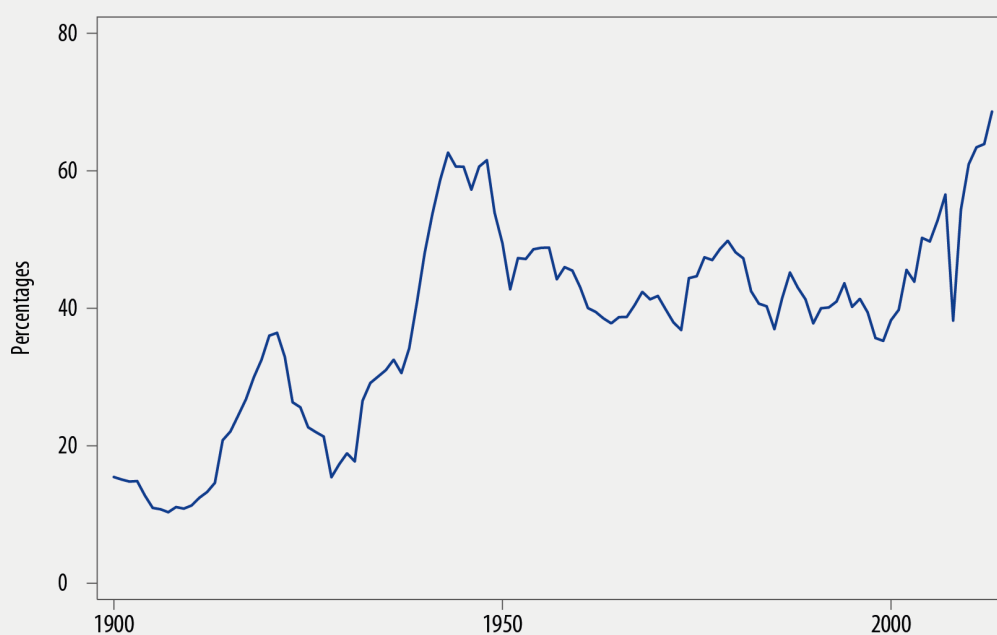
Figure 3 plots aggregate foreign assets as a share of total balance sheet size. The first line reports this average across central banks, counting gold as a foreign asset. Under the pre-World War I gold standard, foreign assets accounted, on average, for a higher share of central bank balance sheet size than at any other point before the 1990s. The World Wars were low points of foreign asset holdings. Central banks rebuilt foreign assets after 1950. During the financial crisis central banks amassed domestic assets in 2008 as part of their policies to restore financial market functioning.



3.1.2 Government debt holdings

Next we look at central banks' holdings of public debt. Figure 4 plots the average government debt holdings across central banks as a share of total balance sheet size. What is evident is that supporting governments' war finances became a dominant function of central banks during the World Wars. Government debt holdings as a share of total assets did not normalise to pre-1939 levels during the widespread balance sheet reduction episode of the 1950s and 1960s. The pronounced decline in 2008 was due to central banks' emergency measures during the heat of the crisis. After lender of last resort policies were phased out, some central banks substituted government securities and other government-guaranteed assets. Government debt and government-guaranteed assets today again account for as large a share of central bank balance sheet size as they did during World War II.

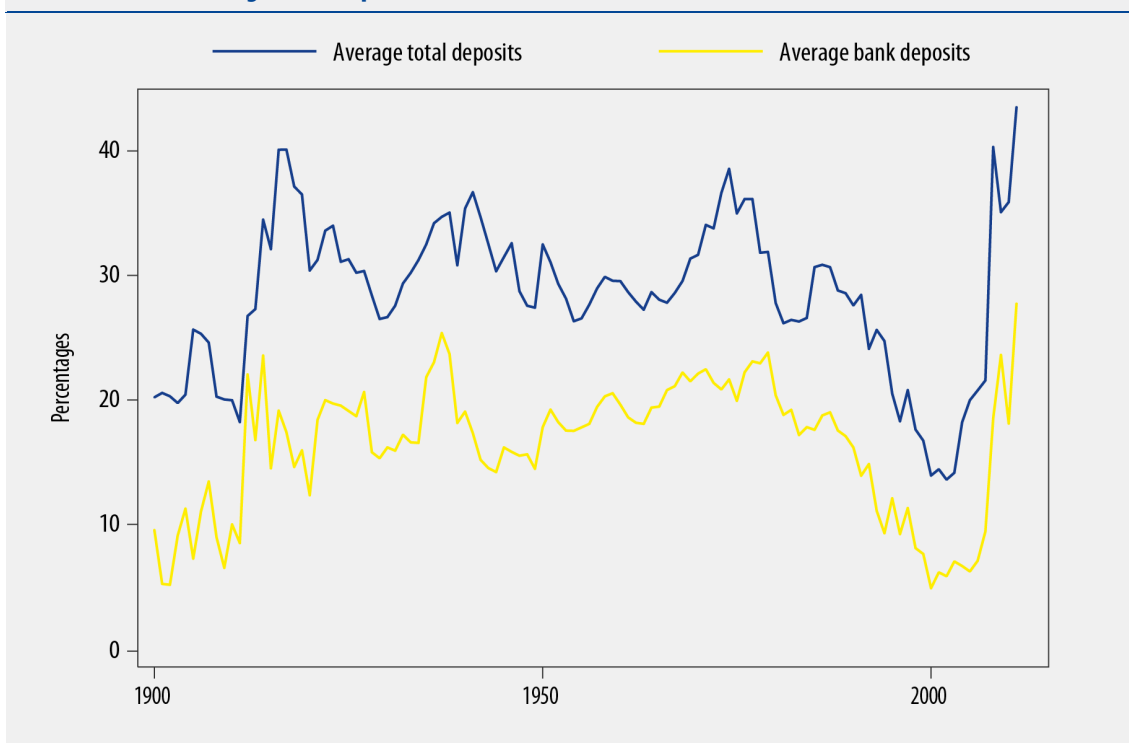
Figure 4 – Government debt holdings as share of total balance sheet



3.1.3 Commercial bank reserves

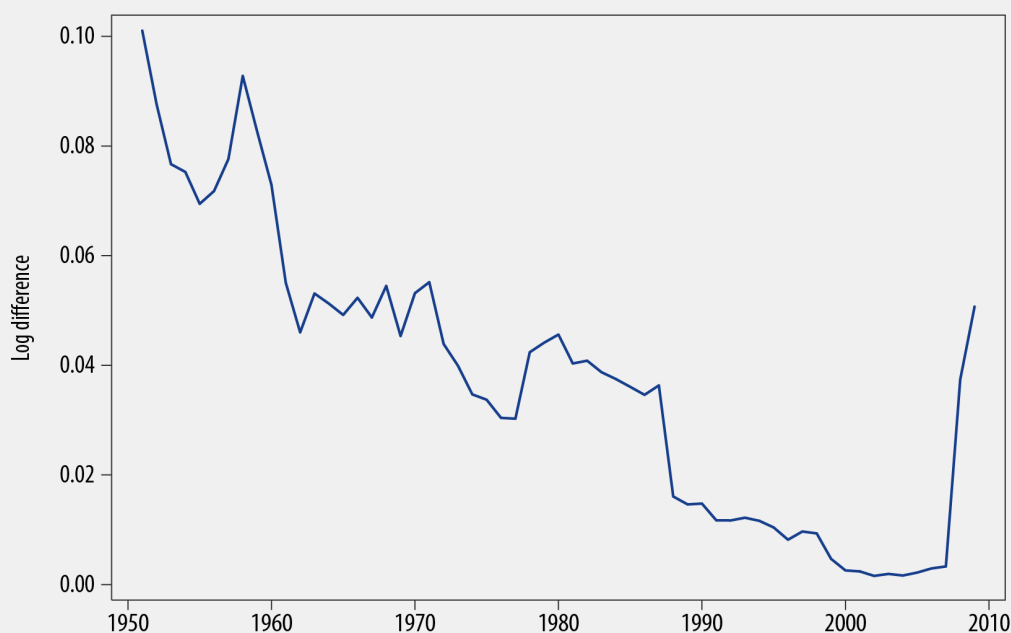
In Figure 5, we plot total deposits and bank deposits as a share of total central bank liabilities. The most striking observations are the gradual decline of deposits after 1980 and the sudden spike during the financial crisis. Especially large-scale asset purchases from 2009 onwards have increased the share of bank deposits in total central bank liabilities. Yet the long-run perspective delivers an additional important insight: despite the large expansion after the global financial crisis, the share of bank deposits in total liabilities is only now back to where it was in 1980, before the explosion of the size of the financial sector in the last three decades, documented recently by Philippon and Reshef (2013) as well as Schularick and Taylor (2012). From this angle, the growth of reserve liabilities of central banks' in the past few years can be thought of as a normalisation and a return to higher and potentially safer levels of bank deposits that prevailed before 1980.

Figure 5 – Deposits with central bank as share of total balance sheet



We continue this line of inquiry in Figure 6, which shows average commercial bank reserves held with central banks relative to total bank lending, i.e. relative to the size of the financial sector since 1950. Comparing the two figures, we observe the same patterns in recent decades: the volume of bank deposits declined rather markedly relative to reserves held and then spiked after the financial crisis back to levels last seen in the 1970s.

Figure 6 – Commercial bank reserves at central bank relative to total bank lending



3.2 Balance sheets, broad money and bank lending

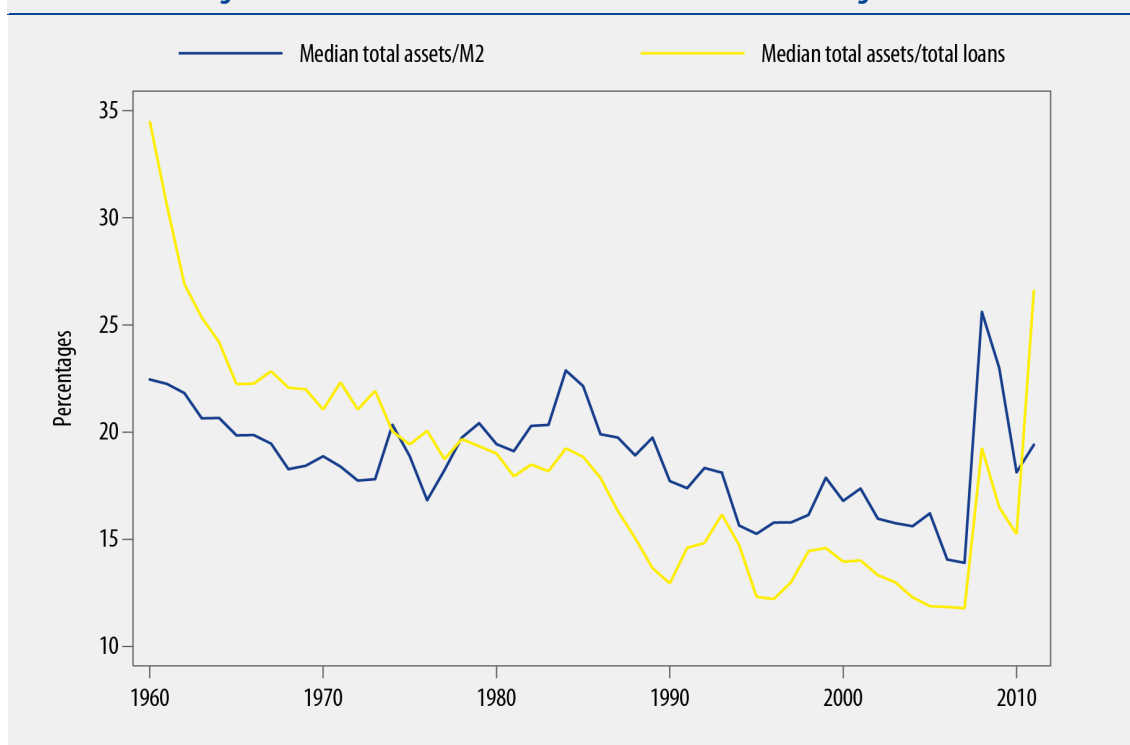
In this section, we take a closer look at the evolution of central bank balance sheets and the growth of the financial sector. Figure 7 plots the median balance sheet size across central banks relative to the money supply and relative to total loans. This casts balance sheet size relative to the size of the financial sector rather than the real economy.

The interesting historical insight here is that, scaled by the size of the financial sector, the recent expansion of central bank balance sheets appears more like a return to previous, potentially safer levels of the ratio of central bank money to financial sector assets. By contrast, what may need explanation is the shrinking size of central bank balance sheets relative to financial sector assets between 1980 and 2007.

This rapid increase in the size of the financial sector, a process sometimes dubbed "financialisation", has attracted considerable attention over the last years. It is reflected in the rising income share of finance (Philippon 2012; Greenwood and Scharfstein 2013; Philippon and Reshef 2013), the growth of the balance sheets of private financial intermediaries (Jordà, Schularick and Taylor 2013) and has been interpreted as an indicator of excessive risk taking (Admati and Hellwig 2013; Aikman, Haldane, and Nelson forthcoming).

Our data demonstrate that, relative to the rapid growth of finance, central bank balance sheets had become rather small by historical standards. The recent increase merely takes us back to the levels seen before the great wave of financial sector growth in the early 1980s. Some of the recent increase in the size of central bank balance sheets might well be permanent if, as seems likely, we do not see a return to the thin liquidity holdings of the pre-crisis years.

Figure 7 – Balance sheet assets relative to financial sector lending and M2



3.3 Balance sheets and inflation

The inflation risk stemming from central bank balance sheet expansion and potential monetisation of government debt figures prominently in today's public debate (see, for example, Reynard 2012). What can the macroeconomic history of the 20th century tell us about the link between central banks' balance sheets and inflation?

The approach taken here is inspired by Lucas's (1980) test of the quantity theory of money. Lucas filtered time series on money growth and inflation in order to remove short-run business cycle fluctuations and extract the underlying low frequency correlations between money and inflation. If the quantity theory of money holds, a change in the growth rate of money should induce an equal change in the rate of price inflation. In his original exercise, Lucas found evidence for such a correlation by looking at slow moving averages of money growth and inflation.

In recent work, Sargent and Surico (2012) have applied Lucas's method to US data spanning the whole 20th century, pointing to the instability of the relationship between money growth and inflation in recent decades. To be precise, the correlation between money growth and inflation breaks down after 1980. The authors explain this divergent result with the change in the monetary policy framework, in particular to the establishment of central bank independence and a credible commitment to keep inflation low.

In this section, we apply the same approach to study the relationship between changes in central bank balance sheets and inflation.³ Clearly, there are good reasons to assume that the association between central bank money and inflation is looser than the correlation between broader monetary aggregates and inflation. Yet to the degree that central bank actions affect monetary conditions and the money creation of commercial banks more broadly, such estimations could still be informative. We use a window of four years on either side to calculate the low frequency correlation between balance sheet changes and inflation. In the spirit of Sargent and Surico (2012) we first look at the 1950-1980 period, and then in greater detail at the 1980-2004 period. Note that we exclude the post-2008 crisis years so that the results are not distorted by the recent balance sheet operations.

Figure 8 shows the slow moving correlation between central bank balance sheet growth and inflation from 1950 to 1980. As many economists would expect, the correlation is positive in almost all countries. But it is also much closer in some countries than in others. Such differences potentially reflect differences in the inflation fighting credentials of the monetary authorities. If the public had no doubt that the central bank would respond strongly to emerging inflationary pressures and not allow persistent increases in money growth, we would expect the relationship between the two variables to have been weaker. It is striking that before 1980 only the Deutsche Bundesbank seems to have achieved such credibility. After 1980, however, the correlations break down in many countries, confirming the findings obtained by Sargent and Surico (2012) for broader monetary aggregates.

Even before the 2008 crisis, then, the relationship between balance sheet size and inflation was loose at best in many countries. A potential explanation for weakening correlations could be that central banks in advanced economies had indeed made considerable credibility gains in recent decades, anchoring the inflation expectations of the public. An important implication may be that there is little to fear from recent balance sheet expansions *as long as the underlying commitment to react to incipient inflationary pressures is not called into question*. At the very least, the data confirm that central banks enjoy considerable short-term flexibility to manage their balance sheets without automatically triggering inflation.

³ Lucas (1980) proposes smoothing the log-differenced time series of money and price level using the following filter: $x(\beta)_t = \alpha \sum_{k=-n}^n \beta^k x_{t+k}$, with $\alpha = (1-\beta)^2 / ((1-\beta)^2 - 2\beta + 1(1-\beta))$. We set $n=4$ and $\beta=0.95$. In practice, the results do not depend on the choice of the filter, as also noted by Sargent and Surico (2012).

