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Rethinking the central bank's mandate

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Rethinking the central bank's mandate
A summary of a conference of international experts

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In recent years, the discussions on what central banks should do have intensified around the world, both among experts at academic institutions as well as in the media, among politicians and among the broader general public. This is due mainly to the crisis in the financial system which adversely affected many countries in 2007-2009 and its lasting repercussions, but also to some extent to more long-term trends in the global economy, including innovations on financial markets and "globalisation". This article summarises the presentations made by international experts at the conference "Rethinking the central bank's mandate", arranged by Sveriges Riksbank on 3-4 June 2016.

1 Central banks from the 17th century to the present day

"When a new nation state seeks to establish itself, the foundation of an independent central bank will be an early item on the agenda, slightly below the design of the flag, but above the establishment of a national airline."[1] This quote is from a conference volume published in connection with the Bank of England's tercentenary symposium in 1994. It is of course half in jest, half in earnest, but it reflects the fact that central banks have been seen through the years as both a prerequisite for an efficient economic system and a key institution in the political system.

Sveriges Riksbank is often considered to be the world's oldest central bank. It dates back to 1668, making it four years older than the Bank of England. In an historical perspective, however, central banks are still a relatively new phenomenon.[2] Central banks did not become common in Europe until the 19th century, and the decision to create the Federal Reserve in the United States was not taken until 1913. The tasks of central banks, and their connection to the political system, have varied over time and among countries. In slightly simplified terms, however, one can say that the main task of a central bank has been to maintain an efficient system for payments and credit.[3]

During the Second World War, many restrictions were introduced on international trade and capital flows. The financial markets remained strictly regulated right up until the 1980s. During this period, an important task for central banks was to administrate this regulation policy. Direct political influence over central banks was generally strong. During the 1980s and 1990s, deregulation and innovations on financial markets gradually began to develop. Greater mobility for labour, capital, goods and services among countries led to a "globalisation" that also made the differences between central banks in different countries less distinct. Central banks' independence in relation to the political system increased in many countries, while their freedom to act was also affected by ever-greater integration

* We would like to thank Claes Berg and Jessica Radeschnig for their help with editing this conference volume.
1 Capie, Goodhart and Schnadt (1994), p. 91.
2 Se Capie et al. (1994).
3 In her presentation, Loretta Mester points out that the Federal Reserve was established after a series of financial panics to help promote a more stable financial system and avoid costly bank runs.

with the rest of the world. Central bank operations focused afterwards on maintaining price stability, with low and stable inflation, by adjusting interest rates.

This, in combination with deregulation, financial innovation and globalisation, contributed to high and stable economic growth in several countries in the 1990s and in the early 2000s. This took place without any surge in inflation – in contrast to the experience of "stagflation" from the 1970s and 1980s, when growth was low and inflation high, not least in Sweden and other European countries. The period of stable and high growth and low inflation, more or less all over the world, from the mid 1990s to the early 2000s, has been labelled "The Great Moderation". But it was followed by "The Great Financial Crisis". The reforms and innovations that had contributed to the surge in economic growth were also found to have given rise to new risks, both on financial markets and in the economy as a whole.[4]

To limit the harmful effects of the global financial crisis, avoid deflation and maintain an efficient payment and credit system, central banks cut their interest rates sharply. They also took a number of other measures, including lending money to banks and purchasing government bonds and other assets. This caused central bank balance sheets to swell. To begin with, this was seen as a necessity in an emergency situation, but the global economy has recovered slowly after the crisis and these "unconventional" measures have therefore still not been phased out.

The development has raised many questions about the design of the central bank mandate. A lesson from the financial crisis was that keeping prices stable was not enough to create stability in the economy on a more general level. It is insufficient for central banks to try to achieve macroeconomic stability through price stability while the micro level in the financial system, that is individual financial institutions, are overseen using traditional supervisory methods by either central banks or separate finance supervisory authorities. Oversight and governance of the financial system as a whole are also required. This insight has led to the creation of an entirely new policy area; macroprudential policy. Macroprudential policy is partly a question of introducing regulations similar to those that applied in the first few decades following the Second World War – different measures for limiting growth and fluctuations in credit and indebtedness. This in turn raises the question of whether it should be the task of central banks to administrate these measures. On the one hand, they work via some of the same channels as interest rate policy and are linked to a central bank's traditional responsibility for the payment and credit system. Furthermore, arguments for keeping macroprudential policy at arm's length from the political system can be just as strong as they are for interest rate policy. On the other hand, macroprudential policy is also closely linked to microprudential policy and also has some similarities with fiscal policy measures. Giving a large toolbox to a central bank that is very independent can also lead to problems relating to the political legitimacy of central bank independence. On economic grounds, we can indeed question whether it is appropriate to separate interest rate policy from micro- and macroprudential policy, but there are political arguments in favour of spreading the responsibility for financial stability among different authorities.[5] Neither is central bank independence a black and white issue but is instead somewhat of a grey area. The degree of independence varies among countries, and it is reasonable to assume that the tasks allocated to the central bank depends on how independent it is, and vice versa.

In addition to experiences from the financial crisis and the consequences it should have for interest rate policy, regulations and supervision of the financial system and central bank independence, globalisation and different financial innovations raise a number of other issues relating to the central bank's mandate. What does it actually mean when we say that

4 See Borio and Lowe (2002), and Rajan (2005).
5 See Acharya (2015).

the central bank has a statutory monopoly on issuing banknotes and coins that are "legal tender", when both the supply of and demand for other forms of payment are constantly increasing? How should the central bank's task of providing emergency liquidity assistance, that is act as lender of last resort, be formulated when (a) banks are increasingly operating across national borders, and (b) banks' tasks are also being performed to a greater extent by other financial institutions (so-called shadow banks)? What responsibility does the central bank have for financial stability, and how is this linked to monetary policy and the resposibilities of other authorities (for example, regulations and fiscal policy)? How should central bank governance be designed – both politically and internally – depending on which mandates it receives?

It was against this backdrop that Sveriges Riksbank arranged a conference of international experts on 3-4 June 2016.[6] The rest of this article summarises the presentations made at the conference. More than half of these presentations are also published in this issue of the Economic Review in the form of specially written papers. These sometimes contain more ideas and analysis than in the original presentations.

The conference was arranged as a number of sessions with different themes and ended with a panel discussion. We summarise all the presentations per session below, including the contributions published in this special issue. Our summary is intended to be easily accessible for non-specialists in the subject or those who just want a quick overview. If you wish to dig deeper, we recommend you to read the published contributions in this issue. Alternatively, you can find the presentations on the Riksbank's website.[7]

2 Why are central banks necessary?

Alan Blinder is a professor at Princeton University and ex-chair of the Board of Governors of the Federal Reserve System. He began by noting that *somewhat independent central banks* are necessary; his point being that the tasks of central banks could in principle be done by, say, a finance ministry, although this would not be appropriate. Thus, a central bank with a certain degree of independence is needed. What that independence should look like depends on the functions given to the central bank by its commissioner (parliament or government).

Blinder describes four classic functions of a central bank:

1. Monetary policy
2. Lender of last resort
3. Supervisor/regulator of banks/financial institutions
4. Guardian/operator of the payments system

Blinder considers 1) and 2) to be defining properties, that is functions where the central bank has a "natural monopoly". However, the central bank can encounter competition regarding tasks 3) and 4).

As regards monetary policy, Blinder said that the central bank's task is broader than merely maintaining price stability at a "nominal anchor" with the help of interest rate policy. This was the view taken by many prior to the financial crisis. Instead, central banks now use several different instruments and can also consider other goals, such as financial stability and employment. A responsibility for financial stability is actually nothing new as central banks

6 For a more detailed background, see the article by Georgsson, Vredin and Åsberg Sommar (2015), which was circulated to the international experts together with the conference invitation. The conference programme can be found in the appendix to this paper.

7 The conference invitation did not stipulate a requirement to deliver a paper, only a request for the experts to share their knowledge in the form of a presentation at the conference itself. The slides from all the presentations can be found on the Riksbank's website at: www.riksbank.se/sv/Riksbanken/Forskning/Konferenser/2016/Rethinking-the-Central-Banks-mandate--konferens-3-4-juni/.

were originally founded to create it. But Blinder expressed surprise over the fact that not more central banks have been given an explicit mandate to control employment. The Federal Reserve has such a mandate.

As regards being lender of last resort to financial institutions, Blinder noted that this is something that can be easily politicised. But the task must be given to one (and only one) institution that can "print money". It must also be handled carefully as having a lender of last resort can lead the financial institutions to take excessively high risks since they know that they will receive support in a crisis situation. This phenomenon is usually referred to as "moral hazard".

Blinder pointed out that many different solutions have been chosen internationally as regards how to distribute the responsibility for supervising and regulating financial institutions. This is not that strange as there are many ways of combining the responsibilities. One institution can, for example, be responsible for regulation, another for supervision. Different authorities can be responsible for banks and other financial institutions respectively. Micro- and macroprudential policy can be given to a single authority or to several different ones. For example, the Fed "competes" with many other authorities in these areas, but has after the financial crisis been given the main responsibility for all systemically important institutions in the United States, both banks and others. However, the Fed shares the responsibility for macroprudential policy with the Department of Treasury. This means that the Fed is to keep track of weaknesses in the system and blow the whistle, although it has no macroprudential policy weapons of its own.

As regards the fourth task, the payments system, Blinder emphasised that central banks have long since had competition in this field. The monopoly on issuing currency, for example, is becoming increasingly less important. Central banks do, however, need to monitor how the payments system functions and act as "plumber". The payments system must be more reliable than cable TV!

In a financial crisis, the role of the central bank changes in these four classic functions. In a crisis situation, central banks naturally act in accordance with a short-term plan. The main task will then be to maintain financial stability by acting as lender of last resort and ensuring that the payments system works, while normal monetary policy takes a back seat. In such a situation, it can be critical for central banks to have access to the same information as the authorities that supervise financial institutions. The need for coordination with finance ministries will also be greater. These conditions mean that the usual arguments for central bank independence may be less relevant in a crisis. But when the crisis is over, independence should be re-established. So what do we do if the crisis lasts a long time and becomes the norm? This is a challenge currently facing the euro area, Blinder thought.

Alan Blinder concluded by noting that there may be reason for central banks to go outside their formal mandate in a crisis situation and for us to accept that central banks then operate less independently. But under normal circumstances, it is important for central banks to "stick to their knitting", that is keep within their mandates, regardless of whether they are broad or narrow, so that they can continue to operate independently.

Jon Faust is a professor at John Hopkins University and former special advisor to Federal Reserve chairs, Ben Bernanke and Janet Yellen. He pointed out that it is important to look at a longer historical span when formulating the central bank's mandate. The risk is that focus will otherwise be only on the most recent crisis. Faust reminded everyone that it is generally a good idea to keep an eye on the rear-view mirror when moving forward and trying to work out solutions to current problems.

Just now, we have particularly good reason to scrutinise relevant history. It was Faust's opinion that the early 2000s may distinguish itself as a misdirected deviation in the long history of how people have viewed the operations of central banks. There was a period when many experts and decision-makers either forgot the lessons of financial crises or felt that they were no longer relevant. According to the view that prevailed at the time, the central

bank's overall objective was to "provide a nominal anchor". Many other lessons from our monetary history were confined to a more remote location. History has a way of reminding those who forget, Faust pointed out, and in this case it did so with breathtaking speed and ferocity, in the form of a classic financial crisis.

According to Faust, central banks – and other private and public institutions that supervise and regulate the financial system in some way – are needed as modern financial economies tend to be adversely affected by pathologies that are difficult to predict. It can, for example, be a question of payment balance crises, an unsustainable fiscal policy giving rise to crises in public finances, unsustainable borrowing in the private sector leading to financial crises and crises, or an overheated economy with an excessively rapid increase in the general price level.

If we are to re-evaluate the tasks of central banks, a focus on the risks of such pathologies, as Faust calls them, is a good starting point. According to Faust, central banks will always be the first to tackle financial crises when they arise, largely regardless of how their mandate is designed. Whether central banks, in addition to the responsibility for price stability, should have explicit mandates to promote stability of real activity and financial stability is something that needs to be further discussed, Faust said. There are synergies between monetary policy and the regulation and supervision of banks and the payments system, which suggest that gathering these tasks at one institution is beneficial. On the other hand, a central bank may find it difficult to manage all this, and politicians may have difficulty delegating such a large responsibility to a central bank with a high degree of independence, Faust noted. As regards to balance of payment crises, central banks have shifted from a strategy of focusing on avoiding them, which meant that the price stability objective became subordinate, to a converse strategy focusing on price stability and leaving the external balance in the hands of the market. According to Faust, neither of these strategies have been entirely successful.

Faust concluded by noting that the economic depression of the 1930s was followed by a long period of economic stability. This may have been due to the lessons learned from that crisis, which, if true, gives us cause for optimism about macroeconomic performance following the latest crisis. But Faust pointed out that economic crises have also tended to lead to political blunders and that it is therefore unclear in the current situation which of these hopeful or ominous tendencies will dominate.

3 What role has a central bank in liquidity provision?

Franklin Allen is a professor at Imperial College, London and the University of Pennsylvania. He pointed out that inadequate access to liquidity was an important component of the financial crisis of 2007-2009 – that is both financial corporations and other companies had insufficient short-term debt-servicing ability although their long-term earning capacity was good. In the development of Basel III, a new international regulatory framework for banks, work has therefore focused on setting out different types of liquidity standards (the LCR and NSFR ratios). Allen stressed the importance of asking why insufficient liquidity can arise, what market failures can cause it and whether the regulations are the best way of correcting the problems. So far, the research literature has focused more on which capital requirements should be imposed on banks than on liquidity standards.

In economic theory, a central bank acting as lender of last resort can be justified in order to mitigate the effects of a single bank, or the entire banking system, being hit by a bank run. But it is not obvious, Allen said, that liquidity standards are also required because of this. Examples of market failures that could prompt such standards have, however, been presented by Rochet (2004 and 2008) and by Perotti and Suarez (2011).

When going from theory to practice, we also have to consider the fact that liquidity standards and other regulations incentivise banks and other companies to develop new financial instruments, mainly created in order to comply with the new standards. This causes a problem both because it can lead to the purpose of the standards not being fulfilled, and because the resources spent on circumventing the standards could be used to better effect. Another difficulty caused by this development is that central banks need access to funding in foreign currency in order to be able to supply the emergency liquidity assistance that banks need. The use of swap agreements between central banks could be extended to increase their access to foreign currency.

Allen's conclusions were that the research into liquidity problems and liquidity standards is still at a relatively early stage compared with the capital requirement complex, and that it is, for example, far from clear which of a bank's assets should be counted as liquidity.

Linda Goldberg is Senior Vice President at the Federal Reserve Bank of New York. She pointed out that central banks are devoting themselves to facilitating provision with means of payment and credit – that is liquidity provision in a broad sense – in several different forms, which has to do with both monetary policy and financial stability.[8] In normal monetary policy, the central banks limit the effects on interest rates caused by normal fluctuations in the demand for liquidity. Central banks also provide emergency liquidity assistance under special circumstances. Goldberg described the Fed's different forms of deposits and borrowing ("discount window basics") and their various conditions, such as interest rate, who is allowed to borrow and collateral requirements. These facilities are associated with various risks because banks may want to borrow too little (stigma) or too much (moral hazard). Goldberg raised the issue of whether it would be possible to design the various tools so that they will be more clearly adapted for certain specific purposes.

Goldberg also highlighted the fact that non-banks do not have access to the Fed's liquidity provision and that there is a general problem with a lack of clarity as to who has the responsibility for liquidity provision to global banks. The increased significance of financial intermediaries other than banks (such as "shadow banks") raises issues, as does the fact that banks are now complex constructions with a set-up of different companies that constitute "the bank", which has parts that are not covered by the liquidity regulations. This requires authorities to increase their supervision.

Goldberg described how supervision is implemented in New York. She pointed out that stress tests of risk management practices are important. It is a question of monitoring what "organisational liquidity" looks like, that is how the bank is organised in order to prevent and be able to cope with liquidity problems, and not just how the assets in bank portfolios are distributed. The hope is that more supervision and tests will reduce banks' need for emergency liquidity assistance, regardless of whether it is due to problems that primarily affect banks themselves or a more general market shock.

4 When and how should central banks take on the role of lender of last resort?

A distinguishing feature of the financial crisis 2007-2009 was that certain banks were forced to suspend payments because they lacked liquidity. In these situations, the central bank plays an important role as lender of last resort. When the bank in distress is unable to obtain funding in any other way, it can turn to the central bank for emergency liquidity assistance.

Charles Calomiris is a professor at the Columbia Business School in New York. He argued that a central bank must make some difficult trade-offs in its role as lender of last resort. On

8 See also Bertsch and Molin (2016).

the one hand, we want to avoid a total collapse of the financial system when a major bank encounters payment difficulties. On the other hand, neither do we want to give banks in distress unconditional support as that might lead them to take greater risks. This could entail major costs for public finances in the longer term. Calomiris claimed that financial crises have become more common due in part to the fact that central banks and other authorities have been too generous in their support to banks and other financial companies facing a crisis. The precautionary principles for how the government should act, as proposed by Walter Bagehot as early as 1873, are still very relevant, said Calomiris, even though the exact regulations have to be adapted to today's more complicated financial systems.

Calomiris also said that clear laws and regulations are required for central banks to be able to act as lender of last resort in the best possible way. He considered it necessary to conclude political agreements on the regulatory framework to provide legitimacy to central banks. An explicit regulatory framework also provides more scope for politicians to demand accountability from the central bank for its actions. Further, Calomiris was of the opinion that central banks should not bear sole responsibility for being lender of last resort. Instead, certain measures should be adopted by a central bank in consultation with authorities that are more under the direct control of parliament and the government, in order to give it legitimacy. He mentioned Canada as an example of a country where regulations already exist as to what type of incident will be met with which type of measure.

Charles Goodhart is a Senior Professor at the London School of Economics and an ex-member of the Bank of England's monetary policy committee. He proposed that when a central bank considers taking on the role of lender of last resort, it shall estimate the size of the expected loss that the credit can lead to. If it exceeds a certain amount, the central bank shall require permission from the government before acting as lender of last resort. Goodhart's incentive for this is that it is not possible in advance to specify all feasible events or the nature of the crisis.

Goodhart also rejected a commonly mooted idea that central banks should lend to the market in general rather than to individual institutions in a crisis. In this way, banks on the market are expected to lend money to the bank that needs it. The problem is, however, that banks on the market will not want to lend money to a weak bank. This may even lead to a downward spiral. First, the weakest bank fails, then the next weakest and so on.

According to Goodhart, the moral hazard problem, that is, that the banks take excessive risks because they assume they will be saved by the central bank, is best counteracted by dealing most harshly with the first bank to ask for help, as this bank has probably taken the most risks. After that, the central bank must be prepared to save other banks. Another means of counteracting moral hazard is to involve other banks in the rescue action. This means that if other banks want to avoid a systemic risk, they must contribute to the costs.

Finally, Goodhart argued in favour of changing the incentives for individuals working at banks and other financial companies, in order to reduce the risk of financial crises. It should be more difficult than it is today for decision-makers who can influence the risks taken by a bank to be discharged from liability and it should be easier to demand damages from them.

5 What responsibility for price stability and economic fluctuations should a central bank have?

Ricardo Reis is a professor at the London School of Economics and Columbia University in New York. According to him, central banks have a unique role in providing a country with its means of payment and a stable and efficient payments system. It is therefore natural that they are also responsible for price stability. The responsibility for price stability in turn means that central banks also have a responsibility for stabilising the business cycle.

The other presenter in this session, Michael Woodford, is also a professor at Columbia University. He had a slightly different starting point. Woodford noted that, since the early 1990s, there has been considerable consensus on the success of central banks' starting to practice flexible inflation targeting. The Riksbank was one of the first to follow such a strategy, which involves the central bank expressing an explicit target for inflation while consciously tolerating some temporary deviations from it in order to be able to take developments in output and employment into consideration. But developments since the financial crisis have caused this strategy to be questioned. Over several years, many central banks have not managed to achieve their inflation targets. It has been discussed whether the inflation target should be supplemented by other explicit targets, above all for employment. Targets linked to economic growth (GDP) have also been proposed and analysed. It has also been discussed whether central banks should be given a clearer responsibility for financial stability.

Reis pointed out that central banks have utilised a number of new tools to achieve the flexible inflation target, including more forward guidance and quantitative easing, for example in the form of purchases of bonds on the open market. He believed that a great deal more could still be done, however. Reis also thought that the inflation target could be replaced by a price level target, to a greater extent than today and that central banks should put more focus on resource utilization (unemployment for example).

Woodford also noted that even if central banks had not managed to achieve their inflation targets, the targets had served both the central banks and the economy well on the whole. The flexible inflation target has considerable advantages as it is easy to understand and firmly anchored in many countries. It is also relevant to private individuals and makes their decision-making easier.

Woodford argued that the flexible inflation target had played a major role as an anchor for future inflation expectations. It has thereby been of considerable importance in reducing macroeconomic instability, both in connection with the crisis of 2007-2009, and later on. Unlike the 1930s depression, inflation expectations did not fall during the most recent financial crisis. But in the 1930s, expectations of low price increases and even deflation caused major problems. Nor did the sharp fluctuations in the oil price in recent years have the same negative effects as in the 1970s, when the oil price increases triggered a destructive, inflationary wage-price spiral.

Although other sub-targets, such as employment and financial stability, are important and relevant, today's flexible inflation target has advantages suggesting that its special status should be preserved, according to Michael Woodford. However, he thought that central banks should consider complementing the flexible inflation target with a target for nominal GDP growth to strengthen the link between the inflation target and general economic development.

6 How should a central bank manage links between macro stability and financial stability?

Loretta Mester is Head of the Federal Reserve Bank of Cleveland and a member of the Federal Open Market Committee (FOMC). She emphasised five points that indicate a link between the degree of financial stability in the economy and macroeconomic developments.

The first point is that the goals of monetary policy and financial stability are interconnected. Price stability promotes an efficient financial system and a stable financial system enables an effective monetary policy to be pursued. There may sometimes be a conflict between the goals, such as when expansionary monetary policy aimed at stimulating the economy can lead to excessive risk-taking, or when measures aimed at improving

financial stability can lead to lower economic growth. But Mester thought that there is no such conflict at present. The financial crisis has shown that better regulations and supervision of the financial system are needed, and this is not contrary to economic growth.

The second point highlighted by Mester is that central banks and other authorities are in the process of developing macroprudential tools that can lower the risk for, and the consequences of, financial instability. Mester believed that the structural tools, such as minimum requirements on bank capital and liquidity and stress tests, are more promising than the tools that are intended to vary over the business cycle. She pointed out, based on the situation in the United States, that it can be complicated to vary the tools over the business cycle, due partly to the fact that many authorities are involved and share the responsibility for the regulatory framework.

Mester's third point was that policymakers should take a systematic approach in applying financial stability policy rather than relying on discretion. This is a well-established approach in monetary policy. Systematic monetary policy can influence the general public's expectations in a desirable way and help maintain a long-term approach to economic policy. Mester thought that such arguments are just as important in the financial stability area, as the regulatory framework aims to influence how financial market participants behave. It is, for example, important to make it clear in advance how a central bank intends to set a countercyclical capital requirement and under what circumstances financial institutions that have problems will receive support or be resolved.

The fourth point highlighted by Mester is that macroprudential policy, similar to monetary policy – but in contrast to normal supervision of banks (microprudential policy) – should be transparent. This is important both in order to influence the expectations and behaviour of financial market participants, and so that it is possible to hold those who make decisions on economic policy measures accountable. At the same time, Mester thought that it is more difficult to communicate financial stability than monetary policy in a clear way. This is because 1) the tools of financial stability are relatively new, 2) measures must be taken before there are any clear signs of financial instability and 3) the regulatory regime is complicated. Mester considered that it could be worth exploring whether it might be possible to simplify the regulatory regime for macro- and microprudential policy.

Mester's fifth and final point was that financial stability should not be added as another goal for monetary policy but that monetary policymakers must constantly consider the linkages between financial stability and monetary policy goals. The first line of defence against financial instability is, according to Mester, structural tools, such as capital requirements and liquidity standards. As it is uncertain how effective countercyclical tools can be, structural requirements should be set somewhat higher than we otherwise would have done, Mester said. But if macroprudential tools proved to be inadequate and financial stability risks continue to grow, monetary policy measures could then become relevant.

Isabel Schnabel is a professor at the University of Bonn. She began by noting that central banks, regardless of their mandate, must take financial stability into account. One of the reasons for this is that the degree of financial stability affects the impact monetary policy has on the economy (the transmission mechanism). The issue is not therefore whether central banks should take financial stability into account but rather how they should do so.

Schnabel outlined three areas where central banks can contribute to financial stability. The first is that central banks may need to act as lenders of last resort in a financial crisis, something which is largely uncontroversial. There is, however, a discussion on the principles that should apply to this, and under certain circumstances, this role may come into conflict with monetary policy objectives. The second area concerns whether financial stability should be a monetary policy objective. The third area concerns the role of central banks as prudential supervisors. The last two areas are more controversial, according to Schnabel.

As regards monetary policy, Schnabel presented a brief discussion on "lean versus clean", that is whether central banks should be content with cleaning up the mess after some kind of

asset price bubble has burst, or whether they should try to prevent such bubbles emerging by using monetary policy to "lean against the wind". Arguments are often put forward for both approaches. Schnabel summarised an empirical study of 23 asset price booms over the last four hundred years that she has conducted with Marcus Brunnermeier, and what the study said about this. She noted that historical experiences suggest that just "cleaning up the mess" afterwards is unlikely to be optimal. Macroprudential measures can be used to prevent bubbles, but monetary policy measures are needed as a complement.

Schnabel also reviewed what empirical research has to say regarding the role of central banks as prudential supervisors. There has long been a debate on whether monetary policy and banking supervision should be managed within the same authority or in separate authorities. But the issue cannot be resolved without empirical research in the field, said Schnabel. Here conclusions are that experience suggests that close cooperation and information exchange among central banks and supervisors is useful. According to her, it improves both monetary policy and financial stability. The effects of giving the central bank the responsibility for supervision are less beneficial. This could lead to the central bank finding it more difficult to achieve its monetary policy goals, while the consequences for financial stability can be both positive and negative.

Charles Goodhart made two presentations at the Riksbank conference, one on the central bank's responsibility for acting as lender of last resort (see above) and one as part of the panel discussion (see below). But his contribution to this conference volume comprises a third paper, which he wrote together with Elga Bartsch and Jonathan Ashworth from Morgan Stanley. (Goodhart works as a consultant for Morgan Stanley.) Goodhart, Bartsch and Ashworth (GBA) discuss an issue touched upon in both Mester's and Schnabel's contributions, as in several others: the monetary policy transmission mechanism, i.e. the channels through which monetary policy measures affect inflation, employment and so on.

According to GBA, a great deal of monetary policy analysis is based on a simplified assumption that there is a direct connection between central bank interest rate decisions and the real economy. One does not then consider that monetary policy works via the banking system. It may seem surprising that the very low policy rates and the expansion of central banks' balance sheets, which occurred when they, for example, purchased government and housing bonds, have not had more positive effects on the economy. But the situation in the banking system can explain this, according to GBA. Generally low interest rates, small deviations between short and long rates (flat yield curve) and major uncertainty have led to the banking system preferring to hold large liquidity reserves at the central bank. The traditional multiplier effect of central banks' securities purchases on money supply and credit creation, which could have been expected, has therefore diminished.

GBA refer to measures taken by the Bank of England (Funding for Lending) and Banco d'España (Dynamic Pre-Provisioning) to create more positive effects on bank lending. At the same time, they see a risk when so much bank lending is channelled to households and real estate rather than to business. The nexus between the banks' credit expansion, the financial cycle and housing booms needs to be broken, according to GBA.

For the monetary policy transmission to work, capital and good profits are needed in the banking sector, say GBA. If transmission mechanisms don't work properly, monetary policy risks running out of ammunition and further stimulus would instead have to be provided by fiscal policy, if need be.

7 What are the links between monetary policy and fiscal policy?

According to Isabel Correia, Head of Economics Department at Banco de Portugal and professor at Catolica Lisbon SBE, the financial crisis has put us in a situation where there

is not much room left for stimulating the economy via traditional monetary and fiscal policies. Interest rates are close to zero or negative and public debt has increased. The focus has therefore shifted towards more unconventional monetary policy measures, such as quantitative easing, that is, the central bank purchasing securities. A problem with these is that they may expand central bank's balance sheets with high-risk assets.

Correia noted that monetary policy has had to bear too large a burden for stabilising economies after the financial crisis, and that unconventional fiscal policy should take greater responsibility.[9] Taxes can be used to stimulate the economy in similar ways to how interest rates are normally used. She argued for a different mix of fiscal policies to stimulate activity in economies struggling to increase growth, without this causing major budget deficits and hence needing to be funded by higher taxes or reduced expenditure later on.

Isabel Correia also raised the issue of which criteria to use to evaluate unconventional monetary and fiscal policies. One way of measuring the effects of policies is to introduce welfare as one of the criteria. This may sound obvious, but it means that the policies are not just used for stabilisation purposes, that is to reduce fluctuations in output and employment. We may even be prepared to accept greater volatility under certain circumstances if it is good for the development of public welfare over time. In other words, it may be time to reassess how economic policy is conducted and evaluated, and not just in the monetary policy area.

Pierpaolo Benigno is a professor at LUISS Guido Carli and the EIEF. He analysed the links between fiscal policy and the purchase by many central banks of government bonds after the financial crisis, known as quantitative easing (QE). One of his points was that the effects of QE may be overestimated if we don't take the fiscal policy implications into account. Benigno argued that QE can have a negative wealth effect on the private sector if the central bank makes losses that are covered by the treasury via higher taxes. For QE to have the desired effect, the measures therefore need to be backed up by a fiscal policy that does not include tax increases. This requires some coordination of monetary and fiscal policies.

There has also been an international debate on whether QE should be used even when the financial conditions in the global economy have normalised. Benigno argued that QE, despite its possible limitations that he had demonstrated, can be a useful tool under the current special economic circumstances. On the other hand, he thought that this is not enough to justify using QE as a monetary policy tool after the situation has normalised.

8 How should a central bank be governed?

David Archer is an economist at the Bank for International Settlements. He said that many central banks may be heading for a legitimacy crisis as their objectives have become less clear. One reason for this is that the powers of central banks have increased, especially regarding financial stability.

According to Archer, it is inevitable for central bank mandates to change over time. It may be difficult, however, to increase the mandate just now as trust in politics and political institutions is falling in many countries.

Moreover, the low interest rates mean that central banks' profits will decline drastically in many countries and they will therefore become less financially independent.

However, the fact that mandates are changing does not mean, according to Archer, that the central banks are necessarily heading into areas where they have no place. Central banks have had a key role in stable and reliable payments systems ever since they were first created.

Four-fifths of the world's central banks also have objectives that concern financial

9 Eric Leeper also argued that fiscal policy needs to support monetary policy in order to stabilise inflation and the price level around the desired target. See the summary of his contribution to the panel discussion below and his article "Why central banks should care about fiscal rules".

stability, but they often only refer to the payment systems and bank supervision. They are consequently more limited than the set of possible objectives we are currently discussing. Furthermore, the objectives are often formulated so that they appear to be subordinate to the objective of price stability.

According to Archer, the problem with the new objectives concerning financial stability now being discussed is that they are unclear. It is difficult to define what is meant by financial stability, what is good or bad credit growth, and how much stability should be sought. If such objectives for central banks are added, there is a risk that central banks will be perceived to have failed to reach their objectives. They would then also lose legitimacy.

John B. Taylor, a professor at Stanford University, also said that the objectives are of major importance if central banks are to be able to continue to operate with a high degree of independence. Today's limited price stability targets, and in certain cases also employment targets, are of very considerable value. If the central banks' mandate is widened, support for them to be independent will weaken.

Taylor also pointed out the major shifts to and from rules-based central bank policies that have occurred historically. His opinion was that the central banks' objectives should not be widened but deepened. Central banks need to communicate a strategy for how they shall reach existing objectives, and make it clearer which regulatory actions they use to achieve them. If this is done in many countries, it may in turn lead to international agreements on how the international monetary system with its large flows of capital and currencies is to work.

Bearing in mind the large number of calls for reforming central banks, Taylor also believed that it is a good time to start introducing more rules-based policies. He felt that some of the increased uncertainty in the economy emanates from the uncertainty surrounding how central banks are to act.

9 Panel discussion: How should central banks be designed?

Patricia Mosser[10] put forward a number of recommendations on how central bank policy can be improved, against the backdrop of her view of the experience gained by the United States from the financial crisis – "Do's and Don'ts in Central Bank Design". Mosser began by noting that the responsibility of central banks for financial stability is a complex issue, as it is linked to both monetary and fiscal policies as well as to regulations.

Mosser's first recommendation was that the central bank's task as lender of last resort should not be limited to only a few counterparties. This does not work when monetary policy channels used to influence the economy (transmission mechanisms) are seriously disrupted. For example, central banks should be prepared to provide liquidity support to foreign banks as well. On the other hand, according to Mosser, the central bank should not establish new rules for liquidity support or other lending and deposit options it offers in the midst of a bank run. For example, it should not change the requirements for collateral for the loans it issues. This can contribute to greater uncertainty and financial instability.

Mosser also thought that central banks should not in advance exclude any tools which they have a legal right to use, for example swap agreements with other central banks. It is also important to be aware of the fuzziness of the boundary between central bank policy and fiscal policy. An example of this is the difficulty in determining whether a bank only needs emergency liquidity assistance because it has liquidity problems or whether it is also

10 Patricia Mosser is Senior Research Scholar at the School of International and Public Affairs, Columbia University. She has previously worked at the US Treasury in Washington and at the Federal Reserve Bank of New York.

a question of a solvency problem which may involve the state having to inject tax revenue. To assess this, central banks must make assumptions about what the effects will be of the integrated economic policy, as it can affect the bank's situation.

As Alan Blinder had done, Mosser also pointed out the importance of central banks keeping track of the risks present in the payments systems – their role as "plumber". For partly this reason, central banks, according to Mosser, need access to more and better data than they have today, for example on shadow banks and how dependent banks are on short-term funding and the risks this poses. Mosser felt that an upgrade and increased international cooperation are needed regarding data collection. Continuous oversight and risk analysis are, according to Mosser, just as important for central banks as the more standard tasks they perform within the areas of macro-modelling and analysis.

Svein Gjedrem took as his starting point four criteria for a good institutional framework as presented by Mervyn King:[11]

1. Clear objectives
2. Tools and competence to meet these objectives
3. Accountability
4. A design that reflects history and experience

Gjedrem started by giving some examples of the significance of history and experience. Norges Bank has had a more uneven path towards greater independence than Sveriges Riksbank, as Norges Bank comes under the government and not directly under parliament, as is the case with the Riksbank in Sweden. In Norway, ministers are also entitled to give direct instructions to authorities, in contrast to how the regulations are stipulated in Sweden. Gjedrem said that there is probably no single best solution to how central bank regulations should be formulated.

As regards the objectives of central banks, Gjedrem noted that central banks have throughout history been tasked with maintaining an efficient monetary and financial system. Monetary policy should also stabilise output and employment. But exactly how these objectives should be stipulated and ranked is not clear. While monetary policy objectives develop over time, it has been more difficult to specify the objectives for the stability of the financial system. As Loretta Mester had done earlier, Gjedrem stressed that the various objectives of central banks are intimately intertwined. He also said that central banks cannot shirk their responsibility if a debt and property bubble emerges which leads to a financial crisis. This is one reason why central banks should have an explicit responsibility for financial stability by law.

As regards the tools and competence of central banks, Gjedrem said that in a situation where interest rates are low or even negative, monetary policy is not necessarily sufficient to be able to achieve price stability. Stability and confidence in public finances and the financial system are also needed. Gjedrem mentioned, by way of example, that the capital requirements imposed on banks are, in his opinion, not high enough to create such stability. It should fall within the central bank's remit, according to Gjedrem, to point out such shortcomings, even when other authorities have the responsibility and the tools to rectify them.

As regards how the political system should hold central banks accountable, Gjedrem said, in conclusion that there may be a tradeoff to consider in relation to their independence. While mechanisms for accountability are needed to maintain a central bank's independence, that very independence also limits the scope for accountability. Transparency on the part of the central bank can facilitate this tradeoff, as would be the case if the political system set

11 Svein Gjedrem was Governor of Norges Bank between 1999 and 2010. He now works part-time (Professor II) at the Norwegian School of Economics in Bergen, and is chair of a commission that is to draw up a new legislative proposal for Norges Bank. Mervyn King was the Governor of the Bank of England between 2003 and 2013 and is currently a professor at the London School of Economics and at New York University.

the central bank's objectives. The central bank can then have a high degree of independence to perform its tasks even though it did not set its own objectives (independent regarding its instruments but not its objectives). Gjedrem's overall conclusion was that a good institutional and political framework is required for central banks so that they can perform their tasks in the best way.

