

Norges Bank Watch 2016

An Independent Evaluation of Monetary Policy in Norway

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Foreword

Each year the Centre for Monetary Economics (CME) at The Department of Economics, BI Norwegian School of Management appoints an independent group of experts to evaluate monetary policy in Norway.

This year the committee consists of Erik Bruce, Chief Analyst at Nordea Markets, Nils Gottfries, Professor in Economics at Uppsala University, and Kjell-Erik Lommerud, Professor in Economics at the University of Bergen.

The committee is solely responsible for the report and the views therein. The report does not necessarily represent the views of the CME or of its members.

The Ministry of Finance partly funds the Norges Bank Watch reports, which contain useful information and analyses for the Ministry's evaluation of monetary policy that is presented each year in a White Paper to Parliament.

Oslo, March 1, 2016

Centre for Monetary Economics

Tommy Sveen

Executive Summary

Chapter 1. Introduction: Tumbling Oil Prices and Macroeconomic Policy

During 2015 the oil price continued its decline. Since the summer of 2014 the price has fallen from around 120 dollars per barrel to around 30 dollars. This is of course dramatic for an oil-producing country such as Norway. Norges Bank has cut its policy rate twice during the year by 0.25 percentage points and the interest rate forecast has been lowered successively throughout the year.

On the surface, monetary policy execution has been very successful this year. The Norwegian currency weakened sharply in 2013 and 2014, and this has continued during the year. The downturn has not markedly spread to industries and regions not directly hit by the oil price tumble, but we do not know to what extent this is a result of monetary policy or simply the result of currency markets reacting to the weaker prospects for the Norwegian economy.

While we applaud the gradual lowering of the interest rate itself and the interest rate forecast path, we have some critical remarks on Norges Bank's communication with the public during the year. This has both to do with the communication given more continuously in the monetary policy reports and otherwise, but we also wonder about to what degree Norges Bank's mandate and the bank's own interpretation of the mandate in policymaking enlightens us about what to expect when the economy enters uncharted terrain.

Norges Bank's Mandate

Norges Bank's mandate is to use monetary policy to stabilize inflation near 2.5% over time, while at the same time stabilizing employment and production. Inflation targeting in Norway is formulated in a quite a flexible way. Norges Bank interprets its assignment as saying that the objective function should take account of both inflation and unemployment, but a third criterion called "robustness" is also used. Robustness implies having an eye on how house prices and debt evolve, but also taking account of uncertainty about the workings of the economy and the impact of the key policy rate as a policy instrument. We will return to the robustness criterion below.

Nominal wage restraint will probably be important to regain competitive power. If the oil price fall in the end leads to a prolonged period of moderate wage settlements, this will in turn lead to low inflation for quite some time. But if inflation stays low for long, this will affect the credibility of the inflation target. What if wage restraint lingers on for quite some longer time than foreseen by Norges Bank. Will the bank then intervene to get inflation up again, to anchor inflation expectations "near 2.5%"? Or will the bank let the inflation rate

establish itself in the range 1–2% over a number of years, thinking that any figure in the range 1–4% lies “near” the inflation target?

Norges Bank’s mandate/operational target does not distinguish between inflation that comes from demand pressure from that which is rooted in supply side disturbances. Neither does the mandate discuss how homegrown and imported inflation should count when stabilizing inflation. A sharper formulated mandate could make monetary policy more predictable, and the impact of monetary policy on the economy is often thought to depend critically on the ability of the public to anticipate future policy.

Robustness

Norges Bank publishes two variants of its expected policy rate path – one based on pure flexible inflation targeting and one where the robustness criterion is added. The policy rate path would have been considerably different if it had not been for the robustness criterion. In the near future the policy rate would have been around a 100bps lower than without the robustness criterion – and in negative terrain. Correspondingly, the output gap would have been close to zero towards the end of the forecast period in three years’ time, which is not the case for the projected policy path.

The question is if the vague robustness criterion is the right way to incorporate housing market concerns. Robustness considerations concerning housing prices have so far only been used to keep interest rates higher than they would have been absent such considerations. What happens if Norway, due to the decline in the oil price, enters a period of severe macroeconomic problems, perhaps a period of recession? Will house prices then be allowed to fall – or is stability the key issue, so that the interest rate will be set lower than it would have been, so as to keep house prices from falling from the high level they have today? Given the way Norges Bank presents this criterion, we think it is hard to know the answer to such questions.