Figure 8 – Central bank balance sheet growth and inflation, 1950-1980

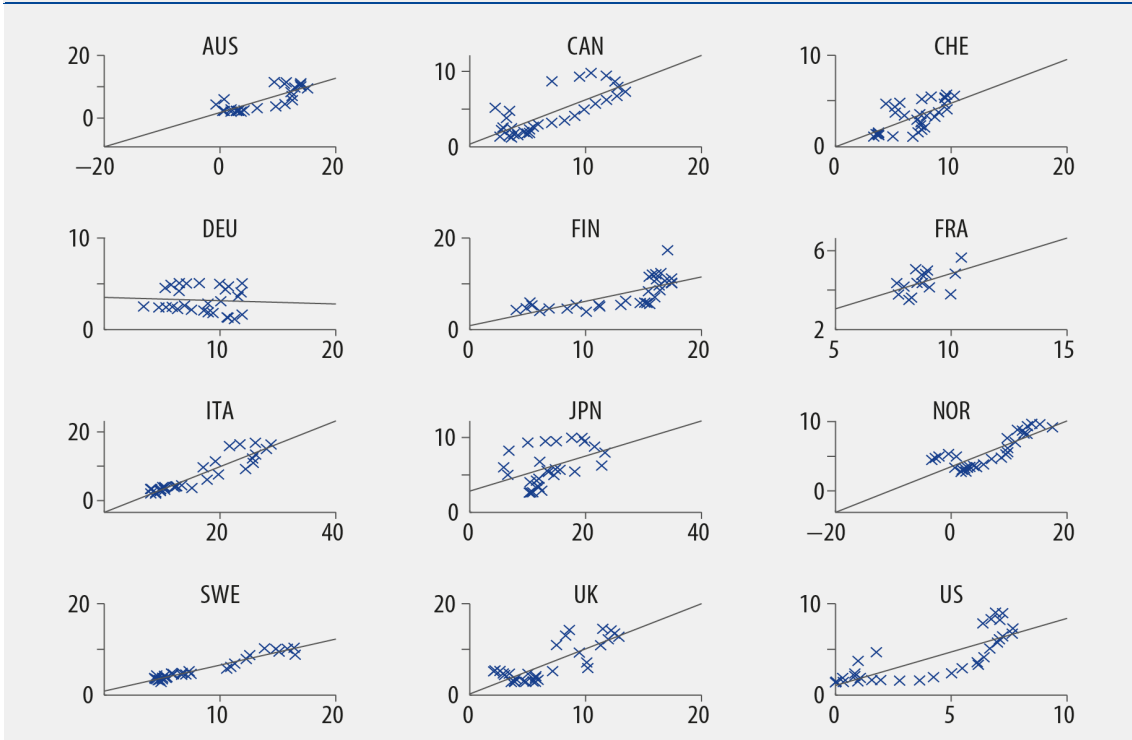
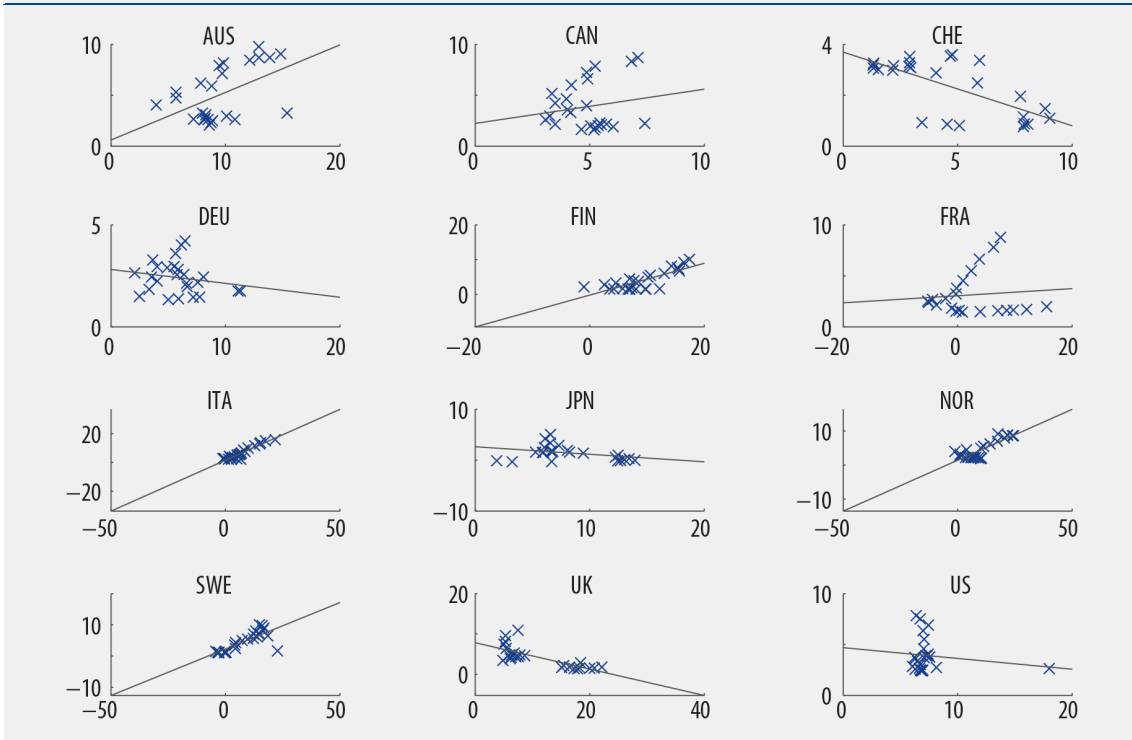


Figure 9 – Central bank balance sheet growth and inflation: 1980-2004



4 Large balance sheet expansions and reductions in the 20th century

In this section, we identify the largest central bank balance sheet expansions and contractions during the 20th century. We identify a total of 23 expansions and 17 contractions across 12 central banks since 1900. Table 3 lists these events. The variable on which we focus is total assets relative to GDP, and we define events as large changes in this ratio. We employed a straightforward identification technique, following two simple steps:

- 5 As a first step, we coded any country-year as a major balance sheet expansion or contraction year if balance sheet size relative to GDP expanded or contracted by more than 10 percentage points, relative to any previous year in a five-year window.⁴
- 6 Once an event was identified as expansion or contraction, we determined start and end dates based on historical sources. Wherever warranted, we increased the time window to include episodes that we deemed important based on our reading of the historical sources, but which were not picked up by this arguably crude algorithm. Our only such addition was the Federal Reserve's balance sheet reduction between 1947 and 1966. While this contraction exceeded the threshold of 10%, it took somewhat longer to be completed.

Table 3 provides information about the episodes' magnitude and length. "Amplitude" reports the cumulative change in balance sheet size relative to GDP, and "duration" the number of years between an episode's start and end dates.

We plot the incidence of large balance sheet expansions and contractions in Figure 10. Consistent with our discussion in the previous section, the graph identifies a few large clusters in the incidence of expansions and contractions: the expansion-contraction cycles during the World Wars, the Great Depression, and the recent financial crisis. In World War I, the central banks of Finland, France and Italy experienced large balance sheet expansions and subsequent contractions. These reductions lasted into the 1920s. Two central banks recorded significant expansions during the Great Depression: those of Switzerland and France. Both countries were among the last to abandon the gold standard in the late 1930s, and their central banks were on the receiving end of global capital flows in the first years of the Great Depression.

Every central bank for which we have data on balance sheet size relative to GDP in the 1940s recorded a major expansion during World War II, with a few exceptions. World War II was followed by a protracted period of balance sheet reduction. In some countries, this episode lasted until the late 1960s. Six central banks in total experienced large balance sheet contractions during those years. Six of the 17 largest balance sheet reduction episodes we identify since 1900 occurred immediately following World War II. Three episodes lasted ten or more years, with the Federal Reserve System experiencing the longest contraction in our sample. The Banca d'Italia, the Bank of Finland, and the Banque de France managed to unwind their positions relatively quickly, taking three, four and five years, respectively.

The most recent balance sheet expansions during the global financial crisis exceed in both magnitude and incidence all previous expansion episodes except those of World War II. Reporting data for the ESCB

⁴ The results generated by a cut-off of 10 percentage points correspond closely to what we would have identified as large balance sheet expansions or contractions from a purely historical perspective.

instead of individual euro area central banks after 1999, we find that six out of nine central banks in our sample significantly increased their balance sheet positions. The year 2008 alone thus witnessed over a quarter of all the largest expansion episodes since 1900. The exceptions were the central banks of Australia, Canada and Norway.⁵

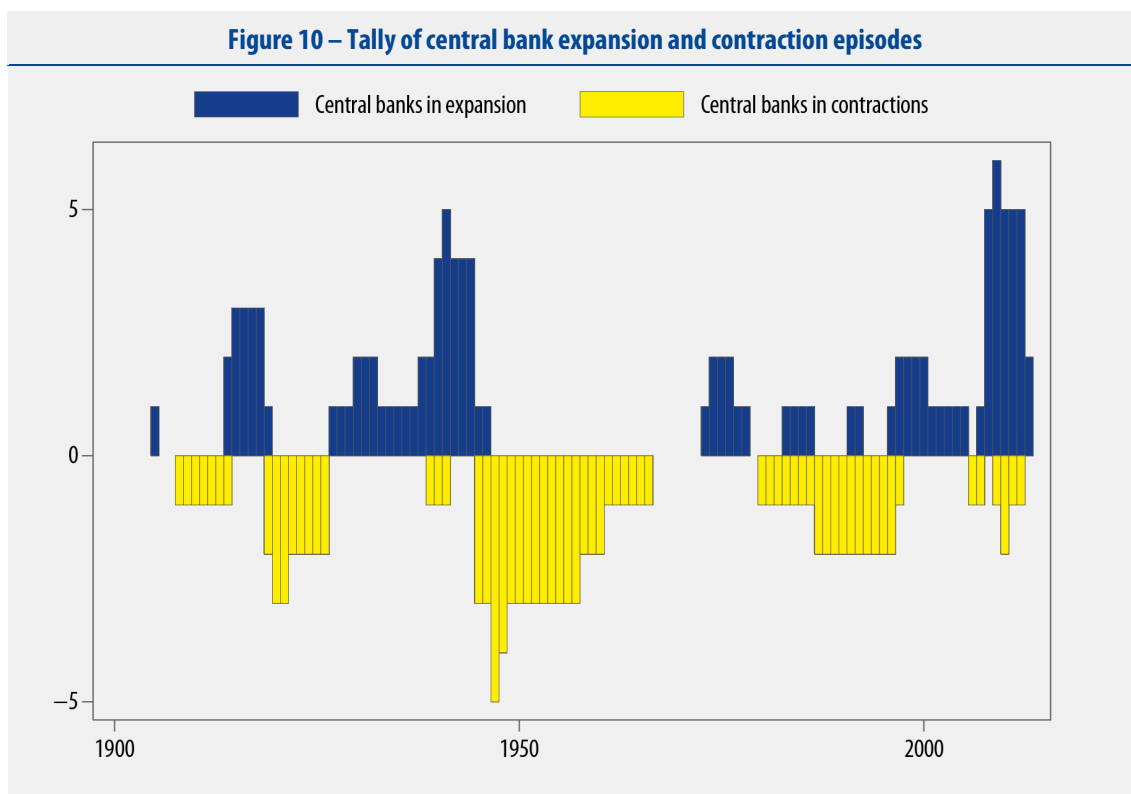
Table 3 – Major expansion and contraction episodes

Expansions	Amplitude	Duration	Contractions	Amplitude	Duration
CHE 1930	31.71	9	AUS 1951	-22.63	10
CHE 1996	11.36	5	CHE 1939	-11.24	3
CHE 2008	60.91	5	FIN 1919	-19.01	3
ESCB 2007	17.90	6	FIN 1945	-18.77	4
FIN 1915	16.60	4	FRA 1919	-17.92	8
FIN 1938	10.55	4	FRA 1945	-44.88	5
FRA 1914	23.55	5	FRA 1980	-18.65	17
FRA 1927	19.55	6	ITA 1920	-14.80	7
FRA 1940	75.43	5	ITA 1945	-24.18	3
FRA 1973	16.54	6	JPN 1908	-12.51	7
ITA 1914	14.62	6	JPN 2006	-11.60	2
ITA 1941	16.96	4	NOR 1947	-65.50	11
ITA 1974	10.57	3	NOR 1987	-18.23	6
JPN 1905	13.49	1	NOR 2009	-10.64	4
JPN 1939	20.45	6	SWE 1993	-14.08	5
JPN 1997	20.16	9	SWE 2010	-13.01	1
JPN 2009	14.00	5	USA 1947	-13.22	20
NOR 1940	75.40	7			
NOR 1983	23.39	4			
SWE 1991	11.80	2			
SWE 2008	16.04	2			
GBR 2008	22.97	5			
USA 2008	14.36	6			

Figure 10 points to a second, more moderate episode of balance sheet contractions in the 1980s and 1990s. However, we do not apply the label “cluster” here as not all of these episodes were related. Some central banks, especially those of France and Switzerland, had run up sizable balance sheet positions during the tumultuous 1970s and began reducing these after the second oil crisis. The Banque de France shrank its balance sheet by almost 19 percentage points relative to GDP over 17 years. In addition, Sweden and Norway underwent expansion-contraction cycles in the late 1980s and early 1990s during the Scandinavian and ERM crises. Together with Finland, these countries experienced both banking and currency crises during this period.

⁵ For Norway, we report total financial assets after 1996 and exclude the Norges Bank’s investment position in Norway’s Petroleum Fund.

Balance sheet reductions have varied in duration. Japan and Sweden achieved the shortest balance sheet reductions in 2006 and 2010, respectively. In both cases, the central bank let large amounts of short-maturity assets roll off, without changing the composition of longer-term assets significantly. However, most central bank balance sheet reductions have historically been prolonged affairs. Many of the longest balance sheet reductions followed the World Wars, with the post-World War II contraction cluster featuring the longest and deepest episodes. Of all episodes in our sample, the government debt finance expansions of World War II have taken by far the longest to unwind.



One can distinguish between four types of central bank balance sheet expansion. In our view, the terms “conventional” and “unconventional” are not very useful if we are to understand the implications and likely consequences of large-scale balance sheet expansions. Such terms are unhistorical, as the conventions they imply are of relatively recent origin and certainly did not apply to central banking in the 1940s and 1950s. We argue that the composition of the central bank’s balance sheet matters a great deal when considering potential normalisation strategies. We also argue that this composition can quite often be traced back to the *policy intent* of the balance sheet operation, a metric that is more easily gauged by the historian. In economic terms some of the major expansions represent clear money supply shocks driven by war finance. Other episodes, especially those taking place in times of financial crisis, can be described as expansions that accommodate major money demand shocks.⁶

⁶ We are indebted to Paul Tucker for pointing this out.

We classify expansion episodes by the underlying motivation, or intent, of balance sheet policy. We identify four distinct categories:

- 7 Foreign exchange and balance of payments (FX): This category describes all balance sheet operations carried out with the explicit goal of supporting the exchange rate regime. During the 1930s, for example, central banks adhering to the gold standard experienced fluctuations in the size of their balance sheets due to balance of payments dynamics. Under a fixed rate regime or peg, the balance sheet is subordinate to balance of payments dynamics.
- 8 Government financing (GF): Episodes during which the central bank had the explicit intention of financing government expenditure fall into this category. Such balance sheet operations represent a shift in monetary regime, whereby the fiscal authority becomes the dominant one. During much of the period covered by our dataset, the idea of central bank independence was far from dominant amongst either economic theorists or central bankers. Especially during the World Wars, most central banks were dominated by the fiscal authority and supported their governments' war expenditures. This should not surprise us, given that so many modern central banks – notably the Bank of England – were established precisely to perform this function.
- 9 Lender of last resort and market functioning (LLR): For the purpose of our analysis, we combine lender of last resort policy with balance sheet operations aimed at restoring credit intermediation and market functioning. The former type of central bank policy aims to provide liquidity and support a single firm or set of counterparties, usually financial institutions. The latter type is targeted at entire market segments, rather than individual market participants. Lender of last resort activity may be considered a subset of the set of policies aimed at restoring market functioning in a broader sense, as the latter can also include outright purchases of securities and other assets. To simplify nomenclature, we subsequently refer to this third category simply as LLR policy.
- 10 Demand stabilisation (DS): We group large-scale balance sheet operations in which the central bank engages in outright asset purchases with the specific aim of stimulating aggregate demand in this final category. The distinction between DS and LLR measures is twofold. Demand stabilisation policies directly aim at reducing yields and borrowing rates in certain market segments, beyond merely restoring their functioning. Secondly, they have often involved outright purchases of longer-term assets, whereas LLR policy has tended to emphasise shorter-term liquidity provision (see International Monetary Fund 2013).

This classification resonates roughly with the distinction between credit easing and quantitative easing stressed by the Federal Reserve to differentiate its first round of large-scale asset purchases from Japan's policy programme after 2001. It contrasts slightly with classifications proposed elsewhere in the literature.⁷

Table 4 again lists large expansion episodes, this time classifying each by type. We focus on what we perceive as the *primary* policy intent behind episodes. In cases where balance sheet policy really did fit more than one type, we assign them to multiple categories. We note that the policy intent behind a balance sheet expansion sometimes changed over time. As most balance sheet reductions have

⁷ For example, Borio and Disyatat (2009).

historically followed immediately after expansions, it will subsequently prove helpful to think about them in terms of what caused the initial increase in the balance sheet size.

During most of our sample period, central banks operated under pegged or fixed exchange rate regimes. Most of the balance sheet size fluctuations during this period were driven by balance of payments dynamics, whereby the central bank bought and sold either gold or foreign assets to maintain a desired exchange rate. Especially during the early part of the Great Depression, balance sheet size fluctuations were primarily due to policy motivated by the gold standard regime. As already noted, Switzerland and France both stayed on the gold standard until the late 1930s and accumulated vast gold reserves during that time.