Charles Goodhart's contribution to the panel discussion was based on a paper he presented at an earlier conference (Goodhart, 2016) and is therefore not published in this conference volume. Similar to Jon Faust, Goodhart performed a review of central banks' development over the course of history and noted that periods of consensus about their roles had been followed by crises and increased uncertainty, whereupon a new period of relatively broad consensus emerged. Prior to the last financial crisis, for example, everyone agreed that price stability and capital requirements would guarantee that banks would remain solvent. The idea was that this would then prevent them from encountering liquidity problems. The belief was that maturity mismatches between banks' assets and liabilities would not be a problem. After the crisis, there was widespread uncertainty regarding how the banking system should be regulated. One reason for this is technical developments, which constantly change the nature of banking services and operations, Goodhart echoed Loretta Mester in saying that macroprudential policy should be the first line of defence against systemic risk, before monetary policy measures are considered. At the same time, flaws in the banking system mean that monetary policy has become less effective and found it difficult to achieve its objectives (see the paper by Goodhart, Bartsch and Ashworth). The financial crisis has also led to a broadening of the focus of central bank operations to include not only price stability but also financial stability. They have also utilised more of the tools in their toolbox than usual. The changes have, according to Goodhart, affected the confidence in central banks and risk having an impact on their independence.

Eric Leeper's contribution to the panel focused on the interaction between monetary and fiscal policies. Leeper began by noting that financial crises often had far-reaching consequences. After the financial crisis in the early 1990s, Sweden adopted far-reaching fiscal reforms starting in 1993 and also established the principle that the Riksbank was to have a higher degree of independence and an inflation target. There was broad political support for exiting a regime of high and volatile inflation and inadequate fiscal policy discipline. Even though the details of Swedish fiscal policy framework have developed since then, the fundamental principles are still in place. Sweden has a net borrowing target and plans to aim for a "debt anchor" as from 2019.

Fiscal policy objectives focus on ensuring that fiscal policy is "sustainable". While sustainability is necessary, Leeper regretted the fact that the fiscal rules adopted in practice have come to take "sustainability" to mean single-minded fiscal austerity. The rules reflect the principle that a low public debt is a good liability, with little regard for how fiscal policy must work to enable monetary policy to successfully stabilise inflation or what role a secure public debt plays in the financial system.

Leeper argued that fiscal policy rules are designed to solve a political problem, for example tendencies towards excessive budget deficit. But instead, they risk creating an economic problem and the remedy could be worse than the illness if it undermines the ability of monetary policy to control inflation. The rules established in the early 1990s are not designed for the present-day situation of healthy public finances and low inflation. They were developed to deal with an entirely different situation of budget deficits and high inflation. A review is therefore needed of fiscal and monetary policy objectives to ensure that both policy areas are able to achieve their own goals jointly.

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Appendix – Program for the Riksbank's conference on "Rethinking the central bank's mandate" Stockholm, June 3-4, 2016

Friday, June 3:

9.00-9.15	Opening remarks: Stefan Ingves (Sveriges Riksbank)
9.15-10.45	**Session 1. (Why) Are central banks necessary?** Alan Blinder (Princeton University) Jon Faust (Johns Hopkins University) Chair: Cecilia Skingsley (Sveriges Riksbank)
11.15-12.45	**Session 2. The central bank's role as a provider of liquidity** Franklin Allen (Imperial College London) Linda Goldberg (Federal Reserve Bank of New York) Chair: Meredith Beechey (Sveriges Riksbank)
13.45-15.15	**Session 3. The role as a lender of last resort** Charles Calomiris (Columbia Business School) Charles Goodhart (London School of Economics) Chair: Tore Ellingsen (Stockholm School of Economics)
15.45-17.15	**Session 4: The central bank's responsibility for price and macro stability** Ricardo Reis (Columbia University) Michael Woodford (Columbia University) Chair: Jon Faust (Johns Hopkins University)

Saturday, June 4:

9.00-10.30	**Session 5: Links between macro stability and financial stability** Loretta Mester (Federal Reserve Bank of Cleveland) Isabel Schnabel (University of Bonn) Chair: Eric Leeper (Indiana University)
11.00-12.30	**Session 6: Links between central banking and fiscal policy** Isabel Correia (Banco de Portugal) Pierpaolo Benigno (LUISS Guido Carli) Chair: Peter Englund (Stockholm School of Economics)
13.30-15.00	**Session 7: Governance issues** David Archer (Bank for International Settlements) John Taylor (Standford University) Chair: Torsten Persson (IIES, Stockholm University)
15.30-17.00	**Panel discussion: How should central banks be designed?** Svein Gjedrem (Ministry of Finance, Norway; Norwegian School of Economics) Charles Goodhart (London School of Economics) Eric Leeper (Indiana University) Patricia Mosser (Columbia University) Chair: Anders Vredin (Sveriges Riksbank)

Organizing committee:
Cecilia Skingsley, Deputy Governor, Sveriges Riksbank
Magnus Georgsson, Legal Counsel, Sveriges Riksbank
Eric Leeper, Professor, Indiana University
Jesper Lindé, Head of Research, Sveriges Riksbank
David Vestin, Senior Adviser, Sveriges Riksbank
Anders Vredin, Head of General Secretariat, Sveriges Riksbank

Why do societies need independent central banks?

Jon Faust*
The author is Louis J. Maccini Professor of Economics and Director of the Center for Financial Economics at John Hopkins University

This paper provides background and historical context for the Riksbank's timely conference on "Rethinking the Central Bank's Mandate." While most of the discussion at the conference will focus on the complex issues we face today and those we will likely face in the future, it is generally a good idea to keep an eye on the rearview mirror as you move forward, and that's the role of this paper.

1 Introduction

History makes clear that central banks exist because modern financial economies are prone to catastrophic pathologies: unsustainable fiscal policies that give rise to sovereign debt and/or inflation crises, private sector financial crises, and crises emanating from external imbalances. This paper will review the essential role that central banks have historically played in society's quest to find remedies for these pathologies.

We have especially good reason to review this history as we reconsider central bank mandates. The early 21st century will, I suspect, stand out as a tragic aberration in the long history of thinking about central banking. It was a period when many experts, pundits, and policymakers either forgot most of financial history or declared its lessons passé. In the bold new view, the central bank's overriding objective was to "provide a nominal anchor"; the myriad other issues that consumed most of monetary history came a distant second. History has a way of reminding those who forget, and in this case it did so with breathtaking speed and ferocity in the form of a classic financial crisis, the economic and political ramifications of which reverberate to this day.

The argument will be critical of the bold new view, but this in no way implies that this view should be rejected wholesale or that some prior version of conventional wisdom should be embraced without alteration. The bold new view incorporated some important advances in thinking, and no one ever argued that prior conventional wisdom was without flaw.

Instead, I will argue it is a good time for academics, policymakers, and the public at large to engage in a thorough re-think of all the key issues surrounding central banking. The papers at the rest of the conference take up many aspects of this re-think and, I hope, will be part of a productive ongoing discussion.

* I thank Bob Barbera and Eric Leeper for insights and comments. During the time while this paper was being prepared, I was a paid policy consultant to the Riksbank.

2 The main question and a summary of the answer

The conference organizers asked me to consider the following:

> (Why) Are central banks necessary? Which functions can central banks fulfill that other government authorities or market mechanisms cannot? Is the central bank's role affected by increasingly sophisticated financial markets and payment technologies? Is the central bank's role broader than providing a nominal anchor?

The traditional answer to these questions begins with the fact that central banks around the world play many roles in the financial sector. The two core functions of central banks are monetary policymaking and acting as lender of last resort to the banking system. Many central banks also have a long laundry list of other functions, including facilitating operation of the payments system, bank supervision and/or regulation, providing banking services to the government, managing foreign exchange reserves, and issuing and maintaining the physical currency (notes and coins).

Monetary policymaking and providing a lender of last resort function are essential tasks in the economy, and they are naturally conducted by a body we would call a central bank. Conventional wisdom also adds the proviso that monetary policy should be conducted by an independent central bank—that is, a central bank that is insulated to a high degree from political interference from the rest of the government.

The central bank should generally use monetary policy to promote low and stable inflation.[1] This is often referred to as providing a nominal anchor. Contrary to some conventional thinking, I will argue that regardless of their mandates, many central banks do not unambiguously have the definitive power to provide a nominal anchor. Further, it is not at all clear that they should have that power. Finally, there is no strong consensus that any of the various other roles central banks often play need necessarily be the responsibility of the central bank. As I will argue in what follows, which of these other roles any given central bank should play may differ depending on other aspects of the system in which the bank operates.

The remainder of the paper explains and provides historical foundations for these views.

3 Ubiquitous financial sector pathologies and the role of central banks

The earliest English-language use of the term central bank that is reported in the Oxford English dictionary conveys a key notion:

> To enjoy the full benefit of the banking system, you must combine with them [local banks] a *central bank*...
>
> [Hunt's Merchants' Mag., Apr. 1841, quoted in Oxford English Dictionary, 2016]

Without a central bank, the country's banking system would be deficient or defective in some way, and a central bank can help remedy the defects.

In this section, I explore this wisdom, and broaden the claim to include the need for myriad private and public sector institutions that form a patchwork of remedies for the ubiquitous pathologies that seem inherent to financial systems.

Financial markets, history makes clear, work very badly. Indeed, without an elaborate set of public and private sector institutions and practices, markets for financing barely work

1 How low and how stable is a matter of some debate, I will not discuss these issues.

at all. For most of history, most people, firms, and governments that had productive ideas simply could not bring those ideas to fruition if they required any substantial capital. This is underscored by the fact that in this century, Muhammad Yunus and Grameen Bank earned a Nobel Prize for figuring out a way to get tiny amounts of credit to folks who would then repay the loans almost without fail (Yunus, 2006).

As economies moved toward a situation in which financing flowed more freely, pathologies inevitably appeared in the form of various types of crisis. This is the main point of Reinhart and Rogoff's (2009) book, *This time is different, Eight Centuries of Financial Folly*. I will follow a slightly modified version of Reinhart and Rogoff's characterization of three types of crisis: government debt crises leading to default or implicit default through inflation, private banking crises, and external imbalance crises arising in the course of international trade in goods, services, and financial claims. These three types of crisis are deeply intertwined and crises may simultaneously have aspects of any or all of these, but the different categories provide a useful way to organize discussion.

3.1 Fiscal excesses and default or implicit default through inflation

Throughout history, governments —which until recently mainly meant autocratic rulers such as kings or queens— have used financial markets to borrow. Large borrowing, however, was limited to wealthy sovereigns, and the biggest driver of that borrowing tended to be the need to finance wars. What we now recognize as the first central banks were initially organized or granted special powers in order to facilitate lending to the government (Bordo, 2007).

As Rogoff and Reinhart thoroughly document, for as long as sovereigns have been borrowing, they have faced crises starting with, or ending in, explicit default or implicit default imposed by inflating away the value of the nominal debt. During the debate over governance of the U.S. Federal Reserve, Senator Aldrich (Kettl, 1986) argued,

> No government yet has been found strong enough to resist the urge for enlarged note issue in times of real or imagined stress.

It is now widely accepted that ceding power over monetary policy to a central bank with strong insulation from interference from the rest of the government is one useful step to reduce the frequency and severity of these destructive inflationary episodes. While various aspects of conventional wisdom have shifted through the years, this one has consistently gained adherents —at least up until very recent political upheavals.

There may be an important difference, however, between reducing the frequency and severity of inflationary events and definitively providing a nominal anchor. As Leeper (2016) and Sims (e.g., 2016) emphasize, so long as the government can issue sovereign debt in a manner inconsistent with price stability, there is at best an ambiguity over the central bank's ability to provide a nominal anchor. Very few countries have clear legal structures subordinating the fiscal policy to the central bank. Further, the democratic justification for subordinating fiscal policy is questionable. For example, it is perfectly possible to envision a government reaching a point where the only options are explicit default or inflation. Having reached such an unenviable position, the best decision for society may be to accept a period of inflation. It is not clear that independence to maintain a nominal anchor could or should be sustained at such times.

3.2 Banks and the associated risk of financial crisis

The ability of wealthy sovereigns to become heavily indebted came long before this privilege was available more generally to firms and individuals. For most of history, most individuals and firms simply could not become heavily indebted. The great sage of central banking, Walter Bagehot (1873), wrote of the stifling effect that this could have on progress and innovation,

> A citizen of London in Queen Elizabeth's time … would have thought that it was of no use inventing railways…for you would not have been able to collect the capital with which to make them.

Bagehot was writing in 1873, during what is known as the second industrial revolution in England, and he argued that by that time England was near the sweet spot at which point every worthy idea could be financed:

> A place like Lombard Street [London's Wall Street], where in all but the rarest times money can be always obtained upon good security or upon decent prospects of probable gain, is a luxury which no country has ever enjoyed. (Bagehot, 1873)

The Elizabethan watchwords, "Neither a borrower nor a lender be" had, by Victorian times, become "Every good idea can be financed".

Two points should be emphasized here — in one case Bagehot was clearly wrong, and in the other he was clearly right.

No one would now argue that England had, by the late 1800s, reached the sweet spot of efficient capital allocation. Indeed, from a modern perspective, the claim is absurd. For example, it was not until well after Bagehot's writing that married women were granted clear recognition as economic agents,[2] and it remains arguable whether credit flows as efficiently to this portion of humanity as to the other portion in many economies. But more generally, we can cite a long list of efficiency-enhancing innovations over the last century or so such as credit cards, which allowed a more efficient flow of credit, and mutual funds, which have allowed funds to flow more efficiently into equity financing.

Second, Bagehot correctly emphasized the point that is painstakingly documented by Reinhart and Rogoff: along with freer financial flows comes financial folly in the form of financial crises. Bagehot gives an entertaining description of Overend, Gurney, and Co., one of the largest, most innovative, financial firms of his day. The firm converted from a partnership to a publicly-owned company and promptly bankrupted itself:

> The case of Overend, Gurney and Co., the model instance of all evil in business, is a most alarming example of this evil. No cleverer men of business probably (cleverer I mean for the purposes of their particular calling) could well be found than the founders and first managers of that house. But in a very few years the rule in it passed to a generation whose folly surpassed the usual limit of imaginable incapacity. In a short time they substituted ruin for prosperity and changed opulence into insolvency. (Bagehot, 1873)

Such follies are obviously a recurring theme.

One important form of financial folly is a bank run or bank panic. As most people know from *Mary Poppins* or *It's a Wonderful Life*, an otherwise sound bank can be driven to

2 The Women's Property Act of 1882 was a significant breakthrough in this area.

bankruptcy by panicked customers withdrawing funds faster than the bank can economically liquidate its assets.

The possibility of folly by either the bank or its customers also elicited a patchwork of institutional fixes. Most notable among these are central banks with a lender of last resort facility, bank supervision and regulation, deposit insurance backed by the national government, modern accounting standards, fraud and bankruptcy laws, and so forth.

The lender of last resort role is the one piece of this patchwork inherently associated with central banking. Bagehot laid out the core of conventional wisdom about the role of a lender of last resort: The central bank should stand ready to lend freely to institutions that were clearly sound, but facing excessive deposit outflows. While the details of how the lender of last resort function should be implemented are subject to considerable debate, the importance of this function is difficult to question.[3]

3.3 Crises driven by external imbalances

Finally, as Reinhart and Rogoff note, balance of payments crises, crises caused by rapid shifts in capital flows, and various types of exchange rate crises have also been a prominent feature of financial history.

In this case, the patchwork of remedies has included exchange market intervention and various types of restriction on trade and capital flows. Between the late 1800s and the Great Depression, the classical gold standard was a principal policy response to recurrent external imbalance crises. Under the gold standard the relative value of currencies was fixed in terms of gold and any payments imbalances were settled in gold. Subsequently, a hybrid system known as Bretton Woods's system was in place from the end of WWII through the early 1970s, and after the breakdown of Bretton-Woods various more ad hoc arrangements and notions of best practices, partly administrated by the International Monetary Fund, prevailed. All of these systems saw recurring crises associated with external imbalances.

Overall, this brief survey is meant to convey the fact that pathologies are ubiquitous in financial markets, and that central banks are one part of a vast array of private and public sector institutions and practices intended to minimize the effects of those pathologies.

4 A brief period of very different views

For a brief period around the most recent turn of the century, the perspective just given was broadly rejected by some of the most influential thinkers and policymakers in advanced economies. Many advocated the view that financial firms could be relied upon to protect the economy from folly that might threaten the financial system.[4] This widespread view was reflected in an approach called "light touch regulation" in the U.K. and was associated with a loosening of financial regulation in the U.S. and elsewhere.[5]

As Bernanke (2011) notes, financial stability had traditionally been a primary focus of central banks, but during this period, matters were different:

> Central banks certainly did not ignore issues of financial stability in the decades before the recent crisis, but financial stability policy was often viewed as the junior partner to monetary policy. One of the most important legacies of the crisis will be the restoration of financial stability policy to co-equal status with monetary policy.

3 For example, Bagehot suggested that the central bank should lend only against good collateral and at a penalty interest rate. It is almost in the definition of a systemic crisis, however, that what is and is not good collateral may be unclear, and indeed, may turn on whether the central bank extends loans.

4 Alan Greenspan was a prominent proponent of this view (for example, Greenspan, 2008). Larry Summers made similar arguments while at the U.S. Treasury Dept. (Summers, 2000).

5 See The Economist, 2012 for a description of light touch regulation.

A similar perspective took hold regarding external imbalances. Traditional concerns about the need to manage external imbalances using various tools to control the exchange rate and capital flows gave way to a brave new view favoring flexible exchange rates and freer capital mobility. The implicit view seemed to be that if countries would just yield freely enough to market forces, then the imbalances of the past would disappear. This philosophy sometimes is pilloried as the Washington Consensus. While John Williamson, the originator of the term, argues convincingly that he had something more nuanced in mind, he admits that the original formulation ignored the role of financial stability and crises and the tools required to avoid them.[6]

With the central banks freed from concerns about both financial stability and the external sector, they could focus exclusively on delivering low and stable inflation. This focus would, in turn, contribute, insofar as an independent central bank can, to minimizing the risk of default through inflation.

It is instructive to think about this brave new view in historical context. From the later part of the 1800s through 1930, monetary policy was more or less dictated by the gold standard and its imperative to maintain the gold parity.[7] Modern thinkers sometimes associate this with a desire for domestic price stability, but that is deeply misguided. The classical gold standard was motivated almost entirely by external factors, and was intended as a framework for enforcing external balance and facilitating trade. It did so by anchoring the value of all the trading partners' currencies relative to gold and providing an unambiguous basis for settling imbalances.

By fixing the money price of gold, however, the gold standard left the general price level to wander where it might with the supply of gold. And wander it did. Economies experienced long periods of inflation and deflation under the gold standard. Since the recent financial crisis, many analysts have been critical of inflation performance in many countries. But even by the yardstick set in this difficult period, the inflation performance under the gold standard looks very poor.

Thus, under the classical gold standard, the behavior of inflation was entirely secondary, while the main focus was on managing external imbalances. In the recent period, the emphasis is reversed: central banks focus first on domestic inflation and leave external matters to the whims of the market. Neither of these extremes seems to have delivered ideal outcomes.

5 Some suggestions for the debate going forward

The main objective of this brief historical review is to posit a perspective that might enlighten the very important re-think of central bank mandates now underway in Sweden and many other countries. The goal is not to present clear solutions for the future, but there are some lessons.

So long as economies run on a government-created currency, it is impossible to avoid having a monetary policy—there is no version of "doing nothing" that does not itself constitute a monetary policy. I have seen no strong reason to question the conventional wisdom behind ceding control of monetary policy to an independent—that is, politically insulated—central bank charged with promoting low and stable inflation in the general course of affairs. The degree to which the central bank should have an explicit mandate for promoting stability of real activity and the best way to codify any financial stability mandate is not a settled matter and is worthy of debate.

6 Williamson (1999) discusses the strengths and weaknesses of his original vision and the cruder version of market fundamentalism that has also been prominent.

7 This discussion of the gold standard is more fully laid out in Faust and Leeper (2015).

So long as banks play a dominant and pivotal role in the financial system, there are very strong reasons for the central bank to stand ready to act as lender of last resort.

As for the long list of other activities central banks are often charged with (bank supervision and regulation, facilitating stability of the payments system, and so forth), I think there is no strong consensus. Almost all of these have some synergies with the core monetary policy responsibilities of the central bank, which provides some reason to house them there.

I think that the main lesson of history, though, is that all questions about these functions should be framed mainly in terms of effectiveness in preventing crises and managing crises when they erupt. And in this light, the central bank's mandate should not be viewed in isolation, but in light of the existing imperfect patchwork of remedies for recurring pathologies. Further, while economists have a good deal to say about these pathologies, one undeniable fact is that these pathologies remain poorly understood. Therefore, the mandate should be considered as much in light of what we don't know as what we do.

For example, many elements of the patchwork of defenses against pathologies are static or not quickly changed: deposit insurance is in place or it isn't, accounting deficiencies cannot be corrected rapidly in response to crises. Central banks often have the resources and the capacity to respond flexibly and quickly in the face of unexpected crises. For better or worse, this often means that when some poorly understood and, hence, poorly prepared for crisis erupts, it first falls to the central bank to deal with the problem. It will probably fall to the central bank largely independent of the bank's official mandate.

Further, it makes little sense to conclude that the central bank should not respond to some problem because ideally some other tool would be used. Donald Rumsfeld famously noted that you go to war with the army you've got. Similarly, the central bank must operate in the context of the imperfect patchwork of remedies in place.

When it comes to crises and their aftermaths, it is also clear that various institutional and political dynamics may dominate purely economic ones. For example, it may be a real management challenge for the central bank to maintain clear focus on inflation, macro stability, and financial stability. This alone might argue for splitting up responsibilities. The central bank should, by conventional wisdom, have independence in its monetary policymaking function. But many aspects of regulation and crisis management inherently involve deep political tradeoffs, and bringing too many politically sensitive topics within the purview of the central bank could make it difficult to justify independence.

I suspect that it is these sorts of issues and not purely economic efficiency arguments that should determine which of the ancillary functions should be lodged at the central bank.

Finally, the fact that the financial market pathologies are not well understood, should remain front and center when drawing lessons from academic research. For example everyone should be wary of predictions from models that are premised on complete understanding of pathologies on the part of private sector and/or public sector actors. Most problems look a bit easier if you start with the premise that folks fully understand them. This injunction covers the vast majority of academic work, at present.

Despite our limited understanding of financial market pathologies, between the Great Depression and the recent financial crisis more than 50 years passed. I believe that lessons learned in the Great Depression contributed to that long period without a widespread financial crisis. Many insights are coming from study of the recent crisis as well, and we have reason to hope that an even longer stable period might be the result. However, history also shows that political instability arising in the wake of crises can lead to erratic and sometimes disastrous policies. Unfortunately, at the current time, it is not so clear how these hopeful and more ominous themes will net out.

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History as an antidote to misunderstandings about the lender of last resort

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1 Introduction

The role of the "lender of last resort" (LoLR) in the financial system, the framework that should govern its conduct, its institutional locus, and the means through which it should exercise its authority have received little attention by economists in comparison to the economic importance of LoLR interventions. Interventions to assist banks can have enormous positive or negative consequences for macroeconomic stability, for the fiscal costs of bailouts, and for the risk-taking incentives of financial institutions.

In recent years, as a result of an unprecedented pandemic of banking system instability around the world, empirical evidence has highlighted the destabilizing macroeconomic consequences of banking system collapses, the enormous potential fiscal costs of bank bailouts, and the costs of moral hazard producing excessive risk-taking by protected banks (Demirguc-Kunt and Detragiache, 2002; Demirguc-Kunt and Huizinga, 2004; Calomiris and Jaremski, 2016). Those facts, taken together, indicate that the stakes are high for properly formulating LoLR policy. Reluctance to intervene may produce banking system collapse, but willingness to bail out banks often produces severe fiscal burdens and incentivizes excessive risk-taking. Furthermore, even from the standpoint of macroeconomic stabilization, bailouts generally have not prevented medium-term credit contractions and severe declines in GDP, which often accompany banking system restructurings (Laeven and Valencia, 2013).

Is there a set of lessons about the LoLR that can guide policy to provide assistance in a way that best avoids the twin threats of short-term instability and long-term moral hazard? There is a rich historical record of successes and failures of LoLR policies that stretches back over two millennia. The first recorded LoLR intervention was by the Roman Emperor, Tiberius, who responded to runs on the Roman banks by offering heavily subsidized loans in 33 A.D. In modern times, the Caisse d'Escompte in France (1776) was an early proto-LoLR. Similarly, Alexander Hamilton used his power as Treasury Secretary to assist banks during a financial market crisis in 1792. In the 19th century, the institutional embodiment of LoLR policy within central banks became common, but not universal, and the extent and nature of LoLR powers varied greatly across countries. The late 19th and early 20th century saw a broadening of LoLR powers in some countries. The late 20th century saw the widespread adoption of generous deposit insurance and other means of protecting banks from failure, which supplanted the role of previous LoLR intervention protocols in many countries. This varied historical experience provides many opportunities to observe and learn from variation in LoLR policies. It also provides evidence about what political factors accounted for variation in LoLR policy.

In this essay, I will show that an historical understanding of the evolution of the LoLR is an essential ingredient for formulating effective LoLR policy. Specifically, there are three overarching lessons from the history of LoLR policy. First, excessively narrow visions of the purview and powers of the LoLR result in inadequate stabilization of the banking system. Second, blanket guarantees of banks (such as generous coverage via deposit insurance) undermine the balance between protection and discipline that is essential for avoiding extreme moral hazard. Third, striking the right balance between excessively constrained assistance and excessively general assistance is not just a technical issue. It is a great political

challenge to create great power that is used legitimately and (as is crucial in democracies) that also is perceived as being used legitimately.

That third overarching lesson has some disturbing implications for the likelihood of achieving desirable policy reform in many countries today. Excessive protection of banks over the past several decades has undermined the crucially important balance between protection and discipline in LoLR policy. Restoring that balance is not just a matter of expert economists' recognizing the need to empower LoLRs, redefining the means of protection they offer, and rolling back the extent of unconditional protection: achieving those outcomes will require galvanizing political support to reverse the last four decades of policy choices to increase deposit insurance coverage around the world. Those choices reflect deep political realities that make such a reversal very challenging.

In Section 2, I present five historical lessons for proper LoLR design, which illustrate the need for powerful but limited protection, and demonstrate that it is possible for properly designed LoLRs to provide effective systemic stabilization policies with minimal moral-hazard consequences. Section 3 concludes by considering the political challenges to restoring balance to LoLR policy.

2 LoLR policy lessons

Table 1 lists what I will show are five common misunderstandings about LoLR policy. The five common misunderstandings are not parts of a single confused philosophy (note that numbers 3 and 4 are mutually exclusive propositions), although pairs of items on the list are related – numbers 1 and 5 reflect similar thoughtlessness about the necessary political conditions that makes LoLRs feasible, and numbers 2 and 3 reflect common errors of understanding about the origins of crises that LoLRs should address. My discussion of each of them draws on a combination of logic and factual evidence about the operation of actual LoLRs over roughly the past two centuries.[1]

Table 1. Five common misunderstandings about LoLR policy

Number	Misunderstanding
1	LoLR design requires economic, not political thinking
2	Proper LoLR interventions provide liquidity without subsidizing default risk
3	Proper LoLR interventions can always be achieved through collateralized lending following Bagehot's rule of lending freely at a high rate against good collateral
4	Given the many unpredictable exigencies the LoLR must face, it is undesirable to require the LoLR to adhere to rules that constrain its actions
5	LoLR authority should be housed entirely in an independent central bank

2.1 The essential political underpinnings of the LoLR

Successful LoLR interventions require significant capacity to act. A LoLR must be able to intervene with great potential scale in the market, and its success in addressing crises depends on its being perceived by market participants as possessing sufficient power to do so. Adam Smith and many other 18th-century writers on money recognized that the use of legal tender status for issues of paper currency (which made the currency receivable in payment of taxes) gave paper money backing at a preannounced par (relative to specie) by the future tax revenues of the government. Without legal tender backing, the private banks of issue (like the Bank of England) which served as proto-LoLRs were constrained by leverage

1 This discussion draws heavily upon Calomiris, Flandreau and Laeven (2016). Facts not otherwise referenced below are generally reviewed in more detail in that article.

limits: they could only issue debt commensurate with their own common equity footings. With legal tender backing, a LoLR could issue much more debt during a crisis (with tax backing, leverage was only constrained by the debt capacity of the sovereign, which reflected expected future taxes).

Early banks of issue (like all private parties) typically were also constrained by usury laws. During a crisis, LoLRs could not lend viably unless they charged high rates of interest (albeit still less than other market participants insisted on charging for a loan). Without the ability to lend at high rates of interest, LoLRs could not intervene successfully.

The valuable privileges of legal tender backing (a sovereign guarantee of the debts of a private bank) and the ability to lend at rates in excess of preexisting usury ceilings could not be granted lightly. In democracies, such as the U.S., the U.K. and France around the turn of the 19th century, the granting of the legal tender privilege required popular support, and popular support depended on the legitimacy of the actions of the empowered LoLR. In the U.S., that support clearly was lacking, and no legal tender privilege was granted to any issuing bank. In the U.K., the Bank of England operated for almost a century and a half before being granted legal tender backing for its notes in 1833. In most of Europe, usury limits constrained the interest rates that banks (including the LoLR) could charge until the late 19th century.

In autocracies, the political constraints on LoLR powers are different: the creation of financial institutions that enjoy special privileges, such as legal tender authority, might empower opponents of the autocrat. Indeed, autocracies typically chose not to create banks of issue, much less to endow them with legal tender powers.

The need for legitimacy in democracies meant that the bestowing of legal tender authority and the relaxation of usury limits had to be accompanied by mandates that ensured the LoLR would use its unique power in pursuit of the public interest, not to use monopoly privileges simply to gain profits for its stockholders. Sometimes those mandates were codified in the charter of the LoLR; other times they evolved as institutional adaptations of the LoLR to earn legitimacy. For example, as an example of the former, in the case of the Bank of England, its charter reforms not only granted legal tender backing, they also required that the Bank intervene during crises and further required that windfall profits earned during crises be returned to the State. As an example of the latter, the Bank of England developed clear procedures that governed its lending (the use of a rating book, and the requirement that the Bank's board recognize that a crisis was underway as a condition for relaxing quantitative limits on the amount lent to particular parties). In continental Europe, too, during the middle of the 19th century, LoLRs were granted unique powers along with unique responsibilities and were constantly subject to political questioning of their legitimacy.

In short, the evolution from specially chartered private banks of issue to specially privileged LoLRs was not simply a matter of recognizing the usefulness of a LoLR, but also recognizing the necessary powers for it to have its desired impact, and finding politically feasible ways to ensure its legitimacy, on which popular support depended. Although the U.K. and much of continental Europe reached similar institutional arrangements for the LoLR during the middle of the 19th century, those institutional similarities reflected deeper similarities in the political environments.

In other countries, different political equilibria constrained the development of LoLRs. In the U.S., rather than create a U.K.-style LoLR, the Jacksonian movement abolished the Second Bank of the United States, which had never enjoyed noteworthy privileges other than its ability to branch across state lines. It was not until 1913 that the Federal Reserve System was established, and when that occurred its lending powers were much more limited than those of the Bank of England. In Australia, a LoLR was not established until 1959 owing to

political conflict over its charter.[2] In mid-to-late 19th century, autocracies such as Russia and Mexico, no institutional LoLR authority was granted; crises were managed by the autocrats' Finance Ministers.

2.2 Effective LoLRs subsidize banks' default risks during crises

A common misunderstanding of the role of the LoLR is to see its role merely as ensuring that a sufficient volume of cash is present in the market. Advocates of this approach, unsurprisingly, see no reason for LoLRs to provide more favorable lending terms during a crisis than those provided by other banks. According to this view, the LoLR does not even need to lend to other banks; it can simply ensure adequate liquidity by purchasing securities in the open market at prevailing market prices.

This misunderstanding illustrates a deeper problem in many macroeconomic models: the absence of a microeconomic modeling of the structure of banks, the nature of their "funding liquidity risk," the reason that banking crises occur, and the way that LoLRs can help end them. Absent that modeling, it is no surprise that macroeconomists often fail to see a need for subsidized lending to banks by the LoLR. In fact, the LoLR's role is not only to influence market rates of interest by providing cash to the financial system, but to prevent the systemic collapse of bank credit by subsidizing the credit risk of banks during crises. By subsidizing credit risk I mean providing loans to banks at rates of interest that are lower than those that the banks provide to one another.

A useful model of the structure of banks begins by recognizing that banks fund themselves with money market instruments, and that the holders of those instruments are risk-intolerant (early models of risk intolerance of bank debt are provide by Gorton and Pennacchi, 1990, and Calomiris and Kahn, 1991). Risk intolerance of bank debt holders implies that debt maturity is short-term (often demandable) and that debt holders might refuse to roll over debts if default risk rose, even by a small amount. It is worth emphasizing that banks that are subject to the discipline of risk-intolerant creditors typically face substantial withdrawals long before they are close to insolvency. That should not be considered an "error" by market participants, nor a matter of "panic" in some emotional sense. Risk intolerance can be seen as a rational choice, and risk-intolerant market participants do not need to believe that their banks are insolvent to withdraw funds from them; a small increase in insolvency risk is sufficient to incite withdrawals.

The funding liquidity risk that banks face as the result of their reliance on risk-intolerant sources of funding is at the heart of the systemic risks that result from shocks to the value and/or the riskiness of banks' loan portfolios. If a shock to bank loan values or risk raises banks' default risks significantly, banks suffer withdrawals, and the primary means of dealing with those withdrawals is to reduce their leverage and their asset risk – both of which are accomplished by reducing the supply of lending. A recession or other common shock to many banks will, therefore, tend to produce a major contraction of credit, which can depress the value of risky assets, worsen loan defaults and risks of default further, and worsen the recession.

The point of LoLR interventions is to reduce liquidity risk by discounting bills or by lending to banks during a crisis at rates of interest that are lower than those at which they would discount bills or lend to each other. By doing so, banks are able to avoid sharp contractions of credit that result from vicious cycles of liquidation. Most importantly, market participants are aware that the LoLR will provide protection to the system, which puts a floor on the prices of risky assets, and limits the deleveraging that banks must undertake.[3] By offering a credit

2 In Canada, it was not until 1935 that a central bank was established, although that delay did not reflect political opposition so much as the absence of need: previously privately chartered banks had found ways to cooperate to fill the void of the absence of a central bank.

3 This role of the LoLR can also be seen outside of banking, too. For example, the Fed's intervention in support of the commercial paper market in 1970 reflected a similar response to a similar threat (see Calomiris, 1994).

risk subsidy to banks during crises the LoLR avoids the self-fulfilling "bad equilibrium" of continuing liquidation of bank balance sheets.

I emphasize, however, that historical LoLRs did not try to prevent some deleveraging by banks in response to a negative shock. It was understood that in the wake of a significant fundamental shock (such as a recession), banks had to reduce their asset risk by contracting lending somewhat in order to restore low default risk, as market discipline demanded. The point of LoLR interventions was not to subvert market discipline, but to permit an orderly adjustment to the new equilibrium, while avoiding an unnecessary plunge into a bad equilibrium.

2.3 The limits of collateralized lending

Walter Bagehot, the journalist and economist, has had an enormous influence on economic thinking about LoLR politic through his classic work, *Lombard Street*.[4] In that work, Bagehot claimed that the LoLR should follow a policy rule, and that in doing so, it would help to shape market expectations in a favorable way. His suggested policy rule was for the LoLR to lend freely during crises at a "high" rate of interest (meaning at a rate higher than the rates prevailing during normal times) against "good" collateral.

There is much to applaud in Bagehot's thinking. He understood the importance of market expectations and the helpfulness, therefore, of following a well-defined rule. He also understood the moral-hazard problem that any LoLR faces from subsidizing credit risk – namely, that it will encourage borrowers to take excessive risks during normal times, if there is no adverse consequence to them during crises from doing so. By advocating a high rate of interest, and by requiring the pledging of good collateral, Bagehot's Rule limits the expected profit from undertaking excessive risk during normal times, and protects the LoLR (and its guarantor, the State) from having to bear large losses during crises.

Despite the appeal of Bagehot's Rule, this approach to LoLR assistance is inherently limited, and is not effective in dealing with very severe systemic shocks to the banking system. To see why, consider what happens to bank insolvency risk when a very large, sudden macroeconomic shock produces large loan losses and increased loan risk (such as occurred during the Great Depression, primarily in response to a large contraction of the money supply from mid-1929 to early 1933).

As policy makers at the Fed and the Hoover Administration learned during the Depression, collateralized lending to banks from either the Fed or the Reconstruction Finance Corporation (RFC) was inadequate for discouraging depositor withdrawals. In fact, there was some evidence that collateralized lending actually increased depositors' incentives to withdraw (Calomiris et al., 2013). Observers pointed to the fact that when banks with substantially elevated default risk borrowed from the Fed or the RFC against good collateral, this effectively subordinated bank depositors, because the Fed and the RFC now had senior claims on these banks' best assets. For that reason, collateralized lending could actually worsen a run on a bank.

The Roosevelt Administration came up with a solution to this problem in March 1933. The RFC would make preferred stock investments in banks in lieu of collateralized loans. Doing so meant that issuers of preferred stock (on which banks paid below market dividend returns to the RFC) were strengthened by the subsidized lending, and because the preferred stock issues were junior to deposits, receiving preferred stock strengthened the position of depositors instead of subordinating them. Several studies of the effects of preferred stock assistance show that it was effective in helping recipient banks to stem withdrawal pressures from deposit market discipline and thus limited bank failures and the contraction in bank loan supply (Mason 2001a, 2001b; Calomiris et al., 2013).