Norges Bank also states that the robustness criterion should take into account uncertainty about how the interest rate affects the economy. In the end, it appears that a robustness criterion that includes such disparate elements comes close to letting Norges Bank set whatever interest rate they find “in the best interest of the country”. Arguably, this introduces too much discretion in monetary policy execution.

Slow Adjustment

Norges Bank seems to value a slow adjustment of its policy rate. When we look at 2014/2015, we think that there were reasons for a gradual adjustment of the policy rate.

The size and the duration of the shock were uncertain, so gradually lowering the key policy rate made sense.

Uncertainty is resolved over time, and setting the interest rate down and up again may cause unwanted volatility in financial markets. There are other arguments in favor of “saving the ammunition” in circulation that are more difficult to incorporate in a theoretical framework where exchange rates are formed in markets with forward-looking agents.

If gradualism is rooted in a wait-and-see approach to uncertainty, we think the situation is less uncertain, at least connected to oil prices, now than a year ago. Most observers do not envisage a rapid return to previous oil price levels. We are therefore less convinced about the value of slow adjustment in the year to come, especially in a situation where the interest rate path is held so high that the output gap will not be closed within the planning horizon, ending in late 2018.

Chapter 2. Oil Price Shocks, Monetary Policy and Wage Formation: Sharing the Burden of Adjustment

In this chapter we look more closely at monetary policy execution in an oil-rich economy experiencing a large negative demand shock for the mainland economy. We take into consideration that Norway is a country where unions are strong and there is a tradition of centralized and coordinated wage bargaining. Moreover, Norway has a floating exchange rate and the monetary policy regime is characterized as flexible inflation targeting. The intellectual tradition that we build on is New Keynesian macromodels.

One can in principle think of two extreme ways to adjust to a severe oil price shock for an oil producing country.

- A. We can have a period of low wage increases and low inflation with the exchange rate remaining constant. Low wage increases will mean that prices of domestically produced goods rise more slowly and consumer price inflation will also be low. In the standard macro model with decentralized wage and price setting, a negative output gap is required in order to get such a reduction in wage growth.
- B. Alternatively, we can let the exchange rate do most of the adjustment. If the value of the currency decreases, this will stabilize mainland production and employment. In the simplest model, all the adjustment can be achieved by letting the currency depreciate. Note that consumer price inflation will rise in this case because the depreciation of the currency raises import prices in domestic currency.

Application of flexible inflation targeting as described above implies an adjustment which is somewhere in between the two forms of adjustment described above. The central bank will allow the currency to depreciate but since this leads to an increase in import prices, inflation

will increase as measured by CPI, and monetary policy will counteract this by accepting a negative output gap so that domestically generated inflation declines. What combination you chose depends on the weights you put on variation in inflation and production. The more weight you put on stabilizing production and employment, the more you let the exchange rate do the adjustment although this leads to temporary overshooting of the inflation target. So the key question is *how flexible* inflation targeting should be in this situation. How much weight should be put on inflation relative to the output gap?

Theoretical models tell us that strict stabilization of consumer price inflation is far from optimal (welfare-maximizing) in this situation. In the simplest model with producer currency pricing, the optimal policy is instead to stabilize some measure of domestic inflation. By stabilizing domestic prices we minimize the distortions associated with domestic price adjustment. In the model, such distortions arise because firms change prices at different times, but we can think of this as representing various ways in which inflation distorts the information that is contained in the price system.

By stabilizing domestic inflation, we also stabilize the output gap. Under certain conditions, all the adjustment can be made by adjusting the exchange rate as described in alternative B above. So alternative B is not extreme but rather the optimal thing to do!

But can we trust the financial markets to set the exchange rate at the right level so as to being balance in the Norwegian economy? Financial markets are far from perfect, but the financial speculators have studied the same textbooks as we have. They understand that the Norwegian economy needs a large real depreciation and that only a fraction of this adjustment will come through wage moderation; hence most of the relative price adjustment must be done by the nominal exchange rate. They also know that if this adjustment does not come about, there will be unemployment in Norway and Norges Bank will react by reducing the interest rate. Hence, the exchange rate reacts to oil prices and other shocks even before monetary policymakers have reacted to the shocks.

