

Øystein Olsen: Macroprudential regulation and monetary policy

Speech by Mr Øystein Olsen, Governor of Norges Bank (Central Bank of Norway), at the Centre for Monetary Economics (CME)/BI Norwegian Business School, Oslo, 7 October 2013.

Please note that the text below may differ slightly from the actual presentation.

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Accompanying charts can be found at the end of the speech. Original presentation is on Norges Bank (Central Bank of Norway) website. [Charts in pdf](#)

International economic developments in recent years have presented a challenge to the economic policy framework. An important lesson from the financial crisis is that regulation of the financial system must be improved and that the macroprudential perspective in particular needs to be strengthened. Development of macroprudential regulatory frameworks is therefore underway in a number of countries, including Norway. Experience shows, however, that financial crises are very difficult to predict and prevent. The aim of macroprudential regulation is to reduce the probability of a crisis and counteract harmful effects in the financial system when a crisis occurs.

A related issue is how monetary policy should respond to financial imbalances, and more specifically, what the implications of the new macroprudential policy tools will be for monetary policy. How monetary policy is conducted and communicated is also evolving, both abroad and in Norway. Norges Bank has decided to launch a major research project with a view to further developing the framework for flexible inflation targeting. I will return to this topic towards the end of this address.

Since Norges Bank will be providing the Ministry of Finance with concrete advice regarding a countercyclical capital buffer, I would like to devote some time to stating the reasons why such a buffer is necessary, and why, more generally, regulation of the banking sector is necessary. Then I shall touch upon the interaction with monetary policy and will also add some brief comments about some of the challenges facing monetary policy in the wake of the financial crisis.

Why capital regulation?

A well functioning financial market is essential for virtually all other economic activity in a market economy. Banks are a key component of the financial system. Banks channel money from savers to investors. Banks determine who should be given credit and closely monitor borrowers and their projects. This is a task that would be difficult for small savers to undertake.

Resilient banks and prudent banking are important for a solid and stable economy. If banks end up with insufficient equity capital following substantial losses in bad times, they will have to tighten lending. This may serve to amplify the downturn, as is currently the case in a number of European countries.

Compared with other enterprises, banks have limited equity capital. It is often more costly for banks to fund lending with equity capital than with deposits and borrowing from the market. As deposits are readily available to depositors and many deposits are covered by a deposit guarantee, depositors accept a relatively low interest rate. The insurance premium banks pay for the deposit guarantee bears little relation to the risk the bank takes. In addition, since investors can expect that the authorities will come to the aid of banks in distress, they may be satisfied with a lower return. The result is an underpricing of risk, potentially leading to excessive risk-taking.

Low equity ratios reduce loss-absorbing capacity and, at the same time, strengthen the incentive to take risks. While owners cannot lose more than their equity stake, there is a potential for high returns on the equity capital they have invested. Banks' owners lack incentives to take full account of the risk imposed on creditors.

To avoid a situation where banks hold inadequate equity capital, banks are subject to capital requirements. Each bank should hold capital in proportion to its risk exposure. This is the basis of microprudential bank regulation.

But even if each individual bank appears to be solid on its own, the banking system as a whole may be vulnerable. Risk in the system has several sources. Externalities between banks are one important source. Banks are exposed to one another and can inflict losses on one another directly. Banks can also inflict substantial losses on one another if they have shared exposures outside of the banking system. This was clearly evident during the financial crisis. When a bank is forced to sell off assets, these assets fall in value. This weakens the balance sheets of other banks holding the same type of assets.

Systemic risk also arises from externalities in the interaction between the financial system and the real economy. Financial crises generally occur following a period of mutually reinforcing increases in credit, property prices and demand for goods and services, culminating in a bubble that reaches bursting point. Each individual loan makes a scant contribution to overall risk, but gradually, as debt burdens increase, the economy becomes more vulnerable to shocks. Chart 1 shows that Norway has also experienced periods of especially strong credit growth that have been interrupted by financial crises. The subsequent losses in the real economy have been substantial.

Ahead of both the banking crisis of the 1990s and the financial crisis, lending growth far outpaced growth in deposits. Banks relied increasingly on short-term wholesale funding, exacerbating the vulnerability of the banking system itself. Wholesale funding often dries up or becomes considerably more expensive in turbulent times.

Banking regulation must therefore include a macroprudential perspective. The purpose is to dampen the build-up of systemic risk and ensure that the banking system as a whole is resilient to shocks. In a number of countries, frameworks are now being established for macroprudential regulation, along with efforts to put policy instruments in place. In Norway, the Financial Institutions Act has recently been amended, with effect from July 2013. The amendments have been harmonised with new EU regulations. The amended act sets higher capital requirements for Norwegian banks and includes a countercyclical capital buffer. The amendments also authorise the Ministry of Finance to issue regulations on the use of other macroprudential instruments.

Preferably, such instruments should focus directly on the sources of systemic risk. This is the principle that is applied when taxes are imposed directly on environmentally hazardous products. However, in practice, this is difficult to accomplish in the financial system. Systemic risk can be difficult to identify and has numerous sources. The financial system and its interaction with the real economy is complex, and problems spread across borders. The financial crisis was a clear reminder of this. We have experienced on previous occasions that some financial sector operators find ways to evade regulations. New sources and forms of systemic risk may also arise. It is difficult to imagine instruments that can fully prevent financial crises from developing. Yet it is still appropriate to increase banks' resilience to losses when systemic risk increases. This is the primary purpose of the countercyclical capital buffer.

Countercyclical capital buffer

The new framework contains a number of new capital adequacy requirements. There are new buffer requirements in addition to the minimum Common Equity Tier 1 (CET1) capital

ratio requirement. Banks that do not meet the buffer requirements will face restrictions on distributing dividend and paying out bonuses.

