

How central banks influence interest rates

Speech by Governor Øystein Olsen at the Centre for Monetary Economics (CME) / BI Norwegian Business School on 1 October 2015.

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

Introduction

A number of items appear on my calendar every year. Today's speech is one of them. Three years ago, the speech was entitled "Monetary policy in turbulent times". The theme was how central banks worldwide were adopting new approaches to the conduct of monetary policy.

Chart: International yield curves

Three years later, this theme has not lost its relevance. The list of countries that have adopted quantitative easing has grown longer. Policy rates in some countries have fallen below the zero lower bound, and we have seen examples of negative yields on bonds. This has challenged a long-held belief – that the lower bound for nominal rates is zero.

The measures have a common goal, which is to bring down market interest rates and keep them there until a firm economic recovery is achieved. By influencing interest rates on financial contracts of varying duration and risk, monetary policy seeks to stabilise inflation and stimulate output and employment.

In this speech, I will take a closer look at how policy rates affect money and financial markets and the impact of the unconventional measures implemented.

Even though interest rates have been low for a long time, activity in advanced economies has been slow to recover, reflecting global developments and economic shocks in the wake of the financial crisis.

Low policy rates and quantitative easing in other countries have also influenced the Norwegian bond market. Yields on Norwegian long-term government bonds have fallen to a very low level, primarily driven by policy rate setting in other countries and global financial markets rather than economic conditions in Norway. And even though the recent cuts in Norges Bank's key policy rate have followed in the wake of the fall in oil prices, the current low level is a result of low interest rates abroad.

The policy rate is the central bank's most important monetary policy instrument. Before we turn to global developments, I will therefore briefly describe how the policy rate influences the shortest end of the curve, with a particular focus on the Norwegian context.

From policy rates to short-term market rates

Banks' deposits with the central bank are often referred to as reserves and are banks' most liquid assets. Central banks set the terms for banks' loans from and deposits with the central bank and control the size of banks' reserves. The objective of liquidity management is to keep short-term money market rates close to the key policy rate.

Chart: Norges Bank interest rates

In Norway, banks' reserves are managed using a quota system. Deposits up to a specific quota are remunerated at the key policy rate, which is Norges Bank's sight deposit rate. Deposits that exceed the quota are remunerated at a rate below the key policy rate, referred to as the reserve rate.[\[1\]](#)

Banks that borrow overnight from Norges Bank pay the overnight lending (D-loan) rate.

As shown in the chart, the reserve rate and the overnight lending rate are set respectively at 1 percentage point below and 1 percentage point above the key policy rate.[\[2\]](#)

Interbank transactions take place throughout the day. The transactions are settled via the banks' accounts with the central bank. Banks with deposits above the quota at the end of the day normally lend reserves overnight to banks with a negative balance in Norges Bank or to banks that have deposits below the quota.

Chart: Norges Bank interest rates and market rate

The interest rate on these transactions, called the overnight interbank rate (NOWA in Norway), is normally very close to the key policy rate.

The interest rate corridor around the key policy rate is intended to promote reserve trading between banks and not between banks and the central bank. This contributes to an active interbank market and an efficient money market.

In order to keep the overnight interbank rate close to the key policy rate, Norges Bank aims to keep banks' total reserves below the sum of the quotas that can be remunerated at the key policy rate.[\[3\]](#) While Norges Bank seeks to maintain the sum of the reserves in the banking system around NOK 35 billion, the sum of banks' quotas is NOK 45 billion, so that banks as a whole can always deposit the reserves outstanding in the banking system at the key policy rate.

Should the volume of reserves exceed the sum of banks' quotas, some banks would have to hold reserves at the reserve rate. That would push down the overnight interbank rate towards the reserve rate. But for that to occur, Norges Bank would have to stop withdrawing surplus liquidity through market operations. There are no plans to make such a change to our liquidity policy.