4 See Walter Bagehot (1873).

Even preferred stock, however, is of limited use as a means of assisting banks. Preferred stock is still a promise to pay dividends and principal, and thus issuers of preferred stock can suffer moral-hazard incentives from "debt overhang" (Jensen and Meckling, 1976; Myers, 1977). RFC preferred stock assistance to deeply insolvent banks, therefore, would likely not have stemmed depositor funs. Given that the Roosevelt Administration confined RFC assistance to preferred stock (rather than common equity purchases or debt guarantees), it was forced to accept the closure of many banks that were not sufficiently strong to be candidates for RFC preferred stock assistance.

More recently, in the case of TARP assistance in the U.S. during the crisis of 2008-2009, the limits of preferred stock assistance became visible again, but this time, the government decided to extend protection beyond preferred stock purchases. Preferred stock was used as the first, but not the last, form of assistance for large financial institutions. When preferred stock assistance was deemed inadequate because of debt overhang, the weakest of the large institutions – Citigroup, Bank of America and AIG – were given access to additional forms of assistance, as needed, and in the event, Citigroup and AIG issued substantial amounts of common equity to taxpayers (for a review, see Calomiris and Khan, 2015).

An alternative to purchasing equity to bail out severely troubled banks is for LoLRs to offer guarantees of their debts. This approach was first employed in France in the 1880s as a cooperative agreement between Banque de France and the other French banks, who together undertook debt guarantees of troubled financial institutions. The Bank of England copied this approach in managing the Barings Crisis of 1890. The London clearing banks asked the Bank of England to bail out Barings. It responded by requiring the clearing banks to put together a guarantee fund to stand behind Barings' obligations and the Bank of England then agreed to participate in the guarantee, effectively providing a backstop to the clearing banks.

Although the participation of the central bank was extremely helpful in these sorts of cases, it was not always essential. In Canada, twice in the first decade of the 20th century (long before the establishment of the Bank of Canada), the Canadian banks organized takeovers of troubled banks (under the leadership of the oldest Canadian bank, the Bank of Montreal) whereby the banks agreed as a group to honor the acquired banks' debts, maintain their branches, and share any losses from the acquisition. Like the Barings Crisis, the privately engineered bailouts reflected the belief that negative externalities from allowing a bank to fail could create even larger losses for the other banks. It is important to emphasize that, for the most part, the deposits of failing Canadian banks were not honored by other banks through takeovers. Only in the few cases where banks perceived a true systemic risk from the failure did they step in to acquire the troubled institution. This approach ensured that depositors faced significant risk of loss, and therefore, significant incentive to discipline banks ex ante.

One of the main appeals of employing cooperative debt guarantees was that it prevented the spread of trouble by avoiding the failure of an important financial institution. A failure can have systemic consequences either through potential counterparty losses, or because the failing institution plays an important role in the financial system (for example, Barings was a major intermediary in the bills market, and its failure threatened to suddenly remove a crucial market maker from the system). By nipping the problem in the bud at the source of trouble, potential systemic consequences were avoided. The sharing of liability for any losses in the bailed-out firm meant that banks with significant counterparty exposure to the troubled institution were also effectively assisted, but the consequence of that assistance did not itself lead to systemic risk because no bank bore a significant loss as the result of its participation.

2.3.1 Bagehot principles and their undoing

Even when historical (pre-1980s) LoLR interventions employed methods other than collateralized lending – such as preferred stock investments, limited guarantees or outright acquisitions – bailouts almost always conformed to Bagehot Principles: The LoLR should address only systemic problems (not individual bank failures), and it should do so with the least possible moral hazard, and with the least risk of loss to the LoLR. Contrary to these Principles, since the 1970s, government policy has increasingly substituted deposit insurance and other unconditional protections for individual banks in the place of a well-designed LoLR, which has undermined the discipline that is retained when protection only applies to systemic risks (Acharya and Thakor, 2016).

Historical LoLRs employed some form of screening (either of collateral quality or of borrowers) to minimize the immediate costs of providing assistance and to address the incentive problems for the future created by assisting banks today. For the same reasons, the LoLR took the most senior position possible while addressing systemic risk. The specific mechanism chosen (collateralized lending, preferred stock, or debt guarantees) reflected the nature and size of the shock buffeting the banking system.

After the 1970s, a new set of policies were implemented in most countries, which combined various LoLR interventions with new, generous blanket support for banks in the form of deposit insurance and government bailouts of banks. Another change, which differentiates markedly the previous era from the current one, is the switch from crisis lending at high rates to the modern approach which favors the lowering of interest rates. Likely related to these differences, banking crises used to be violent and brief. Crises now are more mild but longer lived. The vulnerability of the financial system lingers, and losses often compound over years.

This new approach to crisis management has been propelled by changes in the political economy of banking that favor virtually unlimited protection of banks, particularly of large banks (the so-called “too-big-to-fail” doctrine). This change in policy likely reflects the popularity in democracies of preventing credit crunches and insulating average citizens from losses on their deposits. Nevertheless, the social costs of this new approach have proved to be large.

By 1980, only 20 countries had adopted explicit deposit guarantees, and by the end of 2003, the number had grown to 87 (Demirguc-Kunt, Kane and Laeven, 2008, p. 3). In addition, beginning in the 1980s, ad hoc government bailouts of banks became common – including Continental Illinois in the United States, and Credit Lyonnais in France.

Alongside those changes, there has been a remarkable increase in the frequency and severity of banking crises since the 1970s. Since 1970, excluding communist or former-communist countries, according to Laeven and Valencia (2013), there have been over a hundred major banking crises, with an average severity (measured as the ratio of failed banks’ negative net worth relative to GDP) of roughly 16 per cent. That is an astoundingly high figure. The comparable measure of severity of U.S. bank failures during the Great Depression is roughly 2 per cent of GDP. When one examines the period 1874-1913, using the same criteria to identify a major banking crisis, there were only 10 cases of severe banking crises, five of which were panics in the United States (with severity averaging 0 per cent, the highest of which was the Panic of 1893, with a severity level of 0.1 per cent). The other five cases (Brazil in 1875, Argentina in 1890, Italy in 1893, Australia in 1893, and Norway in 1900) had severity averaging no greater than 5 per cent of GDP. In other words, the last several decades of banking crisis represent a global pandemic of bank failures that is unprecedented in frequency and severity. The new role of government in bailing out failed banks unconditionally has meant that the unprecedented losses from bank failures have become a major burden on taxpayers.

The large empirical literature on banking crises and their costs has shown that the pandemic of severe banking crises is closely related to, and largely caused by, the rapid expansion of government protection of banks.[5] Government protection of banks removes market discipline (the threat of withdrawal by depositors and other debt holders, as default risk rises), which permits incompetent bankers to operate banks (adverse selection), and encourages all bankers to take on more risk than they otherwise would (moral hazard). Both of these influences contribute to the increased frequency and severity of banking crises.

The expansion of deposit insurance protection has reflected political pressure, both internal and external. Demirguc-Kunt, Kane and Laeven (2008) study the adoption and design of deposit insurance in 170 countries, incorporating economic and political influences as explanatory variables. They find that both external and internal political influences were important for deposit insurance adoption decisions after controlling for economic factors.

Clearly, the last several decades have seen a decline in the importance of central banks' LoLR assistance as the primary instruments for managing shocks to banking systems. As the world has increasingly insured banks' debts and shored up failed banks through ad hoc rescues (via subsidized mergers, equity injections, nationalization, or bank debt re-denomination), LoLR assistance through central banks often has been displaced as the primary vehicle for crisis management. When they are involved, central banks often play an assisting role, although they sometimes can serve as vehicles for carrying huge amounts of assets. The new approach to crisis interventions, which often takes the form of virtually unlimited protection, has also meant that, for most countries, managing crises no longer means the application of Bagehot's Principles.

2.4 LoLR-rules improve effectiveness and accountability

Rules are crucial for creating legitimacy. In a world of political bargains (that is, in our world), limits on what LoLRs can do and mandates about what they must do are essential to the political process that grants sustainable powers that make LoLRs effective. Rules are also helpful for ensuring predictability, which allows market expectations to reinforce the actions of the LoLR.

The fact that crises are unpredictable, and that the specific actions a LoLR should undertake cannot be known in advance does not undermine the case for adherence to rules. In fact, the unpredictability of the world makes the predictability of the LoLR all the more important, both from the standpoint of legitimacy and the reinforcing effects of market expectations. But it is necessary to define "rules" in a way that permits flexibility in policy reactions. For example, as I have already noted, collateralized lending is too constrained a vision of LoLR actions. Nevertheless, it is possible to use Bagehot's Principles (rather than Bagehot's Rule) as a credible framework to guide LoLR.

To ensure that the LoLR should address only systemic problems (not individual bank failures), blanket guarantees of banks against failure should be eliminated. Assistance should be limited to systemic events, in which some procedure is required by which the LoLR determines and states that intervention is required to prevent grave systemic consequences. Having done so, the LoLR should choose from a menu of existing pre-approved mechanisms (collateralized lending, preferred stock investments, guarantees, common stock investments) the one that best suits the current circumstances, and should explain why its choice accomplishes systemic stabilization with the least possible moral hazard, and with least risk of loss to LoLR. The procedure employed to make and publicly defend these determinations should be speedy, should draw on prior experience, should make use of tools that have been shown appropriate for achieving the desired objectives, and should be consistent with the governing principles that guide fiscal interventions in each country.

5 For a review of this literature, see Calomiris and Jaremski (2016).

2.5 Central banks cannot do it alone

Because effective LoLR requires legitimacy, central banks alone cannot set LoLR policy. To the extent that LoLR assistance entails only a small subsidization of risk – through collateralized lending against sufficiently good collateral – this can be delegated to "independent" central banks without too much concern about fiscal exposures. But if the subsidies inherent in assistance are sufficiently large, they should be provided through the process normally required for any significant fiscal policy. Doing otherwise undermines the legitimacy of the central bank as a non-political, non-fiscal authority.

Canada's staging of LoLR assistance is one model that seeks to achieve this sort of allocation of responsibility. Rather than categorically prohibit many kinds of lending by the LoLR (as in the case of the U.S.), in Canada, LoLR assistance can occur in three ways: pre-authorized, low-risk forms of lending that are subject to the central bank's discretion (to deal with modest shocks), riskier lending by the central bank that must be approved by the fiscal authorities (to deal with moderately severe shocks), and still-riskier forms of assistance that must be provided by the government rather than by the central bank (to deal with the most severe shocks). By creating procedures and specifying mechanisms in advance, Canada both informs the market of what it is prepared to do and how it is prepared to do it, and also preserves the legitimacy and independence of its central bank.

3 Conclusion

This essay has summarized what I regard as a fairly uncontroversial set of propositions, including theoretical propositions about the structure of banks and the importance of market discipline, historical facts about the operation of LoLRs that are generally understood by financial historians, and recent empirical findings about the moral-hazard consequences of excessive protection about which there is little disagreement. From an economic perspective, I believe it is clear that the desirable policy path forward would entail a return to Bagehot's Principles guiding a flexible and diverse menu of LoLR tools, alongside a substantial rolling back of unconditional protection of banks against failure.

As the history of LoLRs demonstrates, however, economic arguments count for little when they are opposed to the wishes of dominant political coalitions that have reached policy bargains contrary to those economic arguments. At the same time, an economic approach to LoLR policy that entails frequent crises and heavy costs to taxpayers may create the basis for a new political bargain, assuming that the public is able to connect poor LoLR policy design with those economic costs.

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Five points about monetary policy and financial stability

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Since the 2008 global financial crisis and the Great Recession that followed, economists and policymakers have been evaluating the factors that led to the crisis, assessing what could have been done to prevent, or at least limit, the damage, and considering what can and should be done to reduce the probability and impact of future disruptions to financial stability. That this is a very broad topic can easily be seen by looking at the agendas of this and previous years' conferences organized by the Riksbank. Today I will focus my remarks on the nexus between monetary policy and financial stability, and I will arrange my comments around five main points. Before I continue, I should mention that these are my own views and not necessarily those of the Federal Reserve System or my colleagues on the Federal Open Market Committee.

1 Financial stability matters to central banks because the goals of monetary policy and financial stability are interconnected

Central banks care about financial stability. Financial institutions are able to provide valuable credit, risk-management, and liquidity services to businesses and households because they are designed to take risks and are highly leveraged compared with nonfinancial businesses. But this risk-taking and leverage raise the possibility of systemic problems that could threaten the functioning of the financial system, hurt real economic activity, and impose significant economic costs. In fact, the Federal Reserve was established in 1913 after a series of financial panics to help promote a more stable financial system and avoid costly bank runs.

In my view, a central bank should care about financial stability to the extent that it affects the health of the real economy. Volatility or minor disruptions in financial markets that represent the ebb and flow of a dynamic economy but do not threaten the health of the economy are not something the monetary policy authority should respond to. Indeed, to the extent that the word "stability" gives the impression that the financial system is static, we may want to adopt the language used in the United Kingdom and speak about financial system resiliency, that is, the ability of the financial system to continue to provide the core financial services of intermediation, risk management, and payments in the face of the inevitable shocks that will hit a dynamic economy.[1]

Monetary policy mainly works through its ability to affect current and expected future interest rates; however, in certain circumstances, it also has the ability to affect risk-taking by investors and financial institutions, and thereby is linked to financial stability.[2] I believe that, in general, the goals of monetary policy and financial stability are complementary. For example, price stability helps businesses, households, and financial institutions make better

* I thank Stefan Ingves and Anders Vredin for inviting me to participate in this conference on the central bank's mandate. It seems very fitting that such a discussion should take place in Sweden, as the Riksbank is considered to be the oldest central bank in the world, only a couple of years shy of 350 years old. The Federal Reserve, which recently marked its 100th anniversary, is quite a youngster by comparison, although the Fed has endured considerably longer than the first two attempts at central banks in the United States, each of which lasted only 20 years.

1 See Tucker (2015).

2 See Adrian and Shin (2011) for a review of the literature on the risk-taking channel of monetary policy.

decisions, thereby fostering the stability of the financial system. And a stable financial system allows for more effective transmission of monetary policy throughout the economy. I view this complementarity as similar to the complementarity between the two monetary policy goals that the United States Congress has given to the Federal Open Market Committee (FOMC), namely, price stability and maximum employment.

But during the financial crisis we learned that financial imbalances can build up even in a low-inflation environment, so that while price stability may promote financial stability, it is not a sufficient condition. We also learned that financial instability can arise from nonbanks and from institutions that are solvent and not necessarily highly leveraged.[3]

A large body of research has aided our understanding about how systemic risk can build up and propagate through the economy. Well before the financial crisis, Kiyotaki and Moore (1997) did seminal work on the important role collateral plays in lending markets. In their model, because borrowers cannot be forced to repay, all lending is collateralized. When the economy is performing well, the value of the collateral increases, which supports further borrowing and higher output. But when a negative shock hits the economy and output declines, collateral values also fall, which means borrowing falls, which depresses output even further. Thus, the collateral constraint is a mechanism that amplifies and propagates the effects of temporary shocks on the economy.

Brunnermeier and Sannikov (2014) build on the Kiyotaki and Moore model. In their model, an economic boom increases bank capital levels high enough so that credit is amply available to borrowers. This lowers the volatility of both output and asset prices. The lower volatility induces banks to increase their leverage and lend even more, so much so that the system is now vulnerable to a negative shock. Gorton and Ordoñez (2014) examine how private market activities generate endogenous accumulations of and subsequent collapses in leverage. These models illustrate that systemic risk is endogenous, determined by the choices of the model's decision makers, and varies across the cycle.

During the financial crisis, we saw that when financial markets are not functioning well, the transmission of monetary policy to the economy can be disrupted. In those circumstances, the actions taken to implement monetary policy can also affect financial stability. The FOMC has acknowledged that nonconventional monetary policy, including large-scale asset purchases and the extended period of very low interest rates, could pose potential risks to financial stability by affecting market functioning and by spurring risk-taking in a search for yield.[4] Empirical work is beginning to document this effect. For example, Jiménez, et al. (2014) use data on 23 million bank loans from the Spanish credit registry and find that a lower overnight policy rate induces low-capitalized banks to lend more to ex ante riskier firms and to require less collateral compared to high-capitalized banks, direct evidence of monetary policy's effect on risk-taking.[5]

Thus, while I believe that, in most circumstances, the goals of monetary policy and financial stability are complementary, we need to recognize that, at times, actions taken to foster financial stability and those taken to promote our monetary policy goals might be in conflict, at least in the short run. In the U.K., the Financial Services Act recognizes this potential tradeoff and explicitly says that the Financial Policy Committee is not authorized to act in a way that it feels is "likely to have a significant adverse effect on the capacity of the financial sector to contribute to the growth of the U.K. economy in the medium or long term".[6]

3 Feroli et al. (2014) focus on market "tantrums", which they define as periods in which risk premiums inherent in market interest rates fluctuate widely. Using data on inflows and outflows to open-end mutual funds, they conclude that market tantrums can arise independently of the degree of leverage in the system.

4 The Board of Governors discusses developments related to financial stability in its monetary policy report to Congress. For example, see Board of Governors (2016), p. 20.

5 Jiménez et al. (2014) separately identify how a change in the monetary policy rate affects the demand for credit and the volume and composition of credit supplied, in particular, the supply to riskier borrowers.

6 See Section 9c(4) of the U.K.'s Financial Stability Act 2012 (Bank of England, 2012).

In deciding whether to take action against a growing imbalance, policymakers need to balance the expected improvement in future economic conditions against the potential cost of unduly limiting credit extension. Too high a resilience standard will thwart risk-taking and innovation, which will undermine longer-run economic growth. In setting the standard, we need to come to some common understanding about the amount of growth and prosperity we are willing to give up in order to lower the risk to financial stability. In the United States, people who are 80 years old have lived through two major financial crises (the Great Depression and the 2008 crisis). Is that too many? Would we rather lower the probability of such an event to one every 1,000 years? What would we be willing to give up to do that?

That may be a premature question at this point. There are likely things that can be done and that are being done to lower the risk to financial stability without much cost in terms of longer-run growth. If we think of there being a risk-return frontier relating financial stability risk to the economic return that a well-functioning financial system can provide, then it is not hard to imagine that we were operating at a point well interior to that frontier in the run-up to the crisis, and that the improvements being made in our financial regulatory and supervisory regime are moving us toward the frontier without sacrificing growth. This brings me to my second point.

2 To foster the resiliency of the financial system, macroprudential tools are being developed to lower the probability that instability arises and to limit the damage when financial shocks arise

In the United States, the regulatory reforms engendered in the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act aim to foster financial stability in two ways: first, by lowering the probability of a financial crisis, and second, by reducing the costs imposed on the rest of the economy when a shock hits the financial system. Under Dodd-Frank, the Federal Reserve and other financial regulatory agencies in the United States were directed to augment their traditional microprudential approach, which promotes the safety and soundness of individual institutions, with a macroprudential approach in which examiners and supervisors take a horizontal view of risk across institutions rather than looking at only one institution at a time.

Although there is still more to be done, regulators continue to make progress in developing tools to implement the macroprudential approach and to monitor the risks over the business and financial cycles. Some tools focus on building up the structural resiliency of the financial system throughout the business cycle. In my view, these structural resiliency tools are the most promising. They include the Basel III risk-based capital requirements, minimum liquidity requirements, central clearing for derivatives, and bank stress tests. Living-will resolution plans and the Orderly Liquidation Authority, which is housed at the Federal Deposit Insurance Corporation (FDIC), are intended to make it easier for regulators and policymakers to allow large complex financial institutions to fail.

In addition to structural tools, there are countercyclical tools that aim to mitigate the systemic risk that can build up over the business cycle. These include the countercyclical capital buffer and the capital conservation buffer.[7] Other possible cyclical tools, not yet established in the United States but used in other countries, include loan-to-value ratio limits

7 The countercyclical capital buffer allows regulators to increase risk-based capital requirements when credit growth is judged to be excessive and leading to rising systemic risk. The capital conservation buffer ensures that banks raise capital above regulatory minimums in good times so that when they cover losses in bad times, their capital ratio will stay at or above the regulatory minimum.

and debt-to-income ratio limits that vary over the cycle and which have been targeted to particular sectors like housing credit or household credit.[8]

The performance of the set of macroprudential tools is largely untested. Cross-country studies find mixed results, with the effectiveness of the tools varying with economic circumstances and the types of shocks hitting the financial sector.[9]

In the United States, the application of these countercyclical tools is complicated by the complexity of the regulatory structure. There are multiple financial regulators in the United States, including the Federal Reserve, the FDIC, the Office of the Comptroller of the Currency, the National Credit Union Association, the United States Treasury, the Securities and Exchange Commission, the Commodity Futures Trading Commission, the Consumer Financial Protection Bureau, and the Federal Housing Finance Agency. In many cases, the regulatory authority of these agencies is defined by type of institution rather than by instrument. While the Financial Stability Oversight Council (FSOC), created by the Dodd-Frank Act, promotes coordination and information sharing across these financial system regulators, the need to coordinate countercyclical macroprudential policy actions across multiple regulators in the United States adds a complication to effectively using such tools in a timely way.

The complex financial system also makes monitoring risks more complicated. The Office of Financial Research, established under Dodd-Frank, is collecting data to aid in this task. The Federal Reserve has also developed a framework for systematically tracking risks, and financial stability surveillance is receiving regular attention in FOMC meetings.[10] This regular and systematic analysis is helping us to better identify changes in conditions over time. This brings me to my next point: the importance of taking a systematic approach to financial stability.

3 To the extent possible, policymakers should take a systematic approach in applying financial stability policy rather than relying on discretion

The financial crisis underscored the important role of incentives in financial markets – not only the incentives of financial institutions but also those of regulators and policymakers. Time-inconsistency problems and moral hazard issues are important factors that need to be considered when designing a framework for implementing financial stability policy. These types of problems argue for taking a systematic approach in applying financial stability policy rather than relying on discretion.

The benefits of systematic monetary policy are well established. When monetary policymakers respond in a systematic fashion to incoming information, the public will have a better sense of how policymakers are likely to react to economic developments – whether those developments are anticipated or unanticipated – so their policy expectations will better align with those of policymakers. This alignment helps the public make better financial and economic decisions, thereby making monetary policy more effective.

8 For example, Canada tightened loan-to-value and debt-to-income limits on mortgage lending over the 2009 to 2012 period (Krznar and Morsink, 2014). Beginning in 2010, Israel also implemented a package of macroprudential tools to restrict the supply of housing credit (Fischer, 2014). Spain introduced dynamic loan-loss provisioning in 2000. This method builds up reserves during good economic times according to the historical losses experienced by the asset classes held in the bank's portfolio. This buffer is then available to absorb losses in bad times (Balla and McKenna, 2009).

9 For example, a study by economists at the International Monetary Fund (IMF) examined the effectiveness of macroprudential tools in reducing systemic risk in 49 countries. The authors concluded that many of the most frequently used tools were effective in reducing the pro-cyclicality of credit and leverage, but the effectiveness depended on the type of shock hitting the financial sector (see Lim et al., 2011). Another study published by the Bank for International Settlements (BIS) examined 57 countries over a span of up to three decades and found that imposing maximum debt-service-to-income ratios can limit the buildup of credit in housing markets, but maximum loan-to-value ratios were less effective, and instruments like reserve and liquidity requirements focused on the supply of credit had little impact on housing markets (see Kuttner and Shim, 2016).

10 This framework is described in Adrian, Covitz, and Liang (2013), and involves tracking a standard set of financial system vulnerabilities, including the pricing of risk, leverage, maturity and liquidity transformation, and interconnectedness and complexity. Recognizing the complex nature of the United States financial system, Federal Reserve staff track these risks across four broad areas of the financial system: asset markets, the banking sector, shadow banks, and the nonfinancial sector.

An additional benefit of a systematic approach is that it provides a mechanism through which policymakers can commit to policies aimed at promoting policy goals over the longer run. Being systematic can help alleviate time-inconsistency problems in monetary policy, whereby policymakers may favor the short run over the long run. Note that by systematic policy I do not mean that monetary policy will be set mechanically by a policy rule or that policymakers need to be prescient about the types of shocks that will hit the economy. Rather, I mean that policy will react in a systematic fashion to economic developments that change the economic outlook.

A systematic approach to financial stability policy is perhaps even more important than in the case of monetary policy because of the important role played by incentives. The crisis shone a bright light on significant moral hazard problems that exist in financial markets. A financial stability policymaker that is systematic in how it applies its tools to promote stability will likely help tame some of the moral hazard problems and also some of the time-inconsistency problems to which the regulators themselves are subject.

An important tool in this regard is the resolution of insolvent financial institutions. Without a credible resolution method, during the crisis in the face of serious distress at a large financial firm, governments faced a dilemma: either rescue the firm and create future moral hazard problems or let the firm fail and risk causing a cascade of other failures. The fact that policymakers had to make these decisions in the heat of the moment using their best judgment based on limited information did not help. Without a credible resolution method, it is reasonable to expect that even well-intentioned policymakers will be biased toward bailouts. A resolution method that can be applied systematically can help alleviate this problem. The living-will resolution plans and Orderly Liquidation Authority in the United States are promising, but still untested, tools in a process that will allow large firms to fail. This, in turn, provides incentives for these large, systemically important institutions to reorganize themselves in a way that reduces the risk they pose to the financial system.

As I mentioned, the Federal Reserve has become more systematic in monitoring risks across the financial system. Coupling that monitoring with the application of a resiliency standard across the entire financial services landscape, including the so-called shadow banking system that was less-heavily regulated in the past, would limit regulatory arbitrage. As the financial crisis made clear, taking an action that pushes risk from one set of institutions to another does not eliminate the risk, it just moves it around, potentially to a part of the financial system where the risk is more difficult to monitor and control.[11]

I acknowledge that this broad application of the resiliency standard across the financial system may be particularly difficult in the United States with its complex regulatory structure. Still, we can devise ways to make the macroprudential tools more systematic and less discretionary. Regulators could agree in advance on the contingencies under which the cyclical macroprudential tools would be invoked, rather than waiting until the risks escalated before starting the process to coordinate action. For example, we can write down a formula for a countercyclical buffer, and we can define an explicit trigger for contingent convertible bonds. Knowing that such policies will be systematically applied and what will trigger them may induce financial market participants to limit the buildup of risks in the first place. This underscores the importance of communication, my fourth point.

11 Application of a resiliency standard would allow the type of supervision to vary appropriately by the nature of the systemic risk associated with each part of the financial system. As discussed in Mester (2015), this is a component of the regime for financial stability advocated by Paul Tucker (2015). Several of the macroprudential tools are focused on those institutions that have been deemed systemically important, including the capital surcharge for global systemically important banks (G-SIBs) and the United States stress tests for banks with more than $50 billion in assets.

4 Macroprudential policy actions must be communicated in a clear way to avoid creating a conflict with or causing confusion over actions taken to foster monetary policy goals

Transparency and clear communication are hallmarks of best-practice monetary policymaking and the same should be true for financial stability policymaking. Clear communication helps align the public's policy expectations, which makes monetary policy more effective. Transparency is necessary so that the public and elected officials have the ability to hold monetary policymakers accountable for their decisions. The Federal Reserve has been given independence in setting monetary policy, which has been well documented as yielding more effective policy and better economic outcomes. Accountbility must however go hand-in-hand with independence, so the Federal Reserve regularly communicates the basis for its policy decisions.

A parallel can be drawn with financial stability policy. Although, in some cases, prudential supervisory information should be kept private, as a general principle, I think financial stability policymakers should strive for greater transparency and more disclosure. Similarly, they should require more disclosure from financial firms so that creditors and other market participants can exert market discipline.

Of course, clear communication is easier said than done. Three aspects make this even harder for financial stability policy than for monetary policy. First, the framework and tools of financial stability policy are new. It will take considerable effort on the part of the financial stability policymakers to explain the tools they are using and the rationale for their policy decisions. However, such communication is necessary so that the public understands when an action is being taken because of concerns about financial stability rather than concerns about monetary policy goals. This would be particularly true when the monetary policy authority is also responsible for taking financial stability actions, and if monetary policy were the tool used to address the financial stability concerns. It is worth considering whether separating decisions about financial stability from decisions about monetary policy within the central bank, perhaps by having separate committees as in the U.K., could aid communication and decision-making.[12]

A second complication for effective communication of financial stability policy is timing. If effective monetary policy means taking away the punch bowl just as the party gets going, then effective financial stability policy might mean taking away the punch bowl before the guests have even arrived because the seeds of financial instability are sown much earlier and action must be taken earlier as well. If the need for monetary policy to be forward looking is a difficult concept for the public to grasp, the need for financial stability policy to act well before there are clear signs of instability may be even more difficult to explain.

Yet a third complication to effective communication is the complexity of the financial regulatory regime itself.[13] In my view, a sometimes overlooked lesson from the crisis is that regulatory complexity can complicate supervision, risk monitoring, compliance, and enforcement. Given the scope and ever-changing nature of the financial system, regulatory complexity is, to a certain extent, unavoidable. But the tradeoffs should be recognized. For example, it is reasonable to require banks to hold higher levels of capital against higher-risk assets, but a system of risk weights that is overly granular and complex would be counterproductive. In practice, too much complexity would make it harder for regulators to assess compliance and to determine whether institutions were engaging in some practices

12 Kohn (2015) discusses the benefits of such separation.

13 Haldane and Madouros (2012) discuss the benefits of a less complex financial regulatory structure and argue that the complexity of the financial landscape does not call for a complex financial regulatory structure, but just the opposite.

merely as a way to hide risk and lower their capital requirements. If regulators have made the rules such complex that they cannot assess compliance, then, in practice, there are no consequences for firms that fail to meet the standards. Complexity also makes it difficult to monitor the monitors. It might be worth exploring whether we would be better off with a much simpler macro- and micro-prudential supervisory structure, one that is easier to implement and simpler to govern and that is approximately right across various economic models and states of the world even if it is never optimal in any particular model or state.

Of course, we are not in that simpler regime. The question thus is, given our current financial structure, how should policy respond to emerging financial stability risks and what role should monetary policy play? This question is the focus of my final point.

5 Financial stability should not be added as another goal for monetary policy, but monetary policymakers need to remain cognizant of the linkages between financial stability and monetary policy goals

In my view, the first line of defense against financial instability involves the tools that will make the structure of the financial system less prone to crisis. These structural resiliency tools include higher capital standards (including a minimum non-risk-based leverage ratio, as well as risk-based capital standards), liquidity standards, stress tests, living wills, and effective resolution methods for systemically important bank and nonbank financial institutions. Much work has been done to develop these structural resiliency tools, and I believe the system is in a better position to handle shocks now than it was before the financial crisis.

Countercyclical macroprudential tools, such as limits on loan-to-value ratios in particular markets, are worth further study, but at this point, I am not convinced that we have enough knowledge and experience with them to use them effectively in the United States. That consideration leads me to think that we should set standards for the structural resiliency tools somewhat higher than they would be if we had more confidence in the countercyclical tools.

What about using monetary policy? As I have discussed, monetary policy and financial stability goals and actions are interrelated. Very loose monetary policy increases the likelihood that financial instabilities will develop, thereby increasing the likelihood that macroprudential policy tools will be needed. Tight macroprudential policy can tighten financial conditions more generally, thereby increasing the likelihood that a monetary policy response will be needed.

In my view, monetary policy should remain focused on promoting price stability and maximum employment; financial stability should not be added as a third objective for monetary policy. First, it is not clear that monetary policy would be very effective against emerging financial stability risks. While interest rates affect the fundamental value of assets, it is not clear that they affect the speculative or bubble portion; the impact may depend on the underlying nature of the financial imbalance.[14] Second, monetary policy tends to be a blunt instrument, any benefits of using it to stem financial imbalances, mispricing of assets, or excessive leverage need to be weighed against the economic costs in terms of price stability and employment. Svensson (2016) brings some metrics to the question and concludes that the costs outweigh the benefits.[15]

14 For example, in the Gali (2014) model, raising interest rates to combat a bubble can actually inflate it.

15 The benefit of "leaning against the wind", that is, running monetary policy tighter than it otherwise would be in order to stem emerging financial instabilities, is a reduction in the probability of entering into a financial crisis. The cost is worse economic conditions today and higher economic costs should the economy enter into a crisis. By Svensson's (2016) metrics, these costs outweigh the small reduction in the probability of a crisis. One caveat about Svensson's analysis is that it is based on a log-linear model, but we know that financial crises involve extreme states and non-linearities.

While I do not believe financial stability should be part of the monetary policy mandate, I do think that when we are making monetary policy decisions, we need to be cognizant of the linkages between our monetary policy actions and financial stability. In the case of the housing market, which precipitated the last crisis, policymakers underestimated the breadth and depth of the negative impact this would have on the rest of the economy and financial system. To the extent that we misjudged the impact, there is a larger potential gain to carefully monitoring financial market conditions, implementing the structural macroprudential tools, and being open to taking offsetting action should imbalances develop.[16]

If our macroprudential tools proved to be inadequate and financial stability risks continued to grow, I believe monetary policy should be on the table as a possible defense. However, in this case, the blurring between financial stability goals and monetary policy goals would be high: if we assessed the risks to financial stability to be sufficiently great, achieving our dual mandate monetary policy goals would also be in jeopardy. Which brings me back to my original point: in most cases, the goals of price stability, maximum employment, and financial stability are complementary.

6 Conclusion

Let me conclude by noting that in his 2015 presidential address to the American Finance Association, Luigi Zingales (2015) posed the question, "Does Finance Benefit Society?" While academics, and, I believe, central bankers, typically say "yes", a recent survey indicates that the average American is much less certain.[17] I am hopeful that the considerable efforts underway across the globe will change that. I believe it is our responsibility to ensure that we create and maintain a financial system that is seen by the public as being beneficial, and one that truly is.

16 Peek, Rosengren, and Tootell's (2015) textural analysis of the transcripts of FOMC meetings from 1982 through 2009 suggests that the FOMC does consider financial stability when setting monetary policy.

17 Zingales (2015) cites the Chicago Booth-Kellogg School Financial Trust Index survey of a representative sample of about 1,000 American households, conducted by Social Science Research Solutions. Forty-eight percent of respondents to the December 2014 survey said that the United States financial system hurts the United States economy, while only 34 percent said that it benefits the United States economy.

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What role for central banks in safeguarding financial stability?

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1 Motivation

Can central banks ignore financial stability? The answer is clearly no. Independent of their mandates, central banks have to take financial stability into account. The main reason is that the banking system plays an important role in the transmission of monetary policy. When the banking sector is impaired, monetary policy is unlikely to function well. In addition, severe banking crises tend to go along with deep depressions, putting pressure on macroeconomic stability and necessitating monetary policy action. Hence, the question is not whether central banks should take account of financial stability but how they should do it.

Central banks may contribute to financial stability in three different ways: First, central banks act as crisis managers, that is, as lenders of last resort, in an acute financial crisis. Second, they affect financial stability through their regular monetary policy decisions. Finally, they may act as prudential supervisors themselves. While it is largely uncontroversial that central banks have a role to play in an acute crisis, there is much more dispute about how financial stability concerns should enter monetary policy and whether central banks should be responsible for prudential supervision. In the following, I will discuss all three potential roles, focusing on the latter two and trying to enrich the debate by recent research.

2 Central banks as crisis managers

It is largely uncontroversial that central banks should act as lenders of last resort in an acute financial crisis (although it is no longer taken for granted that this should be done according to Bagehot's rules, see Hellwig, 2015). In fact, one of the lessons learnt in the Great Depression was that the failure to act as a lender of last resort may deepen a crisis. This insight helped modern central banks to deal with the global financial crisis. By quickly injecting large amounts of liquidity, central banks may have prevented an even deeper economic downturn.

Does the role of the central bank as a lender of last resort stand in conflict with monetary policy objectives? In most instances, the answer is probably no. Systemic financial crises typically go along with deflationary pressure. Therefore, lender of last resort activities tend to support both monetary and financial stability.

However, this may not be true in a fixed exchange rate regime or in a banking system whose liabilities are mostly denominated in foreign currency (see also Hellwig, 2015). In such circumstances, the scope for lender of last resort activities is limited. A telling example is the German crisis of 1931 when the Reichsbank's role as a lender of last resort to the banking system increasingly clashed with its objective of safeguarding the stability of the currency. When its reserves breached the mandatory gold cover, the Reichsbank rigorously curtailed lending to banks, which triggered the breakdown of Danatbank and simultaneously the general banking panic, and resulted in the abandonment of the gold standard (Schnabel, 2004). Hence, lender of last resort activities are generally supportive of macroeconomic stability but they may stand in conflict with the goal of maintaining a fixed currency peg.

* I would like to thank Simon Rother and Felix Rutkowski for helpful comments.

3 Financial stability as a monetary policy objective

Whether financial stability should explicitly be considered as a monetary policy objective is highly controversial. The debate has focused on the question whether central banks should take account of the evolution of asset prices and the potential emergence of financial bubbles when taking monetary policy decisions. Should central banks behave passively and intervene only when a bubble bursts? This is the "cleaning up the mess" view associated with Alan Greenspan (1999, 2002). Or should they try to prevent the emergence of bubbles early on? This is the "leaning against the wind" view propagated by the Bank for International Settlements (Cecchetti et al., 2000; Borio and Lowe, 2002; White, 2006). And if central banks lean against the wind, should they do so by raising interest rates or by using macroprudential tools?