The capital conservation buffer is permanent and independent of systemic risk. The systemic risk buffer is designed to act as a buffer against more persistent systemic risk and will apply to all Norwegian banks. In addition, the largest banks will be subject to a separate capital buffer requirement. Finanstilsynet (Financial Supervisory Authority) has been given until 1 November of this year to assess criteria for identifying systemically important financial institutions. These assessments are being done in collaboration with Norges Bank.¹ The countercyclical capital buffer is designed to act as a buffer against systemic risk that varies over time. The size of the buffer is to be assessed each quarter, and will normally be between 0 and 2.5 percent of risk-weighted assets.

On 4 October, a regulation relating to the countercyclical capital buffer was issued by the Government. Norges Bank has been tasked with preparing a basis for the buffer decision and providing advice to the Ministry of Finance regarding the buffer four times a year. In preparing its advice, Norges Bank will exchange relevant information and assessments with Finanstilsynet. Since March of this year, Norges Bank has published an assessment of the need for a countercyclical capital buffer in the Monetary Policy Report in addition to its monetary policy assessment. Norges Bank will give its first advice on the level of the buffer to the Ministry of Finance in connection with the next Monetary Policy Report, to be published at the beginning of December.

In line with the purpose of the countercyclical capital buffer, Norges Bank has formulated three criteria for setting an appropriate countercyclical capital buffer. The buffer should ensure that the resilience of banks is strengthened during an upturn. The buffer requirement (size of the buffer) should be viewed in the light of other requirements applying to banks, particularly when new requirements are introduced. One of the most important purposes of the capital buffer is to alleviate stress in the financial system.

History shows that the groundwork for banking crises is laid during upturns. When financial imbalances build up, this increases the likelihood of substantial losses in the entire banking system. In an environment characterised by large losses, insufficient equity capital may force banks to curtail lending to households and enterprises, amplifying a downturn. Banks should therefore hold larger capital buffers when financial imbalances are building up or have built up.

Norges Bank's advice regarding the buffer will primarily be based on four key indicators: Total credit as a percentage of mainland GDP, the wholesale funding ratio of Norwegian credit institutions, the ratio of house prices to disposable income and commercial property prices.

Both economic theory and historical experience from a number of countries provide support for the view that these indicators capture systemic risk. The chart shows the indicators along with an estimated trend and a mean.² The greater the positive gap above trend, the stronger is the signal of vulnerability and imbalances.

In line with the recommendations from the Basel Committee on Banking Supervision and from the European Commission, there should not be a mechanical relationship between developments in the indicators and Norges Bank's advice on the buffer. The advice will build on the Bank's professional judgement and take into account factors other than the indicators mentioned. The weight given to different indicators may vary. As we gain experience and insight, the set of indicators can be developed further.

¹ <http://www.regjeringen.no/en/dep/fin/news/news/2013/systemically-important-credit-institutio.html?id=726797>.

² The trend is estimated using a one-sided Hodrick-Prescott filter ($\lambda = 400000$) extended using a forecast. The mean is for the entire period in the chart.

Uncertainty and the need for resilience suggest that the buffer should not be reduced automatically even if there are signs that financial imbalances are receding. In periods of prolonged lending growth and low losses, banks should normally hold a countercyclical capital buffer.

Banks will be allowed to draw on the buffer in the event of an economic downturn and large bank losses. If the buffer functions as intended, banks will tighten lending to a lesser extent in a downturn. This may mitigate the procyclical effects of tighter bank lending. The four key indicators are not well suited to signalling whether the buffer should be reduced. Other information, such as market turbulence and loss prospects for the banking sector, will be more relevant.

The benefits of higher capital requirements for banks must be weighed against any costs the countercyclical capital buffer imposes on the economy. Several analyses, such as those conducted by the Basel Committee on Banking Supervision, suggest that higher capital requirements will not give rise to considerable, permanent economic costs in the longer term.³ In the short term, higher capital requirements may result in lower growth in credit and overall GDP. Analyses conducted by Norges Bank using Norwegian data find similar patterns.⁴

When credit growth is strong, a higher buffer requirement may restrain the build-up of financial imbalances. But if capital requirements are raised too quickly, the result may be excessive credit tightening. The level of the buffer must therefore be considered in the light of other capital requirements.

The decision basis for setting the countercyclical capital buffer has been harmonised with the international regulatory framework from the Basel Committee and the EU. In the EU, the European Systemic Risk Board (ESRB) is responsible for formulating guidelines for EU countries. Norges Bank and Finanstilsynet have been invited to participate in key committees and working groups under the ESRB to assist in the development of this framework.

The impact on the economy of a higher buffer will depend on how banks adjust. Roughly speaking, banks can raise their capital ratios in two ways. They can increase equity capital or reduce risk-weighted assets.

Banks can increase equity capital by raising fresh equity or by boosting earnings and withholding dividends. When it is more expensive to fund lending with equity capital than with deposits or other debt, increasing the buffer will increase banks' funding costs. These costs will, to some extent, be passed on to customers, dampening credit demand.

Banks can also improve their capital ratios by reducing risk-weighted assets. This can be done in two ways. Banks can reduce lending volumes. Banks can also change the composition of their lending portfolio by shifting into lower risk-weighted assets, by, for example, tightening lending to enterprises and increasing lending to households.

Norwegian banks are well on the way to adjusting to new and higher capital requirements, including a countercyclical capital buffer. Developments in banks' earnings indicate that banks can increase their CET1 ratios by around 1 percentage point a year without reducing lending growth.⁵

³ Basel Committee on Banking Supervision, [An assessment of the long-term economic impact of stronger capital and liquidity requirements](#), August 2010. For an updated collection of references to studies of the costs and benefits of macroprudential regulation, see Annex 1 in IMF Working Paper WP/13/167, by Arregui et al. "[Evaluating the Net Benefits of Macroprudential Policy: A cookbook](#)", July 2013.