Government debt finance episodes are exclusively associated with large wars in our sample. The Russo-Japanese War of 1904-05 prompted an expansion-contraction episode at the Bank of Japan. And, as we have already pointed out in our discussion of aggregate trends, both World Wars witnessed a widespread expansion of central bank balance sheets. We identify the subsequent balance sheet contractions uniformly as government finance episodes. All central banks in our sample whose balance sheets remained functional during the war began shedding government debt in the late 1940s, in a gradual and prolonged process that lasted until the late 1960s. Since then, there has been no major episode of government debt finance in our sample.

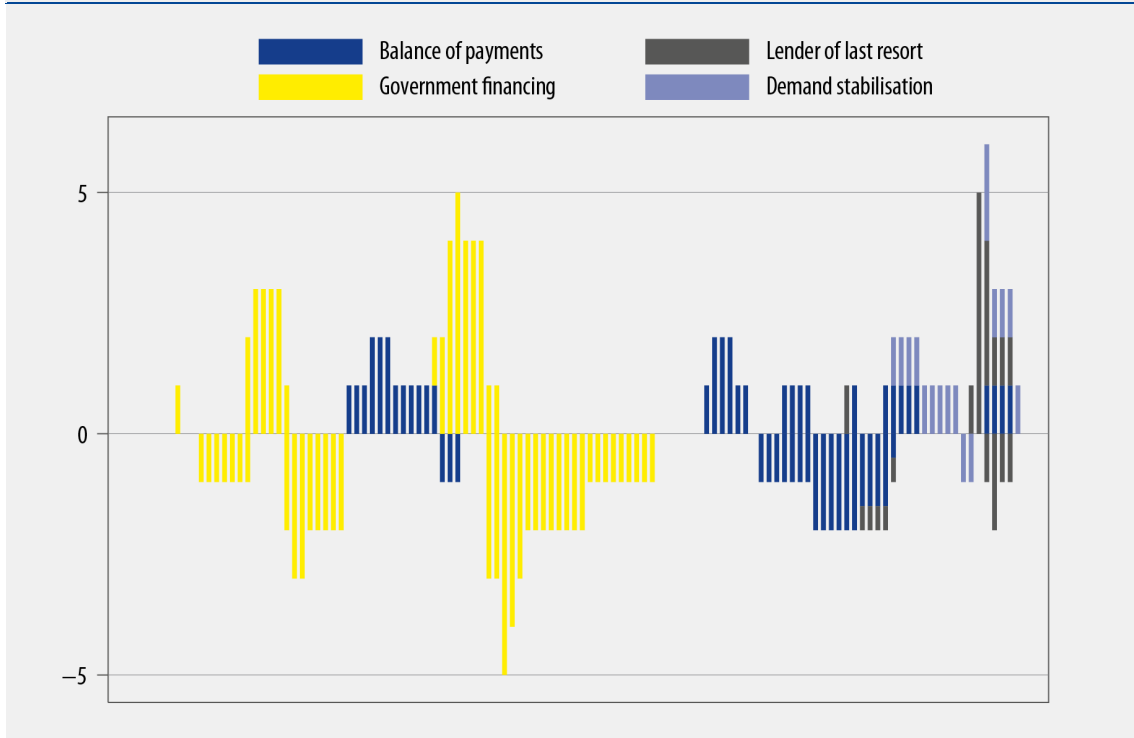
Table 4 – Type of balance sheet expansion

Expansions	FX	GF	LLR	DS
CHE 1930	X			
CHE 1996	X			
CHE 2008	X		X	
ESCB 2007			X	
FIN 1915		X		
FIN 1938		X		
FRA 1914		X		
FRA 1927	X			
FRA 1940		X		
FRA 1973	X*			
ITA 1914		X		
ITA 1941		X		
ITA 1974	X*			
JPN 1905		X		
JPN 1939		X		
JPN 1997				X
JPN 2009				X
NOR 1940		X		
NOR 1983	X			
SWE 1991	X		X	
SWE 2008			X	
UK 2008			X	X
US 2008			X	X

* Our historical research on these episodes is ongoing and classifications are provisional.

Foreign exchange and government finance episodes have occurred less frequently since 1970. For one thing, most countries in our sample adopted floating exchange rates during this period. For another, central banks in general were affected by the gradual intellectual paradigm shift towards both central bank independence and inflation targeting. An additional point is that, after Vietnam, the wars fought by the countries in our sample were significantly smaller in their scale and relative cost.

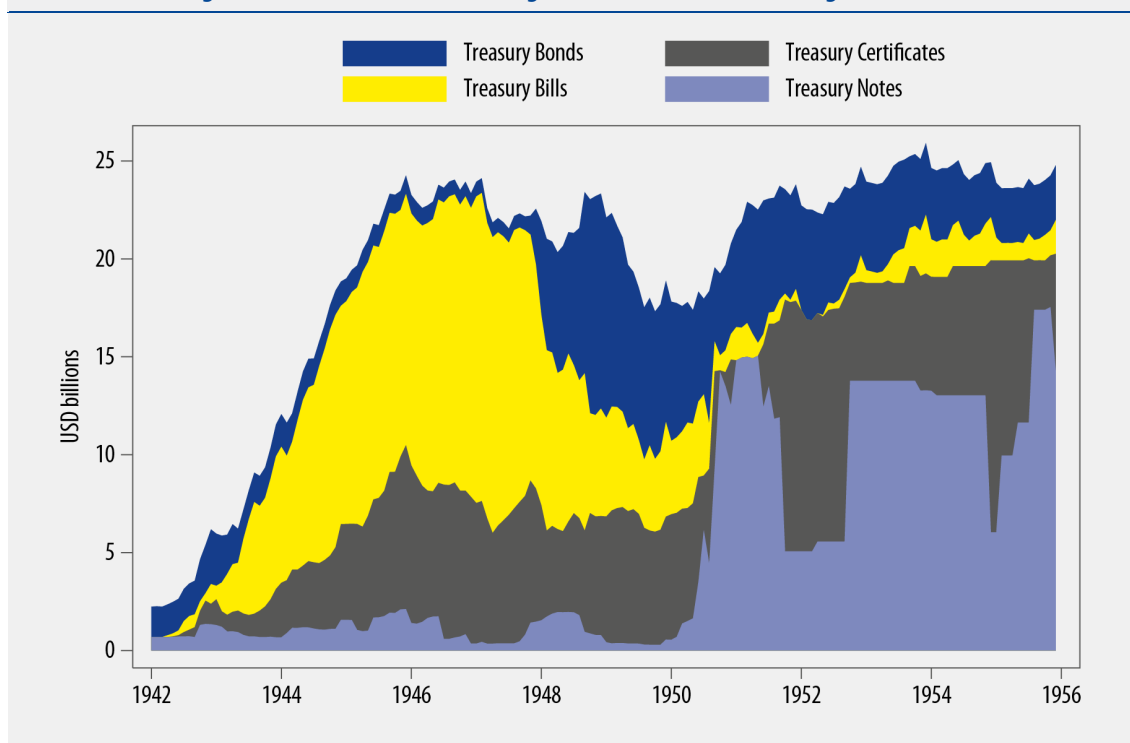
Figure 11: Expansions and contractions by type



5 The Federal Reserve after World War II

As a result of World War II, the Federal Reserve System's balance sheet grew enormously: in nominal terms by a factor of 2.4 between 1939 and 1945 or 3.4 between 1938 and 1948. As Figure 12 makes clear, the increase was due largely to purchases of government securities – mainly Treasury Bills, which generally had 90-day maturities, and Treasury Certificates, which had maturities of up to a year.

Figure 12 – The Federal Reserve’s government securities holdings, 1942-1956



What were the drivers of balance sheet expansion? The main answer is the policy of fixing interest rates. Unlike the Bank of England, the Federal Reserve System targeted long as well as short-term interest rates. Indeed, it began intervention in the market for Treasuries as early as September 1939 (Friedman and Schwartz 1963, p. 552). From April 1942 there was an explicit target for Treasury bills of three eighths of 1%. Implicit targets were also observed for longer maturities. For long-term bonds the tacit ceiling was 2.5% (ibid., p. 563). The rationale was to avoid “disorderly conditions” in the government bond market (Mueller 1952). In effect, the Federal Reserve in wartime became “the bond-selling window of the Treasury” (Friedman and Schwartz 1963, p. 561), though it was also the bill-buying window – fixing rates meant selling or buying securities in whatever amounts the public wished to buy or sell at those rates. The rates were carried over from the late 1930s and reflected the high liquidity preferences of the post-depression period; in wartime, with the Federal Reserve standing ready to buy or sell, the private sector preferred the higher yields on bonds to both bills and excess reserves. As a result the Federal Reserve ended up with hardly any long-term securities on its balance sheet. Such was public demand that, after 1943, yields fell some way below 2.5%. A direct consequence of policy was a substantial increase of the money supply (the terminology is misleading, since the fixed rate policy converted all securities into the equivalent of money); in turn, the Federal Reserve “had no effective control over the quantity of high-powered money” (ibid., p. 566), i.e. the size of its own balance sheet.

Why was balance sheet expansion associated with lower inflation than in World War I (the consumer price index rose by just 2.3% in 1945; inflation in 1918 had been an order of magnitude higher)? Various measures were taken to combat inflation. First, the Federal Reserve was empowered to impose controls on consumer credit. Second, reserve requirements were raised. At the same time, the federal government imposed price and wage controls between early 1942 and mid-1946 (these were briefly restored at the beginning of the Korean War). Of greater importance, however, was the fact that velocity declined sharply

during the war (Friedman and Schwartz 1963, p. 558, p. 569). There was a “greater increase in willingness to save”, which translated into very successful bond (War Loan) sales, culminating in the December 1945 Victory Loan (ibid., p. 571).

With the cessation of hostilities, however, the Federal Reserve was fearful of a surge of inflation – a fear augmented by large-scale inflows of gold and the termination of consumer credit controls (in November 1947, though they were temporarily restored between August 1948 and June 1949). Yet monetary policy did not change in any meaningful way: the Treasury Bill and certificate rates remained unchanged. (Changes in discount rates, increases in reserve requirements and a temporary increase in margin requirements on security purchases made little difference.) Not until July 1947, with wholesale prices surging, was the pegged rate on Treasury Bills scrapped; the rate on certificates was also unpegged the following month (Friedman and Schwartz 1963, p. 578f.). Yet when bond yields rose to 2.37% in November, the Federal Reserve joined the Treasury in a support action, buying USD 2 billion in bonds. Yields were allowed to rise to 2.45% in December, but from then until the end of 1948 they were again capped, with the Federal Reserve buying USD 3 billion in early 1948 (ibid., p. 579). These purchases were offset, it should be noted, by sales of short-term securities, so that the total Federal Reserve balance sheet grew more slowly in 1947 and 1948. It actually shrank in 1949, when the Federal Reserve went so far as to sell USD 3 billion of government bonds to counteract a temporary surge in bond prices. The official line remained that “disorderly conditions in the market for Government securities” were at all costs to be avoided (ibid., p. 621).

It is easy to forget that there was a time when such a policy was looked upon favourably by many economists. In a lecture delivered at Oxford in 1948, R.S. Sayers admirably compared the Federal Reserve’s post-war performance with the somewhat sorer efforts of the Bank of England:

In the United States the Federal Reserve System has exercised a more direct and much more successful control over long-term interest rates than has the Bank of England. ... The Federal Reserve System has stabilized a whole “pattern of rates”, short-, medium- and long-term, by standing ready to enter any section of the market in protection of fixed rates.

But Sayers aspired to more than “stable bond-market policy”. In his view, the central bank “should [also] use financial controls to check ... unhealthy developments in ... particular directions”. He looked admirably at American regulation of trading margins and consumer credit:

Economic planning in a truly democratic society means pressing into service every conceivable device – persuading, cajoling, inciting people, edging the economy now a little in this direction, now a shade in that. If central banks are to play their full part in this process, our central bankers must not be content to stick to the traditional technique. (Sayers 1957, p. 25, p. 30, p. 34).

In the words of Friedman and Schwartz, the experience of the Great Depression, the triumph of the Keynesian “revolution” in the academy, and the apparent success of wartime controls had persuaded many people like Sayers that “the stock of money adapted itself passively to economic changes” (Friedman and Schwartz 1963, p. 626). A more recent interpretation is that the Federal Reserve, scarred by the memory of the early 1930s, sincerely feared what falling bond prices would do to US banks (Eichengreen and Garber 1990). A third view is that the interest rate pegs were “a rough substitute for a commitment to return to a gold standard” (Hutchinson and Toma 1991).

What ended the period of bond yield targeting? There was no excessive growth in the balance sheet between 1946 and 1951, nor in the money supply (Lucia, 1975). On the other hand, inflation reached a peak above 20% in early 1947. According to Friedman and Schwartz, expectations changed. Prior to 1948, people had tended to assume that, as after World War I and as in the Great Depression, there would be a period of painful deflation (Friedman and Schwartz 1963, p. 585). "A changed pattern of anticipations" (ibid., p. 598) led to a rapid rise in velocity and, with it, an upsurge in prices. In particular, the Korean War "drastically altered public expectations about the near-term future and unleashed a speculative boom" (ibid., p. 610, p. 623; see also p. 674). Further alterations in expectations occurred when the 1953-54 recession proved "mild and brief" (ibid., p. 674; see also Meltzer 2010, p. 119).

It was fear of the inflationary consequences of continued pegging of the long-term yield that led to the breakdown of the wartime relationship between the Treasury and the Federal Reserve, which was no longer prepared to play the role of mere "window". The Federal Reserve dreaded having to monetise an avalanche of bond sales from non-bank entities, such as insurance companies. Another way of seeing this is as the collapse of a target zone which it was no longer necessary to maintain once the risks to banks of bond price normalisation had sufficiently diminished (Eichengreen and Garber 1990).

Hostilities between the Federal Reserve and the Treasury threatened to break out in August 1950, when the Board of Governors announced an open market policy designed to permit some rise in yields, though in the end the Federal Reserve bought most of the Fall 1950 refunding at a yield of 1.25% (Friedman and Schwartz 1963, p. 610). The Federal Reserve continued to support the Treasury's refunding operations, purchasing a substantial part of the five-year 1.75% note offered in exchange for maturing securities at the end of 1950, but its patience was wearing thin (ibid., p. 623).

As documented by Hetzel and Leach (2001), the struggle between the Federal Reserve and the Treasury in early 1951 posed a grave threat to the Federal Reserve's independence precisely because the White House sided so strongly with Treasury Secretary Snyder and because the outbreak of the Korean War seemed to justify a resumption of wartime methods. President Truman had a "mole" on the Federal Open Market Committee (FOMC), Governor James K. ("Jake") Vardaman, a friend from his Missouri days, who repeatedly leaked that body's deliberations to the White House and the press. The President himself directly warned the Chairman of the Board of Governors, Thomas B. McCabe: "I hope the Board will ... not allow the bottom to drop from under our securities. If that happens that is exactly what Mr. Stalin wants". On January 31, 1951, the President summoned the entire FOMC to the White House to tell them: "[W]e must combat Communist influence on many fronts. ... [I]f the people lose confidence in government securities all we hope to gain from our military mobilisation, and war if need be, might be jeopardised". The statements subsequently issued by the White House and the Treasury so grossly misrepresented the FOMC's position that Governor Marriner S. Eccles contradicted them in phone calls to journalists and then leaked the FOMC's own memorandum of the meeting with Truman.

Truman's fear that the Korean War might escalate into a Third World War was not without foundation. It was only by firing his commander in the field, MacArthur, that he could rule out the use of atomic bombs against China. Nevertheless, regardless of Armageddon, a majority of FOMC members believed that maintaining the cap on bond yields would have disastrous inflationary consequences because the public would respond to the prospect of another war by unloading their bonds on the Federal Reserve. In the words of Governor Eccles, it was the Federal Reserve that was making it "possible for the public to convert Government securities into money to expand the money supply. ... We are almost solely responsible for

this inflation ... and this committee is the only agency in existence that can curb and stop the growth of money”.

The published language of the final Treasury-Federal Reserve Accord, hammered out at the end of February, was deceptively simple: “The Treasury and the Federal Reserve system have reached full accord with respect to debt-management and monetary policies to be pursued in furthering their common purpose to assure the successful financing of the Government’s requirements and, at the same time, to minimise monetisation of the public debt”. What exactly did this mean? To some contemporaries, the Federal Reserve had won a “battle for survival ... with the forces of the government” (Burgess 1954). Others believed the real winner was Congress (Haywood 1959). In reality, the final outcome was more a draw than a clear victory for anyone. Chairman McCabe was forced to resign; the man who replaced him was William McChesney Martin, Jr., the Assistant Secretary of the Treasury. Under the Accord’s unpublished terms, to be sure, the Federal Reserve was relieved of its obligation to peg bond yields at 2.5%. But it supported the March-April 1951 conversion of 2.5% bonds into 2.75% bonds and did not explicitly renounce bond price support for another two years (Friedman and Schwartz 1963, p. 613, p. 625), with the explicit adoption of the “bills only” doctrine. (There remained a statutory cap, dating back to 1918, of 4.25% on the yield at issue of bonds with a maturity of more than five years, though market rates did not approach that level until 1959.) The discount rate was to be fixed until the end of 1951. Moreover, the Federal Reserve was still willing to intervene to support Treasury financings in July and September 1953, November 1955 and July 1958 (Haywood 1959). “How high”, asked the economist Charles Haywood, “can the cost of servicing the Federal debt be pushed without impairing [the Federal Reserve’s] political viability?”.