There are a number of arguments why central banks should or should not react to asset prices in their monetary policy (see Brunnermeier and Schnabel, 2016 for a more detailed exposition). Proponents of the view that monetary policy should not react to asset prices put forward the argument that bubbles cannot be identified with confidence, which may lead to the pricking of non-existent bubbles. Moreover, monetary policy is said to be a blunt tool, which is not well-suited to contain a bubble in a specific market. In fact, the costs of intervention can be quite high if other parts of the economy are negatively affected. Finally, bubbles are seen as a problem mostly in combination with unstable financial systems and expanding credit volumes. Therefore, they should be tackled by financial (macroprudential) regulation rather than monetary policy.

The opposing view is that even if bubbles are hard to identify, doing nothing is not the best option. In fact, the estimation of key variables in the conduct of monetary policy, such as the output gap or the natural interest rates, is similarly demanding. Moreover, the costs of a cleaning strategy are considered to be very high. The bursting of the bubble is costly in itself. In addition, cleaning is an asymmetric strategy and gives rise to moral hazard problems (the "Greenspan put"), which risks creating the next bubble. Finally, financial regulation may not be sufficient to deal with asset price booms. Regulatory arbitrage limits the reach of financial regulation, whereas monetary policy also reaches the shadow banking sector. Moreover, financial regulation may be less effective if monetary policy is working in the opposite direction.

In a recent paper, we have analyzed the role of central banks in dealing with asset price booms from a historical perspective (Brunnermeier and Schnabel, 2016). We analyze and categorize 23 prominent asset prices booms from the past four hundred years, by considering the types of assets involved, the holders of the assets, the economic environment during the emergence of the bubbles, the severity of the crises, as well as policy responses.

The historical analysis yields several important lessons:

1. The type of financing of the bubble (debt versus equity) matters more for the severity of crises than the type of bubble assets. The most important determinants are lending booms, high leverage, as well as direct asset holdings by financial institutions.
2. A pure "cleaning up the mess" strategy is unlikely to be optimal. We see numerous examples where "leaning against the wind" appears to have been effective in mitigating crises. We also see examples where cleaning strategies seem to have promoted the emergence of new bubbles.
3. The timing and dosage of interventions are of the essence. Late interventions are ineffective or even harmful. This calls for a continuous macroprudential analysis trying to detect the emergence of bubbles early on.

4. No instrument appears to be dominant to deal with asset price bubbles. There is a trade-off: While macroprudential policy is more targeted, it can also be circumvented more easily. Interest rate tools and macroprudential tools should be used in a complementary fashion.

So how should central banks react to asset price booms? There is no simple prescription. Macroprudential oversight is certainly important as an early-warning system. Macroprudential policy measures can serve as the first line of defense against the build-up of asset price bubbles. However, given the uncertainty about the effectiveness of macroprudential policies, it seems a very risky strategy to entirely rely on them. Moreover, they are unlikely to be effective if monetary policy is working in the opposite direction. Evasive behavior may make macroprudential policies ineffective under such circumstances. Therefore, monetary policy and macroprudential tools should be used in a complementary way.

4 Central banks as prudential supervisors

The most direct way to affect financial stability is through prudential supervision. In fact, central banks are frequently directly involved in prudential supervision. Since November 2014, this has also been true for the European Central Bank (ECB), which has taken over broad responsibilities in banking supervision in the context of the Single Supervisory Mechanism (SSM). This setup was chosen because it could be implemented quickly under the existing legal constraints and because the ECB at the time was one of the few institutions capable of acting. However, it was recognized early on that this setup was not necessarily optimal, leading to a debate whether the combination of monetary policy and banking supervision within one institution is really desirable or whether a separation would be preferable in the longer term.

In fact, this debate is not new. Nevertheless it is far from being resolved, which is also reflected in the widely varying degree to which central banks are involved in banking supervision in different countries. Theoretically, there are arguments for and against combining monetary policy and banking supervision (for an overview, see Rutkowski and Schnabel, 2016). Therefore, this question needs to be answered empirically. In the literature, a number of papers have analyzed the relationship between supervisory structure and macroeconomic outcomes, in particular inflation and financial stability.

Overall, the empirical evidence is mixed. Di Noia and Di Giorgio (1999) and Copelovitch and Singer (2008) find that inflation rates are higher (and more volatile) in countries in which the central bank is responsible for monetary policy and banking supervision. In contrast, Lima, Lazopoulos and Gabriel (2012) claim that inflation does not depend significantly on whether the central bank is responsible for banking supervision and monetary policy. Peek, Rosengren and Tootell (1999) show that bank supervisory information has helped the Federal Reserve to conduct monetary policy more effectively. This suggests that a combination may yield informational advantages.

Regarding financial stability, Goodhart and Schoenmaker (1995) show that bank failures are less frequent in countries in which the central bank is also the banking supervisor. Regarding non-performing loans, the evidence is again mixed. Barth et al. (2002) claim that banks have more non-performing loans if the central bank is involved in banking supervision, whereas according to Dincer and Eichengreen (2012), banks have fewer non-performing loans (and higher capital ratios) if the central bank supervises banks.

In a recent paper, we reassess the relationship between supervisory structure and inflation or financial stability (Rutkowski and Schnabel, 2016). The paper contributes in two ways to the literature: First, it presents a new detailed dataset on the structure of banking supervision in OECD countries from 1970 until 2013 based on a careful research of legal texts and other sources and complemented by a survey among central banks. Second, it

makes an attempt to solve the endogeneity problems inherent in this type of analysis, using instrumental variable and dynamic panel methods. In contrast, the papers cited above mostly provide no more than correlations.

The new dataset provides a much finer classification of supervisory regimes than previous research, which distinguishes only between combined and separated regimes in a 0/1-fashion. The new data contains information about seven characteristics of supervisory regimes. The first set of indicators concerns the degree of *cooperation* among bank supervisors and central banks and comprises three aspects: (1) Are there any formal mechanisms for the exchange of information? (2) Is there a sharing of resources (such as staff or financial budget)? (3) Do central banks have voting rights in the supervisors' administrative boards? The second set of indicators refers to the transfer of supervisory *tasks* to the central bank, comprising four types of tasks: (1) the granting and withdrawal of bank licenses, (2) the right of imposing and enforcing sanctions, (3) participation in off-site analysis, and (4) participation in on-site inspections.

The distinction between cooperation and tasks seems useful as theoretical predictions are different. A closer cooperation among central banks and supervisors is expected to improve monetary and financial stability. First, it may help to improve the implementation of monetary policy due to better information about monetary transmission. Second, it may make the central banks' policies as a lender of last resort more effective because it allows for a prompt response to banking troubles, a better distinction between illiquidity and insolvency on the basis of supervisory information (if feasible at all), and thereby a mitigation of moral hazard problems.

The expected effects of a transfer of supervisory tasks to the central bank are less benign. It is likely to raise inflation, whereas the effect on financial stability is ambiguous. The transfer of supervisory tasks makes the central bank responsible and accountable for developments in the banking sector, leading to potential conflicts of objectives and interest. In particular, the central bank is likely to subordinate monetary stability to financial stability when banks are getting distressed, leading to financial dominance. This is not necessarily harmful – it may in fact raise financial stability if the central bank keeps interest rates low at times of bank distress and thereby stabilizes the banking sector (as happened in the US in 1990, see Hellwig, 2014). However, this may give rise to moral hazard (Greenspan put), leading to lower financial stability. It may also induce supervisory forbearance to preserve the central bank's reputation as a supervisor (Hellwig, 2014). Finally, it may lead to higher inflation.

Our empirical results are in line with theoretical predictions. A higher level of cooperation tends to lower inflation and the probability of banking crises. A higher level of tasks tends to raise inflation and has no significant effect on the crisis probability. For the euro area, no significant effects are found. This is not surprising as in the considered time period supervision remained at national level, whereas monetary policy was at supranational level. Hence, the supervisory structure at national level did not measurably affect inflation (managed at supranational level) or financial stability.

The results have interesting policy implications. They suggest that close cooperation between supervisory authorities and central banks is beneficial because it leads to lower inflation and a lower probability of crises. In contrast, the benefit of transferring supervisory tasks to the central bank is less obvious because this tends to raise inflation and does not have measurable benefits in terms of financial stability. For the euro area, the creation of the SSM is likely to have improved cooperation at the supranational level, which is desirable. However, the transfer of tasks may be seen more critically and may even prove to be harmful.

5 Conclusion

In this short paper, I have discussed the different roles that central banks may play with respect to financial stability. The beneficial role of central banks as lenders of last resort in acute financial crises is largely uncontroversial. This is not true for the central bank's role in dealing with asset price booms. Our historical research suggests that monetary policy should support macroprudential policy in preventing the build-up of asset and credit booms rather than leaving this task to macroprudential policy alone. Regarding the role of central banks in prudential supervision, it seems important to carefully consider the specific details of collaboration. The exchange of supervisory information can be useful for monetary policy and lender of last resort activities. Therefore a close cooperation between supervisors and central banks seems desirable. However, a transfer of supervisory responsibilities to the central bank may compromise monetary stability without providing clear benefits in terms of financial stability.

What does this imply for the current situation in the euro area? Low interest rates are putting increasing pressure on financial institutions' profitability and inducing the search for yield behavior, leading to the build-up of risks in various market segments. So far, a sharp expansion of credit has not been observed, but banks' leverage is still high. Macroprudential policies are used only reluctantly and are counteracted by monetary policy. At the same time, there is the danger of a build-up of risks in the shadow banking sector, while a macroprudential framework "beyond banking" does not exist. Given this situation, the ECB may find itself in a straightjacket in the future because raising rates would threaten the stability of the financial system, making an exit from low interest rates more and more difficult. This calls for decisive actions to prevent a further build-up of risks now. Macroprudential tools may prove insufficient, which would require supporting measures from monetary policy. This would be beneficial for both financial and macroeconomic stability.

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Central banks and credit creation: the transmission channel via the banks matters

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A starting point for a discussion of central banks' mandates is the effectiveness of their policies. Such effectiveness has been called into question since policy rates hit the ZLB, given the inability of central banks to boost bank lending and drive a sustainable recovery in economic growth. In this paper, we analyse why, and discuss the process of credit creation. Increasingly, central bank watchers question whether monetary policy measures can significantly boost credit creation. The discussion of monetary policy has mostly, and excessively, concentrated on the direct links between the riskless official policy rate, and expectations thereof, ignoring all consideration of banks, of other financial intermediaries, of credit creation or of broad money growth. We question whether this is correct. Repeated easing initiatives seem to have had a diminishing effect on financial markets, portfolio reallocation, and economic sentiment. Central banks' ability to boost bank lending also crucially depends on financial regulation, fiscal policy and structural reforms. In our view, the main reason for the ineffectiveness of monetary policy has been the weakness of the banking sector.

1 Introduction

A key element in debating central bank mandates is the perception that monetary policy has lost a considerable part of its effectiveness in boosting domestic demand and in guiding inflation dynamics back to target in recent years. Despite subsequent aggressive rounds of monetary policy easing since financial market confidence was largely restored in early 2009, the ability of central banks to boost bank lending and generate a sustainable recovery in economic growth has been limited. Here we analyse why this has been so, and discuss the process of credit creation in more detail. In our view, a clear understanding of these processes is key to any discussion of amending the central bank's mandate in the light of recent experience.

Market perception of the effectiveness of monetary policy measures seems to be oscillating between believing that central banks are omnipotent to them becoming impotent. In itself, this rising scepticism in financial markets could undermine the effectiveness of monetary policy. Increasingly, central bank watchers have seemed to question whether monetary policy measures can effectively boost credit creation. What is remarkable is that much mainstream monetary economics seems to focus solely on the direct relationship

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between the official (riskless) short-term interest rate, and expectations thereof, and the "real" economy, abstracting entirely from the transmission mechanism via the banking sector, and other financial intermediaries. A prime example is Reifschneider's (2016) recent influential paper, on "Gauging the ability of the FOMC to respond to future recessions", in which the words "banks", "credit" and "money supply" are conspicuously absent. Cukierman (2016) has explained how the failure to consider the monetary transmission mechanism via the banking sector can strongly bias downwards estimated values for the natural, or neutral, real long-term interest rate.

2 High-powered money has lost power?

"Don't fight the Fed" is a widely-repeated aphorism. Central Banks have been seen as having great power; indeed, in a world where fiscal policy is constrained by a debt overhang and political issues, monetary policy is often regarded as the "only game in town", the last best hope of a battered and fragile world economy.

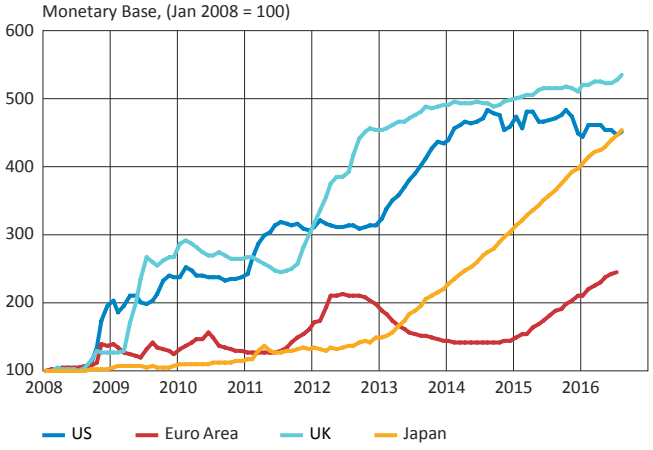
And yet, what is remarkable about the years since the Great Financial Crisis (GFC) has not been the success of expansionary monetary policies, but their failure to drag the world economy out of its low inflationary torpor. Consider the following syllogism: Inflation is a monetary phenomenon. Central Banks can create money. Therefore Central Banks can create (2 per cent or higher) inflation.

Moreover, Central Bank attempts to restrain inflation when it was *above* target were constrained by political and public antagonism to higher interest rates and lower asset prices, as much as that the Federal Reserve Chairman Paul Volcker had to resort to the subterfuge of a purported monetary regime change to defeat the engrained inflation of the 1970s. In contrast, bringing about lower interest rates and higher asset prices should have been a walk in the park for today's Central Banks.

So what went wrong? Central Banks created base money (so-called high-powered money or monetary base) with great enthusiasm. Their monetary liabilities, currency outstanding plus commercial bank deposits with themselves, exhibited a manifold increase since the onset of the GFC, see Figure 1. Yet, after the success of QE1 in helping to bring about a recovery to a collapsing financial system in 2009 together with a pick-up in economic growth, nothing much thereafter seemed to happen. The transmission mechanisms from changes in base money (H) (or M0) to broad money (M) collapsed. High-powered money became low, or zero, powered, see Table 1.

Figure 1. G4 Monetary base expanded rapidly

Monetary Base, (Jan 2008 = 100)



Sources: Morgan Stanley Research, Bank of England, Bank of Japan, European Central Bank and US Federal Reserve Board

Table 1. Tiny changes in broad money despite surging base money

		% change in*		
		Base Money (H)	Broad Money (M)	Ratio M/H
USA	2009	41.8	5.4	−25.7
	2010	−0.2	3.4	3.5
	2011	32.7	9.7	−17.3
	2012	1.1	7.6	6.4
	2013	38.6	6.1	−23.5
	2014	6.8	5.8	−1
Japan	2009	4.7	2.3	−2.2
	2010	3.9	2	−1.8
	2011	14.9	2.5	−10.8
	2012	11.5	2	−8.6
	2013	46.8	3.4	−29.6
	2014	37.4	2.8	−25.2
UK	2009	106	5.7	−48.7
	2010	−0.8	5.5	6.3
	2011	5	−3.1	−7.8
	2012	61.7	0.2	−38
	2013	7.3	0.7	−6.2
	2014	1.3	−0.1	−1.4
Eurozone	2009	−8.3	−0.5	8.5
	2010	2.3	−0.7	−2.9
	2011	24.3	2.2	−17.8
	2012	22.1	3	−15.6
	2013	−27	0.5	37.7
	2014	−0.2	4.9	5.1

*Annual changes are 4Q/4Q.
Sources: US Federal Reserve Board, Bank of England, European Central Bank, Bank of Japan and Morgan Stanley Research.

Why did this happen? Effectively, the commercial banks have found themselves in a liquidity trap, wherein they became happier to hold ever larger deposits with their own Central Bank rather than wanting to use such reserves to expand their assets. See Figure 2. Central Banks can, and indeed do, enforce an aggregate increase in the total of reserve deposits available to commercial banks, but it is up to the individual commercial bank to decide whether to use its own, now much larger, reserve deposits to purchase other (normally higher-yielding) assets. As discussed in Box 1, because the return, risk advantage of doing so has been eroded, they have not been taking this second step.

As Bernanke (2015, p. 325) noted,

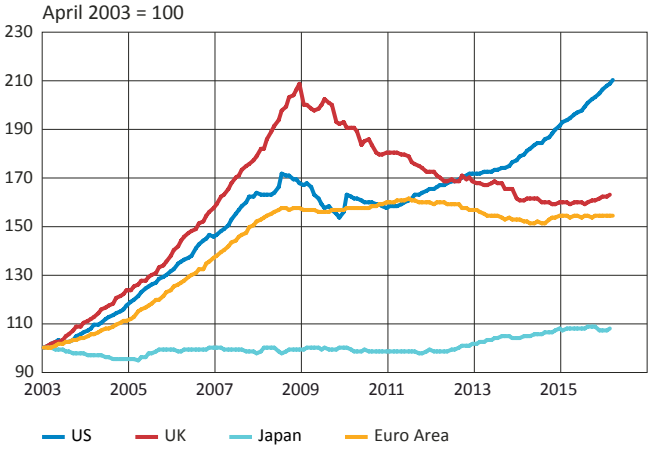
> *"We had initially asked to pay interest on reserves for technical reasons. But in 2008, we needed the authority to solve an increasingly serious problem: the risk that our emergency lending, which had the side effect of increasing bank reserves, would lead short-term interest rates to fall below our federal funds target and thereby cause us to lose control of monetary policy. When banks have lots of reserves, they have less need to borrow from each other, which pushes down the interest rate on that borrowing – the federal funds rate."*

The interest rate paid by central banks on (marginal) reserves held with themselves becomes *the* crucial, central peg for official rates. But this changes the underlying structure dramatically. Reserves no longer necessarily have a lower return than other money market assets. Moreover, they have better risk and regulatory characteristics. They have become an asset whose place in banks' portfolios is determined by their relative return and risk. With expansionary monetary policies not only driving down yields, relative to the interest on reserves, but flattening the yield curve, the demand for such reserve holdings has surged, alongside the massive increase in the supply of base money.

With the demand for liquidity amongst banks largely satiated after 2009, the availability of cash reserves has subsequently become no longer *any* constraint on banks' capacity to expand lending. The constraint, instead, comes from the availability of capital. But capital will always be made available to any clearly profitable enterprise. Like any other service industry, the expansion, or decline, of banking will depend on its prospective profitability.

Figure 2. G4 Bank lending remained sluggish

April 2003 = 100



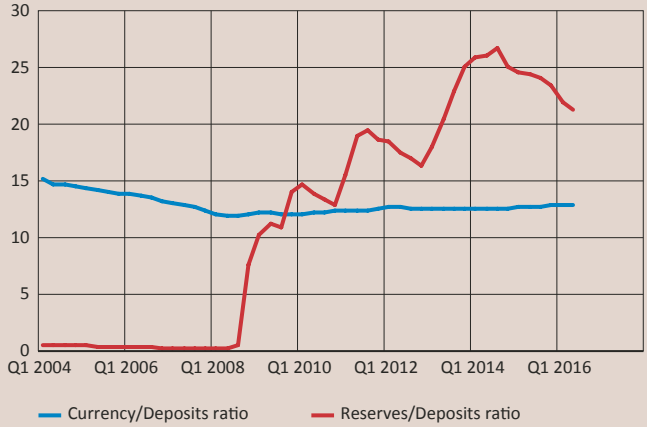
Sources: FRB, ECB, BoJ, BoE and Morgan Stanley Research

Box 1 – The collapse of the money multiplier

As shown in Table 1, there has been no relationship between the rate of increase in the monetary base and in broad money since 2008. QE has led to a massive expansion in the monetary base; this consists of currency outstanding and the reserve deposits of the commercial banks held at the Central Bank. The cash usage of the general public is demand-determined; the Central Bank and the commercial banks provide cash on demand, for example from ATMs, whatever the public wants. Apart from a panicky blip in 2008 Q4, see Ashworth and Goodhart (2014), such cash usage has generally risen quite slowly and steadily, unlike in the USA in 1929-1933 when there was a massive shift out of bank deposits into cash, to protect against the risk of bank failure.

The bulk of the massive increase in monetary base has ended up in commercial bank reserve holdings at the Central Bank. Since such reserves had been kept low prior to 2008, this represented an even larger percentage increase in reserves than in the monetary base.

Figure 3. US – Currency to deposit and reserve-to-deposit ratios



Sources: Federal Reserve Board and Morgan Stanley Research

The prior money multiplier analysis (see Equation (1)) was based on the assumption that both the ratio of commercial bank reserves (R) to total bank deposits (D), that is R/D, and the ratio of the public's currency holding (C) to their deposits, that is C/D, would remain quite stable. As can be seen from Figure 3 above, the C/D ratio did remain stable, but the R/D ratio rose dramatically with a very strong correlation with changes in H.

$$(1) \qquad M = H \times \frac{(1+C/D)}{(R/D + C/D)}$$

This behaviour was quite unlike the past. What had changed? Prior to 2007, reserves held by commercial banks were unremunerated (zero yield), whereas returns on longer-dated riskless assets were positive, and returns on risky assets higher still. Thus, holding reserves at the Central Bank represented a penalty, and the commercial banks maintained a wafer-thin buffer above the required minimum, to avert the non-pecuniary costs of falling below the requirement (for example, the need to explain their short-fall to the Central Bank).

From 2008 onwards all that changed. Reserve deposits at the Central Bank now became remunerated. Moreover, Central Banks often consciously used QE and forward guidance to flatten the yield curve. The running interest-rate advantage from maturity transformation largely disappeared in the main core countries, though not in the periphery of the EU, while

the potential interest rate risk, should rates renormalize, remained elevated. What was then the point for a commercial bank in Germany, Japan, the USA or UK in moving out of reserve deposits at their Central Bank into longer-dated, bonds, JGBs, T-bonds or gilts?

Risky bank assets, such as loans to SMEs, continued to have higher yields, but they were riskier, especially given the weakness of the macroeconomic recovery. Moreover, regulatory policy has been set to require much higher capital against such risks. Clearly, there is an obvious inconsistency between regulation aiming to make banks safer and QE seeking to encourage investors to shift into riskier assets. As a result, banks have refrained from strong expansion of private sector lending, and in the aftermath of the GFC there was not much demand for loans in any case.

To put it simply, commercial banks have been, and still are, in a liquidity trap. Holding reserves at the Central Bank is safe, requires no extra capital, adds to liquidity, and has only a minimally lower yield than other longer-dated public sector debt with far less interest rate risk. With bank loans being considerably riskier, and requiring the application of scarce capital, banks will impose tougher conditions, for example in the guise of additional collateral, on aspiring borrowers. Thus, under present (post GFC conditions), the hurdles facing such borrowers have become higher. The path of least resistance is to allow any extra cash reserves generated by QE, LTROs, etc., to pile up in commercial bank balances at the Central Bank. This is what has been happening.

Whereas Central Banks have made access to additional reserves much easier (via widening the range of assets that they will accept as collateral), the massive accumulation of cash reserves at the central bank by commercial banks has meant that such extra access has hardly been used. For the time being, the trade-off between the costs of Lender of Last Resort (LoLR) action by central banks CBs, in the form of potential loss and greater moral hazard, and its benefits in preventing contagious crises, has not been much tested; this trade-off was, however, discussed by one of the authors of this note (Goodhart) at the Riksbank conference recorded in this volume. This latter paper was first presented at a festschrift in honour of Prof. Gerhard Illing, March 2016, and will be published in the Proceedings of that conference, forthcoming.

At the outset of the GFC, in 2008 and 2009, banks, suddenly fearful of risk, retreated into their shells and hoarded liquidity. In order to keep the financial system afloat, central banks not only had to provide extra liquidity but also themselves to act as intermediaries in place of banks in various markets for allocating credit.

But once that crisis of confidence had been successfully managed, the effects of further unconventional monetary expansion policies, notably QE, upon financial stability became ambiguous. On the one hand, force-feeding banks with a larger diet of cash must protect them from runs and liquidity problems, as Stein has emphasized, in his papers Kashyap and Stein (2012), and Greenwood, Hanson and Stein (2016). On the other hand, forcing down rates on alternative safe assets, relative to the interest payable on reserves, encourages banks to reach for yield on riskier assets, reduces the incentive to clean up balance sheets and harms bank profitability (because of the effective ZLB on deposits), and hence bank expansion. To some extent unconventional monetary policy and QE is turning banks away from enterprise into becoming rentiers of the State.

2.1 Policy discussions often neglect money, focus on interest rates

In the macroeconomic models currently in vogue, the monetary aggregates do not appear to play any role. Instead, the variable that enters, prominently, in such models is the interest rate. Central Banks seem to have put on a brave face, given their inability to restore the expansion of broad money and bank loans, and some indeed claimed, ex post facto, that they had never expected this particular transmission channel to work anyhow. Instead, the important requirement was to lower both nominal and real interest rates, in the latter case by preventing deflationary expectations from taking hold. If the monetary aggregate channel was gummed up, the portfolio balance channel could still work, as well as the effect of a lowering of interest rates on the intertemporal balance of expenditures; in other words, the lower the interest rate, the greater the incentive to shift expenditures (both consumption and investment), from tomorrow to today. A problem is that under conditions of considerable uncertainty, as for example during the Euro area crisis or after the Brexit referendum, a reduction of a few basis points is unlikely to sway many expenditure decisions.

Following the outburst of the GFC in 2008, interest rates were rapidly reduced, initially from a normal level to zero and there they have stuck – Figure 4. There is no doubt that that helped greatly in preventing the GFC from becoming a deep depression, as did QE1 and the LTROs and the promise of OMT, notably by reducing risk premia (Figure 5), which had kept the interest rates on risky assets way above the zero rate on riskless assets (Table 2). But it was not enough to restore strong growth, except initially in China and EM (where massive fiscal stimulus also played a major role).

Table 2. G4 central bank policy measures in comparison

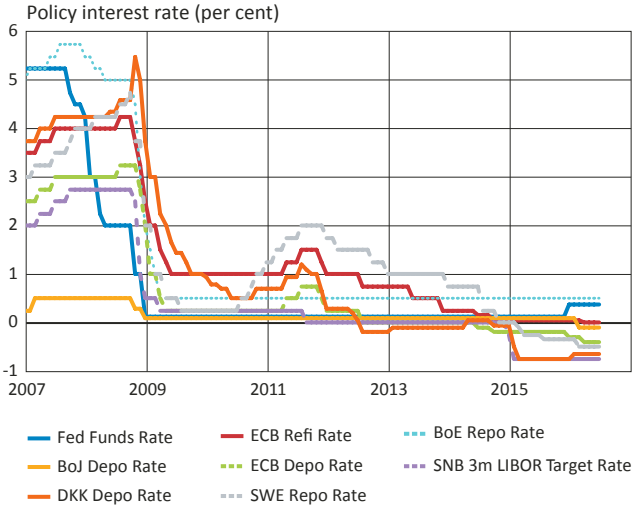
		Fed	ECB	BoJ	BoE
Lending operations		+	+	+	+
QE	– Public debt	+	+	+	+
	– Private debt	Mortgage	Corporate/ Covered bonds, ABS	+	+
Negative Interest Rates		– /?	+	+	–

Source: Morgan Stanley Research

If lowering interest rates to zero was not enough, why not make them negative? The barrier to negative interest rates, giving a subsidy to spending today rather than tomorrow, was the zero lower bound (ZLB), caused by the availability of currency, which has a zero yield and anyone can hold. How can you force interest rates on any asset, say a government T Bill, negative when potential holders of that asset can hold zero-yielding currency instead? Well, actually you can, up to a point, because holding lots of currency notes involves some expense and bother, for example safe-keeping and insurance costs.

Figure 4. Key policy rates headed below zero

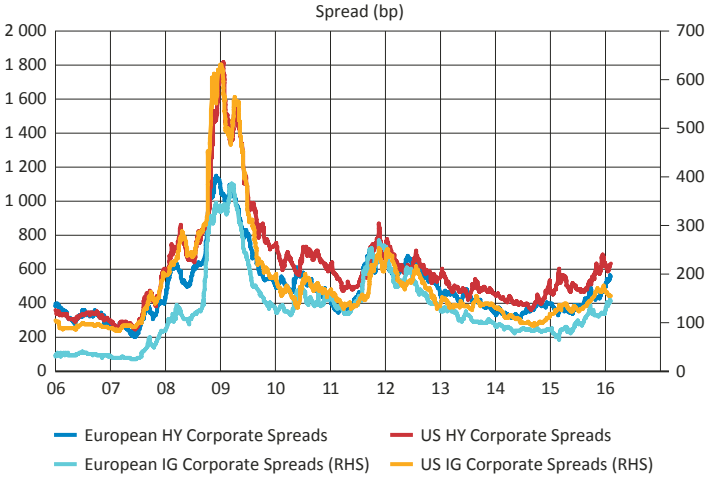
Policy interest rate (per cent)



Sources: National central banks and Morgan Stanley Research

Figure 5. Initially monetary policy helped to reduce risk premia

Spread (bp)



Sources: Markit and Morgan Stanley Research

Nevertheless, the tolerance of the financial system for ever-greater negative interest rates is limited, as long as zero-yielding currency remains as an alternative. Thus, there has been considerable attention given to potential alternative schemes for abolishing zero-yielding currency, or some segments of it. A selection of these is reviewed in Box 2.

Box 2 – Getting rid of the ZLB by changing currency usage

There are at least four, or perhaps three and a half, methods that have been suggested for adjusting currency usage so as to weaken, or completely remove, the ZLB.

(1) Abolish national currencies altogether, replacing cash with electronic purses and other (plastic and telephonic) means of payment.

Pros	Cons
Technically feasible and, indeed, Swish.	An enormous break with historical tradition, and upsetting for the old.
Hinders the Black/Grey economy.	All transactions can, in principle, be monitored, so illiberal.
Would increase the efficiency of payments systems considerably.	Black/Grey economy (and others) will switch to other currencies (dollar or euro), that benefits other countries' seignorage.
Conclusion: A step too far at the moment.	

(2) Abolish large denomination notes, leaving small value notes.

Pros	Cons
Easily do-able.	Relaxes, but does not remove, the lower limit to negative interest rates.
Less of a sudden break with tradition.	Black/Grey economy will simply switch to other countries' high denomination notes. Will such a change be useful unless it is internationally coordinated? Could that happen?
Hinders Black/Grey economy.	
Not nearly so illiberal.	
Conclusion: Worth doing, since it is the right thing to do, but do not expect too much from the reform.	

(3) Impose a tax on cash withdrawals by banks from Central Banks[1]

Pros	Cons
Much the same as (2), but can be made more flexible by varying tax rate according to conditions.	Puts pressure on banks to recoup tax. Would need to be introduced in concert with banks.
Raises extra revenue.	Effect on willingness to shift into currency depends on expectations of the future duration and extent of negative interest rates. If expectations were very gloomy, higher tax rates would be needed to prevent switching into currency.
	Unless the tax was expected to be temporary, people would start using other currencies instead.
Conclusion: If there was a sudden collapse in confidence and in the economy, this could provide, in conjunction with sharply negative interest rates, a real expansionary jolt. But it should be publicly explained, after full negotiation with the banks, and be a once-off measure. Probably not suited to being a continuous mechanism.	

(4) Floating exchange rate between currency and deposit money. Any negative rate could be achieved by the Central Bank committing to depreciate currency relative to deposits.

Pros	Cons
Doable, at least in theory.	Much more complex, with the exchange rate between currency and deposits continually shifting.
Completely removes any barrier to any desired level of negative interest rates.	Can be avoided by certified checks, pre-payment, all sorts of innovation. The banks would get around it.
Allows currency to continue, so not illiberal.	Likely to cause a shift into the use of more stable currencies that are not expected to depreciate.
Conclusion: Too clever by half. It would be, in practice, highly unpopular. If we must go to deeply negative interest rates, the Method 1 is probably better than this.	

Source: Morgan Stanley Research

1 Note that the abolition of high denomination notes is equivalent to imposing an infinite tax rate on them. If the tax rate on high denomination notes was infinite, and on low denomination notes was zero, Then method 3 is exactly equivalent to method 2. Probably best to make such a tax highly progressive in denomination.

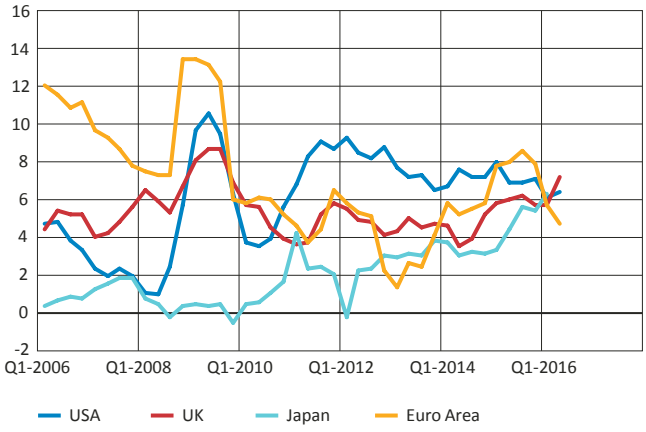
But such schemes are still mostly "pie in the sky", for future enactment, if at all. Moreover, the announcement effect of what could be perceived as a desperate last throw of the dice could be strongly negative. In the meantime, Central Banks, eager to show that they have not run out of ammunition in an uncertain world, have been moving, albeit a bit gingerly, into negative interest rate territory, as can be seen from Figure 4. The results have been quite mixed. There has not been much sign yet of any *massive* shift into currency (Figure 6) (although low interest rates do appear to be a factor behind rising currency holdings in some countries) and, with the exception of the aftermath of the recent introduction of negative deposit rates by the Bank of Japan, the effect on the exchange rates of the countries involved has been largely as expected and intended.

2.2 Boost to growth from negative interest rates negligible due to incomplete transmission via banking system

On the other hand, there is no sign that this move towards negative official rates has done anything to stimulate their domestic economies, apart from the exchange rate effect. Nor do we think that schemes to change currency usage to allow even more negative official rates would be, in present circumstances, much more successful.

Figure 6. G4 currency in circulation

Per cent



Sources: Morgan Stanley Research, Bank of England, Bank of Japan, European Central Bank, US Federal Reserve Board and Haver Analytics

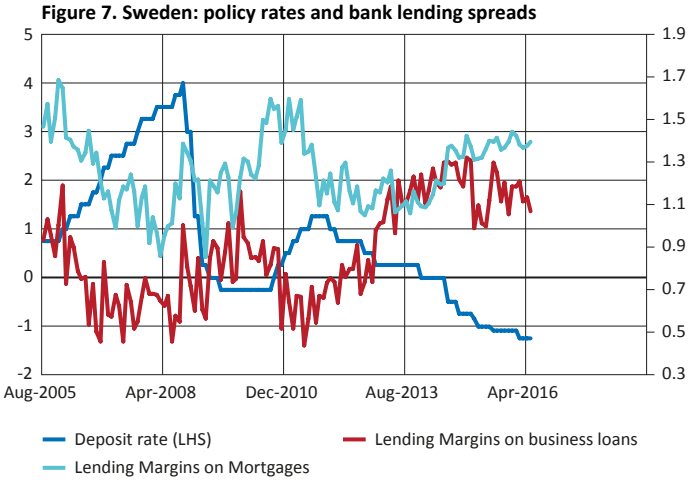
The reason for this scepticism is that the transmission mechanism for interest rate effects runs again largely through the commercial banks. The vast majority of us cannot borrow, or lend, at anything close to the official risk-less interest rate. Instead, we borrow from banks, and hold our liquid financial assets primarily in bank deposits, or in some cases in money market mutual funds. So much, perhaps most, of the force of changes in official rates occurs when, and if, interest rates on deposits and on bank lending change in line with official rates, or in other words when bank spreads vis a vis official rates remain constant.

But as official rates fall towards, and beyond, zero this is not happening, and should not have been expected to happen. The reputation of commercial banks (and MMFs) has depended on them being "safe", which is widely interpreted as meaning an individual's asset holdings not declining in nominal value, not "breaking the buck". There is some margin for increasing fees on handling deposits, strongly limited by commercial pressures, but, as a generality, commercial banks (and MMFs) face an even stronger ZLB than do Central Banks.