⁴ See [Norges Bank Memo No. 1 2013](#) for further discussion and references.

⁵ In the calculation there is an assumption of an annual increase in banks' risk-weighted assets of around 4%, earnings in line with 2012 and all profits are used to increase equity capital. It is also assumed that the transitional arrangement is retained and is binding.

Capital requirements and monetary policy

The countercyclical capital buffer and the key policy rate are two instruments serving different objectives. The objective of the countercyclical capital buffer is to increase banks' resilience to losses in a downturn. The primary objective of monetary policy is low and stable inflation. The key policy rate is set with a view to keeping inflation close to 2.5 percent over time without triggering excessive fluctuations in output and employment. Monetary policy also seeks to be robust and take into account the risk that financial imbalances in the economy build up.

Even though the objectives differ, both of these instruments work through banks' responses. The level of the countercyclical buffer may therefore affect the conduct of monetary policy. Increased buffer requirements may induce banks to increase their lending margins or restrict access to credit in other ways. More restrained lending growth will dampen economic activity. This will in turn contribute to lower inflation. Thus, an increase in capital requirements resulting in rising lending margins suggests, in isolation, a lower key policy rate. Other developments in the economy may amplify or dampen this effect.

Allow me to refer to a recently developed version of our model for the Norwegian economy, NEMO, to illustrate this point. In this version of NEMO, the credit market is modelled explicitly.⁶ Households and enterprises can borrow from banks, but only against equity. For a household, the value of their dwelling is important as collateral. A rise in house prices can thereby allow households to borrow more, increasing their debt. This mechanism is an example of what is referred to in the literature as a financial accelerator.⁷ In the model, banks also face capital requirements that affect their capital costs.

Let us take as our starting point the following scenario, which has similarities to the economic situation over the past few years. Interest rates abroad have fallen and there are prospects that they will remain low for an extended period. At the same time, higher capital requirements for banks have seemed likely for some time and, in response, banks have increased their lending margins.

In this chart, we have used the NEMO model to analyse how these factors affect the economy, including the interest rate. Low interest rates abroad widen the interest rate differential against other countries. This points towards a stronger exchange rate, which will result in lower inflation and output further ahead. At the same time, banks keep lending margins higher than normal for a period in order to build up capital.

Higher bank lending margins and lending rates dampen growth and inflation. Both higher lending margins and lower interest rates abroad imply a lower key policy rate in Norway.

In this scenario, the central bank reduces the key policy rate, but by less than the decrease in interest rates abroad. As a result, the krone appreciates. This leads in the short term to lower activity and inflation, but a lower key policy rate and slightly lower bank lending rates will gradually result in higher capacity utilisation and higher inflation. Borrowers, however, only experience a limited reduction in bank lending rates because of the assumed rise in bank lending margins. Somewhat lower interest rates and higher output nonetheless result in increased credit growth.

What if capital requirements had not been tightened? The results in this scenario are indicated by the blue lines in the chart. Without higher capital requirements, banks' lending margins would have been more stable.

⁶ For a more detailed description of the improved version of NEMO, see Brubakk, L. and P. Gelain (2013): "NEMO – A monetary business cycle model with financial frictions". Forthcoming in the Norges Bank Staff Memo series.

⁷ See for example Bernanke, B., M. Gertler and S. Gilchrist (1999): "The Financial Accelerator in a Quantitative Business Cycle Framework." *Handbook of Macroeconomics*, Elsevier, pp. 1341–1993.

Lower interest rates abroad suggest a reduction in the key policy rate. Bank lending rates largely track the key policy rate. This leads to higher demand and output and accelerating debt growth. These factors suggest that the reduction in the key policy rate should now be smaller than in the scenario involving increased capital requirements and higher lending margins. As a result, the appreciation of the krone is more marked, and inflation will deviate more widely from the target. The effects on capacity utilisation and credit growth are also slightly more pronounced. In simplified terms, it can be said that without higher capital requirements, monetary policy trade-offs become more demanding and economic developments somewhat less balanced.

The model example illustrates a general point. When several instruments are available in economic policy, several goals can be achieved at the same time. Stricter capital requirements could influence monetary policy in a number of ways. First, a tightening of capital requirements would counteract the build-up of financial imbalances. Second, the countercyclical buffer could cushion the adverse effects of a future downturn on bank lending. Third, higher levels of equity capital will increase banks' resilience and thereby reduce the likelihood of financial crises.

The example also sheds light on conditions that have been important to the conduct of monetary policy in recent years. Low interest rates internationally are an important explanation for the low key policy rate in Norway. At the same time, banks have increased their lending margins in anticipation of higher capital requirements.

Let me emphasise that capital adequacy requirements are only one of several factors influencing bank lending margins and rates. And bank lending rates are only one of many factors that are given weight when the key policy rate is set. The relationship between capital requirements and the key policy rate is not straightforward.

The example above shows that it may be appropriate to lower the key policy rate while at the same time tightening capital requirements for banks. But situations could also arise where it would be appropriate to raise the key policy rate while at the same time tightening capital requirements for banks. This could be the case if the economy was booming, with prospects for high inflation and a concurrent risk of a build-up of financial imbalances. Conversely, in a sharp downturn with higher bank losses, it may be appropriate to reduce both the key policy rate and the countercyclical buffer.

The countercyclical capital buffer is not a stabilisation policy instrument. The buffer is more likely to vary over longer credit cycles than follow the normal business cycle. Furthermore, knowledge and experience of macroprudential regulation is incomplete and at an early stage.⁸ And we know from experience that financial market participants often find ways to evade regulations.⁹ Taking the risk of a build-up of financial imbalances into account will therefore continue to be one of the criteria for an appropriate interest rate path and an important element in a robust monetary policy framework.