As Federal Reserve Chairman, Martin believed not in independence as central bankers today define it, but in independence “within the government” (Meltzer 2010). The Federal Reserve retained responsibility for preventing new Treasury issues from failing. As Martin put it in 1950: “I do not believe it is consistent to have an agent so independent that it can undertake, if it chooses, to defeat the financing of a large deficit, which is a policy of the Congress”. When the Federal Reserve bought bonds in July 1958 it was to counter a spike in yields occasioned by a crisis in the Middle East, which had led to the sending of US troops to Lebanon. As Martin observed in this connection: “The [FOM] Committee was dealing with the most difficult problem in political science in the whole world”. (Meltzer 2010, p. 49)

So what exactly was Federal Reserve policy after the Accord? This is not an easy question to answer, not least because the new Chairman had a strong aversion to economic theory. According to Friedman and Schwartz, under Martin the Federal Reserve began paying attention to changes in the stock of money, though without explicitly targeting any growth rate. Recent research does not support this view. Insofar as there was a policy in the 1950s it was to target “free reserves” (excess reserves minus member bank borrowing), though there was seldom agreement on the FOMC about the target range. Martin preferred qualitative to quantifiable targets. He frequently spoke of “leaning against the wind” counter-cyclically, blithely ignoring the lags between actual turns in the business cycle and statistical evidence of them and often misinterpreting movements in market rates. It is conceivable that he did this deliberately, in the belief that to offer any kind of precise target would be to encourage the Federal Reserve’s populist scourges in Congress to press for that target to be lowered (Meltzer 2010: p. 207n., p. 253).

Targeting free reserves meant, in practice, an eclectic mix of policies aimed at fine-tuning the money market. Having been raised in 1948 and lowered in 1949, reserve requirements were raised in 1951, then

lowered in 1953, 1954, 1958, 1958 and 1960 (Friedman and Schwartz 1963: p. 602; Meltzer 2010). These changes were nearly always accompanied by offsetting changes in Federal Reserve credit outstanding (Friedman and Schwartz 1963: p. 604). i.e., purchases of Treasury Bills. The difference was that open market operations were not announced, whereas changes in reserve requirements were. The same was true of changes to the discount rate, the other policy lever frequently in use. Typical was Martin's performance in the summer of 1953, when he first talked in terms of tightening, and then reversed course when market rates rose further than he had anticipated (Friedman and Schwartz 1963, p. 613f.). Another favourite Martin phrase was the "even keel", which meant avoiding changes in free reserves for the two weeks surrounding Treasury debt operations (Meltzer 2010, p. 121).

The net result of policy was, by the standards of subsequent decades, by no means bad. Not only was overall growth strong, despite two recessions (1953-54 and 1957-58); inflation was also low (perhaps even negative if the contemporary index had been adjusted for quality improvements) and there was nothing resembling a financial crisis. The Federal Reserve's balance sheet was more or less stable in nominal terms and, as we have seen, shrank gently relative to GDP. How far this was a matter of luck rather than design is a matter of ongoing debate (Meltzer 2010, p. 90n.). Given the deficiencies of contemporary theory, it is tempting to emphasise the role of luck. Though theoretically constrained by the exchange rate rules of Bretton Woods, the Federal Reserve was in the more or less unique position of being able to ignore gold flows in its monetary policy (Friedman and Schwartz 1963, p. 636; Meltzer 2010, p. 79, p. 191). Moreover, the fundamental passivity of Martin's view of fiscal policy did not matter in the 1950s, as the federal government was running very small deficits or even surpluses.

As one contemporary shrewdly observed:

Such short-run variations in the money supply as we have had were mainly pro-cyclical, a decline or a reduced rate of growth in the money supply occurring during recession and an accelerated growth during recovery. This raises some interesting questions, does it not? Does the Federal Reserve, in effect, laboriously contrive to bring about changes in credit conditions that, with a stable monetary system, would happen of their own accord? (Culbertson 1959)

This verdict of mild pro-cyclicity has been endorsed by the Federal Reserve's most recent historian (Meltzer 2010, p. 33). The more serious criticism, however, is that the policies of the 1950s sowed the seeds – if only the intellectual seeds – of the "Great Inflation" of the 1970s (Meltzer 2010, p. 53).

6 Some historical lessons

In this section, we bring together general observations and patterns that have emerged from our study of over a century of balance sheet data and ask to what extent they can provide historical guidance for what may lie ahead.

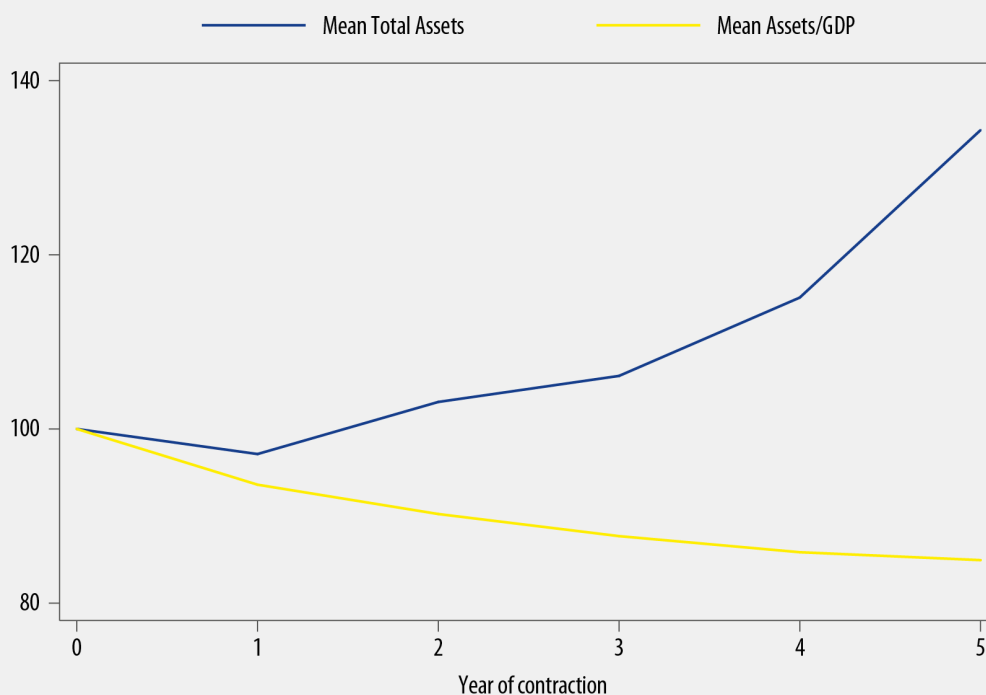
6.1 Nominal contractions are rare

The goal of this paper is to use history to contextualise recent balance sheet size expansions and to suggest some possible implications for policy normalisation in the years ahead. A natural question is therefore to ask is how central banks have historically achieved post-expansion balance sheet reductions.

A key finding is that only a few of the large balance sheet reductions in our sample were achieved by a nominal contraction in total assets. Instead, central banks generally normalised their balance sheet size over time as GDP grew simply by holding total assets stable for a while. Figure 13 plots averages across all contractions of both total assets and assets per GDP by year of contraction, where 1 denotes the first year of the contraction. On average, central banks held their balance sheet size relatively constant, and reductions were realised only in per-GDP terms. Figure 14 repeats this exercise for the reduction episodes after the World Wars only. In the aggregate, no contraction year exhibits a decline in nominal balance sheet size. These results are partly driven by the strong growth after World War II, which allowed central banks to achieve sizable reductions relative to GDP without shrinking their assets in nominal terms.

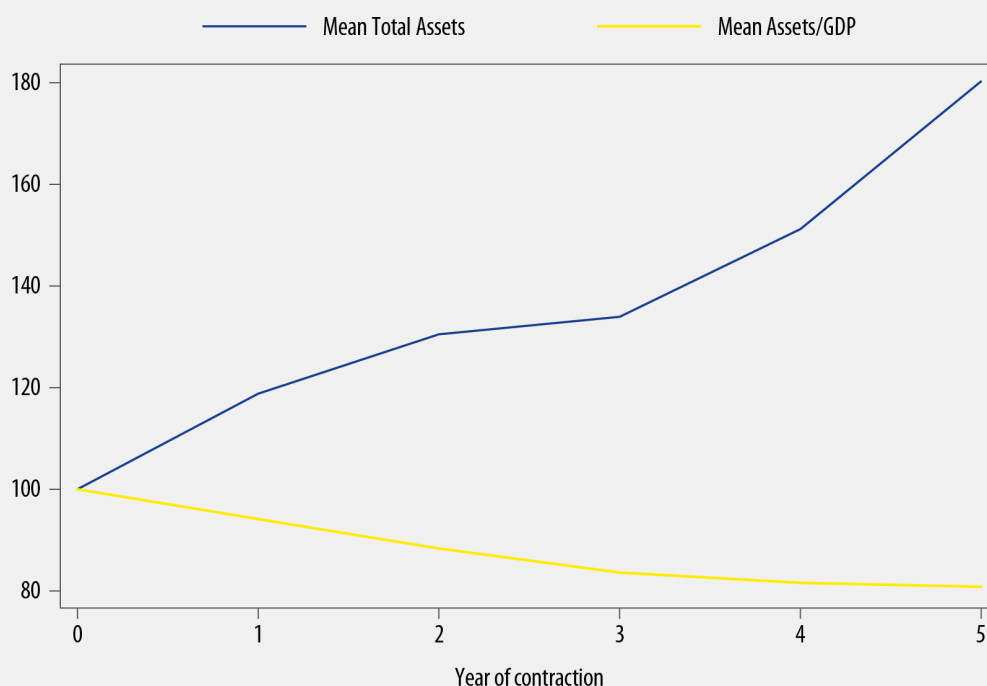
The exceptions to this overarching pattern are the reductions during the Nordic Crisis and after recent LLR policy measures, as well as the Bank of Japan’s unwinding of its asset purchase programme in 2006. The balance sheet policies adopted by the Norges Bank and Sveriges Riksbank in 1986 and 1992, respectively, were primarily in response to external exchange rate pressure. The Norges Bank sterilised its FX intervention first through government security purchases and then bank lending. During the subsequent contraction period, the Norges Bank retained its holdings of longer-term bonds and instead unwound its position in shorter-term Treasury Notes almost fully within a year. In the Swedish case, Sveriges Riksbank’s balance sheet size peaked in 1992 and declined in the next five years by over a third in nominal terms. By 1993 government security holdings accounted for over one third of the balance sheet. Sveriges Riksbank reduced this position by almost two thirds but did so gradually over a horizon of five years.

Figure 13 – Path of central bank balance sheet reductions



Note: The year before the contraction is used as the base year and has the value of 100.

Figure 14 – Path of central bank balance sheet reductions (after wars)



Note: The year before the contraction is used as the base year and has the value of 100.

Historically, then, most major central banks have realised balance sheet reductions only relative to GDP rather than nominally. The few exceptions we have considered above suggest that, in cases where nominal downsizing was achieved, the maturity composition of the balance sheet was crucial. Over short time horizons, nominal reductions have occurred, if at all, primarily in positions that had short maturity and could easily be rolled off.

6.2 Economic conditions during balance sheet contractions

In the following, we provide crude but (we believe) not inadmissible evidence on the economic conditions in which central banks have pursued large-scale balance sheet contractions. In particular, we consider event windows around the start dates of such contraction episodes. The graphs that follow show the evolution of key economic variables in five-year windows before and after the start of the balance sheet contraction episodes. For this event study, we use the contraction episodes defined above. We then plot the deviation of key macro variables in the five years on either side of the contraction episode (excluding war years). Figure 15 plots the evolution of GDP per capita growth from its long-run trend; Figures 16-18 then look at inflation, real bank lending and stock prices.

The first graph suggests that balance sheet reductions generally go hand in hand with slightly below trend growth around the beginning of the contraction and a small drag thereafter. While the mean estimate is negative for the first three years, the effects are not precisely estimated and the overall effect rather small. Nonetheless, there are some indications that large balance sheet reductions occur against the background

of slightly lower real growth. Obviously, these conditional correlations cannot be interpreted in a causal sense.

Turning to inflation in Figure 16, we get the mostly intuitive result that inflation is above trend before the beginning of the contraction episodes and then falls back to trend-like levels or below. (Put differently, we cannot issue warnings about the risk of either inflation or deflation based on this admittedly crude event study.) There are, however, reasons to be concerned about the behaviour of bank lending during contraction episodes. As Figure 17 demonstrates, balance sheet reduction episodes have historically been associated with prolonged retrenchment of bank lending relative to trend. We think the persistent and relatively precisely estimated slowdown of bank lending relative to country-specific trends during central bank balance sheet contractions provides some cause for concern.

Last but not least, the development of equity markets comes as no surprise. Equity market performance turns sour a year before the beginning of the balance sheet reduction and remains subpar for most of the following years relative to long-run trends. Central bank balance sheet contraction episodes seem to take their toll on equity market performance. Caution is obviously warranted when interpreting these historical facts. Yet we find some indications that historically balance sheet reduction episodes have gone hand in hand with lower growth rates, somewhat lower inflation rates and substantial slowdowns in financial sector lending activity.