Much of the time, the difference between CPI and domestic inflation is not very important. After all, most consumption goods are produced domestically and also the pass-through of import prices is slower than it is in the simplest model where import prices are determined in the world market (producer currency pricing). But recent developments in Norway illustrate that large real shocks force us to think about this distinction. If a 30 percent depreciation of the currency feeds through into import prices of consumption goods and the import share is $1/3$ this will raise the domestic consumer price level by about 10 percent. In practice, the pass-through will take time and it will be less than complete also in the long run, but still, rising import prices will have a substantial effect on the consumer price level.

One way to deal with situations like the present one would be to extend the escape clause in the operational target of Norges Bank so as to increase flexibility in dealing with oil price shocks. One could add some formulation such as:

“Large changes in oil prices may lead to fluctuations in the value of the currency which affect import prices. Such shocks will also not be taken into account.”

Another way to increase flexibility is to let measures of domestic inflation and wage growth play a more prominent role in the discussion and motivation of monetary policy decisions. This way the central bank can signal that although consumer prices are the target over the longer run, other measures of inflation play an important role when dealing with shocks in the medium term.

With a flexible exchange rate, the relation between wages and competitiveness becomes complicated. As discussed above, the preferred adjustment to a large real shock will typically involve a substantial change in the nominal exchange rate. If the guideline for wage formation is maintained competitiveness or some form of profit sharing, a large depreciation of the currency may lead some unions to conclude that there is plenty of scope for wage increases. But this would be an unfortunate outcome. The currency is depreciating because the economic outlook has worsened and in such a situation, we need lower – not higher – wage inflation. If wage setters think in terms of preserving competitiveness at the current exchange rate, or safeguarding real wage growth, they may react in an undesirable way to a depreciating currency. To avoid such a reaction, monetary policymakers may choose to avoid a very large depreciation of the currency.

With flexible inflation targeting, a sensible *norm* for how much wages should increase, is to take the following factors into account:

- the inflation target
- normal productivity growth
- the real economic situation and required changes in competitiveness.

Unions should understand that when the NOK falls in value to restore competitiveness, demanding full compensation for the ensuing inflation would be counterproductive.

In the medium term, inflation targeting should be applied in a flexible way. If inflation rises above, or falls below the target for a couple of years this need not be a problem. But for the credibility of the regime, it is important that inflation eventually returns to the target value. If inflation stays persistently above or below the target value, this will undermine the credibility of the inflation targeting regime in the long run.

We would also like to underline that too much wage moderation may be counterproductive. With severe shocks the interest rate may reach its lower bound at zero or just below zero. Lower wage growth can then raise the *real* interest rate. This means that very low nominal wage increases may not help to stimulate employment.

Chapter 3. Predictability and Consistency in 2015

A predictable central bank is a more effective one because monetary policy works through expectations. Norges Bank was among the first central banks to publish its own forecast for interest rates (the interest rate path) and predictability was of course the main reason for that. But it is well understood that if things turn out different than expected the interest rate path will change. Norges Bank has therefore gone far in trying to educate the market on how its view will change with a different development than expected (its “reaction function”).

The inflation-targeting regime makes sure that the objective of monetary policy is fairly stable. Still, the increased flexibility that Norges Bank has adopted over the years, with more weight on financial stability, could easily make monetary policy less predictable and, at least for an outsider, less consistent. In every MPR Norges Bank explains how the risk picture affects monetary policy. To understand and predict how this risk picture changes and how it affects the interest rate path has to a large degree been impossible for outsiders. How much, say, a perceived increased risk of too high household debt affects the interest rate path is hard to know. It is not documented by Norges Bank in the way it has documented how inflation different from forecast has affected the rate path for example. What triggers such a higher perceived risk? How is it accounted for in the interest rate account?

We will here concentrate on two events in 2015 where we found Norges Bank’s communication wanting.