⁸ For a review of our currently limited experience of macroprudential instruments, see for example [Smets, F. \(2013\): "Financial stability and monetary policy: How closely interlinked?"](#) Lecture at a conference arranged by Riksbanken.

⁹ Jeremy Stein, member of the Federal Reserve Board of Governors, has pointed out that it is more difficult to evade the interest rate: "while monetary policy may not be quite the right tool for the job, it has one important advantage relative to supervision and regulation – namely that it gets in all of the cracks... changes in rates may reach into corners of the market that supervision and regulation cannot." See Stein, J. (2013): [Overheating in Credit Markets: Origins, Measurement, and Policy Responses](#). Speech at a research symposium sponsored by the Federal Reserve Bank of St. Louis.

Interest rate paths and communication

Our problems in maintaining a balance in economic policy in Norway are nonetheless still small compared with the challenges facing other countries. Key rates are close to zero in many countries, and a number of central banks have employed unconventional tools. Unconventional monetary policy tools have taken two main forms: the first expansion of monetary policy is often referred to as quantitative easing, or balance sheet policy. I spoke about this when I was here a year ago. The second expansion involves communication with regard to monetary policy. This has become a particularly relevant topic as the central banks in the US, UK and euro area have increasingly signalled their policy intentions, known as «forward guidance».¹⁰

In Norges Bank we have openly communicated our view of interest rate developments ahead for many years. The Bank's interest rate forecasts have been published since 2005. The way in which large central banks abroad now communicate policy intentions is similar to ours, but there are also differences.

As a central bank, we can influence the shortest money market rates by changing the key policy rate. Saving, investment and consumption decisions taken by households and enterprises, however, are influenced by expectations regarding future interest rates, i.e. the yield curve. Monetary policy is more effective when market participants know and understand the central bank's response pattern. If economic developments differ from our assumptions, market interest rates can then adjust in a manner consistent with achieving the objectives of monetary policy. By comparison, without predictability, a central bank would have to change the key policy rate more frequently or by larger increments. Monetary policy would be less effective.

Norges Bank's publication of interest rate projections is an important part of achieving predictability in monetary policy in Norway. We also give an account of the criteria on which the interest rate forecast is based and we explain changes in the forecast.

Changes in money market rates on the day the Executive Board's interest rate decision is published are a simple indicator of predictability in monetary policy. Ideally, these changes should be modest. On average, the changes in money market rates in connection with interest rate decisions have been somewhat smaller after we began to publish our interest rate forecast, despite the considerable market unrest we experienced during the financial crisis.

One of the main reasons why large central banks in other countries now publish forecasts of future interest rates is that they want to achieve greater clarity in their response pattern. Their objective is to make monetary policy more effective in an environment of very low capacity utilisation and near-zero key rates. To provide extra stimulus to the economy under these conditions, the natural course is to seek to influence longer-term interest rates more directly. Specific signals from central banks concerning the likely path of the interest rate can result in lower market rates through lower key rate expectations. Risk premiums may also decrease.

The Federal Reserve, and recently the Bank of England, have also developed central bank communication by linking any introduction of monetary policy tightening to specific unemployment thresholds. In August, the Bank of England clearly stated that it does not intend to raise the key rate until the unemployment rate falls below 7 percent. But the promise was not without conditions. Significant changes in the prospects for inflation or

¹⁰ The forms of forward guidance have been referred to as either «Delphic», after the oracle at Delphi, or «Odyssean», after Odysseus, who bound himself to his ship's mast to avoid the seductive song of the Sirens. Delphic guidance means only stating what you believe about future interest rates. Odyssean guidance also includes a binding promise about future interest rate developments (see [Campbell, J. et al. \(2012\): Macroeconomic Effects of Federal Reserve Forward Guidance. Brookings Papers on Economic Activity, Spring 2012](#)).

financial stability may lead to monetary policy tightening before unemployment falls below 7 percent.¹¹

In theory, the announcement of such thresholds could be particularly effective when the central bank's normal response pattern implies that monetary policy would have been tightened before the threshold had been reached. By «binding oneself to the mast», monetary policy can provide an extra stimulus to the economy in a situation where there is otherwise limited room for manoeuvre.¹²

Norges Bank's interest rate projections are a conditional forecast and not a promise. Economic agents can only expect the interest rate to be in line with the projection if economic developments are in accordance with our assumptions. But the interest rate path may also differ from that projected if new information emerges about the functioning of the economy or the effect of monetary policy.

As shown in this chart, actual interest rates have often deviated from assumptions. This has been the case for both Norges Bank and other central banks that publish interest rate forecasts. Over the past five years, the deviations have been considerable, owing to the financial crisis and other shocks to which the economy has been exposed.

The public announcement of thresholds for changes in the interest rate is probably an instrument more suited to a situation where the key rate is close to zero and additional measures are needed to keep long interest rates low. The Norwegian economy is in a more favourable situation than the large advanced economies I have mentioned. Capacity utilisation is estimated to be close to a normal level. We still have room for manoeuvre in interest rate setting.

Conclusion

In conclusion: the financial crisis has shown beyond a doubt that regulation of banks and financial markets is necessary. However, we must not believe that problems in the financial sector can simply be regulated away, and we must not have exaggerated faith in our ability to fine-tune the economy. But an important contribution will be to ensure that those who take financial risks on behalf of others hold more capital.

Monetary policy has faced considerable challenges in recent years. We think it is important to learn from history and from the experience of other countries and to apply those lessons in the further development of monetary policy. This is why we are launching a research project, "Flexible inflation targeting: challenges and possibilities".

An important part of the background for this project is the fact that international monetary policy research has often focused on closed economies, with more relevance for large countries such as the US. Our small, open economy presents particular challenges. How does this restrict the room for manoeuvre in monetary policy? And how should monetary policy respond to changes in the terms of trade?