The reserve rate in Norway is now at a negative 0.25 percent. But this will not lead to negative money market rates. With normal liquidity management, which ensures that there are no excess reserves in the system, the key policy rate – not the reserve rate – determines the level of short-term money market rates. This also applies when the reserve rate is negative.[\[4\]](#)

Negative interest rates

As I mentioned earlier, it has long been assumed that interest rates had to be positive. That barrier has now been broken by a number of central banks. They now operate a policy of negative rates with a view to bringing short-term market rates below zero. Two approaches are being used to achieve this.

Chart: Sveriges Riksbank interest rates

Sweden has chosen the first approach. The policy rate itself is a negative 0.35 percent. This is combined with normal liquidity management without excess reserves in the banking system. As a result, the shortest money market rates are also negative.[\[5\]](#)

The central banks in the euro area, Switzerland and Denmark have chosen a different approach. Policy rates are zero or marginally positive, while the reserve rate is negative. At the same time, there are substantial excess reserves in the banking system. The reserve rate is a negative 0.75 percent in Switzerland and Denmark and a negative 0.2 percent in the euro area.[\[6\]](#)

Maintaining large excess reserves is a deliberate policy. These central banks have supplied liquidity to the market and intentionally used the excess reserves to push down the overnight interbank rate towards the reserve rate. The central banks of Denmark and Switzerland have achieved this by purchasing foreign currency to counteract an appreciation of the exchange rate. By also permitting short-term money market rates to become negative, they have made the domestic currency less attractive.

Chart: ECB interest rates and liquidity in the banking system

In the euro area, excess reserves are a result of the measures implemented in the wake of the financial crisis and the European government debt crisis. The European Central Bank (ECB) operates a liquidity management system using the policy rate and two interest rates that correspond to Norges Bank's reserve rate and overnight lending (D-loan) rate (shown in the chart as the deposit rate and the lending rate). Until autumn 2008, the ECB ensured that no excess reserves remained in the banking system. Liquidity management was normal and the overnight interbank rate, EONIA, was close to the policy rate.[\[7\]](#)

Excess reserves have increased substantially since the ECB started to provide banks with long-term loans and implemented quantitative easing. This is illustrated by the grey area in the chart. As a result, the overnight interbank rate has remained below the policy rate and just above the reserve rate, as shown in the chart.

Negative rates have their limitations

In the euro area and Sweden, the aim of unconventional monetary policy has been to bring inflation up towards the inflation target. Negative rates – in combination with asset purchases – are intended to boost activity and prevent low inflation from becoming entrenched. The effects can be transmitted via both lower bank interest rates and a weaker exchange rate.

In other words, negative money market rates operate through the usual channels. But even though the zero lower bound is not absolute, the effect of further cuts will diminish as rates approach or fall below zero.

The most important limitation on how far down it makes sense to go is related to the existence of an alternative to bank deposits, i.e. cash. Negative bank deposit rates can always be avoided by holding cash instead. The disadvantage is that cash is more expensive to manage than electronic deposit money. Transport, storage and security all involve costs.

For a bank participating in the settlement system, where large amounts are reinvested at frequent intervals across accounts and across banks, the costs involved in switching to cash will be considerable. Central bank deposit rates can therefore be below zero. How far below, is an open question.

For many retail customers, exchanging bank deposits for cash will be fairly inexpensive. A safe deposit box can be rented for less than €50 a year. If bank customers choose to withdraw their deposits and hold cash, banks will lose an important part of their funding. This is probably an important reason why banks in countries with negative policy rates are reluctant to set negative deposit rates, particularly for households.

If banks hold back on deposit rates, lending rates can only fall to a limited extent before banks' earnings are reduced. A lower policy rate will probably have a less-than-normal effect on lending rates, weakening the impact of monetary policy via the demand channel.

The policy rate in the UK has been 0.5 percent for some time. In the Bank of England's assessment, a further reduction would not serve any useful purpose.^[8] Nor has the ECB found it appropriate to reduce the policy rate further, but is prepared to expand its asset purchase programme if necessary.^[9]

Central banks also influence long-term interest rates

For monetary policy to work, it must have an effect on more than short-term money market rates. The interest rates that influence inflation and employment are those facing enterprises and households.