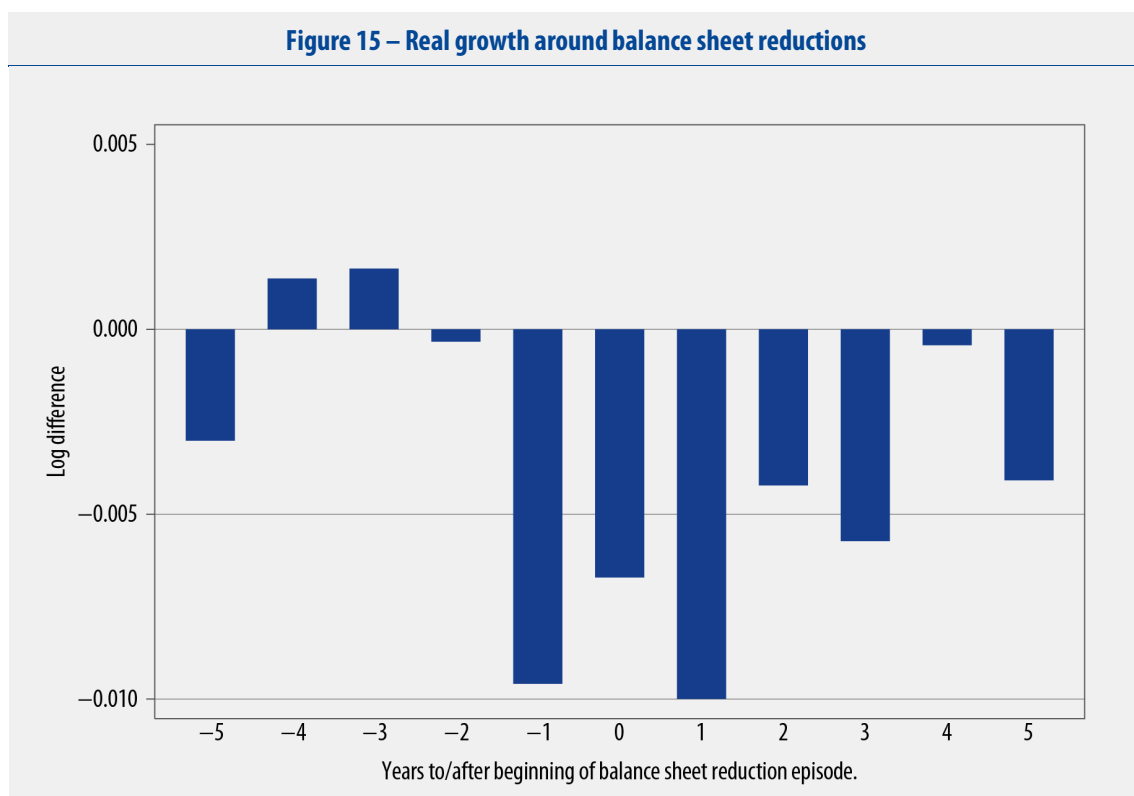


Figure 16: Inflation around balance sheet reductions

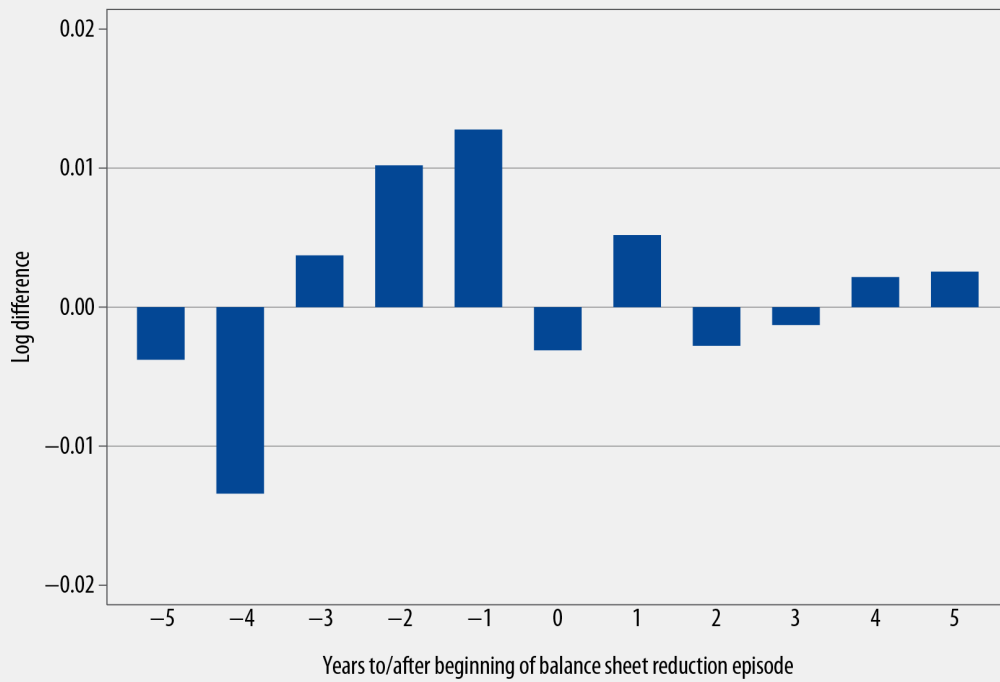


Figure 17 – Real bank credit growth around balance sheet reductions

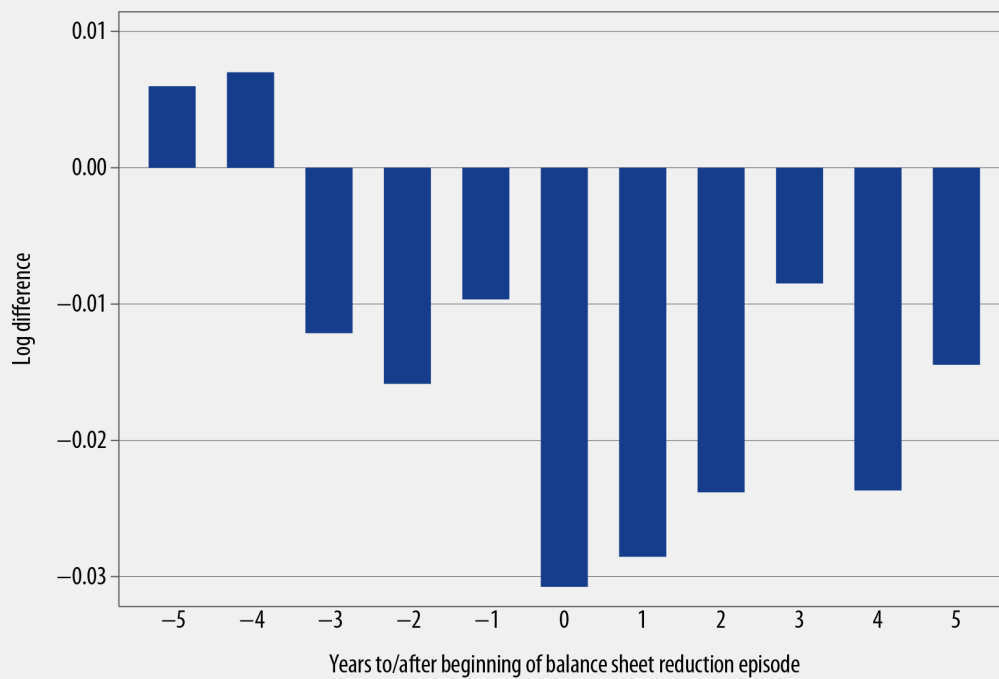
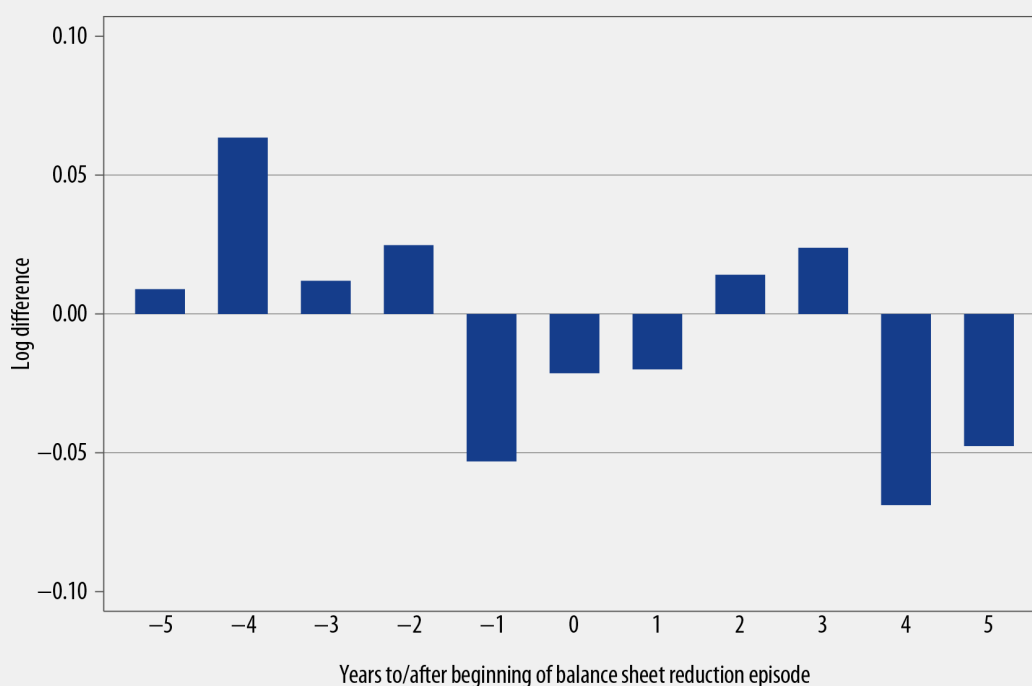


Figure 18 – Real equity price growth around balance sheet reductions



7 Where are we now? In search of historical guidance

In this concluding section, we ask how recent balance sheet size expansions compare historically with their predecessors. Recent work – e.g. Borio and Disyatat (2009) and D’Amico et al. (2012) – has already pointed out that, at least in the US case, the intent and instruments of post-2007 balance sheet policy have not been overly unconventional *in kind*. They have pointed out that central banks have adopted similar types of policies before. We will review their arguments below but begin by assessing what is plausibly the most unconventional aspect of recent central bank policies: their scale.

As we have pointed out in Section 3, the magnitude of balance sheet expansions during World War II still eclipses the recent episode in the aggregate. While the share of central banks undergoing large expansions was similar then and now, the magnitudes of expansion in those countries closest to the war were the largest in our sample. In both Norway and France, central bank balance sheet size relative to GDP changed by 75 percentage points during the war. We lack wartime GDP data for Germany, but it seems likely that the Reichsbank’s balance sheet experienced a comparably large expansion. Some central banks have reached unprecedented levels since 2008, it is true. At the time of writing, the Federal Reserve’s balance sheet size stands at approximately 25% of GDP, 3.5 percentage points higher than its previous record in 1946. The Bank of England had already broken through its 1946 record of 17.3% of GDP by the end of 2008, and recently stopped shy of 30% of GDP. The Bank of Japan’s expansion after 1997, under its first asset purchase programme, failed to break through its 1944 balance sheet peak of 33.5% of GDP, reaching only 31% of GDP in 2005. But it did surpass its wartime peak in 2013.

Relative to our full sample, however, neither the level at which these three central banks' balance sheets stand today relative to GDP nor the size of their expansions since 2008 has been altogether unprecedented. We record six episodes during which balance sheet size relative to GDP exceeded 40%, and 25 episodes where it exceeded 25%. Across our 23 large balance sheet expansions since 1900, four episodes exhibited a change in balance sheet size relative to GDP of over 30 percentage points, and 17 episodes saw changes above 15 percentage points. Relative to GDP, the Federal Reserve and the Bank of England have expanded their balance sheets by 18 and 25 percentage points, respectively, since 2007; the Bank of Japan has expanded its balance sheet by about 30 percentage points since 1997. Judged by the scale of recent balance sheet expansions, this time, as so often, is not so different.

What about intent? As we have seen, central bank balance sheets have experienced major expansions since 1900 for one (and sometimes more than one) of four reasons: balance of payments influences under fixed exchange rates, government financing (usually in wartime), lender of last resort and market functioning, and demand stabilisation. Since 2007, the last of these motives has played an important part in the operations of three of the major developed world central banks: the Bank of Japan, the Federal Reserve and the Bank of England. Others have primarily been engaged in lender of last resort operations. Even the aim of demand stabilisation was not wholly novel, however, as it had already been attempted by the Bank of Japan.

Borio and Disyatat (2009) have argued, with reference to the US and UK experiences, that the most unconventional features of recent balance sheet operations have been the market segments targeted under the Federal Reserve and Bank of England's large-scale asset purchase programmes. Conceptually, these measures have not been dissimilar to open market operations in that they aimed at changing interest rates and, through the transmission mechanism, borrowing rates. While "conventional" policy targets short-term rates, recent balance sheet operations have primarily influenced the term premium component of long-term rates. What was different, these authors argue, was the range of securities bought: not only longer-term government bonds but also various private assets.

And yet, as D'Amico et al. (2012) among others point out, such operations would not have been deemed unconventional in the intellectual environment of the 1960s and 1970s, a time when preferred habitat theory came into vogue. The Federal Reserve experimented with them when it first increased its holdings of longer-term government bonds in line with Operation Twist and later even bought coupon issues of Fannie Mae and Freddie Mac, which, as government-guaranteed paper, were eligible for open market operations. And during World War II, as we have seen, the Federal Reserve sought to control "the whole pattern of rates".

Contemporary policy only appears "unconventional" because of the ascendancy of the expectations hypothesis after the 1980s, which declared central bank balance sheet operations to be ineffective from a theoretical standpoint. (Unlike in a preferred habitat setting, marginal changes in the central bank's portfolio could have no effects on asset prices under the assumptions of perfect arbitrage and asset substitution.) From a theoretical perspective, therefore, the concept of central bank asset purchases as a tool of policy is not novel, merely forgotten.

As noted above, there is a difference of intent between recent central bank balance sheet expansions and those of the period of World War II. The intent of large-scale asset purchases in our time has been to stabilise aggregate demand. The intent in the 1940s was to assist the national Treasury with paying for the

war. The instruments purchased in wartime were almost exclusively government bonds and bills; since 2007, the Federal Reserve in particular has also purchased securities issued by private sector entities. Yet, whatever the intent of a central bank, the effects of its actions may not differ so very much as between war and peace. Large-scale asset purchases have implications for government finance, even when government finance is not the primary objective of the purchases, because depressing bond yields reduces government debt service costs, especially when the public debt is relatively high. Consequently, efforts to normalise rates may give rise to frictions between monetary and fiscal authorities, as happened in the early 1950s.

As then, the Federal Reserve may find itself under political pressure from the Treasury, White House or Congress if the policies it wishes to pursue clash with the exigencies of debt management or are seen to harm the interests of influential constituents. As then, the Federal Reserve may have to contend with unexpected changes in expectations, instigated by “out of model” geopolitical events. As then, the Federal Reserve now has a rather eclectic monetary theory, which includes relative indifference to international capital flows and a confidence in the dollar’s supremacy as the international reserve currency, as well as a readiness to consider (if not to target) an ever widening range of indicators. And, as then, the Federal Reserve may have recourse to instruments of credit control that fell into disuse in the intervening years (Reinhart and Rogoff 2013).

8 Conclusions

In this paper, we have presented a new dataset on historical central bank balance sheet fluctuations that we have assembled from a wide array of historical sources. Our key goal was to present the facts about large balance sheet expansion and contraction episodes, in order to contextualise what may lie ahead, in the belief that financial history can provide a valuable corrective to the amnesia of economic theory.

We have shown, firstly, that in most developed countries since 1900, balance sheet size relative to output has fluctuated within rather clearly defined bands most of the time. The exceptions are clusters of big expansions and contractions associated with periods of geopolitical or financial crisis. The biggest of these crises, in terms of their impact on central bank balance sheets, were World War II and the recent financial crisis. Measured both by scale and incidence, the post-2007 expansion episode has eclipsed all other historical precedents.

Secondly, we have shown that, over the sample period, central bank balance sheet size and public debt relative to GDP have exhibited a surprisingly high degree of co-movement, along with the series “government debt securities held by the central bank”. This observation holds particularly strongly for the period during and after the World Wars. During periods of major economic and political pressure, the fiscal and monetary authorities have tended to work in concert. We believe this has important implications for some major central banks today.

Thirdly, with a few exceptions, large balance sheet expansions have on average taken a long time to unwind. The post-war balance sheet contractions were especially protracted, extending in some countries from the late 1940s to the late 1960s.

A fourth historical lesson we draw is that central banks rarely reduce the size of their balance sheets in nominal terms after large expansion episodes. Reductions are predominantly achieved in real terms by

holding nominal positions stable for some time – this is particularly true for post-war reductions. Important exceptions to this finding are more recent balance sheet expansions related to lender of last resort measures and exchange rate interventions. In these cases, balance sheet composition – in particular the maturity of assets – has been an important determinant of how central banks achieved balance sheet reductions. On the basis of the evidence presented here, it would not be unreasonable to expect the contraction of central bank balance sheets, when it finally comes, to be protracted and to take place relative to GDP rather than nominally. It will happen faster where central bank assets have a shorter average maturity.

Our fifth finding is that, relative to the size of the financial sector, central bank balance sheets had shrunk dramatically in the three decades preceding the global financial crisis. By that yardstick, their recent expansion merely marks a return to earlier levels. Another insight from financial history is that some of the recent increase could prove to be permanent if the financial sector is expected to maintain higher liquidity ratios.

Finally, the near-term inflation risks from the recent balance sheet expansion appear limited because the link between central bank balance sheet growth and inflation has loosened considerably in most advanced economies since 1980. There is, however, an important caveat that we infer from the experience of the 1950s. An important lesson of that period is that fiscal considerations are not easy to ignore once a central bank has involved itself in keeping long-term interest rates low, for to “normalise” rates is to increase debt servicing costs, as well as to reverse the other distributional consequences of large-scale asset purchases. So long as the credibility of central banks as independent custodians of price stability remains intact, balance sheet expansions need not be inflationary, even if in nominal terms they become permanent. But history suggests that the threat to long-run price stability is a real if slow-acting one when fiscal deficits are persistent and central bank independence is compromised.

Appendix: Data coverage by country

Australia: The Reserve Bank of Australia was founded in 1960, after the 1959 Reserve Bank Act removed the monetary authority from the Commonwealth Bank. The Commonwealth Bank, in turn, acted as Australia’s central bank between 1920 and 1960, assuming this responsibility gradually after 1920. We use balance sheet data for the Commonwealth Bank from 1920 to 1945, and from 1950 to 1959. We use balance sheet data for the RBA thereafter. We have no data between 1946 and 1949. Foreign assets are missing for the period after 1950, foreign liabilities are missing for the whole period. Notes in circulation and bank deposits are missing before 1950.

Canada: The Bank of Canada was established in 1934 and we have data starting from 1935. Data for gold holdings are missing for the whole period. Data on foreign asset holdings are missing after 1980, those for foreign liabilities before 1945 and after 2004.

Switzerland: The Swiss National Bank was established in 1907 and we have data since then. Government debt is missing for the whole period, foreign liability holdings are missing before 1961.

Germany: We have data for the Reichsbank between 1900 and 1944, for the Bank deutscher Länder between 1948, the year it was established, and 1956, and for the Bundesbank between 1957 and 2011. Our

data for the Reichsbank are missing foreign assets and liabilities holdings, as well as government debt. We have no data for bank deposits for the Bank deutscher Länder. Foreign liabilities are missing after 1998.

Finland: The Bank of Finland was established in 1812. We have full data coverage from 1900 onwards, except for foreign assets, which are missing before 1999.

France: We have data coverage for the Banque de France from 1900 onwards. The foreign liabilities and bank deposits positions are missing for the whole period. We have no data for the year 1941, and between 1974 and 1977. Foreign assets and government debt are also missing between 1978 and 1994.

Italy: Banca d'Italia was established in 1893 and began issuing bank notes in 1926. We have no data for the year 1939 due to a change in account reporting. Data for 1938 are reports as of December, data for 1940 are reported as of June of that year. We have no data on gold before 1936, on foreign liabilities before 1936, on government debt between 1936 and 1964, and on total deposits between 1936 and 1964. We have no data coverage of bank deposits before 1999, and the foreign assets position is missing between 1965 and 1998.

Japan: The Bank of Japan was founded in 1871. We have no data for foreign liabilities, for foreign assets before 1906, and between 1941 and 1969. We have no coverage of gold holdings between 1941 and 1997, and for bank deposits between 1966 and 1997.

Norway: The Norges Bank was established in 1816. We lack coverage for 1945, and for the bank deposits position over the whole period. We have no data for foreign liabilities before 1950 and between 1989 and 1991, and for foreign assets between 1978 and 1984. Gold holdings are missing from 1992 to 2003. The Norges Bank transferred its government debt holdings to the Treasury in 2004, so we have a position of zero holdings thereafter.

Sweden: Sveriges Riksbank was founded in 1688. We have no coverage of government debt before 1920 and after 2001. We are missing foreign liabilities holdings from 1943 to 1976, and we lack data on total deposits after 1998.

United Kingdom: The Bank of England was established in 1694. We have data coverage for all positions except foreign assets and foreign liabilities, with bank deposits missing before 1962.