The project will include analysis of some of the issues I have mentioned today. There is a need for more research on how financial stability should be taken into account in monetary policy. The project will also draw on the experience we have gained over the past 10–15 years as the Norwegian economy was exposed to a financial crisis and a number of supply-side shocks. Monetary policy communication is also developing.

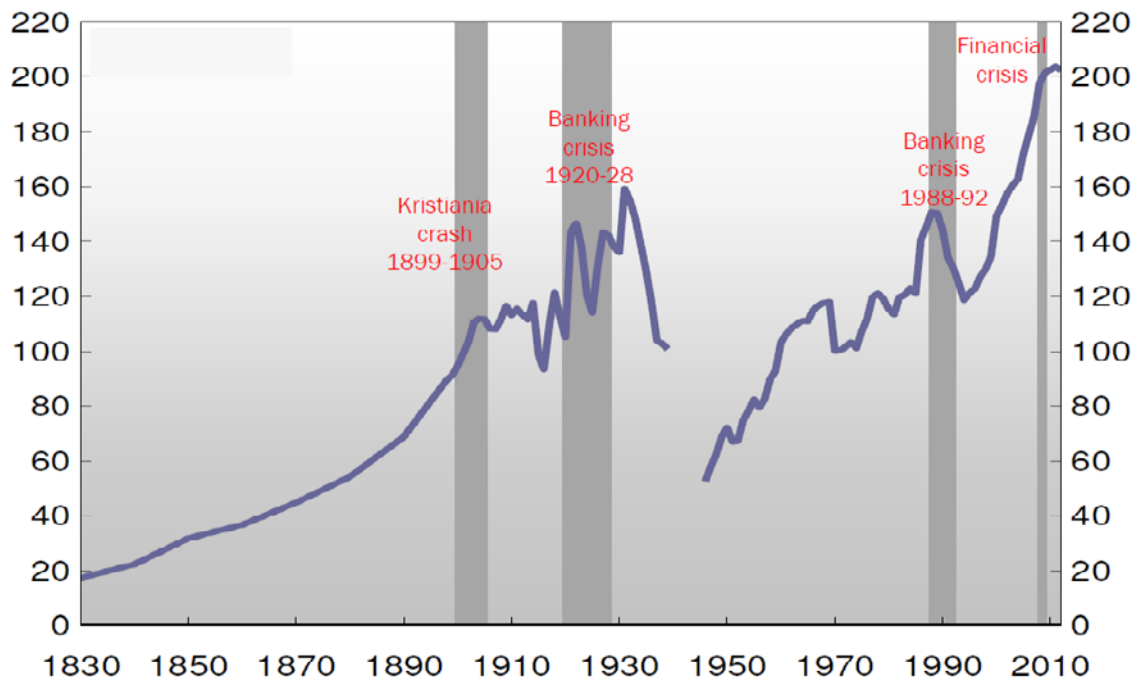
¹¹ See Bank of England: [Monetary policy trade-offs and forward guidance, August 2013](#).

¹² See [Eggertsson, G. and M. Woodford \(2003\): The Zero Bound on Interest Rates and Optimal Monetary Policy](#). Brookings Papers on Economic Activity 2003:1, pp. 139–211, and [Krugman, P. \(1998\): It's Baaack: Japan's Slump and the Return of the Liquidity Trap](#). Brookings Papers on Economic Activity 1998:2, pp 137–205.

I want to reiterate here that monetary policy in Norway will continue to be oriented towards low and stable inflation. This objective provides the economy with a nominal anchor. With firmly anchored inflation expectations, monetary policy can contribute to stable developments in the real economy. Since the inflation target was introduced in 2001, inflation has varied to some extent, but has, on average, remained close to 2.5 percent. And monetary policy has been able to respond rapidly to changes in the economic situation. The monetary policy mandate provides room for flexibility and discretion. In the light of the international debate on the role of monetary policy, Norges Bank, as the country's central bank, should also conduct a thorough assessment of the framework for flexible inflation targeting within our current mandate.

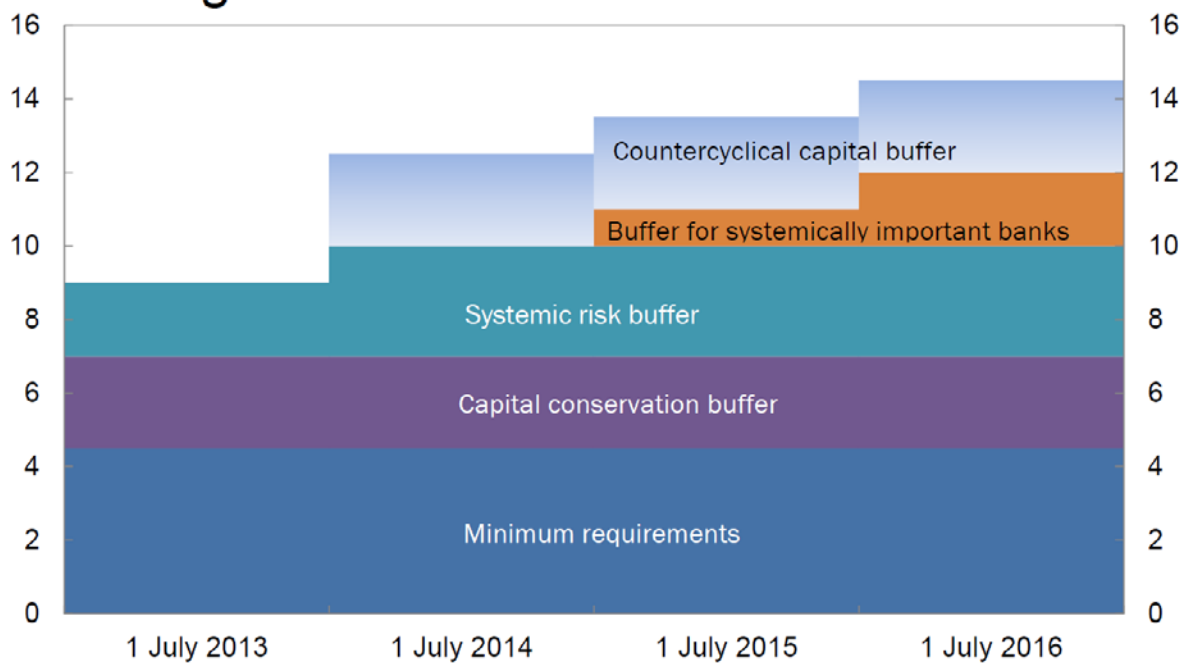
Thank you for your attention.