In economies with well-functioning money and credit markets, a reduction in the policy rate will relatively quickly push down market rates. In recent years, there have been cases where this did not happen. The most serious situation that has arisen occurred after the Lehman

Brothers collapse. The resulting uncertainty led to very high risk premiums. Despite substantial policy rate cuts, market rates remained high.

In response, a number of central banks, particularly the Federal Reserve and the ECB, intervened directly in those money and credit market segments that had been hardest hit. The Federal Reserve purchased mortgage-backed securities owned by banks, for example, which improved banks' funding conditions and facilitated their credit provision to the broad economy. In Norway, the swap arrangement had a similar effect.

In the years following the financial crisis, a number of central banks have adopted new measures. The margin for further reductions in the key policy rate has gradually diminished. Any further attempts to stimulate the economy have had to involve lower long-term interest rates.

Central banks have sought to achieve this in two ways: first via communication. Central banks have clearly stated that policy rates will be kept low for a long time. In some cases, signals have been linked to specific targets that must be reached before a rise in the policy rate will be considered. The purpose is to provide forward guidance to the market concerning future interest rate developments. For Norges Bank, publishing an interest rate path is a form of forward guidance.

Second, central banks have implemented purchases of government bonds and other securities on a massive scale. This has further driven down long-term interest rates. This measure is known as quantitative easing, or balance sheet policy, which the Bank of Japan attempted to use as long as 15 years ago. Following the financial crisis, it was quickly adopted by the central banks in the UK and the US. The ECB and Sveriges Riksbank have subsequently followed suit.

Chart: Central bank reserves

The use of unconventional instruments has vastly inflated central bank balance sheets. On the asset side, central banks have increased their holdings of government bonds and bonds issued by private enterprises and institutions. These holdings are matched on the liabilities side by increased deposits from private banks in the form of central bank reserves.

The stock of central bank reserves in the US and UK is now five times larger than it was before the financial crisis. In the euro area, reserves have doubled in size. These figures provide a good illustration of the extent of the measures implemented.

Such large increases in central bank reserves may evoke associations with historical examples of extensive government money printing. But this comparison only goes so far. Historically, money has usually been printed to finance government budget deficits. The increased money supply then had a direct effect on the economy through purchases of goods and services. The result has often been high and uncontrolled inflation.

Quantitative easing is different. In the same way as traditional monetary policy, the way quantitative easing is able to influence the wider economy is through lower interest rates

and higher securities prices. The transmission mechanism of quantitative easing to the real economy operates through several channels.

First, the central banks' purchases have supported their communication concerning future policy rates. When central banks purchase long-term government bonds, this is in itself a signal that policy rates will be kept low for a long time. This also pushes down interest rates on other securities.

Chart: Long-term yields and term premiums

In addition, the central banks' purchases have pushed up prices for government bonds and pushed down yields. Term premiums on government bonds have fallen. While 10-year government bond yields in the US and UK are now at around 2 percent, German yields are as low as less than 1 percent.

Chart: Credit premiums and equity prices

Another important transmission channel into the economy is the portfolio rebalancing channel. Investors selling government bonds are left with a more liquid portfolio, which they then seek to invest in other financial assets. Prices for a number of securities have risen, and yields on bonds issued by banks and other enterprises have fallen. Premiums on covered bonds, for example, have fallen back to the very low levels prevailing in the pre-crisis period.

A fourth transmission channel operates via global financial markets. Cross-border capital movements as a result of portfolio rebalancing have generated exchange rate fluctuations. Unconventional monetary policy can contribute to a depreciation of the domestic currency, providing a positive extra effect of the policy in the short term. However, the effect diminishes when a number of countries implement quantitative easing and policy rate cuts in parallel. Exchange rate movements may then quickly reverse. Increased volatility creates an environment of uncertainty.

Capital inflows and a stronger exchange rate have at the same time created challenges in other countries, not least in some emerging economies. [\[10\]](#) [\[11\]](#)

We can conclude that, all in all, the aim of quantitative easing has been achieved to a certain extent. Yields have fallen and securities prices have risen. But using strong medicine over a prolonged period also has side-effects. Returns on low-risk securities have been pushed down to a very low level. Investors facing a required nominal rate of return may have invested in higher-risk projects than they would otherwise have chosen.