United States: The Federal Reserve was established in 1913. Our data coverage begins in 1914. The foreign assets position is almost completely missing, and gold is missing after 1945.

We summarise coverage for our macro variables in the following two tables:

Table A.1

	Money	Narrow money	GDP	Capital formation/GDP	CPI	Population	Stocks	Debt/GDP	Total loans
AUS	112	112	103	110	112	112	112	112	110
CAN	103	104	103	110	112	112	97	112	111
CHE	112	108	112	77	112	112	101	93	112
DEU	89	90	90	101	107	112	112	104	99
FIN	112	112	112	112	112	112	90	95	112
FRA	98	103	95	103	112	112	112	96	105
ITA	103	102	112	112	112	112	106	111	112
JPN	96	102	104	110	104	112	99	109	107
NOR	111	111	106	106	112	112	97	105	111
SWE	112	112	101	112	112	112	112	104	112
UK	112	112	112	112	112	112	112	112	112
US	112	109	112	112	112	112	112	112	112
Total	1272	1277	1262	1277	1331	1344	1262	1265	1315

Table A.2

	Short-term rate	Long-term rate	Gov. revenue	Gov. tax revenue	Gov. expenditure	FX	Peg
AUS	73	112	111	111	111	112	112
CAN	67	112	111	111	111	112	112
CHE	111	110	112	111	112	112	112
DEU	102	109	92	93	90	112	112
FIN	112	89	112	112	112	112	112
FRA	96	112	112	112	112	112	112
ITA	105	112	112	112	112	112	112
JPN	94	101	110	111	105	112	112
NOR	100	112	107	112	112	112	112
SWE	112	112	112	112	112	112	112
UK	112	112	112	112	112	112	112
US	110	112	112	112	112	112	112
Total	1194	1305	1315	1321	1313	1344	1344

References

Admati, A.R., and Hellwig, M.F. (2013) *The Bankers' New Clothes: What's Wrong with Banking and What to Do about It*, Princeton University Press, Princeton, NJ.

Aikman, D., Haldane, A.G. and Nelson, B.D. (2014), "Curbing the Credit Cycle", *The Economic Journal*, forthcoming.

Bernanke, B.S. and Reinhart, V.R. (2004), "Conducting Monetary Policy at Very Low Short-Term Interest Rates", *American Economic Review*, Vol. 94, No 2, May, pp. 85-90.

- Borio, C. and Disyatat, P. (2009), "Unconventional Monetary Policies: An Appraisal", *BIS Working Papers*, No 292, November.
- Burgess, W.R. (1954), "Federal Reserve and Treasury Relations", *Journal of Finance*, Vol. 9, No 1, March, pp. 1-11.
- Culbertson, J.M. (1959), "Timing Changes in Monetary Policy", *Journal of Finance*, Vol. 14, No 2, May, pp. 145-160.
- D'Amico, S., English, W., Lopez-Salido, D. and Nelson, E. (2012), "The Federal Reserve's Large-Scale Asset Purchase Programmes: Rationale And Effects", *The Economic Journal*, Vol. 122, November, pp. 415-446.
- Eichengreen, B. and Garber, P. (1990), "Before The Accord: U.S. Monetary-Financial Policy 1945-51", *NBER Working Paper*, No 3380, June.
- Goodfriend, M. (2011), "Central Banking in the Credit Turmoil: An Assessment of Federal Reserve Practice", *Journal of Monetary Economics*, Vol. 58, pp. 1-12.
- Greenwood, R. and Scharfstein, D. (2013), "The Growth of Finance", *Journal of Economic Perspectives*, Vol. 27, No 2, pp. 3-28.
- Haywood, C.F. (1959), "The Adequacy of Federal Reserve Powers to Discharge Responsibilities", *Journal of Finance*, Vol. 14, No 2, May, pp. 135-144.
- Hetzel, R.L. and Leach, R.F. (2001), "The Treasury-Fed Accord: A New Narrative Account", *Federal Reserve Bank of Richmond Economic Quarterly*, Vol. 87, No 1, winter, pp. 33-55.
- Hutchinson, W.K. and Toma, M. (1991), "The Bond Price Support Program as a Change in Policy Regimes: Evidence From The Term Structure of Interest Rates", *Journal of Money, Credit and Banking*, Vol. 23, No 3, August, pp. 367-382.
- Friedman, M. and Schwartz, A.J. (1963), *A Monetary History of the United States, 1867-1960*, Princeton University Press, Princeton, NJ.
- International Monetary Fund (2013), "Global Impact and Challenges of Unconventional Monetary Policies", *IMF Policy Paper*, 7 October.
- Jordà, O., Schularick, M. and Taylor, A. (2013), "Sovereigns versus Banks: Credit, Crises, and Consequences", *NBER Working Paper*, No 19506, October.
- Kliem, M., Kriwoluzky, A. and Sarferaz, S. (2013), "On the low-frequency relationship between public deficits and inflation", *Deutsche Bundesbank Discussion Papers*, No 12/2013.
- Krishnamurthy, A. and Vissing-Jorgensen, A. (2013), "The Ins and Outs of LSAPs", *Global Dimensions of Unconventional Monetary Policy – Federal Reserve Bank of Kansas City Economic Policy Symposium 22-24 August 2013*, Jackson Hole, Wyoming, September.
- Krogstrup, S., Reynard, S. and Sutter, B. (2012), "Liquidity Effects of Quantitative Easing on Long-Term Interest Rates", *Swiss National Bank working paper*, January.
- Lucas, R.E., Jr. (1980), "Two Illustrations of the Quantity Theory of Money", *American Economic Review*, Vol. 70, No 5, December, pp. 1005-1014.
- Lucia, J.L. (1975), "A Reevaluation of U.S. Monetary Policy in the Pre-Accord Period", *Nebraska Journal of Economics and Business*, Vol. 14, No 4, autumn, pp. 21-31.

- McLeay, M., Radia, A. and Thomas, R. (2014a), "Money in the Modern Economy: An Introduction", *Bank of England Quarterly Bulletin*, Vol. 54, No 1, pp. 1-10.
- McLeay, M., Radia, A. and Thomas, R. (2014b), "Money Creation in the Modern Economy", *Bank of England Quarterly Bulletin*, Vol. 54, No 1, pp. 14-27.
- Meltzer, A.H. (2010), *A History of the Federal Reserve, Volume 2, Book 1, 1951-1969*, University of Chicago Press, Chicago.
- Mueller, F.W., Jr. (1952), "The Treasury-Federal Reserve Accord", *Journal of Finance*, Vol. 7, No 4, December, pp. 580-599.
- Philippon, T. (2012), "Has the US finance industry become less efficient? On the theory and measurement of financial intermediation", *NBER Working Paper*, No 18077.
- Philippon, T. and Reshef, A. (2013), "An international look at the growth of modern finance", *Journal of Economic Perspectives*, Vol. 27, No 2, pp. 73-96.
- Reynard, S. (2006), "Money and the Great Disflation", *Swiss National Bank working paper*, January.
- Reynard, S. (2012), "Assessing Potential Inflation Consequences of QE after Financial Crises", *Peterson Institute for International Economics Working Paper*, No 12-22, November.
- Reinhart, C.M. and Rogoff, K.S. (2013), "Shifting Mandates: The Federal Reserve's First Centennial", *American Economic Review: Papers & Proceedings*, Vol. 103, No 3, pp. 48-54.
- Sargent, T.J. and Surico, P. (2011), "Two Illustrations of the Quantity Theory of Money: Breakdowns and Revivals", *American Economic Review*, Vol. 101, February, pp. 109-128.
- Sayers, R.S. (1957), *Central Banking after Bagehot*, Clarendon Press, Oxford.
- Schularick, M. and Taylor, A. (2012), "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises", *American Economic Review*, Vol. 102, No 2, pp.1029-1061.
- Stone, M., Fujita, K. and Ishi, K. (2011), "Should Unconventional Balance Sheet Policies be Added to the Central Bank Toolkit? A Review of the Experience So Far", *IMF Working Paper*, No 11/145, June.

Comments on central bank balance sheets: expansion and reduction since 1900 by Niall Ferguson, Andreas Schaab and Moritz Schularick

Daniel Cohen¹

This is a very useful and pleasant paper to read. It provides the proper data that enable us to gauge how the recent surge in the size of central banks' balance sheets fits into the historical perspective. Data are provided as a percentage of GDP, and also of M2. They span most of the past century and are drawn directly from central bank data. The key findings of the paper are that the balance sheets of most central banks have remained within the range of 10% to 20% of GDP for most of the past century, except on two occasions: during the Second World War, when it reached almost 40% of GDP, and today, at about 30% on average. Some major central banks have broken their Second World War records in the recent period, however: the United Kingdom, Japan and the United States.

The paper distinguishes 23 episodes of large expansions and 17 episodes of large contractions. Most of these expansions are related to either intervention in foreign exchange markets or to the purchase of government securities. Contractions almost always took place smoothly. The ratios of balance sheet size to GDP and to M2 fall because of the rise of the denominator rather than contraction of the numerator. Among the rare exceptions to this pattern is the Nordic crisis of the 1990s during which the balance sheet contraction took place rapidly, once the crisis was over.

This begs the question of how balance sheet size could contract in the current circumstances, given the much lower growth environment, but more to the point, should it contract at all? Why does it matter? The orthodox position claims that there is an inflationary risk associated with such large balance sheet expansions. If true, this would be good news, given the current stance in Europe against deflation. In the analysis of the quantitative easing policies in the United States, there is some evidence that QE1 and QE2 managed to lift inflation expectations, but only very modestly.

The paper itself reports an analysis, which would allay fears of inflationary consequences, (but which would not address the other side of the argument – the deflationary risk) showing that a relationship between inflation and balance sheet expansion appears in the data prior to 1980, but breaks down afterwards. The result has more of the nature of a correlation than of causation, but it still reveals something about the inflationary risk. The results are hardly surprising. Inflation seems to operate of its own accord. As shown in a piece published in the World Economic Outlook (IMF 2013), the Phillips curve coefficient has steadily fallen to the point that it is essentially nil today. This can be viewed as a triumph for central banks in establishing their credibility. Indeed the World Economic Outlook analysis demonstrates that inflation expectations are increasingly anchored by monetary policy as they now move almost one for one with the long-term inflation targets set by central banks. But then again, if central banks' credibility is the key factor behind this success, why should we fear deflation today? If central banks are so good at anchoring long-run inflation expectations, where is the problem?

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It seems clear that the economy is operating under a new model. Wage bargaining is not what it used to be. Very briefly, it can be argued that we are witnessing the emergence of a new paradigm regarding inflation. Under the pressure of new technologies, labour share has been falling. Cheap software of all kinds is taking over labour activities, so that the lowest wages seem to be essentially flat, given downward resistance, with inflation above the minimum levels being driven by relative wage effects. At the top of the ladder, bonuses are paid to the super winners, whose incomes are essentially indexed on the financial markets, which is where the action has been taking place.

Money that floods into the economy as a result of easy monetary policies does not fuel the product or labour markets as before, but boosts asset prices. According to this line of reasoning the issue then becomes about whether the fact that money inflating the price of assets would eventually be good for investment. The price of capital is reduced, Tobin's q is lifted, and investment should follow. It is not that simple, however. The correlation of Tobin's q with investment is notoriously low; one paper by Lorenzoni and Walentin (2007) shows that it is about one tenth of what the theory suggests. For instance, the paper shows that the volatility of Tobin's q is 27 times greater than the volatility of the investment rate. Cash flows do a much better job of predicting investment. Using the same metric, their volatility is just twice that of the investment rate.

So in the end, we have a joint phenomenon. Productive capital becomes cheaper and cheaper as a result of information and communications technology; this makes for wage deflation, low interest rates, with the price of assets climbing up, but with little impact on the real economy. According to the (now famous) data collected by Thomas Piketty, wealth has almost doubled as a percentage of GDP. It climbed from an average of 250% of GDP in the early 1970s to 450% now. From this perspective, the data presented in the paper show that the growth in central banks' balance sheets is commensurate with the rise in asset prices. What does that tell us about the impact of this balance sheet expansion on the economy? When the financial markets become dysfunctional, as they did after the sub-prime crisis, no one can doubt that the intervention prevented a systemic collapse. But what can we expect as the situation is normalised? Is the risk that it may further inflate the price of assets, with no other result than another bubble? As Wasmer et al. (2014) have shown, for instance, most of the results in Piketty regarding the wealth-to-GDP ratio appear to be driven by housing and more specifically by the price-to-rent ratio, which is surely driven by interest rates and monetary policies.

Another line of reasoning relates to the literature on quantitative easing. It shows that the Federal Reserve System's operations succeeded mainly in reducing the price of the assets that were purchased and did not have much of an effect on the other prices (see Krishnamurthy and Vissing-Jorgensen 2011). When controlling for their effects on the underlying credit default swaps, the Federal Reserve's operations have not affected the valuations of the target assets, and only bring down their default risk. This lends weight to the view that quantitative easing operated not through a portfolio rebalancing effect but on account of the fact that the Federal Reserve took some default risk off the economy. This means that the benefit is really to be looked at on the fiscal side of the operation. I do not see this as especially bad news, but the central bank may want to be prudent in advertising it. This interpretation allows a measure of the hidden stimulus that is carried by quantitative easing to be provided. If the risk is, say, 2% on average on the assets purchased, an expansion of the balance sheet representing 15% of GDP makes for a (repeated) stimulus of 0.3%. This is not negligible, but it is not very significant either.

To summarise, the period of balance sheet expansion that we are currently experiencing is not unheard of, although it has broken a few records for a number of key central banks. As the paper emphasises, it is more unconventional from a theoretical point of view than with respect to history. Back in 1980 the idea that a central bank could engineer a repricing of assets by intervening vastly on the markets would have looked perfectly sensible. Today, we think of the relative price of assets as being driven by the marginal rates of substitution across various states of nature, so the theory goes against such balance sheet operations. We clearly need to dig deeper to analyse the whole situation, and with the proper data, such as those presented in the paper, we have a better chance of doing it.

References

International Monetary Fund (2013), *World Economic outlook: Hopes, Realities, Risks*, April.

Krishnamurthy A. and Vissing-Jorgensen, A. (2011), "The Effects of Quantitative Easing on Interest Rates: Channels and Implications for Policy", *Brookings Papers on Economic Activity*, Fall.

Lorenzoni, G. and Walentin, K. (2007), "Financial Frictions, Investment and Tobin's q ", *National Bureau of Economic Research Working Paper Series*, No 13092, May.

Thomas Piketty (2014), *Capital in the Twenty-First Century*, Belknap Press.

Wasmer, E., Bonnet, O., Bono, P.-H. and Chapelle, G. (2014), "Does Housing Contribute to Capital Inequality? A comment on Thomas Piketty's *Capital in the 21st Century*" *Sciences Po Economics Discussion Paper*, No 2014-07, April.

Monetary policy and balance sheet adjustment

Agustín Carstens¹

I would like to thank Mario Draghi, Peter Praet and Benoît Cœuré for having invited me to participate in this first gathering of the ECB Forum on Central Banking. The topic assigned to this panel, monetary policy and balance sheet adjustment, has many different facets. Given my comparative advantage, I will provide an emerging market economy (EME) point of view.

During the last years, events in advanced economies (AEs) have been a very important determinant of EME performance – if not the most important. In 2007-2008, when the global financial crisis erupted, EMEs were by and large well prepared. After many countries in this grouping suffered sequential crises in the 1970s, 1980s and 1990s, with huge economic, social and political costs, they learnt important lessons. These led to the adoption of key policy actions, from which I would like to highlight the following:

- The establishment of flexible exchange rate regimes.
- The enhancement of the degree of autonomy of central banks, with the primary mandate of price stability. This led to a wide adoption of inflation targeting and, probably a more important consequence for a number of countries, to the end of fiscal dominance.
- Consciousness about the relevance of fiscal discipline and the preservation of public debt sustainability.
- Deeper trade liberalisation.
- Keeping up to speed with financial sector supervision and regulation, which has produced well-capitalised banking systems.

The result of this behaviour was that most EMEs did not have any major economic imbalances in 2008. Previous to the global financial crisis, EMEs were not on the radar screen of vulnerable economies.

Then September 2008 arrived, with the bankruptcy of Lehman Brothers, among other systemic financial institutions. The jolt to the world economy was immediately felt, through exacerbated financial volatility and a sudden collapse in world trade and economic growth. But EMEs recovered very quickly, as trade and growth bounced back in early 2009. Access to international financial markets was reinstated and no lasting consequences in local markets were apparent. Given the prevailing situation in AEs, people started talking about EMEs decoupling from AEs. In this context, many EMEs jumped on the bandwagon of trying to defeat the world's business cycle by implementing counter-cyclical fiscal and monetary policies – Mexico did not – as advocated by fora such as the G20 and the International Monetary and Financial Committee.

At the same time, recovery in the United States was very sluggish, with growing unemployment, while several euro area member economies faced major fiscal and financial imbalances, to the extent that, starting in 2011 and up to the second half of 2012, major doubts about the sustainability of the euro as a single currency were prevalent. Growth plummeted in Europe and unemployment reached extremely

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high levels. In most AEs, the feasibility of stimulating the economy through fiscal policy rapidly came to an end, as debt-to-GDP ratios exploded. The only stabilisation policy instrument left was monetary policy, and therefore the main AE central banks adopted, at different times, speeds and with different modalities, unprecedented expansionary policy stances. The Federal Reserve System led the way, followed by the Bank of England, the European Central Bank and the Bank of Japan. These policies guaranteed sharp declines in interest rates across the yield curve, to the point that the zero lower bound in the policy reference rate became binding in most cases (eventually in all), and quantitative easing actions and forward guidance for the policy rate needed to be implemented. A side effect was a sharp increase in the balance sheets of the central banks of AEs.