Credit-to-GDP ratio



Sources: Statistics Norway and Norges Bank

New CET1 capital requirements for Norwegian banks



Sources: Ministry of Finance and Norges Bank

Criteria for an appropriate countercyclical capital buffer

1. Banks should become more resilient during an upturn
2. The size of the buffer should be viewed in the light of other requirements applying to banks
3. Stress in the financial system should be alleviated

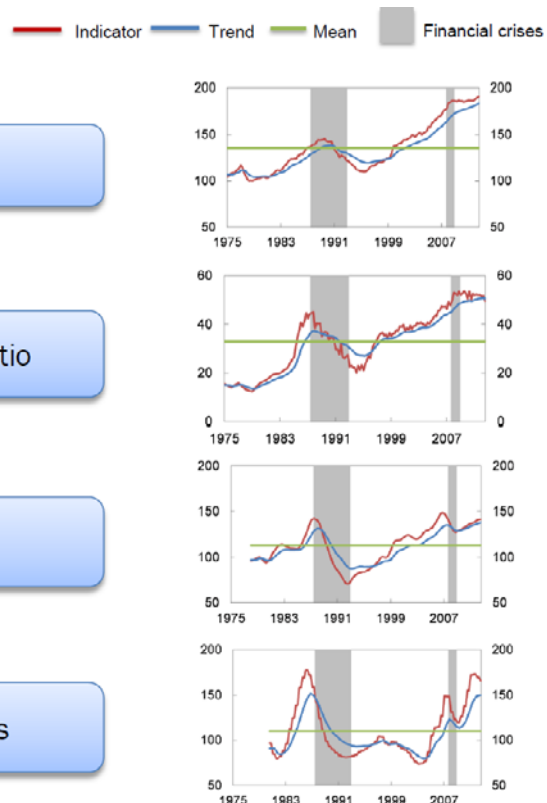
Key indicators

Credit
GDP

Banks' wholesale funding ratio

House prices
Disposable income

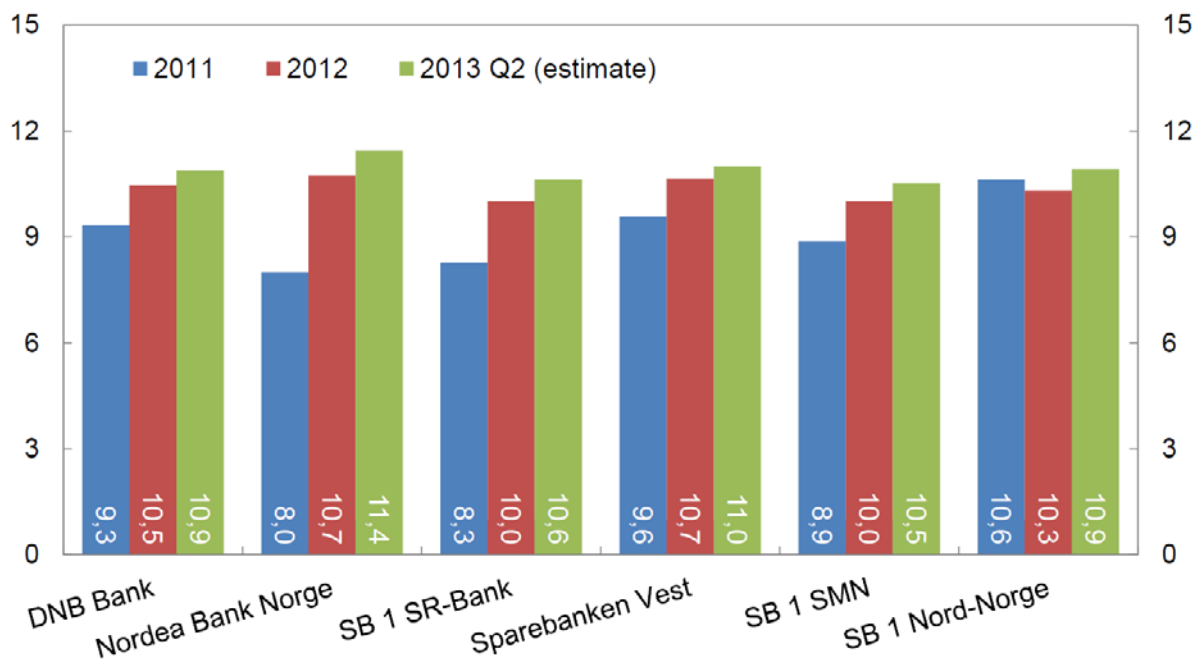
Commercial property prices



Sources: Statistics Norway, IMF, Norwegian Association of Real Estate Agents (NEF), Eiendomsmeglerforetakenes forening (EFF), Finn.no, Eiendomsverdi, Dagens Næringsliv, OPAK, and Norges Bank