As growth prospects improve and monetary policy normalises in the US and Europe, capital flows may be reversed. This may result in increased volatility and wide swings in financial asset prices. When and how central banks will be able to return to more normal monetary policy is thus an open question.

Effects on the real economy

Chart: Nominal and real interest rates

Internationally, monetary policy has moved into unknown territory, employing instruments that have rarely been used before. The theoretical framework is being developed as we gain experience of using these instruments. The need for deleveraging is restricting household and company spending behaviour, adding to uncertainty about the effect of the new monetary policy measures on inflation and employment. At the same time as the post-crisis deleveraging may have weakened the effect of policy rate cuts, advanced economies are facing structural changes that influence the long-term growth picture. It is likely that the level of interest rates that would have a neutral effect on the economy has fallen.

The global economy has never before, in recent history, been through such a long period of interest rates as low as they are now. The interest rate level worldwide was already falling long before the financial crisis erupted. Behind the decline is a downward trend in real interest rates that can be attributed to a number of structural developments. Lowering policy rates is a response to these developments.

For several decades towards the end of the twentieth century, growth in the labour force and higher levels of education boosted economic growth. Growth was accompanied by high returns and considerably higher real interest rates than observed in recent years.

Growth impulses have gradually become weaker. Productivity growth has declined. The labour force is growing more slowly in many countries. At the same time, other structural changes are providing the motivation to save more: population aging and rising income inequality. In sum, these factors have contributed to lower real interest rates, even when economies have been in balance.

Following the financial crisis, interest rates have fallen even further. Economies had been completely thrown off balance. Nor was there much help to be obtained from other policy areas. The role of central banks has been to counteract an even deeper and more prolonged downturn. This is the challenge to which monetary policy has responded.

Chart: Investment and consumption

But there have been strong headwinds. We have had an illustration of the claim that downturns following financial crises are deeper and more persistent than other downturns. [\[12\]](#) As a result, the impact of monetary policy has been weaker than otherwise. Enterprises, households and governments made use of ample capital and low interest rates in the pre-crisis years to debt finance consumption and investment. When the downturn occurred, there was a need for considerable deleveraging, while weak growth prospects have dampened the willingness to invest. In many countries, the downturn was further amplified as banking systems with low resilience had to deal with large loan losses. The uncertainty that arose during the financial crisis has persisted for a long time, dampening the willingness to take on financial risk, and the willingness to save has increased.

Chart: GDP

The pace of global growth is expected to pick up gradually in the coming years. In the US and the UK, the first two countries to introduce quantitative easing, the recovery is on a firm footing. Unemployment has come down. Increased economic activity has contributed to a substantial reduction in government deficits. In the euro area, the recovery continues to be fragile. A large portion of the workforce is unemployed and production equipment stands idle. However, growth is gradually picking up.

It is difficult to judge to what extent the recovery abroad can be attributed to the monetary policy that has been conducted. There is, however, little doubt that it has had a positive effect. Lower interest rates have given firms and households access to cheaper funding. It has also eased the interest burden for heavily indebted borrowers and contributed to growth in disposable income. In addition, the value of households' financial wealth has increased. This may also have provided a basis for higher demand.

Studies conducted so far also suggest that the unconventional measures have had an effect.[\[13\]](#) A study by the Federal Reserve suggests that the Fed's asset purchase program has reduced unemployment by 1¼ percentage points and increased inflation by ½ percentage point.[\[14\]](#) The Bank of England estimates that the Bank's purchases of government bonds from 2011 to 2012 boosted GDP by just over ½ percent. The effect on inflation was also found to be positive.[\[15\]](#)

Chart: Money market rates

Nevertheless, in view of how far monetary policy has been stretched, growth abroad has not been overwhelming. The expected rise in policy rates has been repeatedly pushed further out in time.

Traditional advanced economies are facing deep structural challenges related to low growth that must be addressed by other measures. Monetary policy easing and low interest rates do not result in permanently higher growth. The causal relationship goes in the opposite direction: prospects for prolonged low growth result in a long period of low interest rates.