Faster growth and stability prospects in EMEs, combined with the adoption of unconventional monetary policies in the main AEs, triggered massive capital inflows into EMEs. This phenomena was interpreted by many authorities as a ratification of the perceived economic strength of EMEs. For a while, those flows also reinforced the acceleration of growth in EMEs. In addition, China's double digit growth, among other factors, induced a significant spike in commodity prices, benefiting most EMEs.

But under the surface, problems were brewing for some EMEs. Massive capital inflows into EMEs persisted, fed primarily by carry trades explained by ex ante uncovered interest rate arbitrage opportunities. This generated mispricing in some assets in many EMEs, excessive real exchange rates appreciations, and opened the door for sudden capital flow reversals. In addition, the quick recovery in EMEs post-2008, the ample liquidity and opportunities for leverage, and the positive terms of trade shocks that were not taken advantage of in order to strengthen macro fundamentals, induced some countries to believe that they had some degree of freedom in macro policy management that they did not really have.

In April/May 2013 the reality check arrived. At that time, the global financial cycle was more clearly transmitted to EMEs, triggered mostly by the start of the discussion of monetary policy normalisation in the United States, as the "taper talk" got going. This, together with the correction in commodity prices that has followed the economic slowdown in China, invited a re-evaluation of the prospects for EMEs. As a result, vulnerabilities in economic fundamentals in several EMEs were exposed, in particular in those countries with high levels of public and private leverage, which in turn had produced relatively high fiscal and current account deficits. Tighter financial conditions, together with terms of trade corrections and the lasting real effects of prolonged and excessive currency appreciation, were reflected in a widespread slowdown in economic growth in EMEs. AEs, which represent approximately 50% of the world's GDP, and which had been growing below their potential for several years, did not help the EMEs' growth either. So, with the benefit of hindsight, the perception of "EMEs decoupling" from AEs was more a mirage than reality.

The turbulence in EME financial markets that followed the initiation of the "taper talk" was not homogeneous. The most severe cases happened in countries with weak fundamentals, mostly judged by the size of their current account and fiscal deficits. In these cases, sharp depreciations in local currencies took place, together with disproportional increases in interest rates, in particular for the long tenors, and plummeting stock markets. National authorities reacted by intervening in the foreign exchange markets, facilitating the reduction of durations in investors' portfolios, and more importantly, by tightening fiscal and monetary policies. In contrast, many other EMEs managed to sail through this episode by reinforcing their policy stance, and allowing the exchange and interest rates to make the adjustments, without any market interventions. We could say that many EMEs came out strengthened from this period of volatility.

During 2014, important adjustments were made in the monetary policy stance in the United States and the euro area:

- The tapering of securities purchases by the Federal Reserve started in January 2014 and is programmed to end in October. At the same time, the Federal Open Market Committee enhanced the clarity of forward guidance, creating the expectation of policy rate adjustments until next year. The combination of these events has limited the upward trend in long-term rates, preserving the ones in the short end of the curve at extremely low levels.
- In the euro area, major concerns became evident about sluggish economic growth and massive unemployment, together with inflation rates substantially below the ECB target. This generated the expectation of significant additional monetary policy easing by the ECB, leading to historically low levels of interest rates in euros.

These events have generated quite surprising results in financial markets. Owing mostly to the search for yield, dispersion in spreads in credit markets is unusually low, volatility in all asset classes is also exceptionally low, and capital flows recovered and by mid-2014 were abnormally high, both to EMEs and some AEs. It would be fair to say that there is the potential of major mispricing in credit markets, which poses the risk that once such mispricing is revealed, there will be an overcorrection in markets, threatening the fragile state of financial stability. In AEs financial instability could abort the still incipient recovery. In EMEs the threat would be not only sudden stops in capital flows, but even sudden massive reversals. The trigger of these events could be abrupt changes in AEs' monetary policy stances.

Taking all these elements into account, the main challenge for EMEs boils down to how to stimulate growth without compromising financial stability, facing at the same time an external environment plagued with uncertainties. The question is then, how to move forward.

The governments of AEs have to deal with their own problems, which are not negligible. This means that there is scant hope for AEs internalising the spillover effects on the rest of the world generated by their policies. Therefore, EMEs should take policies in such countries as given. At least if they succeed, the world will be better off. So EMEs have to find their own way out. In my mind, a three-pillar approach should be followed by EMEs.

First Pillar. Strong macro fundamentals and policy settings are of the essence. Basically there is no room for poor fundamentals. In particular, it is very important for EMEs to limit financial needs to what is feasible under stress scenarios. This calls for moderate fiscal policies and the use of aggregate demand management to avoid large current account deficits. Monetary policy should concentrate on keeping inflation under control, since this is a prerequisite for the flexible exchange rate to be able to perform as a shock absorber. The domestic financial markets should be monitored closely; early adoption of the enhanced regulatory and supervisory regime produced under the auspices of the Financial Stability Board and the Basel Committee should be pursued. Macro-prudential policies might work under specific circumstances, but they have not proven to be the silver bullet we were all hoping for.

Second Pillar. External sector resilience under stress scenarios should be a policy objective. This is very important to avoid capital reallocations resulting in bad equilibria in financial markets. To start with, a strong balance of payments is needed. Flexibility in interest and exchange rates, anchored by strong fundamentals, should be part of the adjustment process. But, given the sheer size of capital inflows to

EMEs so far, this might not be sufficient. So to count on large international reserves and other forms of backstops, such as the IMF's flexible credit line, is highly advisable. Also, the public and private sectors should pursue proactive debt management strategies, avoiding the bunching of maturities, lengthening durations and keeping an eye on foreign exchange rate mismatches.

Third Pillar. Economic growth must be promoted by making the economy more competitive, increasing total factor productivity and thus potential GDP growth. This takes us down the road of structural reforms, which have huge potential in EMEs. This is the hard way to achieve sustainable GDP growth, but is the only reliable one that is left.

So, in summary, the first and second pillars are meant to guarantee financial stability. The real lever for promoting growth lies in the third pillar.

With regard to my own country, Mexico, we have in place a plan that fully complies with the three pillar approach. Macro fundamentals are in good shape, we have a strong external position, even under stress scenarios, and unprecedented structural reforms are under way. All this should allow us to accelerate growth and to preserve financial stability even during turbulent times generated by major balance sheet adjustments in the central banks of AEs.

Monetary policy and balance sheet adjustment

Otmar Issing¹

In the wake of the global financial crisis that started in 2007, policy-makers were forced to respond quickly and forcefully to a recession caused not by short-term factors, but rather by an over-accumulation of debt by sovereigns, banks and households: a so-called “balance sheet recession”. Though the nature of the crisis was understood relatively early on, policy prescriptions for how to deal with its consequences have continued to diverge.

1 Normal vs balance sheet recessions

Already at an early stage of the crisis which erupted in 2007, a broad consensus emerged: all efforts had to be taken to avoid the mistakes of the past, and prevent the global economy from falling into a depression. Monetary policy and fiscal policy reacted quickly and forcefully.

However, it soon became evident that the major countries were not just confronted with a “normal” recession. Concerns of a panic in the financial system were visible in discussions about the threat of a “Minsky moment”, that is, a sudden major collapse in asset values. Reinhart and Rogoff (2009) identified high indebtedness as the overriding characteristic of financial disasters in more than 60 countries over a period of eight centuries. The worst case scenario is one where all three sectors – that is, the public, banking and private household sectors – accumulate unsustainable levels of debt, making an adjustment of balance sheets inevitable and necessary. The term “balance sheet recession”, coined by Koo (2011), emphasises this contrast to normal downturns. However, not all balance sheet recessions are the same. The main differences have to do with the number of sectors involved (Brunnermeier and Sannikov 2013).

As short-term crisis management has been successful – at least so far – discussions have shifted to the question of how long-term crisis resolution should be conducted. While there was a broad consensus as mentioned on the former, concerning the latter the harmony is gone and unusually strong disagreements have emerged (Borio 2014).

2 Divergent policy advice

What is the reason for a level of divergence in policy advice, which goes beyond what can be regarded as “usual”? For one, the crisis has revealed a dearth of models which are available to both analyse the emergence of the crisis and deliver substantiated advice for monetary policy actions (Bech et al. 2012). For a long time, even the “state of the art” macroeconomic models lacked a relevant financial sector. Improvements currently being presented are still far away from dealing adequately with a system that reacts to shocks in a non-linear and asymmetric fashion. Although there have been attempts to endogenise financial risk in dynamic stochastic general equilibrium models (Christiano et al. 2014), it is fair to conclude that this literature is still in its infancy and endogenous risk is therefore all too present

¹ President of the Center for Financial Studies. I am grateful to Allan Meltzer, Massimo Rostagno and William White for valuable suggestions.

(Brunnermeier and Sannikov 2014). As a consequence, there is a high risk in deriving recommendations for monetary policy based on insufficient or even wrong models (White 2009). Experience with balance sheet recessions in modern times is also quite limited, and its usefulness for us today is constrained by the fact that the financial system prevailing at the time of the Great Depression and the system of today differ substantially (Schularick and Taylor 2012).

3 Challenges for monetary policy

The key challenge for the central bank in crisis management is to prevent the economy from falling into deflation. The danger is not the negative inflation rate per se, but a process of accelerating deflationary expectations. Delaying purchases of goods today, because of expectations of lower prices tomorrow, is hardly observed. The biggest threat is a process of “debt deflation”, as analysed in all its stages and details by Irving Fisher (1932).

A related phenomenon is the zero bound for the reduction of the central bank interest rate. True, avoiding the deflation trap is the foremost duty of the central bank. On the other hand, it is important to understand that disinflation is a necessary and positive corollary of the adjustment process. Disinflation (and even mild deflation) is not the original cause of the downturn, but rather the side effect of a correction process after the collapse of an unsustainable economic and financial boom.

For Hayek (1933), an upswing is characterised by the build-up of distortions driven by credit expansion, and therefore the corresponding downswing has to bring about the necessary adjustments if a lasting recovery is to ensue: “To combat the depression by a forced credit expansion is to attempt to cure the evil by the very means which brought it about...” (p. 21).

The biggest challenge for policy-makers, meanwhile, is to find the right balance of smoothing the adjustment process, while not preventing it. As Praet (2013) puts it: “Crisis management has to complement, but should not obstruct, crisis resolution”. The adjustment process following the identification of a balance sheet recession logically requires deleveraging, first and foremost of the financial sector. However, the need to both shrink the balance sheets of banks, and to react positively to low central bank interest rates by extending credit to non-financial firms, are in conflict with each other. Therefore, it is not surprising that, under these circumstances, monetary policy is less effective than in a normal recession (see, for example, White 2013).

A very low central bank interest rate opens up an opportunity for a kind of “stealth recapitalisation” by banks (Brunnermeier and Sannikov 2012), who can exploit the yield curve via purchases of government bonds. If, at the same time, the central bank lowers the conditions for the quality of collateral, it implements a reverse kind of Bagehot’s lender of last resort scenario. In the extreme, “zombie banks” may be kept alive, which would in turn have two very unpleasant consequences. Firstly, it would interfere with the banking sector’s much-needed self-correction process, which is necessary to return to a sustainable base. Secondly, zombie banks have a strong incentive to keep “zombie companies” alive to which they have given credit in the past. As a result, not only would the banking sector not be properly restructured, but neither would the non-financial sector, leading to what has been called the “Japanese disease”. “Palliative measures” (Fisher 1932) are simply no substitute for remedies.

In this context, it is interesting to note that for Fisher, the stability of the price level is an indispensable condition for a sustainable recovery, whereas Hayek argued that the “stabilisers” had already done harm enough. In our time, this issue is usually discussed under the headline: “is price stability enough?” when it comes to preserving or restoring financial stability.

This also raises the question of how long a policy of very low interest rates should be maintained. If the central bank uses the zero bound as a reason to justify a more accommodative monetary policy, and applies unorthodox measures of monetary easing, the problem becomes more acute. Even a huge increase in central bank money creation might not have the intended effect on the real economy. While the positive impact on the real economy declines, negative side effects will emerge and finally dominate (Borio 2014). The idea that an economy might have only a “corridor of stability” was developed by Leijonhufvud (2009). In such a case, the economy might enter the zone of instability when pushed too far, e.g. by an overly expansionary monetary policy.

Looking beyond the immediate management of the crisis, an orderly exit will be more daunting, the longer the expansionary monetary policy persists. Very low central bank interest rates induce banks to hold an increasing share of fixed income securities – mainly government bonds – which then makes them vulnerable to interest rate increases. A period of very low interest rates triggers a “search for yield” and, therefore, a high incentive to take higher risk.

The process of deleveraging is, if not stopped, at least heavily distorted. And new distortions are building up. There is, for example, the danger that the housing market – which had plunged during the downturn – will overreact, not least due to speculation in such a situation of very low interest rates. The extension of extremely easy monetary policy might end up leading to the repetition of past mistakes. Indeed, looking back over more than two decades, White (2013) identifies a “serial bubble” problem (already identified to some extent by Hayek (1933)).

A striking example is given by Blinder and Reis (2005), who argue that the “mop-up strategy” after the “mega-bubble burst” in 2000 was a successful demonstration of how to deal with a financial crisis as no single sizable bank, brokerage or investment bank failed. The implication was clear: if the mopping-up strategy worked so well in the case of what they identify as a “mega-bubble burst”, then it would also work after other, presumably smaller, bubbles burst in the future. But, what followed was instead the bursting of a *much* larger bubble. With this experience in mind, the lesson for the conduct of monetary policy after the collapse of financial markets should be quite different.

Finally, the practice of quantitative easing via outright purchases of government bonds connects monetary policy and fiscal policy in a dangerous way. The cheap financing of public spending might be seen as an effective way to conduct deficit spending, since it makes the fiscal multiplier higher. However, there is a high risk that this situation would hardly create any incentives for fiscal consolidation. Fiscal dominance might be the consequence, which would make it extremely difficult for the central bank to get out of the trap. The independence of the central bank – *de jure* and/or *de facto* – would be under threat.

4 Some key lessons

It is always difficult not to be overwhelmed by the complexity of a problem, or get lost in its confusing intricacies, when it comes to giving operational policy advice. However, some conclusions for how monetary policy should deal with a post-bubble-bursting situation can be drawn:²

- 11 The immediate reaction of monetary and fiscal policy should be fast and forceful.
- 12 After successful crisis management, nevertheless, any idea of a “quick fix” is both dangerous and misleading.
- 13 Balance sheet adjustment is an indispensable element of an all-encompassing policy approach. However, the deleveraging has to be done in such a way that it strengthens the system. “Bad” or even “ugly” versions must be avoided (Cœuré 2013). The reduction of indebtedness must include all sectors involved. Deleveraging, or rather restructuring, the banking sector is the key to sustainable future development. For this purpose, recapitalisation of solvable banks is essential, as well as the elimination of institutions without a viable business model.
- 14 In cases where the financial system is mainly based on bank credit, the restructuring of the banking sector should be accompanied by financial innovations outside the banking sector, which could help mitigate the impact of deleveraging on the real sector.
- 15 The longer the central bank conducts a monetary policy of very low interest rates and applies measures of quantitative easing, the more negative side effects will emerge. As the positive effects decline and become harder to identify, the overall balance of continuing on such an expansionary course might become negative sooner rather than later. Therefore, the central bank must increasingly consider the challenge of how to organise an orderly exit from the expansionary policy.
- 16 The notion of the central bank as the institution to solve all problems has dangerous implications for the independence of the central bank. To be seen as “the only game in town” might, over time, turn into the role of the scapegoat for anything that goes wrong. In addition, a policy which transgresses the mandate of the central bank, and/or the frontier between monetary and fiscal policy, might raise questions about the legitimacy of the central bank’s actions.
- 17 Looking beyond the horizon of the current crisis, the fundamental challenge for monetary policy is to prevent – as far as possible – the emergence of new bubbles. This can only be achieved if the central bank rejects the “mopping-up-only” strategy and applies a symmetric approach (Issing 2012).

5 References

Bech, M.L., Gambacorta, L. and Kharroubi, E. (2012), “Monetary policy in a downturn: Are financial crises special?” *BIS Working Paper*, No. 38.

Blinder, A.S. and Reis, R. (2005), “Understanding the Greenspan standard”, *The Greenspan Era: Lessons for the Future – Federal Reserve Bank of Kansas City Economic Policy Symposium 25-27 August 2005*, Jackson Hole, Wyoming.

² For the specific aspects in an EMU context, see Draghi (2014). The international dimension would need a deeper analysis than can be provided here. See e.g. Caruana (2014).