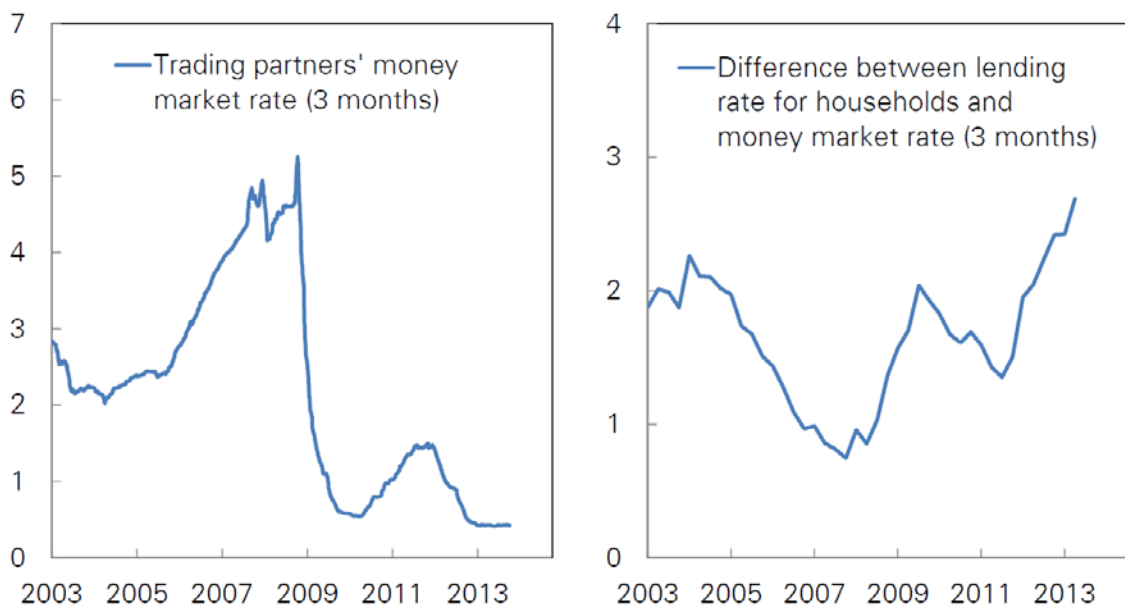
CET1 capital ratios

Percent



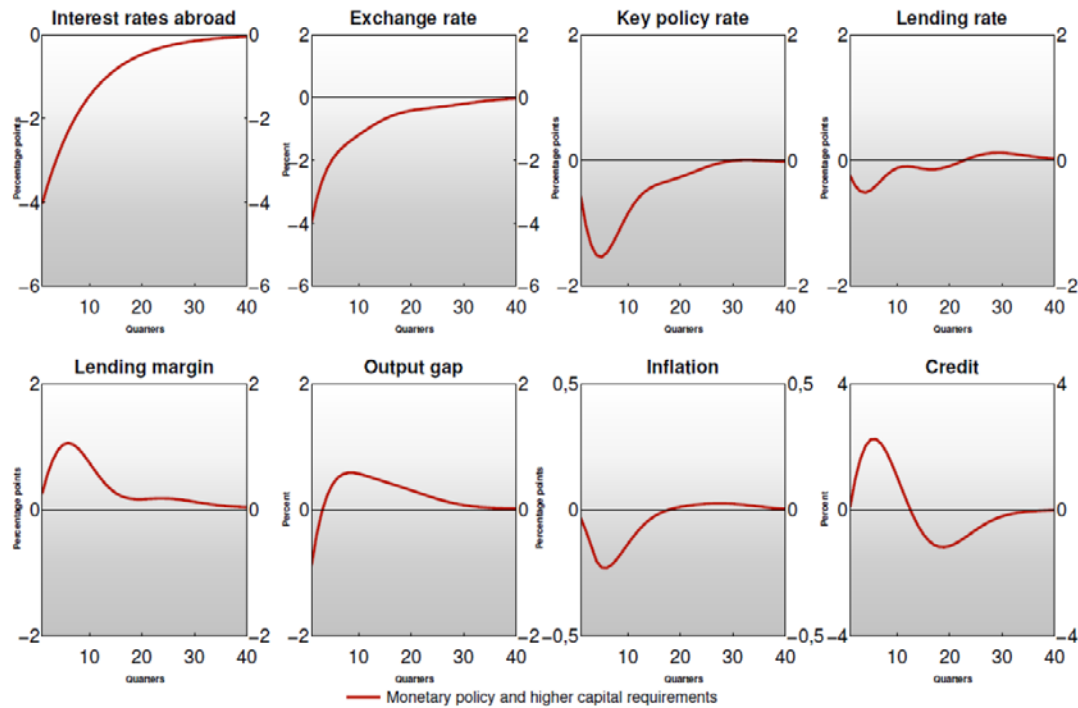
Sources: Banking groups' financial statements and Norges Bank