It is not just the direct effect of the negative rate on their (marginal) reserves that matters; it is the wider effect of the reduction of interest rates on their assets, relative to the rate that they will feel forced to continue offering on their (retail) deposits. As was set

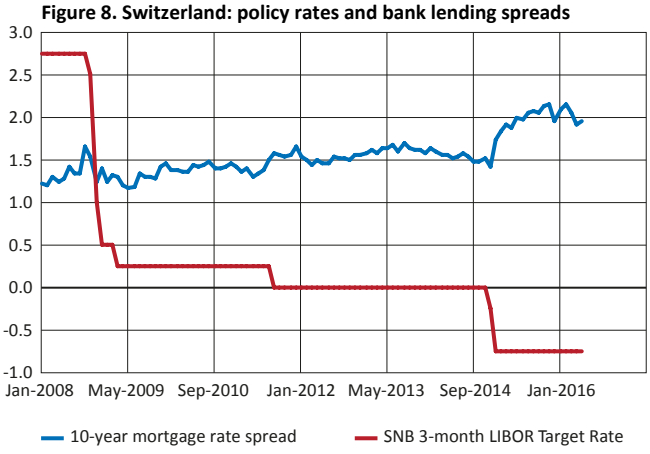
out in Van Steenis and Bartsch (2016), the effect of negative interest rates on banks' net interest margins and incomes is increasingly adverse. The impact on commercial banks of negative rates on their deposits at the Central Bank and their holdings of public sector debt is to reduce their interest income and profitability yet further. If this happens, their reaction could be to widen spreads between deposit and lending rates. This is indeed what has been happening, see Figures 7 and 8. This rise in spreads is clearly counter-productive.

Figure 7. Sweden: policy rates and bank lending spreads



Sources: Morgan Stanley Research, European Central Bank, Sveriges Riksbank and Haver Analytics

Figure 8. Switzerland: policy rates and bank lending spreads



Sources: Swiss National Bank, Morgan Stanley Research and Haver Analysis

Commercial banks, and MMFs, have a reputation to defend. They will not, perhaps cannot, pass on increasingly negative official interest rates to their retail customers on a one-for-one basis, unless the government takes full responsibility for the exercise. And until that happens, the application of such negative official rates may well continue to be counter-productive. If a government should state publicly that the purpose of its policy is to enforce a continued decrease in the nominal value of all your liquid assets, it may have a sharp and beneficial effect on expenditures; spend now because you will not have that much to spend next year. But would that be a political vote winner?

Have proponents of negative interest rates thought through its political implications? Unless the government takes the heat off the banks by taking responsibility for negative deposit rates, it will not work economically. But if they should take the heat off the banks by taking direct responsibility for declining nominal values, it will probably not work politically.

The basic problem, both with monetary expansion and negative interest rates, is that the primary transmission channel is via the commercial banks, and that channel has, for a variety of reasons, become constricted.

3 Mission to reboot bank lending

So what could be done? The first lesson, of course, is the need for Central Banks to be sensitive to the impact of their policies on commercial banks, because it is through the transmission channel of such banks that much, perhaps most, of the effect of such policies will come through to the real economy. The focus should be to rekindle bank lending. Four good examples of such sensitivity, and one example that stymied it, are set out below.

The first good example is the recent decision of the Bank of Japan to apply its negative interest rate to the marginal deposits of commercial banks with itself, rather than to their total reserve deposits. The application to marginal deposits fully maintains the desired relative interest rate effect, while greatly reducing the adverse effect on bank profits, which is counterproductive. Even so, the response to this unexpected change of policy has been negative, in some part because there still has been an adverse effect on Japanese commercial banks' profitability. The next three, good, examples are the earlier Funding for Lending Scheme (FLS) and now the Term Funding Scheme (TFS) of the Bank of England, the Dynamic Pre-Provisioning program of the Banco d'Espana and the TLTRO of the ECB.[2]

All of these worked in concert with the needs and objectives of commercial banks to achieve public policy outcomes. In contrast, the levying of considerable legal fines on financial institutions, rather than on individuals within a financial institution, reduced credit creation. Moral and ethical judgments aside, from a macroeconomic viewpoint they have created a headwind. Some improvement now could be obtained by the common application of best practice; thus, if any Central Bank wants to move deeper into negative interest rates, then do so on a marginal, rather than an average, basis.

But the world economy remains in a fragile condition, and it is possible that this could get worse. What more could be done that, unlike negative interest rates, works with the grain of a strengthening commercial banking system?

One answer to this could be for Central Banks to extend QE to purchases of unsecured senior bank debt. Such purchases would be somewhat risky, the more so now that such debt has become bail-inable. But if such purchases of the debt of bank X would seem too risky for a Central Bank to contemplate, does not that by the same token imply that bank X has too small an equity buffer, so that its Recovery program should be initiated?

If Central Banks were to purchase senior unsecured bank debt, it would give them some "skin in the game", and perhaps encourage them to move faster to prevent a downwards spiral (and even, possibly, to shift the governance of banks away from shareholders alone towards a wider set of creditors). Pessimists might argue that Central Bank holding of bank debt might reinforce forbearance, but would it, if such forbearance then later made Central Bank losses likely to be even greater? For agents to have skin in the game is generally thought desirable, for example to reduce agency problems; might this be just as true for regulators as for any other agent?

The ECB used to apply a two-pillar approach, with the second pillar based on the growth of the monetary aggregates, not just on M0. Whatever became of this second pillar? Can any Central Bank really expect to achieve significant real expansion if its commercial banking system, broad monetary growth and bank lending remain mired in a difficult slough? Moreover, the problem is getting worse because the prior expansionary success of Central

2 Though recent research, (Forbes, Reinhardt and Wieladek, 2016), suggests that some large part of the extra bank lending in the UK was mirrored by a cut-back in cross-border bank lending.

Banks rested partly on a generalised belief that they did have the power to lift us out of despondency. But confidence in that power is ebbing, and that just makes it that much harder for them.

A somewhat deeper problem is that banks have, by and large, almost ceased to be a conduit for channelling household savings towards business. The bulk of their business now involves channelling household savings into real estate projects; they have become akin to "real-estate hedge funds". The nexus between bank credit expansion, housing booms and busts and the financial cycle has become a major source of dynamic instability in our economies. Yet, partly because of an erroneous diagnosis of the causes of the GFC, blaming it largely on the dangers of exotic derivatives and investment bankers, little has yet been done to break this nexus and to mitigate the underlying dynamic instability.

4 Summary and conclusion

When a crisis of confidence hits the financial system and banks withdraw from risk-taking and hoard liquidity, there is no real policy alternative to central bank expansion, for the purpose of creating liquidity, reducing risk spreads and even in some cases replacing banks in certain markets for credit allocation. This is what central banks did successfully in 2008/9 and in the Eurozone in 2012.

But when confidence has been restored, simply repeating the same medicine runs into rapidly diminishing returns. When the demand by banks, and others, for liquidity has been satiated, as it has been, the constraint on banks' credit expansion becomes capital and, above all else, profitability. The move towards the ZLB, and beyond to NIRP, and the flattening of the yield curve, has depressed bank profitability, as have other factors, for example the imposition of fines on banks, rather than on individual bankers. Facing such diminished profitability, banks have responded to regulatory requirements for higher capital ratios by deleveraging rather than by raising new equity.

Consequently the massive expansion in the monetary base, the liabilities of the central banks, have not been matched by an equivalent rise in bank credit expansion or of broader monetary growth. Meanwhile from 2009 onwards, apart from the problems of the periphery of the Eurozone, the extent of potential cuts in interest rates has been pitifully small, relative to the uncertainties of the sluggish recovery.

The monetary authorities have now become cognisant of this problem, but it is not clear how they can best respond. As long as the bank transmission channel is thus clogged up, and the abolition of currency remains a futuristic dream, it would seem that monetary policy really is running out of ammunition. If so, the authorities have to look elsewhere, notably to fiscal policy, to provide further impetus, should this be desired, to our economies.

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From unconventional monetary to unconventional fiscal policies

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"...the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be exempt from any intellectual influences, are usually the slaves of some defunct economist."

Keynes, in The General Theory

1 Introduction

The recent crisis has brought economic policy to the center of the public debate. If during the last decade reality shaped policy, at the end of last century we witnessed a period in which the interaction between economic policy and theory was stronger than ever. As usual, in practice causality runs in both directions, but nonetheless during this period this relation was closer and in large part very much driven by investments in research by central banks. Researchers worked on problems motivated by specific policy questions and specific policy experiences, and policy makers made use of theory to shape institutions, design rules, or simply to communicate policy decisions to the public. In contrast to Keynes´s quote above, lags between new theoretical results and their introduction into everyday policy making diminished as economists worked in close connection with policy makers.

To better understand this change we will focus on monetary policy. After strong changes in the 70s and 80s, monetary policy recovered its glamour during the 90s, largely due to the positive economic outcomes perceived as the result of new ways of designing institutions and of using monetary policy instruments. We can summarize these outcomes as: a strong decline in the average inflation rate during that period, positive average growth in most economies, as well as low volatility of real aggregates over the business cycle frequency. Additionally, these results were not limited to some small area of the world but were widespread across developed countries. Trying to trace these results to a common trend, lessons from research suggest that the biggest change was the push for central banks to be independent of political power and the strong movement toward rule-based monetary policy.

By 2002, 22 countries had adopted monetary frameworks that emphasized inflation targeting as one, or the main, objective of its mandate.

This can be seen as the success of stabilization policy in normal times, and the widespread feeling was that the big hero was monetary policy. This idea was bolstered by the image of the central bank as an independent institution with a very concrete goal (low inflation), a very precise instrument (the short term policy rate), a rule and clear communication rule that governed the decisions on this instrument, and the credibility that came as a by-product of this institutional arrangement. It is therefore probably fair to say that the pre-crisis stability and growth was to a large extent explained by this new monetary design.

* The opinions expressed in the article are those of the author and do not necessarily coincide with those of Banco de Portugal or the Eurosystem.

At the same time on the research front we went from showing that monetary policy shocks should be avoided since they just introduce volatility and uncertainty into the economy, to showing how good monetary policy should play a stabilizing role. This revealing step came from the ability to extend the traditional framework used to define optimal tax policy to monetary environments. In this way, researchers could support the robustness of an average low inflation, and, at the same time, explain the gains of using monetary policy as a stabilization policy device, namely explaining how the so called "gaps" should be smoothed across time and states.

In contrast, developments in fiscal policy were often far from those reached in monetary policy, both in terms of real institutional design and research discussion. We should, however, remember that Milton Friedman (1948) famously railed against the use of discretionary (both fiscal and monetary) policy to stabilize the business cycle. Friedman instead defends the power of fiscal automatic stabilizers as a preferred tool for countercyclical policy. In a sense, we now can recognize that Friedman was very ahead of his time. By recognizing that "changes in fiscal incentives may be more useful than traditional discretionary fiscal policies that increase budget deficits and work through income effects alone", Friedman launched the foundations of what later would be named unconventional fiscal policies, which are the main topic of this note.

2 From conventional to unconventional monetary policy

Solow (2005) strongly argued that policy and research should focus more on automatic stabilizers as a route through which fiscal policy could and should affect the business cycle. However, these remarks didn´t have an impact on research and the way they were transmitted to the policy arena is in no way comparable to the above description of the changes in the conduct of monetary policy.

As a result, we arrive to the financial crisis with a consensus that stabilization policy is the responsibility of monetary institutions and that fiscal policies should be designed with built-in automatic stabilizers. Additionally, fiscal policy should not amplify the cycle and there was some common understanding that it should satisfy some rules that guarantee the sustainability of public debt.

In the pre-crisis thinking of policy economists, there was a clear division of institutions, instruments, and objectives between these two set of policies. Still we can find in the research community some areas of intersection between monetary and fiscal policies, namely in the literature known as the Fiscal Theory of the Price Level, which discusses the multiplicity of equilibria associated with the conduct of monetary policy, and in the role of the central bank as a lender of last resort.

With the onset of the financial crisis, the Great Recession and the European debt crisis, this consensus was broken. Fiscal stimulus came back as a prescription to stabilize the economy. The development of government plans to increase aggregate demand marks a change both for the US and for Europe. Subsequently, governments in a large set of countries found themselves with very high levels of public debt. This was in part due to the aforementioned stimulus and lower tax revenues due to the economic downturn, and in part due to automatic stabilizers which reduced revenues and increased expenditures. Following the economic turmoil and the associated political stress we have seen a strong focus on fiscal consolidation through discretionary actions, but to my knowledge there has been little new analytical work on fiscal stabilization policy. On the question of designing better stabilizers, a recent answer was given by McKay and Reis (2013), who show that most of the measured welfare benefits from automatic stabilizers come from the provision of insurance (through changes in precautionary savings) and from redistribution. These authors also show that high

transfers to the unemployed and poor can be quite effective at lowering volatility. However the effect on welfare, consumption, and output depends on the specific design of those automatic stabilizers, that is, on the way they avoid reducing the incentives to work or save and invest.

At the same time, the stance of monetary policy became exceptionally expansionary by historical accounts: the policy rate was lowered toward its effective zero lower bound and central banks began large scale purchases of private and public assets, with longer maturities than in normal times. Consequently, central bank balance sheets grew to unprecedented levels. At the same time that these policies were used as stimulus to the economy, they served specifically to provide liquidity to the financial sector and to repair specific financial markets. In this way, monetary policy had a strong effect on the lowering of rates and risk premia.

Part of this new, unconventional monetary policy works through credit easing through the so-called credit channel which affects credit allocation and relative yields. Through this channel monetary policy can have aggregate effects, but it also has strong redistributive effects. As quantitative (or credit) easing policies benefit the holders of financial assets, e.g. boosting prices of bonds and real estate, it is more difficult now to trace the dividing line between monetary and fiscal policy. Monetary policy transmission now looks like fiscal policy.

The abstraction typically used in research of not differentiating between the budget constraint of the government from that of the central bank began to be challenged these days. Modeling a separate balance sheet for the central bank and a constraint for the government obliges one to make explicit the restrictions of having an independent central bank, as well as the vulnerabilities created by having the private sector holding an increasing amount of assets (reserves). Is it sustainable for the private sector to hold an increasing amount of liabilities when these are not associated with expected future taxes? If the associated risks materialize, should the treasury be ready to receive fewer remittances or to recapitalize central banks? On the question of why the central bank balance sheet matters, the recent work by Del Negro and Sims (2015) gives us good arguments to discuss the consequences of the lack of fiscal support for the central bank. For example, the commitment from the government to never recapitalize the central bank can impose a restriction on the ability of the central bank to satisfy its mandate to control inflation. I will not further comment on issues related to central bank balance sheets and risky assets, and instead refer interested readers to Benigno (2016).

So in practice we have arrived in a world where the new, unconventional monetary policy has an increasing connection with the traditional fiscal policy, and policy makers are scrambling for additional instruments that could complement monetary policy and/or could be accommodated by governments with little fiscal room.

3 From research on optimal fiscal policy to optimal monetary policy

What happened on the research front that could help answer these questions? While we had a strong line of quantitative general equilibrium models which were largely used for fiscal policy over the long term and had helped to make progress on the analysis of fiscal (tax) policy, its extension to business cycle frequency and its interaction with monetary policy is very recent. Let me begin by describing the advances in monetary policy and return later to talk about its extension to unconventional fiscal policies and its potential value for the current situation. By extending general equilibrium models to stochastic and monetary environments, we were able to explain the gains of using monetary policy for stabilization purposes: agents may be restricted in the setting of prices, wages, or in the choice of

portfolio composition. The severity of these restrictions determines the strength of the transmission mechanism of monetary policy. Even though monetary policy can have positive effects, it is not possible to use this policy systematically to take advantage of these effects. A new impetus for using monetary policy as a stabilizing mechanism occurred when research showed that policy can be used in response to shocks so that the negative welfare effects of the nominal rigidities, together with the other distortions in the economy, are minimized. This new strand of literature was able to address quite relevant questions such as: How should monetary policy be conducted in response to shocks in the economy? How relevant is the transmission mechanism of monetary policy for the conduct of this optimal policy? How costly can a single monetary policy be when countries don't share a single monetary transmission mechanism and are exposed to asymmetric shocks? Or in short, how should central banks conduct short run monetary policy?

Ireland (1996) is the first to extend the Ramsey concept of minimizing distortions in a general equilibrium model to a monetary model with nominal rigidities. The idea is to define the set of feasible allocations given the existing policy instruments, and then to determine what characterizes the best solution, namely how policy should react to fundamental shocks and how prices and allocations react to the fundamental shocks and to the described policy changes. This new approach allows us to explain how the the so called gaps can really be read as triangles, or wedges, which policy should smooth across time and different states of the world[1].

This can be related to what, already at the end of the 80s, we read in De Long and Summers (1988), that "demand management policies can and do affect not just the variance, but also the mean of output" and "…successful macroeconomic policies fill in troughs without shaving off peaks". That is, the role of policy is not to close gaps but to minimize wedges, implying that the criteria for stabilization policy should be identical to that of any other policy: a welfare criteria. When this framework, developed mainly for fiscal policy, is applied to monetary policy it has the advantage of making very clear the comparability between monetary and fiscal stabilization policy channels.

Even though the first series of papers had a strong focus on conventional monetary policy, with fiscal policy being reduced to lump sum taxes/transfers, that comparison was clear. The substitution of gaps by triangles showed that while the transmission of monetary policy shocks is extremely dependent of the type and degree of the frictions existing in the economy, the same is not true of the optimal reaction to a given shock: the design of optimal rules to various shocks have been shown to be much more robust.

One very instructive result from the early stage of this literature is that when price adjustment is slow, for example due to sticky prices, the planner is able to side step the zero bound restriction on nominal interest rates and achieve higher utility. This ability is driven by the reaction of policy to a particular fundamental shock that allows ex-post mark-ups to be state-contingent, contrary to what happens when prices are flexible, for the class of state-of-the-art monetary policy models with monopolistic competition with constant elasticity of substitution across goods. Therefore, we can write theoretical examples where the existence of nominal rigidities can improve the outcome of policy relatively to those with flexible prices. This is clearly a result similar to the well-known one in the second-best literature on fiscal policy: namely that in the face of several distortions the elimination of one of them is not necessarily welfare improving.

1 See Adão, Correia and Teles (2003).

4 The optimal mix of policies

The next step in the research literature was to study the interaction of monetary and fiscal policy. The optimal policy was then a joint decision on the choice of both type of instruments. The way this interaction was developed was to limit fiscal instruments to proportional tax rates that can be state-contingent. In most of these papers government expenditures is exogenous and therefore cannot be used as a policy instrument. This methodological choice is very much driven by the difficulty of evaluating the welfare effects of a broad measure of public consumption.

These papers allow us to argue that, independently of the degree or type of price stickiness, it should be possible to implement the same relevant set of allocations[2], and that each allocation in that set is implemented with policies that are also independent of the price stickiness. The intuition behind this result is that policy shocks have differing effects in the model economy depending on the type and degree of price rigidity, but the same is true for the exogenous shocks, e.g. technology or government expenditures. This leads to the important result that when a policy satisfies a minimum requirement of optimality, the combined effect of the exogenous shocks and the response of policy is invariant to the degree or type of price. In other words, the influence of price rigidities can be undone if policy makers can decide monetary and fiscal policy jointly. We can summarize these results by saying that transmission is very relevant when policy is discretionary or when it is very far from efficient. But in other environments, for example with different price setting restrictions, transmission can be observationally equivalent.

The necessary condition for this equivalence result of different environments is the existence of a sufficiently rich set of policy instruments. In particular, we show that within the confines of a standard business cycle model, state-contingent debt is a redundant policy instrument as long as policy makers can use both consumption and labor income taxes freely.

The main policy lesson from our analysis is that when state-contingent fiscal and monetary policy are jointly decided, price stability is a requirement of efficiency, independent of preferences, as long as preferences concern the final goods from which the households extract utility. This is a normative statement, stronger than the Ramsey prescriptions. It also appears to be consistent with a generalized mandate and practice by central banks. In addition, this result tell us that it is not possible to distinguish whether the Great Moderation was due to lower volatility of outcomes from different transmissions of shocks or to better policy.

A related result is that the more you need to use monetary and fiscal policy instruments, the more effective they become. Therefore the question of the magnitude of the fiscal multiplier that has produced that many works in the post crisis period should be assessed carefully. What we have learned is that just as very different channels can be associated to different magnitudes of the multiplier, the same channels would lead to very different effects of the shock to which policy is reacting. When we joint these two pieces, the total effect of the shock behind the recession and the policy response, the outcomes should be much more similar than those described in most of the literature.

We can now apply the lessons learned from this literature to the links between central banking and fiscal policy. To do that, let me present some results from what we can call the unconventional fiscal policies toolkit. I show how I believe we should complement monetary and fiscal policies in crisis times, when monetary policy has exhausted its conventional instruments and fiscal space has no room for conventional stimulus of the economy.

In this way we can discuss really important, particularly topical questions. The first is the answer to the question of "How can we overcome the costs of the ZLB?" and the second is "How can we compare credit subsidies to credit easing?"

2 See Adão, Correia and Teles (2004) and Correia, Nicolini and Teles (2008).

It is well known that non-arbitrage between money and bonds restricts nominal interest rates from becoming (too) negative. How negative is currently an open question, but no one doubts that there is some lower bound. It is clear from recent experience that the Great Recession is one event in which it would be desirable for the central bank to lower the policy rate below that bound. Instead, alternative policies were put in place, namely the use of unconventional monetary policies, including forward guidance and the fiscal stimulus that lead to the public debt legacy that we face these days in a large number of countries. I want to stress that not only were there more options left unexplored but, more relevant for this note, these alternatives were precisely in the set of unconventional fiscal policies which include the interaction between fiscal and monetary policy.

5 The time for unconventional fiscal policy?

The cost of the zero bound is a major concern, which leads to the suggestion of better integration between monetary and conventional fiscal policy.[3] However, Correia et al. (2013) proposes the use of unconventional fiscal and monetary policy when the zero lower bound is reached. If the nominal interest rate is zero, proportional contingent taxes can substitute for the role that the nominal interest rate would normally play. Whatever monetary policy can achieve with the nominal interest rate, fiscal policy can also be done with a combination of consumption, labor and capital income taxes. The intuition behind why this unconventional fiscal policy can neutralize the cost of the zero bound constraint is simple. The prices that matter for inter-temporal decisions are consumer prices, which are gross of consumption taxes. Therefore, the idea is to induce inflation in consumer prices, keeping producer price inflation at zero, to eliminate the costs associated with nominal frictions. The result is that we can reach negative real interest rates while avoiding the distortions associated with producer price inflation. A temporarily lower consumption tax relative to the future one generates inflation in consumer prices. To avoid changes in incentives, distinct from those usually associated with a lower interest rate, the change (increase) in the level of consumption taxes (or the equivalent VAT taxes) must be counteracted by a decline in the labor income tax. For the same reason, a change (a decline) in the tax of capital income neutralizes the introduction of the increasing tax on consumption goods. In this way, the use of those three taxes can replicate the decline of the tax on money, that is the nominal policy interest rate.

This policy recommendation requires flexibility of tax policy. It should be noted that this type of flexibility has been prescribed by several authors. Moreover, and perhaps even more relevant, some changes adopting these insights were introduced (partially) during this crisis. For example Feldstein (2002) says that "The Japanese government could announce that it will raise the current 5 percent value added tax by 1 percent per quarter and simultaneously reduce the income tax rates to keep revenue unchanged, continuing this for several years until VAT reaches 20 percent". And in his presidential address to the 2011 American Economic Association Annual Meeting, Robert Hall (2011) reiterated Feldstein's ideas and encouraged further research to understand the viability and effects of unconventional fiscal policy, both theoretically and empirically. On the introduction of this instrument in reaction to the state of the economy we can point to the Japanese experience: Japan announced in October 2013 an increase of the consumption tax in two phases (April 2014 and October 2015). Economic activity in Japan grew strongly in 2014Q1, particularly consumption, but contracted afterwards. The second plan was postponed to April 2017.

Therefore, I believe that the argument that fiscal instruments are not as flexible as monetary policy instruments should be revisited. While perhaps this conclusion can apply to stabilization policy during normal times, exceptional circumstances such as the recent crisis or the Japanese stagnation since the nineties can change this evaluation.

3 See for example Blanchard, Dell'Ariccia and Mauro (2010).

Another exercise is to compare the use of unconventional monetary versus fiscal policy, namely credit subsidies.[4] When considering the recent crises, financial and sovereign, the limitations of models without an explicit role for the financial sector and without financial frictions to evaluate both the causes of the recession as well as the policies to the recovery were self-evident. In the models used before the crisis, under the assumption of the absence of nominal rigidities, the zero bound on nominal interest rates is not a restriction to policy. In fact, it is the optimal policy. However, those models were too simple to be able to take into account the financial channels that a large body of literature agrees were relevant during the recent crisis. One way to model the interest rate spreads as a simple extension to the existing models is to subject financial intermediaries to an enforcement problem, in the spirit of Gertler and Karadi (2011). Firms must borrow to pay wages, those loans must be intermediated, and banks can do that at low cost. This imposes not a resource cost, which for simplicity we assume to be zero, but rather an efficiency cost resulting from the incentive problem that bankers can divert part of the bank's assets. As banks must earn rents, they charge a differential between the deposit and the lending rates; this spread generates profits which are accumulated as internal funds. These lending spreads can be particularly high when banks' internal funds are low as a result of unfavorable exogenous shocks, which can be interpreted as shocks to the value of collateral. There is a sense in which lending rates may be too high in these economies: if they are too high or too volatile then policy can be used to lower or smooth them, increasing welfare. Although interest rate policy does not act directly on the spreads, monetary policy can be used to partially correct those distortions. The spreads are whatever they need to be to align the incentives of banks. Interest rate policy reduces the financing costs of banks, reducing the spreads and the lending cost of firms.

A very low policy rate, possibly zero, will minimize the lending rates and minimize the distortion that it causes on allocations. Nevertheless, because of the Zero Lower Bound, lending rates may still be too high and too volatile. If the policy rate could be negative and if it could be financed with lump sum taxes, then it would be possible to achieve the first best in these economies. A result analogous to the Friedman rule would be obtained, but this rule would be on the lending rate and not on the policy rate. When we introduce unconventional fiscal policy, in this case a credit subsidy, we can act directly on the existing distortions. Credit subsidies play the same role as the policy interest rate, even if acting through very different mechanisms. And, furthermore, they have the advantage that they are not subject to any restriction such as the zero bound constraint. With credit subsidies it is therefore possible to implement allocations that would be previously infeasible for monetary policy, because they would require negative interest rates. The policy rate could be set at some arbitrary level, possibly close to the zero bound. Banks would charge time varying spreads and lending rates. But the rates paid by borrowers net of credit subsidies could be smooth and very low. We also show that the budget implications of the policy rate and tax subsidies are exactly the same if we take into account a consolidated budget constraint between the government and the central bank. This environment allows the comparison of this unconventional fiscal policy with the unconventional monetary policy in place after the crisis, namely the credit easing policies. It assumes that there is an alternative technology, which the central bank can use, in which the enforcement problem is solved by paying a resource cost, which allows the central bank to give credit directly to firms. The comparison of unconventional fiscal and monetary policies comes down to comparing a resource cost versus a deadweight loss. It can be shown that credit easing does not appear to be a good alternative to the already described unconventional fiscal policy.

4 See Correia et al. (2016).

6 Concluding remarks

We find ourselves in this post crisis period with a legacy that, in addition to quite special economic and financial conditions, is also characterized by a legacy coming from new policy tools and new experiments. The monetary toolkit was clearly reinforced and new, unconventional, monetary policies were implemented and are still in place in most developed economies. What I wanted to discuss in this short note was that the new world that monetary policy makers entered was not accompanied by a similar move in the fiscal sphere. And that it is difficult to say whether the return to the old normal of not very low policy interest rates will be there in the near future. The theoretical developments of the last two decades would point to more ambition and originality in the use of fiscal instruments such as the ones described here. This would not give additional room of manoeuvre to tackle the ongoing prolonged recovery but, maybe more importantly, may allow us do so in a more efficient way compared with current policy actions.

It is true that this would require a stronger coordination across institutions compared to the pre-crisis period. But it is also the case that the continuation of the unconventional monetary policy has mechanisms very similar to those of fiscal policy and stronger re-distributional effects, which would imply such coordination may prove necessary in any case.

In this scenario, keeping the research agenda updated as well as a strong dialogue between policy and research is more important than ever.

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The relevance or irrelevance of asset purchase programs

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This essay analyzes the effectiveness of central bank asset purchase programs pointing out their quasi-fiscal nature. By neglecting this channel, as in the portfolio balance theory, their benefits can only be exaggerated. By including this channel, instead, there can be positive effects on inflation and output only if the private sector experiences a wealth gain and thereby, on the opposite side, the government (treasury and central banks) retains losses. An impossible trinity arises for the central bank among setting freely conventional monetary policy, being financially independent from the treasury and choosing an arbitrary composition of the portfolio of assets. In general, asset purchase programs do not represent a new style of conducting central banking and should be abandoned in normal times.

1 Introduction

This essay analyzes the effectiveness of certain unconventional monetary policies– namely Large Scale Asset Purchases (LSAPs) programs– recently implemented by many central banks around the world. The perspective is on the transmission mechanism pointing out their quasi-fiscal nature.

LSAPs involve central banks buying long-term securities issued either by the private sector or by the treasury.[1] The key aspect of LSAPs is the unconventional nature of the purchased securities with risky features as opposed to risk-less, short-term securities characterizing the classical composition of a central-bank balance sheet. There is a double component of riskiness: securities can have credit risk, because the issuer can seize them, fully or partly through default, and/or securities can be subject to interest-rate risk and therefore their market price can vary depending on the expectations of future short-term rates and term premia.

2 Irrelevance of LSAPs

The most popular narrative for why these asset purchase programs have an effect on the economy has nothing to do with their fiscal effects. I will argue below that by neglecting the fiscal effects their benefits can only be exaggerated.

The popular narrative, the so-called portfolio-balance theory, suggests that purchases of long-term securities are effective because they alter supply in some markets leading to counterbalancing effects through prices and returns which cause spillovers in other markets.

Let us think about a central bank that purchases securities of type X. These purchases reduce the supply of securities X in market X. As a consequence, the resulting excess demand increases the price of the security and lowers their return. At the same time, previous owners of securities X should be in the position to reshuffle their portfolio according to

* This is a written version of remarks prepared for the Riksbank Conference on "Rethinking the Central Bank's Mandate", Stockholm, June 3-4, 2016. Technical background material can be found in Benigno (2016) and Benigno and Nisticò (2015).
1 This form of unconventional monetary policy is often called Quantitative Easing (QE), although QE defines more properly policies that increase the liabilities of the central bank's balance sheet regardless of the asset composition.

their desired risk/return profile. This reshuffling will create excess demand in other security markets lowering their returns. The cascade of adjustments will eventually spread with the final effect of lowering interest rates and premia in several money and bond markets and to even depreciate the exchange rate.

However, the described mechanism completely neglects the fiscal consequences of the action of the central bank which can indeed even neutralize the overall effect.

First, we note that by purchasing long-term securities, the central bank alters the allocation of risk in the economy. In particular, it takes some risks off the hands of the private sector and put them on its balance sheet. The key question to ask is what will happen when this risk materializes in the hands of the central bank. In the case of a credit event, for example, it can produce losses that impact directly and negatively on the income of the central bank which is the way through which purchases of risky securities can have fiscal consequences. Indeed, in general, central banks rebate all profits to the treasury and, therefore, in the case of lower income, they deliver lower remittances to the treasury. If the treasury covers the missing revenues by increasing taxes on the private sector, the central bank's losses are then transferred to the private sector.

In the case the central bank's gains or losses are transferred to the treasury and the treasury transfers them back to the private sector, risk does return at the end of the day to the private sector which ultimately bears all losses or eventually gains. It is like those securities never exited the border of the private sector. How is it then possible that the central bank's purchases can produce any effect on the economy? If the above transfers mechanism is in place, they shouldn't. Total wealth of private sector has not changed. The financial wealth did change because of the different composition of the portfolio but this variation is completely offset by a change in human wealth since net income is lowered because of higher taxes.

Considering that total wealth of households has not changed, then there is no reason for them to change consumption choices. Therefore, inflation and GDP should not vary because there are no movements in aggregate demand.

This is a striking result which generalizes Wallace's (1981) irrelevance theorem to a context in which central banks buy risky assets and money is dominated in return by risk-free bonds (see Eggertsson and Woodford, 2003). Open-market operations of any form are irrelevant meaning that they do not produce any effect on the equilibrium allocation in terms of GDP and inflation. But, then, why do we see central banks making an extensive use of these instruments? Is there any hope that they can have some of the desired effects?

3 Relevance of LSAPs

Following the reasoning above, one should find a way to break the mechanism that neutralizes the overall impact: that is, the risk should stay in the hands of the central bank or at least in the hands of the whole government (central bank and treasury) so that when it materializes, the private sector experiences a change in total wealth, raises consumption and therefore shifts aggregate demand, which in turn moves prices. In this case, LSAPs can have an inflationary impact and positive output effects.

There are two transfer channels of the irrelevance mechanism underlined above: (1) losses or gains of the central banks are transferred to the treasury; (2) lower or higher remittances from the central bank to the treasury are covered by higher or lower taxes levied on the private sector.

Let us first focus on the first channel to see what the most common central bank practices are. One interesting case of complete transfer of losses and gains from the central bank to the treasury is the one put in place by the Bank of England which, in light of its LSAPs program, created a financial subsidiary jointly owned by the central bank and treasury with

the purpose of purchasing the unconventional securities using a credit line issued by the central bank. The critical aspect of the joint subsidiary is that gains or losses due to asset purchases are entirely borne by the treasury. According to this mechanism, the central bank is fully supported by the treasury and indeed its losses are passed to the treasury. If the treasury passes them to the private sector, there will be a neutrality result.

In the U.S., on the contrary, the treasury is not allowed to recapitalize the central bank. Whenever it experiences losses, the Federal Reserve has to rely only on internal resources to restore initial net worth. It can indeed stop paying remittances to the treasury and retain earnings to pay past losses. Once all losses are recovered, the central bank returns to the usual business of paying remittances to the treasury.

4 Buy assets of dubious credit worthiness

The U.S. case is an interesting one since it can deliver a neutrality or a non-neutrality result depending on the magnitude of the central bank's losses. On the one hand, the central bank has still the possibility to transfer losses to the treasury across time, because of the zero remittances when the positive income is retained to pay past losses. If this happens to be the case, the central bank can bring the materialization of risk out of its balance sheet by lowering over time remittances to the treasury. If the treasury passes back these losses to the private sector, then there will be another neutrality result.

However, on the other hand, it might also be possible that the central bank is unable to transfer all losses to the treasury even over time. For this to be the case, losses should be quite significant to impair the profitability of the central bank and its solvency. For example, if losses are such to bring the level of net worth to a negative number and up to the point at which the overall position on non-interest bearing securities (currency and net worth) of the central bank is negative, then the central bank loses its profitability and cannot recover from past losses in the current conditions (inflation and output). To return profitable, the central bank must increase the level of non-interest bearing liabilities (net worth or currency). Net worth cannot rise because the treasury does not recapitalize the central bank, therefore money holdings should increase. But how is it possible to raise money holdings? Well, inflation is the way to go since it increases private sector's need of money for transaction purposes. The increase in money holdings raises the level of non-interest bearing liabilities of the central bank and works to restore profitability. Note that this adjustment mechanism is consistent with the fact that losses are kept in the central bank's balance-sheet with risk that has been taken out of the hands of the private sector which therefore benefits of a positive wealth effect. This translates into higher demand which in turn pushes prices and inflation up consistently with the need of the central bank to restore profitability.

Note that it is not necessary that the central bank experiences losses in the current contingencies but it is sufficient that there is some contingency in the future, which does not even materialize in the history, in which the central bank suffers significant losses. Indeed, in this contingency, inflation will pick up and, considering economic models with forward-looking features, then the rise in future inflation will create positive feedback effects into the current outlook for inflation and output.

Therefore, we have here a first case of relevance of LSAPs provided two conditions are met: (1) the treasury should not cover losses of the central bank, (2) losses should be significant to impair the profitability of the central bank.

The prescription from theory is therefore to buy assets of dubious credit worthiness. But, this is not the way central banks went. Indeed, the scheme underlined above rests on the fact that the central bank is in some way willing to take losses on its balance-sheet and let its net worth to substantially fall up to the point that profitability is impaired. In this case, central bank may be easily questioned by the parliament or the public because they

did put their solvency at risk. Although *ex ante* the treasury is not supposed to recapitalize the central bank, *ex post* it may offer support which could possibly undermine central bank's independence. Last but not least, the public may be afraid to hold the currency issued by the central bank due to its insolvency risk and may find devices to substitute it with other currencies. Such a confidence crisis might lead to disappearance of currency or the appearance of non-central bank backed currencies (like bitcoin). One example of the former was the florin in the late eighteen century whose solidity was jeopardized by the risky lending exerted by the Bank of Amsterdam to the East India Company (see Quinn and Roberds, 2014).

5 The impossible trinity in monetary economics

All these considerations point toward the conclusion that central banks might want to avoid these risky territories to preserve their financial independence from the treasury.

But here there is an interesting trilemma. The impossible trinity in monetary economics: Central banks cannot be at the same time financially independent, target independent and freely choose balance-sheet policies:

1. Financial independence means the willingness to avoid recapitalization by the treasury and at the same time to avoid significant losses and prolonged periods of net worth's reduction.
2. Target independence is the ability to set the inflation target independently of other conditions or in general the way to conduct conventional monetary policy.
3. Independence of the balance-sheet policies means the ability to set arbitrary the composition of the central bank's portfolio of assets independently of the credit worthiness of the issuer or duration of securities.