Ripple effects on the Norwegian economy

Monetary policy in Norway is oriented towards keeping inflation low and stable. The operational target is annual consumer price inflation of close to 2.5% over time. The inflation target provides a nominal anchor for the economy. When inflation expectations are firmly anchored, monetary policy can serve as the first line of defence when the economy turns down.

The key policy rate is set with a view to stabilising developments in the Norwegian economy. At the same time, the interest rate level abroad influences the policy rate in Norway, particularly through the exchange rate. Norges Bank's interest rate forecasts have been adjusted as expectations regarding policy rates abroad have fallen. The alternative could have been an excessive appreciation of the krone and the risk of excessively low inflation.

The interest rate level in Norway was therefore low even before oil prices began to fall last summer.

It is not only through low policy rates Norway's economy is influenced by monetary policy abroad. In a number of areas, we import the effects other central banks are seeking to achieve through quantitative easing.

Chart: Yields on 10-year government bonds

One example is the government bond market. For investors seeking safe investments, Norwegian government bonds have been one of several alternatives. Norwegian 10-year government bond yields are now quoted at around 1½ percent.

Other investors have turned to the Norwegian equity market. Equity prices on Oslo Børs have tracked the rise in equity prices abroad. Even when oil prices – and oil equities – began to fall, the rest of Oslo Børs continued to rise.

The commercial property market is another example of foreign capital finding its way to Norway in search of higher returns. The required rate of return on attractive office premises has fallen in pace with long-term yields, and prices have risen considerably. At the same time, rental prices in a number of locations are showing a downward trend. Large foreign capital inflows have probably contributed to the fall in the required rate of return.

Like their counterparts in other countries, Norwegian bond-issuing enterprises and banks have over time been able to obtain cheaper funding. Lower risk premiums on covered bonds, for example, have reduced banks' residential mortgage funding costs. A low policy rate in combination with low risk premiums has resulted in low residential mortgage financing costs for households. Household debt has grown far faster than income.

Low interest rates may increase the risk that debt and asset prices rise to levels that are unsustainable over time. Such financial imbalances could trigger or amplify an economic downturn. More resilient banks reduce this risk. Requirements with regard to banks' equity capital and funding structures have been strengthened and the countercyclical capital buffer has been implemented. In addition, the requirements for prudent residential mortgage lending practices have entered into force. Norges Bank's policy rate setting takes account of the risk of a build-up of financial imbalances. The aim is to avoid an abrupt downturn in the economy and higher unemployment at a later stage.

Over the past year, there has been a negative turnaround in the Norwegian economy. Oil prices have decreased by more than 50 percent in a year. The fall in oil prices has amplified an expected decline in activity in the oil sector, and the Norwegian economy is experiencing a period of restructuring. No more than in other countries can monetary policy in Norway assume primary responsibility for delivering structural changes in the economy. However, monetary policy can dampen the impact on output and employment in a transitional period.

Chart: Labour costs relative to trading partners

The policy rate has been cut and the interest rate differential between Norway and other countries reduced. Lower interest rates stimulate consumption and investment. The krone has depreciated markedly and has recently been at historically low levels. The depreciation of the krone is contributing to underpinning inflation and dampening the effects of lower oil prices on output and employment. Even though the cost level in Norway is still high compared with other countries, a weaker krone is strengthening the competitiveness of Norwegian firms exposed to international competition. At the same time, wage growth in Norway has moderated, and there are prospects that real wage growth in 2015 will be at its lowest in 20 years.

Norway is therefore in a sound position to tackle the restructuring facing the economy.

Conclusion

The monetary policy instrument employed by Norges Bank is the key policy rate. With a well-functioning money and credit market, changes in the key policy rate will normally be transmitted to short-term and long-term rates.

In recent years, a number of our trading partners have employed unconventional instruments to achieve a sufficiently expansionary monetary policy. This is not under consideration in Norway. We still have room for manoeuvre in economic policy. Based on our current assessment of the outlook for the Norwegian economy, there is little likelihood of a negative key policy rate in Norway.