Low interest rates abroad and higher bank lending margins in Norway

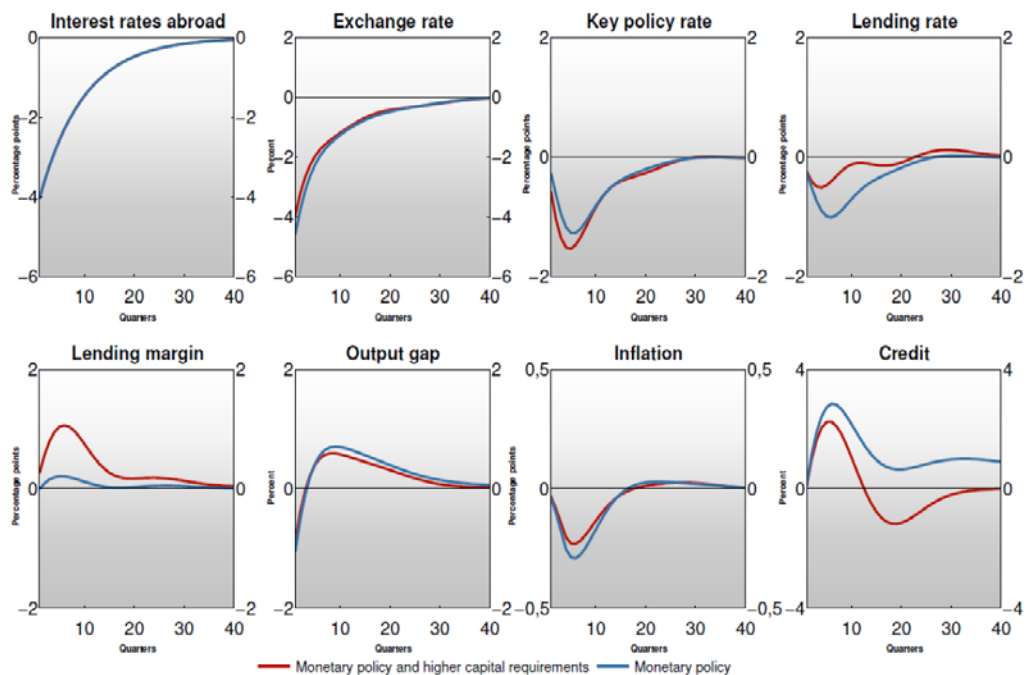


Sources: Thomson Reuters and Norges Bank

Lower interest rates abroad and higher capital requirements

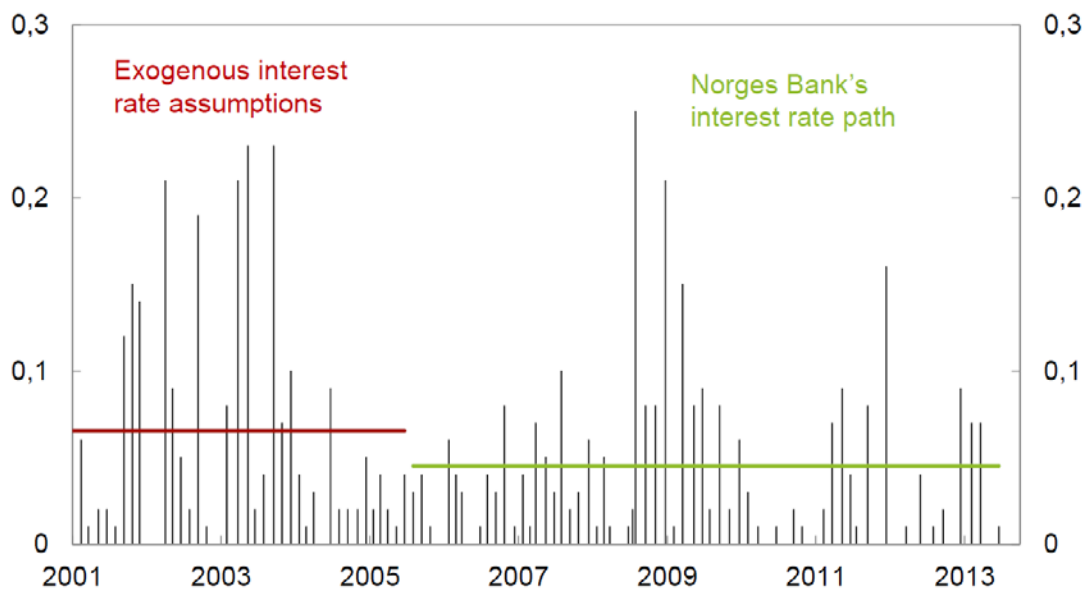


Lower interest rates abroad with and without higher capital requirements



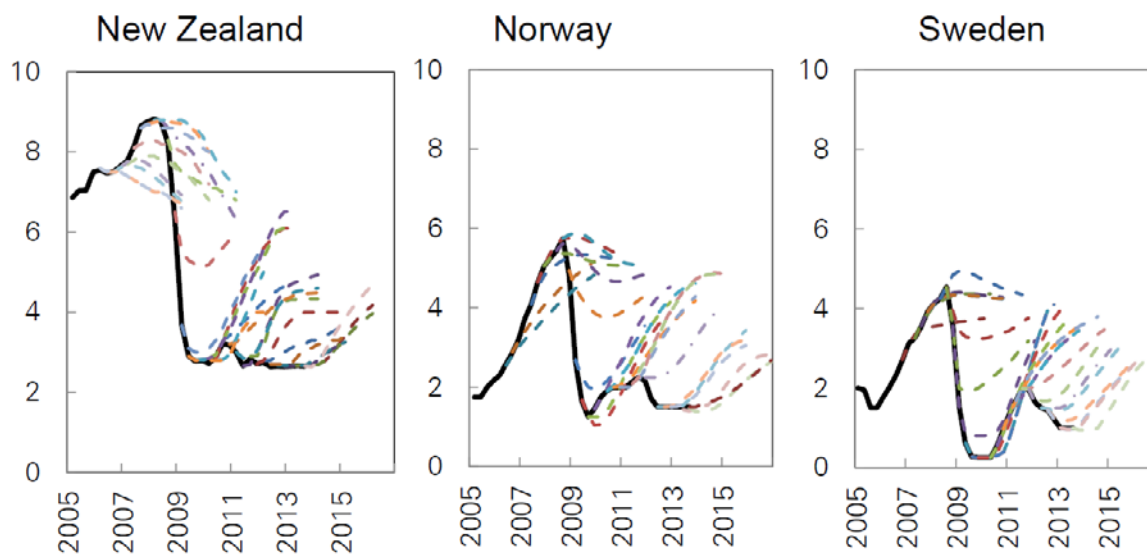
Changes in money market rates after interest rate decision announcements

Absolute values. Percentage points. 12-mth NIBOR. March 2001 – September 2013



Sources: Thomson Reuters and Norges Bank

Interest rate assumptions and actual developments



Sources: BIS and Norges Bank