The impossible trinity works in this way. A central bank that engages in purchases of unconventional securities, thereby making potential losses, and wants to keep its financial independence should change its conventional monetary policy stance in a way to prevent income losses and net-worth reduction. Then, it cannot at the same time achieve target independence.

Also, a central bank that strives to maintain target independence and engages in unconventional purchases could experience losses, even significant ones, affecting its profits and net worth. It thereby eventually may have to be supported by the treasury. Then, it cannot be financially independent.

Finally, a central bank that wants to maintain target independence and financial independence has to restrict its choice of balance-sheet policies to mostly riskless securities.[2] It cannot have any compositions of its balance-sheet.

This impossible trinity is interesting since it reveals another non-irrelevance result. A central bank that engages in purchases of risky securities and wants to maintain financial independence has to change its monetary policy stance. In other words, purchases of long-term securities and commitment to financial independence signal a change in conventional monetary policy which has implications for inflation and output.

Therefore, we have found two cases of relevance of LSAPs. Either the central bank is willing to take large losses on its balance-sheet or it is determined to avoid these losses.

There is one critical observation to make at this point. The bottom line of a non-neutrality result is that, at the end, it should come through a change in the conduct of conventional monetary policy. But, could it not be the case that this change can be achieved without unconventional open-market operations? The sad answer is yes. If the central bank wants to vary conventional policy, after all, they should just do it and communicate to the public in

2 Foreign reserves can be as well subject to capital gains or losses.

the most transparent way. Indeed, if the central bank could credibly commit and implement optimal inflation targeting policy, then unconventional purchases are really unnecessary. Alternatively, with lack of commitment, they could be used to signal a more expansionary monetary policy stance like a longer sojourn at zero interest-rate policies.

6 The treasury's role

Let's now go back to the two channels of the neutrality mechanism described above since insofar I have been only focused on the one between central bank and treasury and taken as granted that the treasury is passing profits of central banks to the private sectors or covering losses by raising taxes on the private sector. This second channel, between treasury and private sector, reveals the quasi-fiscal nature of central bank's LSAPs.

Suppose we are in the case in which the central bank is passing all gains or losses due to LSAPs to the treasury. In turn, the treasury could decide to pass or not these gains or losses to the private sector. This decision could be critical for the effects of targeted LSAPs on the economy. As already discussed, a neutrality result arises when the treasury passes all gains and losses to the private sector. But what is going to happen when the treasury retains losses or gains in its balance sheet? We are then in a situation in which the private sector holds more safe securities and the central bank holds risky assets. If risk materializes, the private sector experiences a gain, while the treasury retains losses that lead to an increase in aggregate demand which in isolation pushes prices and output up. Therefore, differently from the two cases of non-neutrality discussed earlier, here it is the treasury rather than the central bank that keeps losses in its balance sheet or tries to avoid them.

This brings us to point out an equivalent role that fiscal policy has independently of the unconventional action of monetary policy. Fiscal policy could influence equilibrium through a similar mechanism. It could make a transfer to the private sector through a reduction in taxes so that the private sector experiences a permanent wealth gain that pushes up consumption and aggregate demand. The key aspect is, however, how the tax cut is financed. If it is financed by issuing bonds to the private sector, then there could not be wealth effect since it is possible that private sector understands that the cut is not permanent and will be reversed by higher taxes. An alternative, what has been called helicopter money, is that these financing needs are covered by purchases of government debt by the central bank which are financed by issuing monetary base in a permanent way and surely well beyond the stay of the economy at the zero lower bound. In this way, the wealth effect is going to be consistent with an inflationary path. However, there are other ways through which one can achieve the same outcome. For example, a permanent QE policy that raises the monetary base and transfers all profits of the operations to the treasury can achieve the same effects as helicopter money.

All these observations point towards the need of some coordination between monetary and fiscal authority to achieve a certain outcome. Indeed, taking literally the proposal of helicopter money as a money financed tax cut, the lead of the action is here from fiscal policy but the financing support should come from monetary policy. On the contrary, given that central banks are already implementing QE policies, independently of what the treasury does, the treasury could exploit them in order to finance a tax cut by issuing more bonds to be held by the central bank. In the aftermath of the financial crisis, some of the tax-relief policies that have been implemented around the world may have found justification along the same line of reasoning. However, to qualify as helicopter money, QE should be permanent and surely well beyond the duration of zero-lower bound policies.

7 Central bank independence

Let me finally come back to the problem of independence of the central bank from a slightly different perspective. Nowadays, central banks have an inflation-targeting mandate and an important issue in monetary economics is to define how to set their instruments in a way to achieve the desired target on a certain medium-to-long horizon. In this direction, the main question to address is whether unconventional purchases can jeopardize the achievement of the final objective of the central bank. Here again the important distinction to consider is the presence or not of treasury's support. In theory a central bank is able to uniquely achieve a determined target for inflation if the following three conditions are met: it has enough capital to start, it holds only risk-less securities in its portfolio, it transfers all income (which under a conventional composition of the balance sheet is positive) to the treasury. A central bank with these characteristics will be financially independent from the treasury, except for the initial injection of capital, and can defeat any deflationary or inflationary spirals by relying only on its own resources.

When instead the central bank starts to purchase risky securities, it can still defend and achieve any desired inflation target provided, however, that there is financial support from the treasury. This support can create dependence between central bank and treasury, a state that a central bank may want to avoid but at an important cost. If the central bank starts to purchase long-term securities and wants to be financially independent from the treasury, then it might be subject to self-fulfilling inflationary spirals or in general to multiplicity in which the desired equilibria with stable inflation coexists with inflationary paths. Under the same conditions, credit events or simply the expectations of credit events can even exacerbate the development of self-fulfilling inflation or induce deflationary spirals. Furthermore, they can completely challenge the achievement of the inflation target.

Restating the impossible trinity, the prescription is to have a central bank with a traditional asset composition. Otherwise, treasury's support is needed if the central bank buys risky securities.

8 Concluding remarks

Asset purchases of risky assets bring monetary policy into risky territories. In particular, as balance-sheet grows and central banks become closer to financial intermediaries (a gigantic one), and as the fiscal consequences of their action become more evident, the appointment of a governor of a central bank who is sitting on balance-sheet of a size multiple of the country's GDP will likely to be driven by non-technical considerations perhaps related to who is going to be more prone or against these quasi fiscal actions. All these considerations might indeed distract the standard job of monetary policy.

The conclusion to draw from this analysis should not point much toward minimizing the importance of these quasi-fiscal monetary policy actions in certain adverse contingencies – although they seem to be just a desirable way to signal the escape from suboptimal monetary policy. What should not be defended is the view that there is a new style of doing central banking through unconventional policies out there that should be adopted moving forward to normal times.

Be old style, learn how to better communicate inflation-targeting procedures seems the way to better achieve inflation-targeting goals even during liquidity traps.

9 Related literature

This essay is based on the analyses of Benigno (2016) and Benigno and Nisticò (2015). It is related to a recent literature which, by emphasizing the separation between the balance sheets of central bank and treasury, has pointed out the important role of transfers between

treasury and central bank and the solvency conditions of the central bank. See Bassetto and Messer (2013), Del Negro and Sims (2015), Hall and Reis (2015) and the early work of Sims (2005). The reference literature on the irrelevance of open-market operations includes among others the works of Wallace (1981), Sargent and Smith (1987) and Eggertsson and Woodford (2003). Sargent and Wallace (1981) is also an important reference for the analysis of the interaction between monetary and fiscal policies.

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A coming crisis of legitimacy?

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1 An overview of the argument

In this article, I want to spell out why central banks may be heading for a crisis of political and democratic legitimacy, and to suggest a solution. I will set out the argument initially at a high level, then dig down into selected aspects.

A crisis of legitimacy is not inevitable. But unless some crucial things change, it may be the most likely outcome of differences between the evolving tasks of central banks as central bankers perceive them compared with how their social partners see them.

The fundamental problem is the difficulty in describing how we would use far-reaching transactional and regulatory powers to maintain "financial stability". We cannot yet describe with any clarity how delegated powers of the state would be used efficiently and fairly to achieve an end that we can only, for now, describe in the negative – the absence of crises, or worse still the absence of "too much" instability.

Yet central bankers generally think it appropriate that they be given extra powers, most of a regulatory nature, for independent execution. Exactly which powers are sought is not really clear. Quite a long shopping list is offered. Exactly how these powers would be deployed, in what circumstances, with what limitations, is not able to be articulated clearly. Most notably, it is difficult to explain how this big new fuzzy goal relates to existing goals.

To a limited extent, some central banks have explicitly been given new powers for these imperfectly defined purposes. More commonly, central banks are showing a strong inclination to use powers that they already have, or could be argued to have, for new, imperfectly-defined purposes. It is this *reinterpretation* of the proper use of delegated state powers that threatens legitimacy.

And as it happens, the circumstances in which boundaries of society's tolerance for reinterpretation of mandates are being tested are not propitious for such testing.

- Central banking mandates have already been liberally reinterpreted alongside use of unconventional monetary policies, causing some political discomfort (for example in Europe, especially Germany, and the United States).
- Trust in politics and political institutions is falling, quite generally and almost everywhere.
- For various reasons, central banks may be transitioning from a world in which they have had plenty of income to a world in which they are income-constrained. They may find themselves having to negotiate compensation from governments to cover fiscal agency and other services.

Let me quickly add that I do not think central bankers are necessarily wrong to believe that they have an obligation to society to make financial stability a key focal point of their work. There is a strong case to be made that central banks exist for more than price stability in a fiat currency world. Since their inception, in different and evolving ways central banks have been part of the hunt for stable and efficient monetary technologies that facilitate economic exchange across distance, between strangers and through time (that they have also been at times convenient channels for war finance is incidental). In this conception of the public

* The views contained in this article are personal, and should not be attributed to either the BIS or the CBGG.

good that central banks exist to supply, the reliability of the *system* of financial intermediation is just as important as the predictability of the exchange value of the monetary tokens that this system creates and exchanges.

But that is not the discussion that central banks had with legislatures, with society, when autonomy – distance from daily political command – was granted (or renewed) through the last third of the 20th century. For the most part, the discussion that led to autonomy was around inflation, or more generally around the nominal component of macroeconomic stability.[1]

What is holding back an expanded discussion about repurposing the use of state powers? Central banks are just not yet ready to have it, at least with the depth needed. Their level of knowledge is insufficient to answer the essential questions that would need to be asked:

- What exactly do you mean by financial stability (and don't just tell me the absence of instability)?
- Which part of changing financial conditions is bad, and which part good? Can you reliably tell them apart?
- How much stability – as you define it – do you think is efficient?
- What are the costs, the side effects, of using these powers that you seek? Who will bear those costs? Can you assure us that it is the same people who benefit from the gain in stability – as you define it?

Without being offered good answers to these questions, the issue for legislatures would be whether to delegate important state powers to agencies at arms length from the electoral process, without being able to delimit their use solely for agreed and stated purposes. Moreover, to agencies that already have major delegations. That is a big ask, and one rightly to be wary about.

This places central banks on the sharp horns of a dilemma:

- Logic says that financial stability is indeed part of the same public good that price stability aims to supply.
- Plenty of historical evidence says that severe interruptions to the workings of the system of financial intermediation involve serious real costs, much larger indeed than the real costs of moderate price instability.
- Instinct says that we can use regulatory powers to moderate the risks of such disruptions occurring (even if we don't yet know their full causes), and make the system more resilient to such dislocations, without imposing overwhelming costs or distortions.[2]
- And the basic logic of the public good that is a reliable monetary system says that such regulatory powers should be deployed *jointly* with other state powers aiming to deliver monetary stability. Or at least be considered in an integrated fashion.
- Together, all these things say that waiting until formal mandates can be properly spelled out is a counsel of perfection, and perfection can be the enemy of the good. Waiting would condemn our economies to unnecessary future crises. Existing powers *could* be used for wider purposes, and perhaps *should* be, especially in view of the logic that a central bank exists to deliver monetary stability in a broad sense.
- And in any case we know that central banks are likely to be held to account, in the court of public opinion, should they not have acted to prevent the next big financial crisis.

1 Conti-Brown (2016) makes this point strongly in his review of the concept of independence for the Federal Reserve. In his view, the concept is not only slippery (partly as it is not explicitly a product of the Fed's law), it is really attached most clearly to the task of keeping inflation down and not of getting inflation up, or to a multitude of other Fed tasks.

2 Cost-benefit analyses of the use of regulatory instruments is not something that financial regulators are much practiced at, at least by comparison with other regulators. Regulatory impact assessments and open-forum consultation process are much less frequent in the domain of financial regulation than the regulation of other economic activities, for example.

So what to do? How to resolve this dilemma? The only clear answers, it seems to me are: **First**, urgently invest more in filling the knowledge gaps. We need quickly to acquire the capacity to spell out: the nature of financial instabilty problem; the origins of the problem in terms of market and existing regulatory failures; and the public policy tools that might address the problem (including their strengths and weaknesses and their interaction with existing policies). **Second**, develop ways of setting financial stability objectives in law that properly recognise the multiple dimensions that are relevant for such objectives, and that allow for the adaptation of such objectives as the state of knowledge improves. Without improvements on both these fronts, I fear that a crisis of legitimacy is indeed likely.

I would now like to dig a little deeper into four aspects of these assertions, with the fourth aspect being an attempt to offer a way forward.

2 Monetary system stability as a public good

Consistent with the new-found relevance of financial stability to the central bank's task, Goodhart's (1988) argument that the essence of central banking is not the pursuit of price stability but the capacity to be a lender of last resort is now often cited approvingly.[3] There is a tendency to bypass the points that many early central banks were created as a part of an effort to fix problems in payment systems and provide monetary stability, and that the majority of central banks were created (in the 20th century) as a tool of government macroeconomic management.[4]

Giannini (2011) offers an additional perspective. He argues that both the lender of last resort and monetary stability perspectives are useful and relevant, yet both miss the point, which is that the functions of central banks are in evolution. The thing driving that evolution is mankind's millennia-old search for an effective and stable payment technology, a set of institutional arrangements that support monetary exchange and thus facilitate real exchange.

From this perspective, monetary stability and financial stability are two dimensions of the same public good, as opposed to two separate public goods. And that seems also to be the lesson of the many treatises on the history of money and of financial systems.[5] In these histories, both *money* and *credit* get strong billing. We may never resolve the question as to which is the chicken and which the egg, because both money and credit seem to have existed very early in the historical record, and both are about enabling economic exchange. Both are technologies that remove the shackles of the "simultaneous double coincidence of wants" of real time barter, allowing economic exchange to take place over time. Non-commodity monies in particular are trust-based technologies, equivalent in many respects to credit.

These histories also give top billing to the *mechanics of the financial system* – the service providers, the rules under which they work, and the resulting modalities of financial exchange and intermediation.

One can consider this same history through the new lens of a search for safe assets, to facilitate exchange and store value. Using this lens, we get very similar messages.[6] Commodity money has been unreliable because of episodic bouts of feast and famine. Transferable privately-issued credit instruments, such as bills of exchange and bank deposits have also had a patchy track record in acting as reliable safe assets but these, along with tradeable government debt have come to the fore during the last couple of centuries. Alongside irredeemable fiat currency, itself with a patchy track record for reliability in exchange value, hence a patchy record of reliability in providing the services sought.

3 Goodhart (1988).
4 Central Bank Governance Group (2009, pp. 19–20).
5 See for example, Davies (1994). See also David Graeber (2011), for emphasis on debt and debt instruments.
6 See for example Gorton (2016).

The point is that such histories mingle the roles of money and credit instruments and the institutions that are involved in their supply. Catastrophic breakdowns are commonplace, in the wake of which people search for and then experiment with arrangements that may (hopefully) be less frail. Yet certain types of breakdown repeat themselves. One is the collapse in the exchange value of the thing that that community has adopted as the medium of exchange and store of value − that is, runaway inflation. Another is breakdowns in the *machinery* of the financial system − of the institutions, and of the systems and networks that connect them. Such breakdowns impede economic exchange, and also lead to collapses in stores of value. Both types of breakdowns cause harm to the users of the monetary system.

Through time, governments have played an increasing role in the organisation of the monetary system. Presumably, the reason for increasing government involvement even as the power of monarchs diminished relates to the public good that a stable and reliable monetary system can provide. That public good is the facilitation of economic exchange across distances, between strangers, and through time. Such a monetary system is not something of just marginal value. Indeed, some argue that the quality of the monetary system is a key ingredient of successful civilisations.[7]

The telephoto lens of history makes it natural to think that this high-level public good encompasses all elements of the system, and all the main sources of instability and unreliability. Yet, modern discussions of the financial system, using much shorter focal length lenses, still predominantly divide up or isolate various elements for separate discussion:

- There is monetary policy, which focusses on constructing and fine tuning fiat currency arrangements to assure predictability of exchange values.
- There is the regulation of financial intermediaries and financial infrastructures − the machinery of the financial system − which focusses on the safety and reliability of the individual parts of the machine.
- And now there is the macroprudential angle, focussing on interactions between individual components of the machinery of the financial system, and how they interact collectively with the rest of the economy. This is a step ahead, because the focus is on interactions. However, macroprudential policy discussions do not yet shed much light on interactions between the workings of the financial system machinery and the workings of fiat currency arrangements.

Of course it can be useful to divide up complex matters into more comprehensible parts, to be able to think about them more clearly. However, problems can arise if segmentation ends up burying crucial aspects. Apart from the intuition that a single public good should be analysed in an integrated manner, there are multiple indications that we might be burying things we should not be:

- The Global Financial Crisis (GFC) showed that price stability and prudential regulation of the insitututional components of the financial system does not assure the stabilty of the monetary system. The resultant losses in employment and real income have been very substantial.
- The available policy instruments do not divide up neatly along the lines we use to segment the discussion. Interest rates affect incentives to take risk. Regulations of various types change the effective cost of credit and the resulting signals about whether to spend now, or later. There are not unique “transmission mechanisms” for price and financial stability.
- Our regulatory policy instruments are neither sufficiently powerful nor sufficiently well understood that their gentle application will always be successful. At times, even energetic, well-timed regulatory efforts to lean against excesses can be overwhelmed.

7 Ferguson (2008).

Collective enthusiasms – occasionally manias – are formidable forces. As John Kay noted in the Financial Times, regulators often get blamed for the stupidity of crowds where that stupidity overwhelms the best effort of regulatory agencies. And if not overwhelmed by the crowd, regulatory actions can still reach a point where adverse side-effects – regulatory arbitrage, distortions – become too large. Using interest rates to lean against collective enthusiasms that manifest in strong leverage and asset price movements may often be inefficient, or perhaps net negative, relative to using effective regulatory instruments.[8] But when regulatory instruments are themselves constrained, perhaps the cost-benefit analysis changes.

- Business cycles and financial cycles do not always tidily align. Recently, a number of central banks have confronted a dilemma caused by an apparent lack of aggregate demand, as evidenced in persistent sub-target inflation, combined with concern that strongly stimulatory monetary policy is disproportionately feeding financial risk-taking. (For some reason, the boost to real sector risk taking and to consumption has been muted relative to the boost to financial risk-taking. At the same time, resultant financial asset prices can apparently remain persistently out of line with the future incomes able to be generated by the underlying real assets.) In the last couple of decades, we have witnessed episodes of financial bubbles coinciding with increasing pressures on real resources that have not manifested in inflation.
- Yet there are also important causal connections to consider. Persistently low interest rates – even relative to a declining neutral interest rates, and almost certainly relative to the representative agent's rate of time preference – may well have induced risk-taking that has evolved into bubbles.[9]

In general, there seem to be plenty of indications that the pursuit of monetary stability does not neatly subdivide into money, institutions and systemic linkages. Monetary stability and financial stability are not separate topics. In principle, considering all relevant policy instruments together *should* lead to better results than segmenting the use of these instruments.

3 Why the emphasis on spelling out mandates?

I have emphasised the desirability of spelling out mandates, and in particular the accompanying objectives, with a great amount of clarity. Yet it is true, as a number of you have pointed out, that our monetary policy objectives are not very precise, at least in law, and that imprecision did not stop the independent exercise of monetary policy from acquiring widespread legitimacy, at least post-Volker and pre-GFC.

Indeed, many central banks do not have price stability specified as an objective either in their constitutions or their statutes. Around a fifth of BIS member are in this position. Such central banks are directed to use their powers in pursuit of monetary stability, stability in the exchange value of the currency, or the general welfare of society.[10] These words could be taken to refer to stabilising a certain form of inflation at relatively low levels – and are interpreted that way in several cases (for example, Australia, Chile, Israel, Malaysia, Thailand, South Africa) – but that is not the only admissible interpretation. Of the greater number that do have price stability specified in law as the prime monetary policy objective, in no cases does the law identify what is meant by "price stability". It has become acceptable that such clarifying details are set out in non-statutory form.[11]

8 See for example Svensson (2016).

9 Juselius et al. (2016).

10 Central Bank Governance Group (2009), Chapter 2.

11 In a small number of cases, such as New Zealand and the United Kingdom, setting out the clarifying details in non-statutory form is in fact a requirement of the law. But these requirements do not always specify which details, simply that details need to be provided, and in a particular form (a Policy Targets Agreement, and a Chancellor's Remit letter, respectively).

At the same time, as Philip Wallach (2015) points out, legitimacy is not automatically a consequence of law, and legality does not assure legitimacy. There are plenty of laws that are simply not implemented, or when implemented invoke widespread distaste or resistance because they are just contrary to public opinion. In the specific context of central banking, Lastra (2015, p30) writes "Central banks inhabit a 'world of policy'. This does not mean that there is no law. It means that the law has generally played a limited role in central banking operations."[12]

I would argue, however, that with respect to new, expanded and more active financial stability mandates, legitimacy almost requires legislative action beyond what we have observed to date. It is not inconceivable that such legitimacy would be acquired over time, as was the case with monetary policy and price stability. It is rather that two characteristics of financial stability policy make the progressive acquisition of credibility and legitimacy much more difficult, and probably dangerously slow. These two characteristics are:

- Financial stability policy principally uses regulatory powers and it is in the nature of regulation that incidence is selective (if not arbitrary) and that unintended distortions follow.
- The number of dimensions of fully-specified financial stability objectives is far higher than the number of dimensions of fully-specified monetary stability ones.

I will develop these thoughts further in a moment. But let me first finish the case for making the effort to create legislative support for new financial stability policies by reiterating that it is the unilateral repurposing of existing delegated powers that provides the greatest challenge to legitimacy. Action by the legislature to condone that repurposing perhaps matters more than the resulting law.

4 The complexity of financial stability objectives: regulation and multi-dimensionality

There are several things that are particularly troublesome when it comes to being explicit about financial stability mandates:

- Identifying what specific aspects of stability/instability give rise to a case for public policy intervention.
- Quantifying that, in a manner that allows statements about how much stability is sought, and how far policy instruments can be used.
- For the greatest part, these are regulatory instruments, and as such warrant special attention to considerations of fairness, distribution and economic efficiency.
- Failures hurt public finances very directly.
- All in all, compared with monetary policy objectives, financial stability objectives have very considerable multidimensionality.

Let me spend a few minutes on the multidimensionality of financial stability objectives, as it is under discussion.

A fully-articulated monetary policy objective typically has very few dimensions, and these few can be ranked. Price stability is usually primary, with avoiding unnecessary harm to output and employment being secondary. Some concern for avoiding harm to financial stability might now be added, though without the ability to quantify. Price stability is not usually quantified in law, but often is in extra-statutory strategic statements.

12 Lastra (2015).

In contrast, a fully-articulated financial stability objective would include, at a minimum:

- An indication of what aspects of financial stability are considered important (for example, an objective might be framed in terms of the resilience of the financial system as a whole to shocks, such that self-reinforcing dynamics do not bring essential services down for sustained periods).
- Special concern for the protection of naïve creditors.
- The desirability of informed investors anticipating the possibility of loss in their behaviour.
- Concern that the fiscal position is protected.
- Protection of the property rights of investors in financial services, conditional on the avoidance of moral hazard.
- Productive and especially dynamic efficiency, such that financial services efficiently support economic progress.
- Respect for the rights of citizens of other jurisdictions.
- And, where the implementing agency has other functions, the non-interference with those functions, or some indication of how tradeoffs are to be managed.

For economists thinking about how one might boil the policy task down into a tidy policy reaction function, so as to avoid the messy politics of discretion, such a list will seem unreasonably detailed, unnecessarily complicated. But to recall, we are talking primarily about the use of powerful regulatory tools that directly impact peoples' options, their freedom to act. We are not just playing with agents' incentives to consume earlier or later, leaving available all the extant options. Concern about side effects, and recognition of the existence of tradeoffs, is essential. What responsible legislator would not actively inquire into the likely consequences of delegating extensive regulatory powers along all of these dimensions? And what responsible legislator would sign off on such delegations without some assurances on most or all of these fronts?

Hesitation to provide additional powers in legislation can, I suggest, be traced in significant part to our inability to provide such assurances. We typically do not even volunteer the relevance of all these aspects of financial stability policy. And we are lost when it comes to identifying how the tradeoffs would be managed. This is a major problem, since the tradeoffs within this list are many and significant, and legislators know that (at least in their gut).

Consider the last on the list, in the context of central banks being the agency to which the financial stability function is delegated. Even quite recently, it was standard to hear the claim from central bankers that there are no tradeoffs to be considered. In the long run, all is consistent: financial and macroeconomic stability are mutually compatible. Yet it has been clear for some time now that the Fed – to highlight just one example – has had to think hard about the risks that persistently low interest rates pose to future financial stability. And the literature on the location of microprudential regulatory functions has much discussion of potential short run conflicts of interest between financial and monetary stability objectives. The separation of decision-making on the Single Supervisory Mechanism from that on monetary policy within the ECB's structure is based on the possibility that such conflicts will arise. Trust in the ability of those seeking delegated powers is not enhanced by their denial, non-recognition or even slow recognition of important trade-offs.

But how can one reasonably write such a complicated tradeoff structure into law, let alone specify the tradeoffs, when we don't know them? Even if we had a first guess at how the complicated tradeoffs should be managed, surely the passage of time would quickly prove us wrong, leaving us back on the horns of the same dilemma? In my closing section, I would like to offer a way out.

5 More explicit yet flexible statutory mandates

A little-noticed piece of law enacted in 2009 in the United Kingdom provides the framework of the solution I think we are looking for. This piece of legislation is the Banking Act, the legislation that created the United Kingdom's special resolution regime.[13] Section 4 of that act specifies no less than five objectives that the resolution authorities must consider when using the powers provided under that act. These five objectives are:

- to protect and enhance the stability of the financial systems of the United Kingdom, with particular reference to the continuity of banking services;
- to protect and enhance public confidence in the stability of the banking systems of the United Kingdom;
- to protect depositors;
- to protect public funds;
- to avoid interfering with property rights in contravention of EU treaties.

Because the Act has a narrower ambit than financial stability policy in general, the list of objectives here is shorter than the list I provided earlier. But the lists overlap considerably, and both are multidimensional. Importantly, there are internal conflicts within each list; there are obvious tradeoffs.

After setting out the (potentially conflicting) objectives, the Act states that "the order in which the objectives are listed in this section is not significant; they are to be balanced as appropriate in each case". But it does not leave it there. It goes on to require, in the next section, the creation of a "Code of Practice" − a high level strategy statement would be a better description − that inter alia provides guidance on:

- how the objectives are to be understood and achieved;
- the choice between different options; and
- the advice provided by one relevant authority to other relevant authorities about how and when the special resolution powers are to be used.

This Code of Practice is to be issued by the Treasury in consultation with the Bank of England (as the central bank, as the financial supervisor, and as the resolution agency) and the manager of the deposit insurance scheme. And the Act envisages that the Code will be revised and reissued.

This governance structure allows the legislature to set out the minimum range of considerations that *must* be taken into account when delegated powers are used, without attempting to rank them or pre-specify tradeoffs when these things are neither known nor likely to be stable. But the legislature also requires the use of a public device that fills in the blanks using the best knowledge available at the time, at least as agreed between the relevant expert agencies of government.

6 Concluding remarks

I started out by worrying that the creation of additional regulatory powers and the repurposing of existing ones for deployment by agencies at arms' length from electoral sanction will lead to a crisis of legitimacy if the purposes for which these powers are to be used are not better spelled out. Especially where the relevant agencies have other powers pointed at other objectives that may not fully be defined. I argued that one of the problems

13 I point to this Act, rather than the later (2012) Financial Services Act that established the governance arrangements for financial stability policy in the United Kingdom, because the Banking Act provides the cleaner exemplar for legislation involving multidimensional objectives. The Financial Services Act contains several echoes of the Banking Act structure, and has the virtues of attempting to clarify what is meant by "financial stability", of setting out a range of objectives, of specifying secondary law and non-statutory devices for updating the working interpretations of the requirements of the Act, and of requiring consultation between the relevant public agencies on specific matters.

is the significant multidimensionality of financial stability objectives, a multidimensionality that is not much acknowledged by the experts but is surely instinctively understood by legislators.

To better ensure legitimacy, it seems necessary that substantial new powers, and especially the repurposing of existing powers, be endorsed by the legislature, in a manner that attends to this multidimensionality. For the most part, new law in this area does not do that. Financial stability objectives, some of which have been introduced quite recently, usually do not define the aspects of stability that are thought important, let alone identify conflicting objectives.

But rather than providing a counsel of despair, my purpose is to provide a counsel of hope. We need not wait until our understanding of the relevant economics has much improved – though that is important – before writing central bank mandates for financial stability policy that are more likely to be seen as politically legitimate. There are governance structures available that show the way.

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Independence and the scope of the central bank's mandate

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Thank you for the opportunity to participate in the Riksbank conference on rethinking the central bank's mandate. As requested by the organizers of the conference, in these remarks I discuss issues relating to the independence of central banks and to the scope of the mandate given to central banks. In addressing these issues I draw on my own research and on several recent conferences that take a rules-based approach to monetary policy.[1]

1 Central bank independence for limited purposes with strong accountability

Economic research and experience has clearly demonstrated the value of central bank independence for achieving good economic performance. But in granting independence to a government agency in a democracy, great attention should be paid to making sure that the agency has a well-defined *limited purpose* with *strong accountability*.

Macroeconomic research – including the work on time-inconsistency[2] – has concentrated on the importance of central bank independence in the sphere of monetary policy as a means of achieving price stability and preventing high inflation. This research suggests that a key purpose of a central bank should be to achieve and maintain price stability – with an inflation target of some kind – and that the central bank should be held accountable for achieving this goal. Indeed, the international spread of inflation targeting and central bank independence that took place in many countries in the 1990s was motivated by these considerations. Because of a tradeoff between price stability and output stability,[3] most central banks interpreted that purpose with a *flexible* inflation target – whether or not that is part of the mandate.

If the purpose of the central bank is broadened, then the rationale for independence becomes weaker. Of course there is a close connection between financial stability and monetary policy, and that argues for financial stability being a purpose of a central bank, especially in its lender of last resort role.[4] But many financial regulatory activities could be handled by less independent agencies of government, and one needs to establish a clear connection between monetary policy actions and regulatory actions to rationalize placing these activities in an independent central bank.

When central banks drift too far from being limited-purpose institutions and become independent multi-purpose institutions, they escape the checks and balances needed in a democratic system. This can lead to inappropriate interventions which may not have been approved by a legislative process or a vote of the people. It can also lead to poor economic

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1 The proceedings of these conferences are found in Bordo, Dupor and Taylor (2014), Cochrane and Taylor (2016) and Bordo and Taylor (2017).

2 See Walsh (2010, Chapter 7) for a review of the monetary policy implications starting with Kydland and Prescott (1977).

3 See Taylor (1979).

4 Tucker (2016) shows that lender of last resort policy can be systematic and rules-based, and that it should be framed within a regime along with monetary policy.

performance. Currently there is a danger that central banks are being transformed into multipurpose institutions, involved in interventions in particular sectors or in credit allocation without a rationale for independence. In the United States, for example, questions have been raised about why the Consumer Financial Protection Bureau – with oversight of such activities as payday loans – is located in the Federal Reserve without a specific appropriation role for the congress.

One reform would require congressional appropriation of funds for all regulatory activity within the central bank – as is currently the practice with regulatory activity outside the central bank – leaving only the monetary policy function to be independent of the appropriations process. If central banks do not have a limited purpose with accountability, they will likely become less independent in the future. Thus expanding the mission of central banks creates the risk of losing independence for the key monetary policy function.

1.1 De jure independence is not enough

While legislation establishing central bank independence is necessary for good monetary policy and macroeconomic performance, it is not sufficient. Considerable evidence for this principle can be found in the large shifts in the past several decades between more rules-based and less rules-based monetary policy, which in my assessment, have significantly affected economic performance, just as macroeconomic research would predict. The absence of a rules-based framework in the United States in the 1970s was accompanied by high inflation and high unemployment. The move to rules-based policy with a clear focus on price stability during the two decades starting in the early 1980s was accompanied by improvements in both price stability and output stability. And the move away from rules-based policy starting around 2003-2005, was followed by poor economic performance including the Great Recession and the Not-So-Great Recovery. For historical evidence of these well-known shifts and their effects see Meltzer (2009, 2011) and Taylor (2012a, 2013). For formal econometric evidence, see Nikolsko-Rzhevskyy, Papell and Prodan (2014).

These swings towards and away from rules-based policy occurred without any concomitant changes in the underlying legal basis for central bank independence.[5] While there have been changes in the Federal Reserve Act during this period,[6] standard numerical indices of *de jure* central bank independence have not changed as shown by Crowe and Meade (2007). The record thus indicates that *de jure* central bank independence is insufficient for generating good monetary policy. It certainly has not prevented the central bank from swinging away from rules-based policies.

It is important to note also that there have been swings in *de facto* independence. Meltzer (2009) showed how the Fed sacrificed its independence in the late 1960s and 1970s and regained it in the 1980s and 1990s. Meltzer (2009) along with Goodfriend (2012) and Issing (2012) have found a decline in *de facto* independence in recent years. There is thus a close correlation between the ups and downs in *de facto* independence and higher and lower adherence to rules-based policy during this period. These changes in *de facto* independence have been driven by both the executive branch and the central bank itself. Meltzer (2009) argues that the loss of *de facto* independence in the late 1960s and 1970s was originally driven by the U.S. Administration, while the loss of *de facto* independence more recently was due to actions taken by the Fed itself. Thus central bank independence is sometimes taken away, and sometimes given away.

In sum, within a given legal framework, policy makers have been able to engage in varying degrees of adherence to rules-based policy and *de facto* independence. We have seen major shifts in the effectiveness of monetary policy within a single framework of central

5 See Taylor (2013) for further discussion of trends in *de jure* and *de facto* central bank independence.
6 For example, the dual mandate was added to the Federal Reserve Act in 1977.

bank independence and stated inflation goals. The policy implication is that monetary reform needs to focus on ways to encourage more rules-based policy and discourage the bouts of discretion and loss of *de facto* independence.

2 Deepening the scope of the objective given to central banks

The fact that *de jure* central bank independence with stated inflation goals has not prevented harmful departures from rules-based policy indicates the need to review the scope of the objectives given to the central bank. Rather than *widening* the scope to include more goals, consideration should be given to *deepening* the scope to include the strategy to achieve the existing goals, giving details about the strategy for the policy instruments.

To be sure, this is not an easy reform to implement. For one thing, strategy is difficult to define. Moreover, some central banks would say that they already have stated a strategy to achieve their goals. In the United States, for example, the Federal Reserve recently issued a statement entitled "Longer-Run Goals and Monetary Policy Strategy". But if you read this statement you will find nice clear statements about goals, but little in the way of an accountable strategy for the policy instruments to achieve the goals. The European Central Bank has issued a statement about monetary policy, which it simply calls "Strategy". It has a good explanation about goals including a "quantitative definition of price stability", but it too says little about a strategy for the instruments of policy other than reference to its "two-pillar approach" which provides for some cross-checking with the monetary aggregates.[7]

2.1 Policy rules legislation

One way to proceed would be to enact legislation requiring the central bank to report its strategy or rule for the policy instruments. In other words, in addition to a "goals" mandate, which currently exists in a number of countries, there would be a "rules" mandate. For example, several years ago I suggested such legislation,[8] and a proposal along these lines has now been written into a bill which passed the U.S. House of Representatives last year.[9] This bill would require that the Fed "describe the strategy or rule of the Federal Open Market Committee for the systematic quantitative adjustment" of its policy instruments.

According to this approach, a specific strategy would not be prescribed in the legislation; it would be the central bank's job to choose the strategy and how to describe it. The central bank could change its strategy or deviate from it if circumstances called for a change, but the central bank would have to explain why. For concreteness, the legislation requires the Fed to compare its strategy with a "reference rule" that is often discussed inside and outside central banks.

Policy rules legislation in the United States with similar provisions was voted out of the Senate Committee on Banking, thus, working out a compromise with the House is feasible. If such a bill passed Congress and was signed into law, it would constitute the needed reform of the Federal Reserve Act.