Footnotes

1. Similar quota systems are in use in Denmark, Switzerland and New Zealand. For a more general discussion of liquidity management systems, see Syrstad, O. (2011): "Systemer for likviditetsstyring: Oppbygging og egenskaper" [Liquidity management systems: design and features], Norges Bank Staff Memo 5/2011 (Norwegian only). Banks' feedback on the current liquidity management system, introduced in October 2011, is discussed in [Norges Bank Papers 4/2014: "Banks' assessment of Norges Bank's liquidity management system"](#).
2. Normally, the reserve rate acts as a floor and the overnight lending rate as a ceiling for the overnight interbank rate, as banks will not normally lend reserves at an interest rate that is lower than the rate they receive from the central bank or borrow reserves at an interest rate that is higher than the rate they have to pay the central bank. There may be a stigma attached to using this lending facility. When this stigma cost is high, the market rate may exceed Norges Bank's overnight lending rate. If one or more banks do not have access to the central bank's deposit facility, the market rate may fall below the reserve rate.
3. Competition among banks keeps the overnight interbank rate close to the key policy rate. A bank holding reserves in excess of its quota towards the end of the day can avoid having to deposit these excess reserves at the reserve rate by lending in the interbank market to a bank with room on its quota. This bank will be able to deposit the borrowed reserves at the key policy rate and earn an interest rate margin as long as the borrowing rate is lower than the key policy rate. Competition among banks

with room on their quotas pushes up borrowing rates and pushes down interest rate margins.

4. [Bernhardsen, T. and K. Lund \(2015\): "Negative interest rates: Central bank reserves and liquidity management", Norges Bank Economic Commentaries 2/2015.](#)
5. Sveriges Riksbank uses a corridor system (with no reserve requirements) to manage banks' reserves. The interest rate corridor is normally +/- 0.75 percentage point. The policy rate in Sweden, the repo rate, is the interest rate on the Riksbank's weekly market operations. In addition, the Riksbank conducts daily fine-tuning operations, normally at the repo rate +/- 0.1 percentage point. The Riksbank manages the reserves in the system to keep them "approximately in balance", i.e. virtually all reserves are withdrawn in the weekly repo transactions or in the daily fine-tuning operations. Only very marginal amounts are remunerated at a rate corresponding to Norges Bank's reserve rate. For details on liquidity management in Sweden, see "The Riksbank's operational framework for the implementation of monetary policy – a review", Riksbank Studies, March 2014, Sveriges Riksbank.
6. In Denmark and Switzerland, the interest rate on banks' marginal deposit facility at the central bank corresponds to our reserve rate. For details on the liquidity management system in Denmark, see Jørgensen, A. and Lars Risbjerg (2012): "Negative interest rates", Monetary Review, 3rd Quarter 2012, Part 1, Danmarks Nationalbank.
7. The policy rate in the euro area is the refinancing rate, which is the minimum bid rate in the ECB's weekly market operations.
8. [Bank of England \(2013\): Note on Negative Interest Rates for Treasury Committee](#)
9. Cœuré, Benoît (2015), Member of the Executive Board of the ECB: "How binding is the zero lower bound?" (speech given on 18 May 2015), European Central Bank.
10. Carstens, A. (2015): "Challenges for emerging economies in the face of unconventional policies in advanced economies" (speech given on 20 April 2015), Bank of Mexico.
11. Rajan, R. (2015): "Going Bust for Growth" (speech given 19 May 2015), Bank of India.
12. Jordà, O., M. Schularick and A. M. Taylor (2013): "When Credit Bites Back", Journal of Money, Credit and Banking (45), 3-28.
13. IMF (2013): "Global impact and challenges of unconventional monetary policies". IMF Policy Paper, October 2013.
14. Engen, E. M., T. T. Laubach and D. Reifschneider (2015): "The macroeconomic effects of the Federal Reserve's unconventional monetary policies", Finance and Economics Discussion Series, Federal Reserve Board, Washington D.C.
15. Churm, R., M. Joyce, G. Kapetianos and K. Theodoridis (2015): "Unconventional monetary policy and the macroeconomy: the impact of the United Kingdom's QE2 and Funding for lending Scheme". Staff Working Paper No. 542, Bank of England.