- Borio, C. (2014), "Monetary policy and financial stability: what role in prevention and recovery?" *BIS Working Paper*, No. 440.
- Brunnermeier, M.K. and Sannikov, Y. (2012), "Redistributive monetary policy", *The Changing Policy Landscape – Federal Reserve Bank of Kansas City Economic Policy Symposium 30 August-1 September 2012*, Jackson Hole, Wyoming.
- Brunnermeier, M.K. and Sannikov, Y. (2013), "The I Theory of Money", *Princeton University working paper*, available at <http://www.princeton.edu>
- Brunnermeier, M.K. and Sannikov, Y. (2014), "A Macroeconomic Model with a Financial Sector", *American Economic Review*, Vol. 104, No 2, pp. 379-421.
- Caruana, J. (2014), "Global liquidity: where it stands, and why it matters", *IMFS Distinguished Lecture at the Goethe University, Frankfurt, 5 March*, available at <http://www.imfs-frankfurt.de>
- Christiano, L., Motto, R. and Rostagno, M. (2014), "Risk shocks", *American Economic Review*, Vol. 104, No 1, pp. 27-65.
- Cœuré, B. (2014), "Monetary Policy Transmission and Bank Deleveraging", *The Future of Banking Summit, Paris, 13 March*, available at <http://www.ecb.europa.eu>
- Draghi, M. (2014), "A consistent strategy for a sustained recovery", *Lecture at Sciences Po, Paris, 25 March*, available at <http://www.ecb.europa.eu>
- Fischer, I. (1932), *Booms & Depressions: Some First Principles*. Adelphi Company, New York, 2010 reprint.
- Fischer, I. (1933), "The Debt-Deflation Theory of Great Depressions", *Econometrica*, Vol. 1 No 4, pp. 337-357.
- Hayek, F.A. (1933), *Monetary Theory and the Trade Cycle*, Martino Fine Books, Mansfield Center, CT, 2012 reprint.
- Issing, O. (2011), "Lessons for monetary policy: What should the consensus be?" *IMF Working Paper*, No 11.
- Issing, O. (2012), "Central Banks - Paradise lost", *Institute for Monetary and Economic Studies*, Vol. 30, November.
- Issing, O. (2013), "A New Paradigm for Monetary Policy?" *International Finance*, Vol. 16, No 2, pp. 273-288.
- Koo, R.C. (2011), "The world in balance sheet recession: causes, cure and politics", *Real-world economics review*, No 58.
- Leijonhufvud, A. (2009), "Out of the Corridor: Keynes and the crisis", *Cambridge Journal of Economics*, Vol. 33, No 4, pp. 741-757.
- Praet, P. (2013), "Monetary policy in the context of balance sheet adjustments", *Speech at the Peterson Institute for International Economics, Washington, DC, 22 May*, available at <http://www.ecb.europa.eu>
- Reinhart, C. and Rogoff, K. (2009), *This Time is Different: Eight Centuries of Financial Folly*, Princeton University Press, Princeton, NJ.
- Schularick, M. and Taylor, A.M. (2012), "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008", *American Economic Review*, Vol. 102 No 2, pp. 1029-1061.
- White, W.R. (2009), "Should Monetary Policy 'Lean or Clean?'" *Globalization and Monetary Policy Institute Working Paper*, No 34, Federal Reserve Bank of Dallas.

White, W.R. (2013), "The Short and Long Term Effects of Ultra Easy Monetary Policy", *A Changing Role for Central Banks?* – 41st Economic Conference of the Oesterreichische Nationalbank, Vienna.

An old school proposal to meet monetary policy requirements in the current financial environment

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Let me say very sincerely that I am grateful to Peter Praet, Benoît Cœuré, and all our colleagues at the ECB for including me on the programme for the first ECB Forum on Central Banking. It is a great honour. In particular, it is very nice to be seated next to my friend and role model Otmar Issing, because I think he embodies what many of the people in this room (including our ECB colleagues) are trying to do, which is to build a unified Europe through economic means without sowing division between member countries. At this time and juncture, from outside the euro area, let me say that I admire the ECB for the continued pursuit in Otmar's spirit. So thank you.

Let me also begin my remarks exactly where Peter asked us to, which is how we get from some of the discussions we have had so far to practical policy. Peter placed the discussion in the context of the recurring debate between the liquidationist view and the balance sheet view. I would like to think that if the 1930s in Europe were not enough to settle the debate, that the 1990s in Japan would have killed the liquidationist view forever.² Unfortunately, it has not. Sometimes, as Agustín Carstens pointed out a moment ago, it is not just that bad ideas get recycled; they simply will not die. Some of us were writing back in 1998 about Japanese economic policy turning recovery into prolonged recession, and having self-fulfilling monetary policy restraint because of backward-looking output gap measures, and so on. And yet, here we are in the euro area today.

The point that is worth taking away is that we already had a very strong theoretical literature by people like Caballero and Hammour or Greenwald and Stiglitz, that Japan bears out: when you get these kinds of credit booms followed by a recession, the recession does not punish, let alone cleanse, the right firms. Simply having a recession is too blunt an instrument. Simply tightening monetary conditions is still too blunt an instrument. To be very pointed about this, when we look around the euro area right now, it is very difficult for anyone to argue credibly that the incidence of the current credit crunch across borders, differentiated according to the country risk within the unified monetary zone, and with differentials according to the size of firms, is in any way less than arbitrary. Of course, we can rationalise why it is occurring this way, but the facts do not support a liquidationist interpretation that the right businesses are being rationed out of credit and the better investments are the ones being pursued right now. We can debate that in religious terms, but I would hope that those that are empirically minded would let us move on.

So if we take the balance sheet view of recession as the starting point, which an increasing number of speeches by the ECB's leadership over the last year or two clearly have done – and I think, rightly – where do we go next? I found the preceding two sessions of the conference interesting but a little odd because both of them essentially ignored what I think is the main message of the financial crisis for macroeconomic

¹ President, Peterson Institute for International Economics. The author's work in this area is supported by a major grant from the Alfred P. Sloan Foundation. The views expressed here, however, are solely his own and not those of the Sloan Foundation or the Peterson Institute.

² See Posen, A. (1998), "Recognizing a Mistake, Not Blaming a Model", in *Restoring Japan's Economic Growth*, Peterson Institute for International Economics, Washington, DC.

analysis: analysing financial fluctuations and their impact in terms of representative agent models, or the impact of central bank balance sheets solely by their size, misses the point.

The point that we got fundamentally wrong in the early 2000s was that we did not include in our analyses the fact that asset classes and financial markets are highly differentiated, particularly in times of strain. This relates to an earlier discussion of the costs of the Lehman Brothers' failure –the impact of a true crisis is a switch in the overall economic environment, not just the direct impact of the shock. The euro area's macroeconomic challenge is not just that we are in a low and declining inflation state. It certainly should not be defined as just trying to calibrate monetary policy in terms of how much liquidation we will induce versus how much moral hazard. It should be viewed as having moved from one state of blissful ignorance, moral hazard and credit boom, in combination, to an already protracted state of huge risk aversion and dysfunctional financial markets. This new other state that we are in cannot be summarised by monitoring the degree of balance sheet adjustment, even though that is an important aspect. I think monetary policy-makers have to take the analysis at least one step further.

Think about the way that we try to understand the Great Depression. First there was the Friedman-Schwartz argument about monetary aggregates. Then we had research by Frederic Mishkin and others who looked at household balance sheets instead of the disembodied aggregates. We found the big explanation when Ben Bernanke led the effort to deepen the analysis with the non-monetary transmission of the shock through the destruction of information in the banking system. That remains the core cause and in spirit it still applies today, and specifically it applies very well to southern Europe's current downturn. Now, all of you in this room know that in principle, but nonetheless our policy discussion often disengages from that reality. Yet, if any insight should have clearly emerged from the policy experience of the last five or six years, it is the fact that there is no single representative interest rate that the central bank controls which affects all assets in the economy (at least in the current state of the world). That has been our overwhelming policy constraint – the zero lower bound is reached because of this situation; it does not cause the situation.

So, in my view, when we talk about raising inflation expectations or pre-committing to a policy path or other such general approaches to easing, we are neglecting reality. I have some sympathy for the argument by Blanchard and others that, in a normal (pre-crisis) world we would rather be occupying, having a higher inflation target than 2% might offer some insurance. But I do not see talking about that as being a solution to the current problem, because then all the central bank is doing is announcing that it is putting the cart before the horse. Monetary policy needs to restore enough confidence in, and stability between, key differentiated asset classes to get on a higher inflation path and to broaden the impact of traditional interest rate policies. It is not enough to announce that there will be higher inflation and, therefore, that households and business should change their entire mindset. As the Bank of Japan demonstrated with its regime shift over the last 18 months, central banks have to actually make asset purchases and push hard on intermediate targets to establish a different monetary regime, and sustain a different state of affairs, in order to achieve that higher inflation target.

The understanding of our current situation as one with persistently fragmented financial markets and heightened risk aversion brings us back to kinds of policy measures that I believe the ECB's leadership is talking about presently (at least as I gather and I hope). Policies are needed to address specific credit market problems in the euro area. This is why it is very interesting to think about some of the past emerging markets discussions of monetary policy, and about the now global discussion of possible macro-

prudential measures. If we look at the emerging market economies' and resource-rich economies' experience of the last few years, what we find is that you need aggressive targeted interventions to try to limit the impact of capital inflows and stem credit booms. Increases in the interest rate instrument alone are not enough. I would refer to what the Governor of the Central Bank of the Republic of Turkey Erdem Başçı detailed regarding the Turkish case yesterday, as well to the contemporary experiences of the People's Bank of China, the Hong Kong Monetary Authority or the Reserve Bank of Australia. They all have found that you have to employ a whole range of measures to try to constrain credit booms. That is the difficulty of differentiated assets in the boom cycle – interest rate tightening alone does not work.

But if that is the case in the boom, it is all the more true in the bust. Under normal macroeconomic thinking, we know that in response to the circumstances of distressed balance sheets, capital-impaired banks and investor risk aversion – as found in the euro area today – if anything the policy asymmetry goes the other way. It is more difficult to stimulate than it is to tighten when you have people sitting on huge piles of cash who are scared. So if anything, what the ECB faces is not a literal deflationary cycle, but a dangerous sticky state of non-financial businesses and investors being unwilling to move out of a long yield curve or out of near cash except in small ways. If the ECB wants to get Europe out of that state – and it should – it does need to use multiple tools even more so than it would to fight a credit boom. You cannot pretend that moving one central interest rate or making an inflation commitment will be sufficient to reverse the cash hoarding and asset market fragmentation.

That reality creates a challenge because we know that there are arguments made from a political economy point of view, as well as from organisational convenience, to keep macro-prudential policy and monetary policy separate. Is the right approach that of the Bank of England, which has overlapping financial and monetary policy committees? Or that of the United States, which has an interagency committee on financial stability, with the Federal Reserve represented but not chairing? Should the central bank draw a line so as to avoid accusations of engaging in fiscal policy?

It is easy for me to say, now that I am on the outside, but I think that we have to get the central banking community beyond this separation fixation. Most other government departments do not define their mission by their primary tool. If you are the Department of Health and Human Services or of Welfare, you might employ pensions, taxes or social workers, but your goal is health and human welfare. If you are the military, your goal might be deterrence, peacekeeping or war, but you do not say I am defined by being the Navy and I am only going to use traditional ships and tactics. At some point, the central bank has to clearly state that its goal is to get credit flows and risk-taking behaviour back to normal because that is the basis of price stability and financial stability. That is the policy goal that we really should care about, and therefore we should set central banks' duties by that and not by the tools we used to use.

This is why I find the repeated characterisation by central bankers of the policy measures of recent years as "unconventional monetary policy" to be very unfortunate, as it implies that they should be avoided if possible. This characterisation is both misleading and destructive. It is misleading because historically central banks have intervened across a wide variety of private and public assets through the centuries. Go back to the monetary history analyses written by Charles Goodhart, Niall Ferguson and others. Or look around at what the People's Bank of China and numerous emerging market central banks are doing today. It is destructive because it reinforces this notion that there is something so awful about the tools being used that we need to fixate on them rather than our distance from our mandated goals.

What should be the next step for the ECB if you were to take my call to action in line with the reality of fragmented credit markets? Well, as it happens, I agree with where the ECB seems to be going: we need to see the ECB purchasing bundles of securitised small and medium-sized enterprise (SME) loans. I advocated this explicitly for the euro area at the Federal Reserve Bank of Kansas City's conference in Jackson Hole two years ago.³ I advocated such measures at the Bank of England when I was on the MPC.⁴ I did not push for such a measure for the United States because it is not relevant for the problems there given the diversity of its financial system. Bundled SME loans are not a cure-all. I advocate this policy measure here, given that in the euro area, it is the crushing of credit availability for small and medium businesses and for some consumers that is the source of great divergence and is a current barrier to growth. It is not enough to say that we must wait for balance sheets to repair. That is necessary but not sufficient.

So then we get to two practical aspects of such an asset purchase programme. We have had representatives of the Bank for International Settlements and various other speakers warn us yesterday about being prudent with central bank purchases. But purchases of securitised small loans are not as imprudent as some would have it. In terms of operations, as discussed yesterday and as I think is evident, you do need to put in some form of government guarantee for some tranche or part of these bundles. That is not the end of the world. That is effectively what Fannie Mae and Freddie Mac did through the decades in the United States. Let us remember that the problem which arose with Fannie and Freddie was not the securitisation itself; the problem emerged in the mid to late 1990s when they decided they would go into profit-making for themselves and started speculating on their own account. For decades, Fannie and Freddie were stabilising as long as they behaved like a warehouse that just took components in (i.e. loans) at one end and sold them on in a standardized and transparent form at the other.

The more serious issue raised yesterday with such asset purchases is the issue of monitoring. Of course, that relates to the core information imperfection, which drives our present difficulties of a breakdown in lending to small and medium businesses, and why those borrowers can only go to banks. This is not a trivial issue by any means. It is fundamental to why these are bank-constrained borrowers. But let us think about the realities of how lending to small or medium businesses is conducted today. If you were to go in to most banks in Europe, they have credit-scoring software that is based on large databases of past small or medium business loans. It is analogous to what we have already done with mortgages. It is slightly more complicated, definitely more risky, but only in degree; it is not worlds away. This software, with its limitations, was the basis for most lending to small or medium-sized enterprises throughout the 2000s. It is not as though we are in a situation where we have the paradigmatic local credit officer, the Sparkasse manager from 1953, who is there checking in on his business buddy in a particular township. Moreover, if you want to go back to that period in history, let us look at the great example of the Kreditanstalt für Wiederaufbau, the German reconstruction bank that effectively bought bundles of small and medium enterprise loans in the immediate post-war period. It did it through the banks, but in guaranteed tranches.

Furthermore, we know from emerging markets (and there is a vast literature done through the IMF, the World Bank and the regional development banks on this) that when central banks move in to new areas of finance they create markets. So while it is true that right now in the euro area there is not that much

³ Posen, A. (2012) "Comments on Methods of Policy Accommodation at the Interest-Rate Lower Bound by Michael Woodford", [The Changing Policy Landscape – Federal Reserve Bank of Kansas City Economic Policy Symposium 30 August-1 September 2012, Jackson Hole, Wyoming](#).

⁴ Posen, A. (2011) "How to Do More", *Bank of England speech*, available at <http://www.bankofengland.co.uk>

securitised SME paper to buy, it need not remain so. We know that if a central bank creates a market, starts discounting an asset, creates standards for how this paper should be issued, creates minimum regulations for it and some liquidity in the trading of it, there will be an increase of issuance and of demand for that asset class. Going back to the misguided unconventional monetary policy fixation, this actually is a beneficial intervention and one which central banks have often made until the present day. So doing would not mean that the ECB is disrupting markets, but instead is actually working to build a new integrated financial market in Europe. So to me this is the way forward.

Let me close on political economy. A number of officials and researchers are wrestling with the politics of the euro area, but also the politics of central banking in general. I have conversed bilaterally with many people in this room over the years about the sincere concern that many have about monetary policy getting too involved in specific private asset markets or drifting in to fiscal policy. I completely agree that central banks have to be accountable to their legal mandates, and that unelected officials cannot take over the world. One might ask whether unelected officials in Europe have in some sense already done that in the recent past in terms of what they ask for from various member countries as a condition for monetary stimulus, but let us leave that aside today.

If we are going to have central banks move forward in the world – and this includes the Federal Reserve, the People’s Bank of China and the Bank of Mexico, not just the ECB – they have to meet their mandated public goals of financial and price stability. To do so, we have to recognise that in today’s world financial markets are segmented. Borrowers and lenders are both differentiated. Central banks will only be able to meet their goals by engaging in intervention that is not neutral across assets or groups of asset holders. To the extent that this becomes fiscal policy, it is well within precedent and has operational trade-offs – it is not a religious matter.

Again to draw attention to something which I have pointed out before, but which is critical: in the United States it is unimaginable to some that the Federal Reserve would engage in buying private sector assets, as defined by Congress, because that would be considered fiscal policy; in the euro area, it is unimaginable to some that the ECB should buy public bonds outside the very specific conditional market programme because that would be considered fiscal policy. So the issue of what can be considered an acceptable intervention does not have a universal truth. It is a matter of context and reasonableness as is the case for any other instrument of policy. Therefore, the real issue is what if the central banks were to lose some money in dealing in non-governmental assets. And the answer to that is you set in place a rule for recapitalising your central bank ahead of time so that does not arise as a problem.

I hope that I have interpreted some of what the ECB is working towards correctly. I was very glad to see the joint announcement in June of the ECB and Bank of England talking about the SME market. I hope this advances that discussion and I am very grateful for the opportunity to address this distinguished audience.