There is precedent in the United States for giving such a detailed objective to the central bank. For example, language appeared in the Federal Reserve Act from 1977 to 2000 requiring the Federal Reserve to report the ranges of the monetary aggregates. The legislation did not

7 The Fed's statement (adopted effective January 24, 2012 and amended effective January 26, 2016) can be found at www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals_20160126.pdf. The ECB's statement can be found at www.ecb.europa.eu/mopo/strategy/html/index.en.html

8 See Taylor (2011).

9 Section 2 of the Fed Oversight Reform and Modernization Act. A statement supporting this legislation was signed by Lars Peter Hansen, Robert Lucas, Edward Prescott, George Shultz, Robert Heller, Jerry Jordan, Athanasios Orphanides, William Poole, Michael Bordo, Michael Boskin, Charles Calomiris, Varadarajan Chari, John Cochrane, John Cogan, Steven Davis, Marvin Goodfriend, Gregory Hess, Peter Ireland, Mickey Levy, Bennett McCallum, Allan Meltzer, Gerald O'Driscoll, Lee Ohanian, Scott Sumner, and John Taylor.

specify exactly what the numerical settings of these ranges should be, but the greater focus on the money and credit ranges was helpful in the disinflation efforts of the 1980s. When the requirement for reporting ranges for the monetary aggregates was removed from the law in 2000, nothing was put in its place. A legislative void was thus created concerning reporting requirements and accountability, and proposed reform would fill that void.

Recently economic research has emerged endeavoring to evaluate legislation with a rules mandate. Nikolsko-Rzhevskyy, Papell and Prodan (2016) carried out a counterfactual exercise in which they assume that such legislation was in force for several decades in the United States. They found that the Federal Reserve would have had to explain its deviations in several cases, suggesting, but not proving, that this would have reduced the tendency to deviate from rules-based strategy.

Walsh (2016) applied a "contract theory" approach to analyze the rules-based proposal. This method had previously been used effectively by Persson and Tabillini (1993) and Walsh (1995) to evaluate mandates based on goals for the central bank. Walsh (2016) notes that the key difference between the "goal-based" and the "rules-based" approaches is in how the alternative performance measures affect incentives. He assumes a central bank objective function with squared deviations of output and inflation from targets, but he adds terms representing temporary political pressures to deviate. Using an empirical model, he finds that if the central bank's chosen policy rule has a measure of real economic activity based on the gap between real output and its efficient level, then it is "generally optimal to place weight on both the goal-based and the rule-based measures of performance".

Some have expressed reservations about this type of legislation, arguing that central banks should not be chained to any mechanical rule. But the central bank would choose and describe its own strategy, thereby it need not be mechanical. The strategy could change if there was a crisis as long as an explanation was provided. The central bank would still serve as lender of last resort or take appropriate actions in the event of a crisis. The strategy does not mean that the instruments of policy be fixed, but rather that they flexibly and systematically respond to economic developments in a way that can be explained.

Another concern raised about policy rules legislation is that the central bank would lose its independence. Based on my own research and experience in government, the opposite is more likely. A clear public strategy helps prevent policy makers from bending to pressure. Another difficulty is that there are many types of policy rules. Some rules are better than others, and it makes sense for researchers and policy makers to do research on rules. I do not think adding housing prices or the stock market to a rule is a good idea, but with this legislative approach it would be up to the central bank to decide.

Of course there are perennial policy problems to deal with, such as uncertainty about the output gap, the effective lower bound on the interest rate, or movements in the equilibrium real interest rate. However, these are even more difficult issues for discretionary policy when one does not have a strategy. There is plenty of research on how policy rules can incorporate such uncertainties.

2.2 Forecast targeting legislation

It is worth considering other approaches to deepening the mandate given to the central bank. Such alternatives might be more appropriate in countries with different political systems and central banking traditions. One alternative to stating a monetary policy strategy in terms of a rule for the instruments is to use "inflation forecast targeting" or simply "forecast targeting" as developed in other contexts by Svensson (1997) and Woodford (2012). Indeed, Woodford entitled his paper "Forecast Targeting as a Monetary Policy Strategy," emphasizing that this alternative approach is a strategy.

There is a close connection between the two approaches to rules-based policy. In Taylor (2012b), I argued that they were the dual solution to the same problem, much like first-

order conditions and decision rules provide dual and complementary answers to the same optimization problem. One can learn from both approaches.

According to this approach the central bank would choose its policy interest rate so that a linear combination of its forecast of different variables would fall along a given path. For example, Woodford (2012) suggested a linear combination of the *h*-period ahead forecast of the inflation rate $\pi_{t+h,t}$ relative to the target inflation rate π^* and the *h*-period ahead forecast of the output gap $x_{t+h,t}$ follow the following path

$$(\pi_{t+h,t} - \pi^*) + \phi x_{t+h,t} = 0$$

over a range of *h* where interest rate policy can affect these variables.

While an interest rate path can be calculated using this approach, it need not yield a simply policy rule. As with the policy rules legislation, the central bank would have the job of deciding on the strategy, and as with the policy rules legislation, this need not be mechanical. Qvigstad (2005) showed how charts and other diagnostic tests could be used to describe the intended path for the interest. In addition, with examples from Norges Bank policy decisions, he showed how policy rules could be used as a cross-check, emphasizing the connection between proposals for policy rules legislation and forecast targeting legislation.

To make this approach workable in practice, one would have to write the appropriate language into legislation without impinging on central bank independence in the sphere of monetary policy and also have a means of establishing accountability. Here the monetary policy evaluation method proposed by Svensson (2012) would be useful. It evaluates central bank's decisions for the policy instruments in terms of their consistency with stated goals for output and price stability in real world situations where there are lags in policy and other forces affecting outcomes. In this way, departures from the stated forecast targeting commitment could be detected resulting in a degree of accountability.

Note that this proposed approach is much deeper than what is sometimes called "constrained discretion." Under constrained discretion, all one needs are the goals and the policymaker does whatever he or she thinks needs to be done with the instruments. There is no description of a strategy or a contingency plan for the instruments; there is no commitment to a forecast target. Constrained discretion is an appealing term, and it may be constraining discretion in some sense, but it is not inducing or encouraging rules-based policy. Simply having a specific numerical goal or objective function is not a monetary strategy. The evidence shows that relying solely on constrained discretion has not worked for monetary policy.

2.3 International monetary considerations

Because deviations from rules-based monetary policy seems to spread from country to country, there is an important international monetary aspect of reform proposals to maintain rules-based policy. These deviations cause movements in exchange rates and capital flows, which in turn cause governments to impose capital controls, intervene in exchange markets, and use regulations to affect international exchange transactions. Staffs at the international financial institutions have recently endorsed such controls, in contrast to the 1990s when they suggested that they be removed. Thus the international monetary system has drifted away in recent years from a rules-based system long advocated by monetary economists.

These international problems trace to deviations from rules-based monetary policies at the national level, because central banks tend to follow each other. Extra low interest rates in the larger countries are followed by extra low interest rates in many other countries, in an effort to fight off currency appreciations.

Many are calling for a new international monetary strategy to deal with these problems, including Volcker (2014) who argues that "the absence of an official, rules-based, cooperatively

managed monetary system has not been a great success" and Rajan (2016) who says that "what we need are monetary rules that prevent a central bank's domestic mandate from trumping a country's international responsibility." I have argued that economic research indicates that a rules-based international monetary system should be built up from rules-based monetary policy in each country,[10] and thus, that a natural reform proposal would be for countries to forge an agreement where each country commits to a rules-based monetary strategy. Essentially this is a multi-country version of the reforms I proposed earlier in these remarks. Each central bank would describe and commit to a monetary policy strategy for setting the policy instruments. The strategy could include a specific inflation target, a list of key variables to react to in certain ways, and some notion of the long-run equilibrium interest rate.[11] Each central bank would formulate and describe its strategy. As in the above proposals, the strategies could be changed if the world changed or if there was an emergency. A procedure for describing the change and the reasons for it would be in the international agreement.

There are important lessons from previous international monetary agreements. For example, under the Plaza Accord of the 1980s between the United States, the United Kingdom, Japan, Germany and France, the Bank of Japan agreed to shift its monetary policy in a way that adversely affected its economy – too tight at first and too easy later – causing a boom and bust. In contrast, other central banks' monetary policies were not affected: the Fed clarified what it was already doing. The lesson is that the international agreement should not impose specific strategies on central banks. As with the legislative proposals suggested earlier in these remarks, such a process poses no threat to the national or international independence of central banks.

3 Conclusion

Given the many calls for reform, now may be a good time to move ahead. However, because some countries are still in the midst of unconventional monetary policies, and others are only starting to normalize, there will be a need for a transition to more rules-based policy. Moreover, there is still much disagreement about the nature of the problem and about the remedy as I have tried do make clear in these remarks. For these reasons, it is important to get views from a wide spectrum of people both inside and outside of government and in particular both inside and outside of central banks. Good governance, especially of independent agencies of government, requires it.

The opportunity for economists to go in and out of government service can be beneficial in terms of bringing new ideas into practice and also in developing new research ideas in academia. For this reason, where it is practical, having economists and other experts from the outside participate for a term in policy decisions makes sense. In the United States, this is frequently achieved in practice because actual terms of Federal Reserve governors can be quite short even though the legislated maximum terms are long. The Federal Reserve district banks have also been an important source of diversity of views.

Good governance also requires a strong independent civil society and a press that can speak out when appropriate. I think it is important to have conferences on monetary policy with people from both inside and outside central banking. Central bank conferences such as this one with candid out-of-the-box thinking from a range of views are very important. I am grateful to have had the opportunity to participate in this conference.

10 See Taylor (2016).

11 Clarida (2016) describes how this might be done while taking account of the fact that the equilibrium real interest rate is globally determined.

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Central banks' role, objectives and accountability

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1 Introduction

Central banks' mandates have shifted through history, along with economic developments and new knowledge about how the economy works. Monetary and financial stability have nevertheless been at the core of the mandates in most cases. Changes of the mandates are often triggered by new challenges or crises facing the economic policy framework. Partly as a result of the latest financial crisis, the responsibilities of central banks have been much discussed also in recent years.

I am currently heading a Government Commission in Norway with a mandate to design a new law for Norges Bank.[1] The current Norwegian central bank law is from the period of financial repression and needs to be modernized. However, the most important reason for reviewing the law is the presumption that the board of the bank has a workload that is too heavy.

The board has the main responsibility for all activities in the bank, including the traditional central bank tasks and the management of the Government Pension Fund – the oil fund: The fund is now close to 900 billion US dollars in size or almost three times our mainland GDP. It is invested in bonds, equities and real estate worldwide.

Norges Bank's responsibilities are broad and its duties heavy, but I guess overloading boards, governors and senior staff members is also an issue in other central banks.

In his Adam Smith Lecture in 2006, former Bank of England Governor Sir Mervyn King laid out four criteria for a good institution.[2] The institution should have:

1. clear objectives
2. tools and competence to meet these objectives
3. accountability
4. a design that reflects history and experience

These were considered to be timeless characteristics.

2 The institutions should be designed to reflect history and experience

Let me start with the last criterion. The institutions should be designed to reflect history and experience. A country's constitution and legal system are part of its history. These differ between countries. Since the central bank must fit into the country's legal and political traditions, this also has consequences for the central bank laws.

The Scandinavian countries may give an illustration. These countries are all modern parliamentary democracies. To an outsider, I presume the countries look very much alike. But looking closer, you will find some striking differences which are relevant for the set-up and functioning of their central banks.

In Denmark and Norway, there is what we call ministerial rule. This means that a minister has a constitutional right to instruct in all matters within the portfolio of the ministry or one

1 The views expressed here are my own and not necessarily shared by the Commission.
2 See King (2006) and Haldane and Ovigstad (2016).

of its subordinate agencies, unless otherwise specifically provided for in law. This right to instruct is mirrored by a corresponding responsibility for the minister. She cannot free herself from her responsibility by delegating to subordinate agencies.[3]

According to the constitution in Sweden, on the other hand, individual cabinet ministers do not bear any individual ministerial responsibility for the performance of the agencies within their portfolio. The directors-general, and other heads of government agencies, report directly to the government as a whole; and ministers are prohibited from interfering in matters handled by the agencies, unless otherwise specifically provided for in law.

Sveriges Riksbank is also in a different position to its Scandinavian sister central banks by the fact that it is "owned by" the Parliament, the Swedish Riksdag. The bank is accountable directly to the Riksdag. In Denmark and Norway, the operating bodies of the central banks are appointed by their respective ministries or governments, and the banks get their remits from them as well.

An implication of these differences has been that the central bank's road to independence in monetary policy has been rockier in Norway than in Sweden.

The Scandinavian case illustrates a more general point: when it comes to writing a central bank law, one size does not fit all. And although there is much to be learned from others, there is probably not a single best international practice for the regulation of these institutions.

3 Clear objectives

The central bank objectives can and should be formulated in broad terms in the law, and then made more specific and operational through separate remits or secondary laws.

Over the years, central banks have been delegated the task of maintaining a well-functioning and stable *monetary* and *financial system*. Monetary policy also aims to stabilize production and employment.

There is usually a hierarchy between the objectives, specifying which objective should have the highest priority.

These objectives are, by themselves, rather imprecise. In a world of delegated responsibility, they need to be made operational and, ideally, measurable. Targets for monetary stability have evolved considerably. Operational targets for the stability of the financial system have been less easy to specify, at least in clear, quantitative terms.

Another question is whether price stability, financial stability and economic stability/growth are three separate objectives. They are integrated and rely on each other. The stable value of money and economic growth rely on a strong and stable financial sector. A broken financial system can undermine the transmission mechanisms for monetary and financial policy, as the crisis in 2008 illustrated too clearly. That is one reason why central banks' pursuit of financial stability is intimately linked to their pursuit of price stability and stability in the real economy. The three elements merge into each other.

Also under more normal circumstances, monetary and financial market authorities should take into account the risk a potential future financial instability may represent to price stability. The authorities must be aware of the potential debt and real estate bubbles developing partly as a result of the low interest rates we have today.

In my view a central bank setting interest rates cannot run away from its responsibility when a bubble bursts in real estate and debt markets and a financial crisis arises. Too much borrowing leading up to the crisis will be associated with too low interest rates. The finger will be pointed at the governor and the committees. Also for this reason, central banks should have and are well served by an explicit responsibility for financial stability written in law.

3 See Smith (2002, 2009).

4 Central banks should have tools and competence to meet these objectives

A central bank must have an appropriate set of policy tools to meet its objectives. The tools need to have an effective impact on the final objective. And the central bank needs to be competent in using them.

The effectiveness of the instruments has implications for how strictly we should formulate the central bank's obligation to meet its objectives, whether in the central bank law or in the remits. Should the central bank "ensure" stability and growth or should it "contribute to" meet these targets?

- On price stability, the tools are – under normal circumstances – quite effective. However, as I mentioned above, central banks do not operate in a vacuum and cannot by themselves ensure monetary stability. Our economies are repeatedly affected by unforeseen, unpredictable shocks and disturbances. In a time with interest rates at zero or below, monetary policy is not necessarily equipped to ensure price stability. Stability and confidence in public finances and a well-functioning financial system may also be a precondition for price stability.
- On the objective of financial stability, central banks are well positioned to be given and take responsibility for new macroprudential tools in addition to the traditional lender of last resort role. But these new tools are soft as is often the case also for microprudential policies. It is also a challenge in my view that the current international and European requirements for banks' capital are far from sufficient. Neither are the new resolution mechanisms necessarily helpful to stabilize a banking system under severe stress and to avoid creditors running away. These regulations are the responsibility of governments and parliaments. For a small open economy, we have the additional challenge that the stability of the financial system depends on the quality of rules, regulations and supervision in other countries, as we learned from the breakdown of Icelandic banks in the autumn of 2008. The quality of the supervision and regulation in Sweden and Denmark is of particular importance for financial stability in Norway since their banks have large market shares in Norway. The Swedish regulation of its banks' capital might be a concern in Norway. As compared with Norwegian banks, Swedish banks have a high risk-adjusted equity ratio but much lower leverage ratio. The differences can hardly be explained by the composition of assets or by the track record of actual losses. They probably reflect a generous acceptance by the Swedish financial authorities of individual banks' risk models.

  All this said, I believe that central banks should aim for financial stability. In addition to conducting its own available instruments, central banks should have a legal obligation to speak out when they judge that new measures should be introduced also by other authorities.
- Central banks have a particularly important role to preserve a stable and effective payment system. Stable and effective payment systems are crucial for financial stability. The development of new types of money beyond the control of central banks may change the central banks' future role in this area.

5 Accountability

Central Banks should be accountable. According to the textbook, central bank accountability is a necessary condition for sustaining its operational independence.[4]

Nevertheless, I believe there is a tradeoff between independence and accountability.

The central banks should be transparent so that their assessments and decisions can be monitored by the authorities and by society at large. Central banks also have to report and communicate to the political authorities and the public. Then they can be evaluated and also criticised for misjudgements or errors. Is this sufficient to be fully accountable?

A CEO in a company is clearly accountable to its board. The board can overrule decisions taken by the CEO, withdraw delegated authorities and at the end of the day the board can fire him. By the same token, a minister or a government in a parliamentary system is accountable to the parliament who can change her decisions and, if not followed up, issue a vote of no confidence.

Independence, on the other hand, protects against such an outcome for a central bank. To be independent and at the same time fully accountable is therefore not possible. There is a tradeoff, and the question should perhaps be where to find the right balance between these two qualities.

Transparency helps. Monetary policy may also be more accountable and better anchored politically, when political authorities decide both the overall objectives in law and the operational target. The bank will then be instrument-independent and not goal-independent.

In summary, when building institutions, it is helpful to have clear criteria to reach for. For central banks and other institutions, however, one size does not fit all; the institutional setup must fit into national traditions. And even the best designed central bank cannot do the job all alone, when it comes to achieving monetary and financial stability. To get the best out of central banks, one also need good institutions and policy frameworks surrounding them.

4 See among others Fischer (1994).

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Why central banks should care about fiscal rules

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This essay aims to explain the nature of monetary and fiscal policy interactions and how those interactions could inform the fiscal rules that countries choose to follow. It makes two points: (1) monetary policy control of inflation requires appropriate fiscal backing; (2) European fiscal frameworks appear unlikely to provide the necessary fiscal backing.

1 Introduction

Fiscal crises spawn fiscal rules. On the heels of what may be the worst financial and fiscal crisis in Swedish history in the early 1990s, Sweden adopted sweeping fiscal reforms beginning in 1993. Although details about Swedish fiscal policy have evolved over time, the guiding principles have been enshrined in the "Swedish Fiscal Policy Framework" (Swedish Government, 2011). Sweden has followed a net lending target, which currently is 1/3 percent of GDP, and plans to aim for a "debt anchor" of 35 percent of GDP starting in 2019.[1] After the Euro Area's sovereign debt crisis that began in 2009, member nations are now required to adopt medium-term budgetary frameworks (European Commission, Undated). Germany, whose fiscal position was sound despite a large crisis-induced run-up of government debt, adopted a debt brake in 2011 that sets the maximum structural new borrowing limit at 0.35 percent of GDP (Federal Ministry of Finance, 2015).

Each of these approaches to fiscal rules focuses on ensuring that fiscal policy is "sustainable".[2] Unfortunately, the fiscal rules that countries are adopting seem to take "sustainability" to mean single-minded fiscal austerity. The rules appear to reflect the principle that low debt is good debt, with little consideration given to how fiscal policy needs to behave for monetary policy to successfully target inflation and the roles that safe government debt plays in the financial system.

This essay aims to explain the nature of monetary and fiscal policy interactions and how those interactions could inform the fiscal rules that countries choose to follow. It makes two points:

1. Monetary policy control of inflation requires appropriate fiscal backing
2. European fiscal frameworks appear unlikely to provide the necessary fiscal backing.

Before getting into these points, we take a step back to ask what determines the aggregate price level, and therefore inflation, in the economy. That discussion argues that a unique price level requires fiscal behavior of a certain sort. The essay then explains how monetary and fiscal policy must interact in any equilibrium. This establishes point 1. The essay then briefly discusses fiscal rules to ask if they provide the fiscal backing necessary for monetary policy to control inflation, point 2. Two appendices provide the formal background for the verbal arguments in the text.

* I thank Jesper Lindé for comments. This is based on comments I made at the Sveriges Riksbank's conference "Rethinking the Central Bank's Mandate", June 2016.

1 Evidently, the anchor is a target and the government must explain any deviations from target that exceed five percent in either direction.

2 "Sustainable" is a generally ill-defined concept that is often invoked as a rationale for fiscal rules.

2 Determining the price level

The aggregate price level is a relative price: it measures how much a basket of goods is worth in terms of nominal government liabilities – money plus bonds. This relative price must be determined by the interaction of supply and demand for these government liabilities.

To the private sector – the ultimate holders of government-issued paper money – demand for money and bonds depends, as it does for any asset, on expected discounted cash flows. In the case of government paper money, those cash flows are primary government surpluses – tax receipts in excess of expenditures, exclusive of the interest the government pays to holders of high-powered money and bonds.[3] To the extent the liabilities also provide service flows – liquidity, collateral, and so forth – those flows also affect the liabilities' value.

This asset-pricing logic creates a direct link between the nominal objects being priced (nominal liabilities) and the "goods" (surpluses) that give them value. Critical to understanding how the price is determined is the fact that the government – the central bank and fiscal authority jointly – controls both the nominal quantity of liabilities outstanding *and* the real quantity of goods that back the liabilities. By varying either the nominal supply or the real backing, the government can achieve any relative price it desires.

Appreciating that the price level is the price of goods in terms of nominal liabilities radically alters how to think about inflation. This is the essence of the fiscal theory perspective on price-level determination.[4] It may be helpful to contrast this perspective with more conventional views.

Monetarists emphasize that the equilibrium price level emerges from the interplay between the supply and demand for money. Individuals seek to hold some real value of money balances to acquire goods or to hold their wealth in liquid form. The central bank supplies the nominal quantity of money, but its real value – and thus the price level – is determined by real factors like private sector wealth, which are ground out by the economy's general equilibrium. These real factors are beyond the control of policy, at least in the long run. Expectational considerations, particularly expectations of inflation, can also affect the desired level of real money balances, as Obstfeld and Rogoff (1983) show. But these expectations may also be beyond the control of policy.

By the monetarist viewpoint, government controls only the nominal object – money supply – and not the real or expectational objects that determine its value. This is why monetarist models are plagued by indeterminacies and self-fulfilling equilibria (Kareken and Wallace, 1981, Obstfeld and Rogoff, 1983, and Sims, 1994).

New Keynesian analyses fare no better. They shift the focus away from money to the nominal interest rate, which is the instrument that most modern central banks target. Fundamental economic behavior connects real consumption demand negatively to the entire expected path of *ex-ante* real interest rates. In the presence of nominal rigidities, monetary policy's choice of the nominal rate can affect the real rate in the short run. Higher real rates reduce demand for goods and, therefore, the price level.

But few economists believe monetary policy can affect real interest rates forever. In fact, long-run neutrality is a central tenet of inflation targeting. As in the monetarist view, new Keynesian theory gives the government control over a nominal object, but only temporary influence over real variables. Several authors have argued that indeterminacies are ubiquitous in new Keynesian models of monetary policy (Benhabib, Schmitt-Grohé and Uribe, 2001, Cochrane, 2011, and Sims, 2013).

Determinacy problems with monetarist and new Keynesian perspectives stem from attempts to view inflation as a purely monetary phenomenon. Problems disappear once

3 High-powered money is currency plus bank reserves. Although currency earns no interest, many countries now pay interest on reserves.

4 This theory is developed formally in Leeper (1991), Sims (1994), Woodford (1995), and Cochrane (1999).

fiscal policy, and its control of primary surpluses, is fully integrated into the analysis. Cochrane (2011) and Sims (2013) illustrate that appropriate fiscal backing for monetary policy can eliminate self-fulfilling explosive inflation paths. Del Negro and Sims (2015) specify fiscal behavior that rules out low-inflation traps.

Perhaps monetary economists dismiss the joint monetary-fiscal message on the grounds that abstract theoretical arguments have little relevance for the practical problems that central banks now face. After all, have we ever seen speculative hyperinflation? Maybe not. But we are all now living through extended periods of low inflation and tepid economic growth. Maybe it's time to adopt a broader perspective on inflation than money-only views offer.

Movement toward that broader perspective starts with understanding how monetary and fiscal policy *must* interact in any equilibrium. Although there are many similarities between how monetary and fiscal policy affect the economy, one distinction between the two is central: fiscal policy has taxing power; monetary policy does not.[5]

3 How monetary and fiscal policies interact

Rather than explore the pathologies of exploding inflation or chronic deflations, this discussion focuses, as do most central bank models, on relatively small fluctuations around a stable and unique steady state. The discussion is about "normal times" or even periods, like now, when inflation has been moderately below target for some period. Appendix A describes the formal model and the solution that underlies this verbal description.

Macroeconomic policies have two fundamental tasks to accomplish: determining the price level (and inflation rate) and stabilizing government debt. Of course, policies have a great many other objectives as well, but if they are not successful in achieving these two minimal tasks, they will be unable to pursue other worthy objectives.

The Riksbank, like many central banks, has a mandate to target inflation. If inflation is not determined uniquely, it means that inflation can wander around in a manner detached from the central bank's actions and goals. Clearly, an inflation-targeting central bank must ensure that inflation is unique and that it responds in predictable ways to policy actions.

Analogously, if policies do not stabilize debt, then debt can grow without limit to a point where it is impossible for the government to honors its obligations. In this situation, the government can no longer borrow and it must finance all its spending year-by-year. Inability to borrow makes fiscal policy unable to conduct countercyclical policy or to build automatic stabilizers into spending and taxes. Tax rates and spending will have to move dramatically over time with shocks that hit the economy. Those dramatic movements create inefficiencies that reduce economic well-being.

Price-level determination and debt stabilization are necessary for good economic performance, so it is important to understand how monetary and fiscal policy together can achieve them. The theoretical literature finds that there are two different mixes of monetary and fiscal behavior that deliver both a determinate price level and stable debt when attention is limited to bounded equilibria, as it is in central bank models. I describe these in terms of common – and simple – specifications of policy rules: monetary policy sets the short-term nominal interest rate as a function of current inflation and fiscal policy makes tax revenues net of transfers respond to past real government debt outstanding, where both net revenues and debt are measured as ratios of GDP. These are stylized policy rules: actual policy behavior is far more complex.

5 This statement makes the distinction too stark. Modern central banks do have some taxing capacity through seigniorage revenues. But using this tax instrument will generally conflict with achieving an inflation target.

Table 1. Monetary and fiscal regimes
Two policy mixes that deliver determinate price level and stable debt. In the policy rules, *i* is the interest-rate instrument, π_t and π^* are actual and target inflation, *T* is tax revenues net of transfers as ratio of GDP, b_{t-1} and b^* are actual and target debt-GDPlevels. The random error terms, ε's, are exogenous changes in policy instruments.

Regime M	
Monetary Policy:	targets inflation by raising nominal interest rate more than one-for-one with inflation
Fiscal Policy:	raises taxes when real government debt rises by enough to cover real debt service and to eventually retire the increase in principal
Label:	*Active Monetary and Passive Fiscal Policy*
Regime F	
Monetary Policy:	adjusts nominal interest rate weakly in response to inflation to ensure that interest payments on government debt do not destabilize debt
Fiscal Policy:	makes taxes unresponsive to state of government indebtedness and the price level
Label:	*Passive Monetary and Active Fiscal Policy*
Policy Rules	
Monetary Policy:	$i_t = \bar{i} + \alpha(\pi_t - \pi^*) + \varepsilon_t^i$
Fiscal Policy:	$T_t = \bar{T} + \gamma(b_{t-1} - b^*) + \varepsilon_t^T$

Table 1 summarizes the combinations of monetary and fiscal policies that are consistent with a determinant equilibrium.[6] Regime M produces an equilibrium that reflects the conventional assignment of the two tasks: monetary policy controls inflation and fiscal policy ensures government solvency. This is the policy mix that virtually all central bank models assume prevails.

Regime F flips the assignments, tasking fiscal policy with determining the price level and monetary policy with stabilizing debt. Clear instances of this regime have occurred historically: during wars, when governments borrow heavily, central banks stabilize debt by pegging the interest rate and keeping bond prices high to help finance the war; during recoveries from large financial crises – the Great Depression or the 2009 global financial crisis – central banks keep interest rates at or near their lower bound for extended periods while fiscal policies aim to stimulate the economy through deficit spending.

3.1 Regime M – active monetary/passive fiscal policies

This conventional assignment of tasks produces conventional monetarist/new Keynesian outcomes. When the central bank tightens monetary policy by raising the short-term nominal interest rate – an increase in ε_t^i in Table 1 – inflation falls. But it turns out that fiscal behavior is central to generating this conventional result. A higher policy interest rate has fiscal consequences because it raises yields and debt service on government bonds. When the higher interest rate is engineered by an open-market sale of bonds, the action also raises the principal held by the private sector.

Suppose, in contrast to the passive fiscal behavior in regime M, fiscal policy were to hold taxes fixed following the monetary contraction (that is, fiscal policy sets $\gamma = 0$). If taxes do not rise to cover the additional debt service due to higher interest rates, then the debt service will be financed by selling more nominal government bonds. In time, people will see that nominal debt is growing but taxes are not rising and they will come to expect higher

6 The table refers to "taxes" as the fiscal instrument, but this should be understood more generally to be the primary surplus – revenues less expenditures net of interest payments on debt.

inflation. That expectation will induce people to substitute out of nominal assets and into buying goods, driving up actual inflation.

We have a contradiction. Monetary policy actions geared toward reducing inflation set in train forces that *raise* inflation if fiscal policy does not respond appropriately. But regime M posits that fiscal policy will not hold taxes fixed. Higher interest rates raise real debt in two ways: through increased debt service and through a lower price level that raises the real value of nominal bonds. Passive fiscal behavior increases taxes enough to finance the interest payments and gradually retire any increase in real principal. This is the accounting explanation of passive fiscal policy.

What is the economics behind passive fiscal behavior? The contradiction arose because higher debt service raises bond holders' wealth if taxes are not expected to increase. And because the higher interest payments are rolled into increased debt issuance every period, the size of the wealth effect grows over time. Passive fiscal policy eliminates the wealth effect by following a rule that informs bond holders that their increased bond wealth will be taxed away in the future. With the wealth effect gone, the monetary policy action successfully reduces inflation.

Of course, since 2009 central banks have generally been trying to raise inflation, not lower it. But the reasoning that fiscal policy must eliminate monetary policy-induced wealth effects is perfectly symmetric. When the central bank reduces interest rates in order to raise inflation, it triggers negative wealth effects that need to be offset by lower future taxes.

At the beginning of the financial crisis, monetary and fiscal policies were complementary: central banks rapidly reduced interest rates and many governments implemented substantial fiscal stimulus packages. Those packages, though, took the form of temporary increases in spending and decreases in taxes. And when the stimulus expired, countries quickly began to consolidate fiscal policy. By 2010, the IMF's *Fiscal Monitor* was entitled "Fiscal Exit: From Strategy to Implementation", making clear that the time for fiscal retrenchment had arrived (IMF, 2010).

Consider the situation in which the Euro Area and countries like Sweden, Switzerland and Japan find themselves. Inflation has been chronically below target and policy interest rates have been pushed into negative territory after being near zero for many years. Those central banks have also engaged in sizeable asset purchases designed to drive down interest rates at the long end of the yield curve. Despite what in regime M constitutes very loose monetary policy, inflation has remained stubbornly low. How can this happen? Section 4 will return to this conundrum.

Exogenous changes in fiscal policy in this regime are trivial by design. Passive fiscal behavior delivers Ricardian equivalence in simple representative agent models. Cuts in lump-sum taxes or increases in transfers are initially financed by more bond issuance. But higher real debt raises the taxes that people expect to pay in the future. Recipients of the tax cut save their increase in disposable income to pay for those future taxes. The fiscal rule in regime M ensures future taxes exactly offset the initial tax cut or transfers increase so there is no wealth effect and no impact on inflation.[7]

3.2 Regime F – passive monetary/active fiscal policies

Switching policy assignments, as regime F does, dramatically alters the impacts of monetary and fiscal policies and the roles that the two policies play in determining inflation and stabilizing debt. The notions that fiscal behavior may determine the price level and monetary policy can stabilize debt may be alien to some readers, so I'll try to explain how these can happen.

7 Of course, exact Ricardian equivalence is an extreme and implausible assumption. Fortunately the logic of the arguments in this essay does not rely on this assumption.

The simplest examples of regime F policies look a lot like the policies many advanced economies adopted immediately after the financial crisis hit: monetary policy pegged the nominal interest rate and fiscal policy chose taxes and spending that created deficits designed to stimulate the economy, setting aside efforts to stabilize debt. In terms of the rules in Table 1, these policies set $\alpha = 1$ and $\gamma = 0$. Appendix B goes through this case formally; here I focus on the economic intuition.

Imagine that the government increases transfers to the public – lower ε_t^T – and finances those transfers by selling new nominal government bonds. Because fiscal policy is not responding to debt and the public understands this behavior, people see that the transfers do not generate higher future taxes (or lower transfers). This makes them feel wealthier and they try to use those transfers to buy goods they can consume. Higher demand for goods raises the krona price of goods. As goods prices rise, the nominal assets people hold lose value, tempering the higher real demand. If the supply of goods in the economy is perfectly inelastic, equilibrium is restored once the price level has risen enough to eliminate the initial positive wealth by reducing the real value of the government bonds held by the public.[8]

How does monetary policy behavior fit into this chain of reasoning? An essential step in the reasoning is that the price level (and inflation rate) rises sufficiently to eliminate the initial wealth effect from higher transfers. Suppose that the central bank tries to combat this inflation by sharply raising the nominal interest rate, as it does in regime M. This policy reaction triggers a very different sequence of events. Higher rates increase bondholders' interest receipts, which do not portend offsetting future taxes in regime F. People will want to convert this interest income into consumption goods, further increasing demand for goods to drive prices still higher. A hawkish central bank responds to this second round of inflation by raising interest rates still more. This sets off a cycle that puts the economy on a path along which inflation and nominal government debt explode. Loyo (1999) argues that a mix of active monetary and active fiscal policies caused Brazil's hyperinflation in the late 1980s. This is why stability in regime F requires monetary policy to respond only weakly to inflation.

Pegging the interest rates means monetary policy does not respond at all to the inflation that the original transfers increase produces. Keeping the nominal interest rate fixed prevents interest payments from destabilizing debt. In this simple economy, a one-time increase in transfers financed by nominal bonds creates a jump in the price level that keeps the real value of newly issued debt unchanged. Pegging the interest rate permits this jump to occur.

If the central bank does not hold the interest rate fixed, instead raising it modestly with inflation, the mechanism takes on a dynamic element. A weak increase in the interest rate produces a weak increase in bondholders' interest receipts in the subsequent period.[9] Higher interest income is spent on goods next period, raising the price level. Once again, this sets off a cycle, but in this case the cycle is stable and the interest income and price effects gradually dissipate.

Just as fiscal policy provided backing for monetary policy's control of inflation in regime M, monetary policy supports fiscal policy in regime F by ensuring government debt is stable. In both regimes, stability comes from a passive policy authority that accommodates the actions the active authority takes.

We have established that exogenous fiscal actions have very different impacts in regime F than in regime M. It turns out that monetary actions also have very different effects in the two regimes. Alert readers have probably deduced that a positive shock to the interest rate in regime F will eventually *raise* rather than lower inflation. This seemingly perverse outcome

8 Inelastic supply is a simplifying assumption that can be dispensed with at the cost of substantial complication. In the presence of nominal rigidities, goods supply becomes elastic, responding to changes in the price level. Nominal rigidities enrich, but also greatly complicate, the analysis.

9 Here all government bonds are pure discount bonds that mature in one period. Bonds bought in period t cost $B_t/(1 + i_t)$ kronor and pay B_t kronor next period. Generalizing to a full maturity structure for bonds alters the dynamics, but not the basic logic. See Cochrane (2001) or Leeper and Leith (2016).

stems from precisely the wealth effects from debt service that have been a theme of this essay. Whether the higher interest rate raises, lowers, or leaves unchanged the price level on impact depends on various model details.

In regime M, positive wealth effects from higher interest rates were eliminated by higher taxes. Those taxes are not forthcoming in regime F. By the reasoning above, higher future interest income will raise future demand and future prices. One immediate result is that "tighter" monetary policy – a higher policy interest rate – raises expected inflation in regime F.

3.3 Summary

In one important respect, the policy effects in regime F require far less stringent assumptions about private behavior than do the outcomes in regime M. Central to both the monetary and fiscal impacts in regime M is the assumption that private agents know the policy rules that authorities obey and form expectations of future policies rationally. For example, Ricardian equivalence requires the private sector to save current tax cuts to pay for rationally expected future tax hikes. Similarly, monetary policy's control of inflation rests heavily on private agents anticipating that future taxes will eliminate the wealth effects of changes in nominal interest rates. Eusepi and Preston (2013) and Sims (2016a) show that if private behavior is purely backward-looking, equilibria always resemble those in regime F.

I trust that this exposition makes it clear that a central bank tasked with targeting inflation needs to be confident that fiscal policy will behave in a passive manner. In practice, discovering the nature of fiscal behavior can be tricky. A first step in the process of discovery is for central bank models to include fiscal details – nominal government debt, tax rates, various types of expenditures, and rules for fiscal behavior. A second step is to permit the data to inform about the prevailing monetary-fiscal regime. I know of no central banks that have taken these steps.

4 Fiscal rules and fiscal backing

In this section, I focus on two countries that have had fiscal rules for some years and take those rules seriously. By "seriously" I mean the governments actually follow the rules. My intent is not to conduct a rigorous analysis of exactly how fiscal policies in these countries have affected their inflation processes – such analysis goes well beyond this essay. Instead, I briefly describe the countries' rules and point to some merely suggestive evidence that these rules may make it difficult for the Swedish and Swiss central banks to achieve their inflation targets.

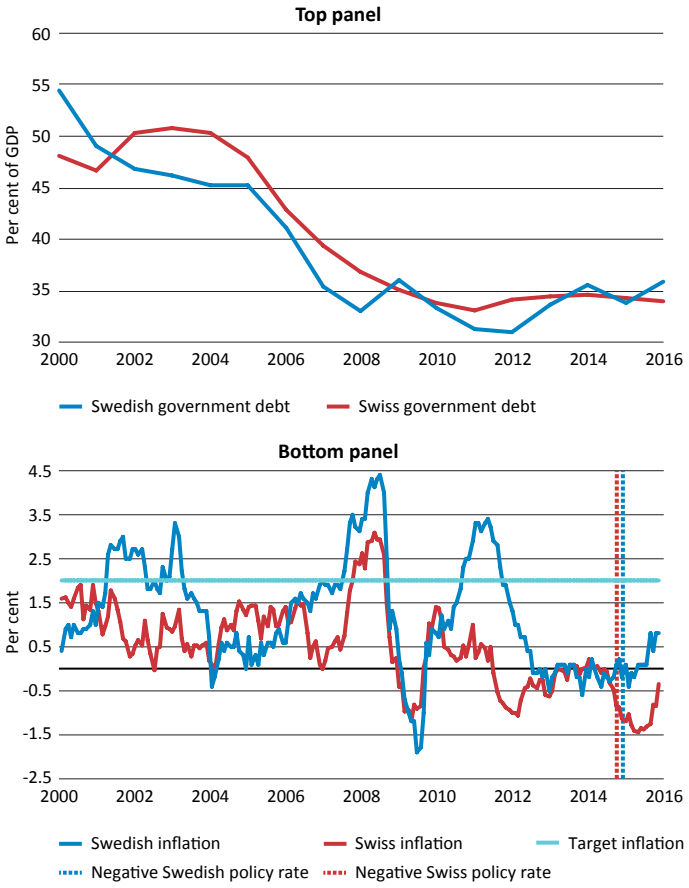
Sweden's *Fiscal Policy Framework* lays out the general principles that guide fiscal policy (Swedish Government, 2011). Each government then adopts the particular rules it will follow to be consistent with the framework. Currently, Sweden aims for a 1/3 percent of GDP target for net lending (the surplus inclusive of interest payments) and is now considering also imposing a 35 percent of GDP "debt anchor". This anchor is akin to a target around which debt will fluctuate within prespecified bounds.[10]

Since a nationwide referendum in 2001, Switzerland has followed a debt brake, which limits spending to average revenue growth over several years. If spending differs from this limit, the difference is debited or credited to an adjustment account that has to be corrected in coming years. Debt brakes have a built-in error-correction mechanism intended to restrict the size of government debt.[11]

10 Many more details are available on the Swedish Fiscal Policy Council's web page (www.government.se/government-agencies/swedish-fiscal-policy-council/).

11 See Danninger (2002) and Bodmer (2006) for additional details and analyses.

Figure 1. Debt-GDP ratio and CPI inflation rates in Sweden and Switzerland
First vertical line in bottom panel is when Swiss National Bank adopted negative policy rates and second line is when Sveriges Riksbank did.



The top panel of Figure 1 suggests that Swedish and Swiss fiscal rules have worked to limit debt growth. In both countries, debt has steadily fallen over the past 15 years and now is about 35 percent of GDP. Remarkably – and these two countries may be the sole exceptions – debt either continued to fall or was flat during the financial crisis. This stunning outcome is a testament to the effectiveness of fiscal rules that are followed.

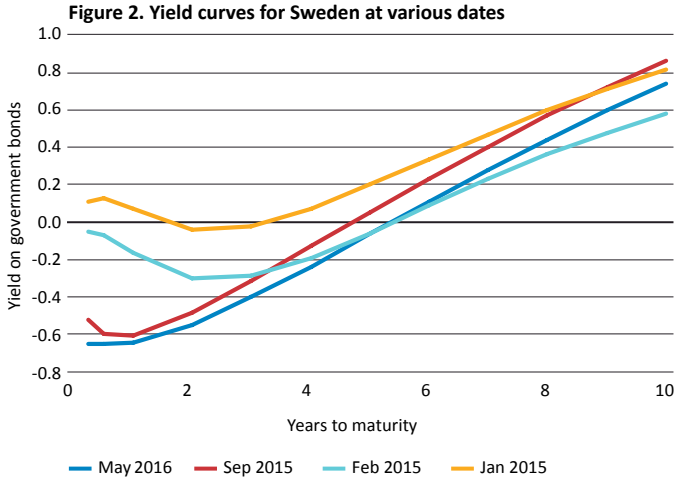
But this prudent fiscal policy may have come at a cost in terms of inflation targeting. Both countries have 2 percent inflation targets that have been missed. In Switzerland, inflation has been persistently below target since the beginning of 2009. As of this writing in October 2016, CPI inflation in Sweden is about 1 percent, while it is approaching 0 percent in Switzerland.

Money-only understandings of inflation that neglect fiscal policy have a difficult time explaining why zero or negative policy interest rates *that have lasted for years* have failed to bring inflation up to target.[12] The discussion in Section 3.1 points toward one possible explanation. If the urge to reduce government debt makes fiscal policy respond asymmetrically to monetary policy – raising taxes/cutting spending when interest rates rise, but not cutting taxes/raising spending when interest rates fall – then fiscal policy is not providing the backing necessary for monetary easing to raise inflation. Whether governments in Sweden and Switzerland are implementing fiscal policy in this asymmetric manner requires careful analysis that extends well beyond the data in Figure 1.

12 The Swiss National Bank set the policy rate negative beginning in December 2014 and Sveriges Riksbank made the repo rate negative starting in February 2015.

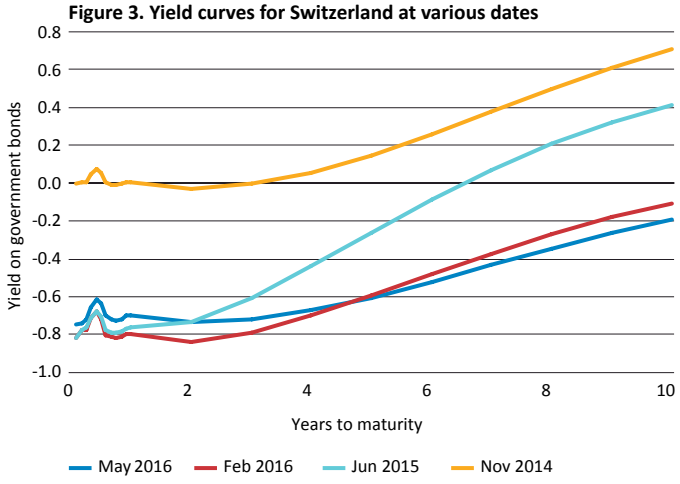
To my knowledge, central banks are not even asking the questions that arise from conceiving inflation as a joint monetary-fiscal phenomenon. And central bank models, as currently specified, cannot address the questions. Those models impose symmetric rules – when they impose any fiscal rules at all – that behave as regime M prescribes. Conditional on those rules, the models attribute below-target inflation rates in the wake of extremely low monetary policy interest rates to a host of non-policy shocks – price or wage markups, preferences – or to foreign policy disturbances. The argument in this essay points away from shocks and toward systematic, asymmetric fiscal policy behavior.

Figure 2. Yield curves for Sweden at various dates



Source: The Riksbank

Figure 3. Yield curves for Switzerland at various dates



Source: IHS Global Insight

Figures 2 and 3 report evidence consistent with the view that Swedish and Swiss fiscal policies have focused strongly on debt reduction. The figures plot estimated zero-coupon government bond yield curves at various dates. In Sweden, yields are negative for maturities up to five years, as Figure 2 shows. Swiss yields are even more striking: negative at maturities of 10 years, as Figure 3 plots.

A careful analysis would decompose these negative yields into components due to expected inflation, long-term real interest rates, and term premia. It's treacherous to read too much into these figures, but they do stimulate some questions. Is there a shortage of safe assets in these countries? Do these yields mean that inflation expectations have become untethered from the central banks' inflation targets? Or do the yields largely reflect declining real interest rates worldwide, which are beyond the policy authorities' influence?

We can infer something with confidence. The private sector is willing to *pay* these governments to borrow from them for periods of 5 to 10 years. But the governments have refused the private sector's generous offer. At a minimum, the figures raise the question of why governments do not take up this offer and invest the proceeds in sovereign wealth funds, infrastructure, or any other investment whose return is likely to exceed the negative cost of borrowing.

5 Concluding remarks

Research on monetary-fiscal policy interactions is not new. Friedman (1948) originally advocated a policy mix much like that in regime F. By Friedman (1960), he had shifted his advocacy to something close to regime M. Importantly, both positions explicitly specified monetary *and* fiscal behavior. From about Friedman (1970, 1971) on, though, Friedman's analyses focused solely on money and monetary policy. Fiscal considerations had been pushed so deeply into the background that they didn't play any role in his views of inflation. Contemporary economists like Patinkin (1965), Tobin (1974), and Brunner and Meltzer (1974) never adopted Friedman's extreme money-only views, but their more complex approaches never gained much traction against simple monetarism.

Friedman's money-only view continues to dominate analyses of inflation and inflation-targeting frameworks in which central banks operate. Even the massive economic disruptions caused by the global financial crisis and the unprecedented and unconventional monetary policy actions of the past eight years have not shaken the belief that price-level and inflation determination can be understood without reference to fiscal policy.

Sims (2016b) offers a non-technical exposition of how bringing monetary and fiscal policy jointly into the picture alters one's perceptions on several pressing macroeconomic issues:

1. central bank independence
2. large central bank balance sheets
3. the apparent ineffectiveness of monetary policy in advanced nations in recent years
4. providing economic stimulus when interest rates are at their lower bound.

Sims does not explicitly address the matter of whether adopted fiscal rules can conflict with the central bank's mandate to target inflation, but this is implied by much of what he writes.

Fiscal rules are designed to solve a *political* problem – the bias toward running excessive budget deficits – but may create an economic problem. And the cure may be worse than the disease if it undermines the ability of monetary policy to control inflation. Central banks cannot rely on fiscal authorities to work through the implications of their rules for monetary policy. That requires a level of analysis that in the realm of government, central bank economists are uniquely qualified to perform.

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Appendix A – a model of price-level determination

We examine the simplest model that can determine the economy-wide price level and inflation rate. Although simple, this model underlies the more complex models that central banks employ for policy analysis and forecasting (Christoffel, Coenen, and Warne, 2008, Adolfson, Laséen, Christiano, Trabandt, and Walentin, 2013, Brayton, Laubach, and Reifcshneider, 2014). To make the analytics neat, we use the model after it has been linearized around a deterministic steady state.[13] This model shows that the two basic tasks of determining the price level and stabilizing the debt can be accomplished by two distinct assignments of the tasks to monetary and fiscal policy.

A single representative consumer populates the model economy. That consumer receives an endowment of goods each period and decides how much to consume and how much to save in the form of nominal government bonds. The real interest rate is constant at $1/\beta$, where β, which is between 0 and 1, tells how much the consumer discounts the future. We treat this discount factor as a primitive of the economy that policy cannot affect.

Because this is an economy with only a single asset – nominal bonds – the price level P, is how many kronor (in bonds) it takes to purchase the single consumption good, and the inverse of the price level, $1/P$, is the goods price of one krona worth of bonds.

Four equations constitute the complete model[14]

(1) Fisher relation: $i_t = E_t \pi_{t+1}$

(2) Monetary policy: $i_t = \alpha \pi_t + \varepsilon_t^i$

(3) Fiscal policy: $\tau_t = \gamma b_{t-1} + \varepsilon_t^\tau$

(4) Government budget: $b_{t-1} = \beta b_t - \beta i_t + \pi_t + (1 - \beta)\tau_t$

The Fisher relation comes from a no-arbitrage condition and connects the nominal interest rate, i_t, to the expected inflation rate, $i_t = E_t \pi_{t+1}$. Monetary policy aims to target inflation by adjusting the interest rate in response to current inflation, with an exogenous shock to reflect times when policy deviates from that simple rule. Fiscal policy adjusts taxes net of transfers, τ_t, with the level of real government debt, b_t. The exogenous shock permits fiscal choices to deviate from reactions to debt. Government purchases are zero. Government choices must satisfy a budget constraint that says any excess of existing debt payments and current surpluses must be financed with new bond sales. At date t, the government sells pure discount nominal bonds, b_t, at price $1/(1 + i_t)$, which pay 1 krona in period $t + 1$.[15] We assume the two policy disturbances are $AR(1)$ with AR coefficients ρ_i and ρ_τ.

This model reduces to two dynamic equations that determine how inflation and real debt evolve over time. Inflation dynamics come from combining Equations (1) and (2) and debt dynamics from substituting (2) and (3) into (4) to yield

(5) $\alpha \pi_t = E_t \pi_{t+1} - \varepsilon_t^i$

(6) $b_t = \Gamma b_{t-1} + (\alpha - \beta^{-1})\pi_t + \varepsilon_t^i - (\beta^{-1} - 1)\varepsilon_t^\tau$

where $\Gamma = \beta^{-1} - \gamma(\beta^{-1} - 1)$. These two equations determine equilibrium inflation and real debt.

Before solving this model, we can learn about how monetary and fiscal policies interact by inspecting these two equations. Equation (5) might seem to suggest that inflation evolves

13 This model appears in Leeper and Li (2016).

14 The deterministic steady state has zero net inflation and a surplus-debt ratio of $s/b = 1 - \beta$.

15 This is a cashless version of the model in Appendix B.

independently of government debt, but this appearance is deceiving. Inflation at t, π_t is the rate of change of the price level between period $t-1$, P_{t-1}, and t, P_t, and real debt, b_t, is nominal debt deflated by the price level, P_t. So (5) shares both P_t and P_{t-1} with (6). The price level connects monetary to fiscal policy.

Equation (6) shows that the inflation rate and the monetary policy shock, ε_t^i, directly affect debt dynamics. Inflation enters in two ways. First, higher inflation at t reduces the value of nominal debt carried over from the previous period, which tends to reduce new debt issuance. Second, inflation affects the nominal interest rate through monetary policy behavior: higher inflation raises the nominal rate, which reduces the price of new bond sales, and requires the government to issue more bonds to support the same level of financing. Because the monetary policy disturbance also affects bond prices, it influences the evolution of debt.

To study this model, we will need to take a stand on how monetary and fiscal policy behave, as summarized by their choices of the parameters α and γ. We focus on finding solutions that satisfy two sensible criteria. First, inflation and debt should be stable, which is a sign that policy has been effective. Second, the solutions should be unique, otherwise we cannot say for certain what paths these variables would follow after a shock hits the economy.

Two regions of the policy parameter space deliver unique bounded equilibria (see Leeper, 1991):

$\lvert\alpha\rvert>1, \lvert\gamma\rvert>1$:	active monetary/passive fiscal policies	"Regime M"
$\lvert\alpha\rvert>1, \lvert\gamma\rvert>1$:	active monetary/passive fiscal policies	"Regime M"

A.1. Regime M

Equilibria in regime M are conventional monetarist/new Keynesian/Ricardian solutions. Active monetary policy makes inflation depend only on monetary policy parameters and shocks and passive fiscal policy makes debt converge gradually back to steady state following either kind of policy disturbance. The equilibrium is

$$\pi_t = -\frac{1}{\alpha - \rho_i}\,\varepsilon_t^i \tag{7}$$

$$b_t = \Gamma\, b_{t-1} + \left(\frac{\beta^{-1} - \rho_i}{\alpha - \rho_i}\right)\varepsilon_t^i - (\beta^{-1} - 1)\,\varepsilon_t^s \tag{8}$$

$$\tau_t = \gamma b_{t-1} + \varepsilon_t^\tau \tag{9}$$

where $\Gamma \equiv \beta^{-1} - \gamma(\beta^{-1} - 1) < 1$.

A.2. Regime F

For this regime, we consider the case of exogenous surpluses, $\gamma = 0$, which is an analytically simple case of active fiscal policy. Inflation now depends on the fiscal disturbance and the state of government debt, while monetary policy acts to stabilize the real value of debt. This equilibrium is

$$\begin{aligned} \pi_t &= b_{t-1} - \frac{(1-\beta)}{(1-\beta\rho_\tau)}\,\varepsilon_t^\tau \\ b_t &= \alpha b_{t-1} + \varepsilon_t^i + \left(\frac{(1-\beta)(\rho_\tau - \alpha)}{1-\beta\rho_\tau}\right)\varepsilon_t^\tau \\ \tau_t &= \varepsilon_t^\tau \end{aligned} \tag{10}$$

where we take $\alpha \in [0,1)$ because negative responses of the interest rate to inflation, although theoretically possible, make little economic sense.

Notice that government debt is stable in both regimes. In regime M, the fiscal choice of γ ensures stability and determines how rapidly debt returns to steady state. In regime F, the monetary choice of α does the job: as (10) reveals, α determines the speed of adjustment of debt toward steady state. In fact, if monetary policy were active, $\alpha > 1$, debt would grow without bound. A weak response of monetary policy to inflation – a setting of α between 0 and 1 – is necessary for debt to be stable.

Another important difference between regimes is the equilibrium inflation process. In regime M, as (7)–(9) make clear, inflation is decoupled from the joint (s_t , b_{t-1})process, an implication of Ricardian equivalence. In regime F, although the surplus evolves autonomously, it feeds directly into inflation and b_{t-1} affects π_t through a breakdown of Ricardian equivalence. In regime F, nominal debt expansions raise nominal wealth and nominal spending, raising the price level to ensure that *in equilibrium* there is no change in real wealth.[16]

16 See Leeper and Leith (2016) and Appendix B for details.

Appendix B – the fiscal theory mechanism

We posit a permanent income theory of consumption in which a representative household makes a consumption-saving decision. The household receives an endowment y_t, pays lump-sum taxes net of transfers τ_t, and saves in the form of nominal assets, money M_t, which earns no interest, and government bonds B_t, which sell at price $1/(1 + i_t)$. The household takes prices and initial nominal assets, M_{-1} and M_{-1}, as given when it chooses sequences c_t, M_t, and B_t to maximize

$$E_0 \sum_{t=0}^{\infty} \beta^t \left[u(c_t) + v\left(\frac{M_t}{P_t}\right)\right], \ 0 < \beta < 1$$

where u and v are strictly increasing, strictly concave, and differentiable functions, M_t / P_t is real money balances, and E_0 is the expectations operator conditional on inflation at time , subject to

$$c_t + \frac{M_t}{P_t} + \frac{1}{1 + i_t}\frac{B_t}{P_t} = y_t - \tau_t + \frac{M_{t-1} + B_{t-1}}{P_t}$$

Let $A_t \equiv M_{t-1} + B_{t-1}$ denote total nominal assets and $q_{t,t+1}$ denote the one-period real stochastic discount factor for the household, where

$$q_{t,t+1} = \beta E_t \frac{u'(c_{t+1})}{u'(c_t)}$$

The household's intertemporal budget constraint in period 0 is

$$(11) \quad E_0 \sum_{t=0}^{\infty} q_t \left[c_t + \frac{1}{1 + i_t} \right] m_t = \frac{A_0}{P_0} + E_0 \sum_{t=0}^{\infty} q\_t[y_t - \tau_t]$$

where q_t is the stochastic discount factor for computing the real value in period 0 of a unit of consumption goods in period t, so $q_0 = 1$, and $m_t \equiv M_t / P_t$ is real money balances. Equation (11) uses the limiting condition $\lim_{t \to \infty} E_0[\, q_t A_t / P_t] = 0$.

The first-order condition for money implies

$$\frac{v'(m_t)}{u'(c_t)} = \frac{1}{1 + i_t}$$

which permits us to write the liquidity preference schedule as $m_t = L(i_t, c_t)$.

If we specialize the model by setting government purchases of goods to be identically zero, then goods market clearing is $c_t = y_t$ for all $t \geq 0$. Imposing goods and money market clearing on (11) leads to an expression that links the real value of initial government liabilities to their real backing, seigniorage revenues and net taxes.

$$(12) \quad \frac{A_0}{P_0} = E_0 \sum_{t=0}^{\infty} q_t \left[\frac{1}{1 + i_t} L(i_t, y_t) + \tau_t \right]$$

This expression may be further simplified by assuming the endowment process implies $y_t \equiv \bar{y}$, so that $q_t = \beta^t$. If output is constant, liquidity preference simplifies to , and (12) becomes

$$(13)\quad \frac{A_0}{P_0} = E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{i_t}{1+i_t} L(i_t, \bar{y}) + \tau_t \right]$$

Policy chooses sequences $\{i_t, \tau_t\}$. To illustrate how the fiscal theory operates, we posit the policy rules

$$(14)\quad \begin{aligned} i_t &= \bar{i} \\ \tau_t &= \bar{\tau} + \varepsilon_t \end{aligned}$$

where $E_t \varepsilon_{t+j} = 0$ for $j > 0$.

Notice that pegging the nominal interest rate pegs expected inflation since $1/(1 + i_t) = \beta E_t [1/(1 + \pi_{t+1})]$ Assume $\bar{i}$ is chosen to ensure $\bar{\pi} = 0$. This and the rule for setting net taxes collapse (13) to

$$(15)\quad \frac{A_0}{P_0} = L(\bar{i}, \bar{y}) + \tau_0 + \beta/(1-\beta)\bar{\tau}$$

The real value of initial government liabilities is determined by seigniorage, summarized by $L(\bar{i}, \bar{y})$, and by current net taxes, τ_0, and the present value of future net taxes.

Consider an increase in transfers or decrease in taxes at time 0 – lower . Equilibrium condition (15) says that this reduced backing for liabilities must reduce their value by increasing the price level, P_0 (because initial nominal assets, A_0 are given at time 0, and the tax rule, (14), implies that a change in current taxes carries no predictions about future taxes).

But the equilibrium condition masks the economic mechanisms. Those mechanisms are made clear from the household's intertemporal budget constraint, (11). Adjustment to equilibrium after a tax cut – a decline in τ_0 – involves two offsetting wealth effects. The tax cut reduces the government's holdings of goods and raises the households'. Households feel wealthier and try to spend that tax cut on consumption goods. Because the supply of goods is fixed, the household's increased demand drives up the price of goods, P_0 as the price level rises, the real value of household financial wealth, A_0 / P_0, falls. This negative wealth effect must be sufficient to eliminate the excess demand for goods so that the household is content to consume its endowment, $c_t = \bar{y}$.

Do's and don'ts in central bank design

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The 2007-2009 financial crisis and its aftermath have induced – quite rightly – a re-examination of the mandate and design of central banks, particularly with respect to financial stability. The role of central banks in financial stability and managing financial crises is inherently complicated, because of the necessarily close ties to and overlap with monetary, fiscal and regulatory policy. This paper does not attempt to provide a complete framework for financial stability policy by central banks, but instead highlights a few key areas where the design of central bank policies could be improved significantly. The recommendations are influenced by the crisis experience of central banks globally, but particularly by liquidity and monetary operations done by the Federal Reserve and by U.S. regulatory reform and financial stability policy in the years since the crisis.

My central bank design recommendations are framed as "do's and don'ts". They span both the central banks' mandate (typically its legislated responsibilities and its relationship to fiscal and regulatory agencies) and central banks' internal policy apparatus and governance – in other words how central banks organize themselves to execute their mandates. The paper concludes with several key lessons for central banks about the design of financial stability policy and crisis management, about their own internal structure, management and priorities, and their relationship with the fiscal authorities and regulators, both domestic and international.

1 Don'ts: after a crisis (and with perfect hindsight), the "don'ts" are always easier to describe

First: *don't* rely exclusively on operating frameworks for monetary policy or for lender of last resort (LoLR) that depend on a small number of private counterparties transmitting monetary policy changes and central bank liquidity to the rest of the (global) financial system. Narrow operating systems, such as the one used by the Fed, work wonderfully well in normal financial conditions, in part because they are very efficient. But they are woefully inadequate in times of stress. When the monetary policy transmission mechanism is broken – as it typically is during periods of market turmoil – a narrow operating framework will not be sufficient to pass on adequate monetary and liquidity stimulus to the financial system and the rest of the economy. Moreover, for some central banks, liquidity provision during a systemic event will have international dimensions, particularly if the domestic financial system is tightly integrated with global financial markets and institutions. In such cases (which include most advanced economy central banks and many emerging market central banks), central bank actions may require an even greater degree of international cooperation and perhaps even coordinated policy responses.

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Another way to say this (in financial stability language) is: Don't have a large share of leveraged maturity transformation in the financial system without access to central bank liquidity provision – whether for monetary policy implementation or lender of last resort. This was – and remains – a very large problem in the U.S.[1]

If a central bank has too narrow a framework for monetary policy implementation and liquidity provision, in a crisis it is likely to be forced into the situation of doing two addition "don'ts": *Don't* design and develop completely new liquidity facilities in the midst of a financial panic (and over the weekend). And *don't* make the collateral system a moving target as the crisis progresses. Wholesale changes in central bank "rules of engagement" in the midst of crisis are not only detrimental to financial stability (because they increase uncertainty and risk additional confusion among market participants), but they can also significantly increase risk to the central bank and thus taxpayers as new programs and collateral rules are rushed into use over a very short timeframe. An overview of central bank changes to collateral and counterparty rules can be found in Domanski, Moessner and Nelson (2014).

Second: *Don't* rule out using a set of policy tools or instruments ex ante that the central bank is legally allowed to use. In a crisis, the odds are that a central bank will use every policy tool in its arsenal. For example, central banks in many countries typically have restrictions on collateral, asset composition and counterparties that are tighter than the law allows. Moreover, in some cases, central bank officials publicly stated that "we will never use policy tool X", even though it was legal to do so in their framework. Such statements have ended up being time inconsistent, because in the event, most central banks significantly expanded their policy tools, types of purchased assets and collateral during crises.[2]

As an example, there was considerable reluctance to use central bank liquidity swap lines before the 2007-2009 financial crisis, because of the historical association with swap lines for foreign exchange interventions. By the end of 2008, the dollar liquidity swap lines were the single largest liquidity program managed by the Federal Reserve. In short, central bankers should be somewhat humble about their ability to predict which policy tools will be needed in a crisis situation and as such should be prepared to call on their entire toolkit, if needed.

Third: *Don't* act as if the central bank can always operate with a clear line between fiscal policy and monetary policy, that is between solvency/resolution decisions and liquidity provision/LoLR. There is no clear line.[3] In normal times – for very good governance reasons – the central bank and the fiscal authority typically create a line. The central bank sits on one side with a set of activities labelled monetary policy, while on the other side are a set of activities labelled fiscal and regulatory (even in the case where the central bank has regulatory authority, the regulatory apparatus and decision making is typically separate from monetary policy). The separate structures make a lot of policy sense when solvency risk is low, insolvency is idiosyncratic and monetary policy is almost exclusively interest rate policy. It clarifies responsibilities, governance and decision making. It also allows for the (relative) independence of monetary policy (that is interest rate policy) in normal times.[4]

But when solvency risk is systematic amid fire sales and runs, the distinctions between monetary and fiscal go away. And because those cases are the ones that matter most (because they pose the highest cost), the government – broadly defined as central bank, regulators, legislature/fiscal authority need a joint agreement, which clarifies which part of the government is responsible for what and when.[5] Again, if authorities don't have this – and the US did not (and still does not) – the central bank may end up stuck doing a couple

1 See Adrian et al. (2014) and Goldberg (2016).
2 See BIS Markets Committee (2009, 2013).
3 See Calomiris (2016) and Goodhardt (2016).
4 See Taylor (2016).
5 See Tucker (2014) and Mester's (2016) commitment device.

of additional "don'ts". *Don't* try to determine solvency of large complex financial company over the weekend. And *don't* assume that solvency assessment is fixed or static. Solvency determination is always a probability exercise (Goodhart, 2016), and importantly, during a crisis, solvency is completely dependent on *total* government policy response, which in turn requires a joint understanding of responsibilities across the key stakeholders.

Fourth: *Don't* neglect the financial plumbing. Plumbing such as payment systems and securities settlement operates largely under the radar, but as generations of central bankers know, it is enormously important to maintaining stability of the financial system and the economy. How does liquidity actually flow through the system? Where are the hidden risks in payments and settlement systems? Where is the collateral and who controls it? These are all questions that central banks should answer (and update their answers to) regularly. Nothing is more devastating in times of financial instability than failure – or risk of failure – of a payments system, of securities settlement, or to get one's collateral back.

2 Do's:

First: *Do* design LoLR, collateral rules, and liquidity provision capacity for systemic not idiosyncratic events. This requires that central banks keep on top of monetary policy transmission mechanisms and fire sale/wholesale funding risks, monitor them constantly, and adjust their planning for liquidity provision and monetary policy accordingly. Moreover, most central banks need to understand how these mechanisms and channels work globally.

To do this, central banks need much more data than they currently have to monitor transmission mechanisms, liquidity risks and contagion channels. Many central banks, particularly those in jurisdictions with large financial centers, are likely to need global data in order to do such monitoring. The gap is enormous; nine years after the start of the financial crisis, central banks still do not have basic aggregate data on the financial system. For example, there is no measure of the total amount of short-term wholesale funding in the financial system, let alone data that describe the distribution and structure of such funding. Whole sectors of the financial system are measured incompletely, or with data that are inconsistent with other parts of the financial system. In other words, central banks cannot monitor aggregate financial risks, particularly fire-sale and run risk, and thus do not have the information they need to size and design liquidity facilities and monetary policy implementation structures that are robust. Certainly efforts to gather additional data internationally – on secured funding markets and interbank funding for example – are to be applauded, but they remain incomplete and typically will allow little data sharing.

This is a "call to arms" for central banks – to very significantly increase the resources, expertise and policymaker attention to gathering more complete information and data on the global financial system – particularly shadow banking and propagation mechanisms.

Second: *Do* crisis planning all the time. Tabletop exercises are not enough; central banks need to do true planning of liquidity facilities and other monetary policy operational changes that can be used in financial crises. Such facilities should be designed in normal times and adapted over time to changes in financial intermediation and financial structure based on the monitoring, data and information that central banks regularly gather on the financial system. In addition, central banks should test such facilities, if allowed. If testing is not possible, then central banks should insure that the legal structures and financial plumbing are in place to set up a new facility in relatively short order. Finally, in light of the international dependencies, some international crisis planning is important, even if it is less formal that domestic efforts.

Third: *Do* limit constructive ambiguity by clarifying the decision making of the central bank, the fiscal authority and regulators in a systemic crisis. "Fuzziness" about who will do what and who is responsible for policy decisions and regulatory actions

poses particularly large risks for central banks, even those without regulatory authority.[6] Constructive ambiguity on the central bank's powers and the perimeter of regulation/safety net can increase moral hazard in normal times, particularly for large complex financial intermediaries, since they are likely to benefit the most (in terms of official sector support) when a crisis occurs.[7]

During a crisis (when moral hazard behaviors come home to roost), we know which public institution will be the first mover by providing liquidity to financial institutions. But because the central bank is typically first, it can easily become the flash point for all public sector crisis management. If there is fuzziness about crisis responsibilities of fiscal authority and regulators, then delays elsewhere can cause the central bank to become the *entire* story. AIG became the Fed's problem. In the public conversation, the Fed became responsible for the failures of Bear Stearns and Lehman Brothers. Relatedly, this raises the questions of whether quick monetary policy actions can delay policy actions by fiscal authorities and regulators.

Fourth: *Do* keep oversight authority and responsibility for the financial plumbing, both public sector and private sector systems. If there is one area besides monetary policy which central banks should have clear responsibilities and oversight authority, it is the financial plumbing: payments systems, settlement systems, and even security collateral/custody systems. As noted in Ingves (2016), this is likely to be a large challenge for central banks in light of the rapid speed of innovations that are on the horizon. Technological changes and innovations from fintech, the rapid growth in high-speed transactions across many markets, and the enormous expansion of centralized clearing and settlement will require careful monitoring, and most likely significant changes in the regulation and supervision of payment and settlement systems in the coming years. A key question will be central banks' ability to determine the degree to which systems – both new and old – are robust to financial and operational shocks.

3 Implications for central bank design

- Central banks should spend significantly more resources understanding and monitoring financial system structures and vulnerabilities, including the monetary transmission mechanism, financial infrastructure changes, and global financial market interlinkages that they have previously. This will require significant investments in improved, detailed data on markets, institutions and infrastructures. Importantly, this monitoring and risk analysis should be elevated to the same level of governance and policymaker attention as standard macroeconomic analysis and modeling.
- Crisis planning and facility (re)design should become standard operating procedure for central banks and not periodic, one-off exercises.
- Central banks are in the financial stability business even if their only mandated responsibility is monetary policy. In this case, their role is largely in the cleanup of financial crises, through LoLR and the use of balance sheet and credit policies. A key design question then is whether central banks are comfortable being *only* in

6 Unfortunately, constructive ambiguity tends to be quite attractive to legislators. For example, the U.S. system of many regulators with overlapping and sometimes shared responsibilities is complex to the point that it can be unclear which agency is in charge of which policy, and unclear how different authorities (fiscal, regulatory, central bank) will determine policy in a systemic crisis. The complexity encourages regulator shopping in normal times and creates incentives for regulated firms to arbitrage both regulatory overlaps and gaps. The resulting increase in moral hazard behavior is a problem for both regulatory agencies and the central bank.

7 The government's decision making plan also needs to be credible. Managing moral hazard by allowing multiple and widespread failures in a systemic financial panic is neither good public policy nor time consistent policy. In systemic crises, societal costs of financial and economic collapse greatly outweigh moral hazard costs; solvency is typically dependent on public policy to stop the panic; and governments historically bail out their financial systems regardless of pre-crisis statements to the contrary. Moral hazard can be mitigated in normal times by policy actions and regulation of financial firms and markets (so crises are as rare as possible), and by allowing the idiosyncratic failure of insolvent firms.

the cleanup business? There is no one-size-fits-all answer to that question, since it depends critically on financial system structure, the regulatory framework, and political considerations in each jurisdiction. However, it raises several other important design questions for central banks and others to consider.

- If the financial stability and crisis responsibilities are split between the central bank and other authorities – and in the vast majority of countries they are – has policy authority been aligned with responsibility? Take the case of a central bank with only monetary policy (including LoLR) and payments policy authorities. Assume solvency determination and resolution are done by regulators, and backstop decisions are with legislatures and fiscal authorities. Ex ante the roles seem clear and the dependencies are relatively small: the central bank relies on accurate information on solvency from the regulators to execute its policies, particularly LoLR. Solvency, resolution and any government backstops are not the central bank's responsibility. But in a crisis, is the central bank sure it is lending to solvent financial firms? If not, what happens if the resolution mechanism is not invoked or government backstops are not provided? In this case, it is unlikely that LoLR will be effective in restoring financial or economic stability, and the risks of a zombie bank conundrum are significant. In such a scenario, the central bank may be on the hook for running exceptionally expansionary monetary policy for many years, but still may fail to hit its monetary policy targets. Who is responsible then?
- In addition to the "clean-up business", should central banks also be in the "prevention business" – that is preventing financial instability? If so how do central bank policy tools and responsibilities "fit" with those of other (microprudential) regulators?[8] If the responsibilities for financial stability and microprudential regulation are spread across multiple authorities, the dependencies across different parts of the government can be quite complex. Who decides solvency for different types of financial companies and are the solvency standards consistent?[9] How should regulatory coordination and information-sharing be managed? In practice, my experience has been that information sharing across regulatory agencies is particularly fraught.
- A related governance issue is the extent to which financial stability committees or split responsibilities will work in practice. If they lead to constructive ambiguity and "fuzziness" in responsibilities, then they will not work well. In addition, constructive ambiguity is more likely when committees are big and complicated with overlapping and shared responsibilities.[10]

- The financial stability role of major central banks is likely to be global, but their authorities and accountability to the public are local. As an example, more than two-thirds of the dollars lent by the Fed between 2007 and 2009 went to financial institutions based outside the U.S. This is of course a direct consequence of the breakdown of the triple coincidence in international finance noted by Avdjiev, McCauley and Shin (2016). Major central banks – particularly those whose domestic currencies are also global funding currencies – need to consider what monetary policy and lender of last resort structures are appropriate when global liquidity shortfalls in their currencies can reflect external economic and capital flows rather than domestic ones. Individually central banks need to be prepared to explain and justify in detail why the financial and economic stability of their home jurisdiction depends on

8 For a case study on the complexities of macroprudential decision making, see Danthine (2016).
9 Note that solvency standards for different types of financial institutions are unlikely to be the same (nor should be they be), but the standards should be consistent.
10 See Kohn (2014).

providing liquidity to the global as well as the local financial system. Moreover, the international dependencies – for example the solvency determination that is needed in order to provide local lender of last resort to a large, foreign global bank – are even thornier than the domestic-only issues described above. While a formal international agreement on such home/host responsibilities may be unrealistic, it is important for central banks to work toward a set of international best practices to guide home country supervisors and host country central banks.

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