First, the March 2015 meeting, where the key policy rate was not cut. In MPR 2014 the forecast for Q1 2015 was 1.23% and for Q2 it was 1.13%. That is exactly half way between the level which was consistent with a cut by 25bps at the next meeting in March and the level implied by an unchanged rate at the meeting. The market understands this as a 50% probability of another 25bps rate cut in March 2015 as opposed to 100% probability if the Q1 level was 1.21% and Q2 level was 1.00%. Norges Bank knows that this is the way the market will think. Market and analysts were convinced Norges Bank would cut at the March meeting. Current developments in the economy were not very different from Norges Bank’s forecast, but oil prices had fallen further, the wage settlement indicated much lower wage growth than the Norges Bank December forecast and rates abroad had fallen. That NOK was weaker than expected was far from enough to counteract that. “Nobody” doubted that Norges Bank would lower the bottom in the interest rate path at least to 1% and the question analysts asked was how much more it would be lowered. There was even some talk about a 50bps cut at the meeting, but no analysts expected that.

There is no clear explanation in the MPR for this seemingly counterintuitive outcome. But at a meeting with analyst and market participants after the meeting where Norges Bank presented the MPR, the following explanation was given. The development of the domestic economy, apart from the wage settlement, such as unemployment, growth etc. had been close to Norges Bank’s main scenario and with that some of the downside risk to the

economy was removed. Norges Bank was therefore no longer in hurry to cut rates as an insurance against the economy collapsing.

That is not a convincing explanation. When Norges Bank in December said it was 50% probability for a cut in March it was contingent on the economy developing as expected. In other words, when Norges Bank said there was 50% chance for a cut it was based on a development which would reduce the downside risks. With the economy developing as expected on most points, but some factor arguing for lower rates, it is still hard to understand why the policy rate was not cut in March.

The second event we would like to comment upon is the downward revision of the interest rate forecast during 2015. As we see it, this massive downward revision due to weaker demand is not based on actual developments surprising on the downside, but the reason is that Norges Bank turned much more pessimistic about the future.

There is no link between the size of the oil price drop and the strength of the downward revision to the path. However, it seems that in the second half of 2015 Norges Bank's view turned much more pessimistic than its previous reactions to lower oil prices indicated. One could argue that a given percentage drop in oil prices hurt more the lower is the price. Still, that a given percentage drop should hurt 5 times more if the initial level is USD 70 per barrel rather than USD 80 per barrel does not sound very convincing. That is actually what Norges Bank did if one compares the reaction in MPR 3/15 with that in MPR 1/15.

Whatever the reason, the idea that the market, by knowing the reaction function, can anticipate how Norges Bank interest rate path will change, did not work in 2015. It seems that Norges Bank just rethought its previous assumption for reasons not possible to see for outsiders. This is probably not new and something one perhaps must accept. Our understanding of how the economy works is not static. Still our main conclusion is that the rather dramatic change in view, especially through the second part of 2015, is not satisfactorily explained by Norges Bank. We still know very little about how Norges Bank will react to future changes in oil prices.

It is hard to avoid the conclusion that 2015 was a bad year for Norges Bank in terms of predictability and consistency. It made a decision in March which few understood and no one foresaw. The meeting made it clear that shifts in risk assessment are not possible for outsiders to follow. There was a lot of uncertainty concerning several of the decisions through the year. The rather strong downward revision of the interest rate path and the outlook for demand in the second part of the year was also hard to foresee. We do not doubt it was hard to assess the impact of the oil price downturn early on, but during 2015 Norges Bank clearly stated that the huge downside risks it saw as a possibility in December 2014, were removed.

We have tried to come up with possible explanations for this. It could be due to a desire to move gradually. Whatever the reason, the cost is that forward guidance in the future may be

less effective, simply because the experience through 2015 made the market trust the communication less. But maybe that is the price we have to pay for a more flexible central bank.

Apart from a general view on the way communication was handled through 2015 we have a few more concrete suggestions:

- On meetings, essential information such as whether any alternatives other than the actual decision were considered should be part of the written material and not only mentioned at the press conference.
- It is also important that answers at the press conference are precise and do not leave any doubt how the written statement should be interpreted.
- On intermediate meetings Norges Bank should try to conclude clearer whether news since the last MPR in sum argue for higher or lower rates looking ahead.

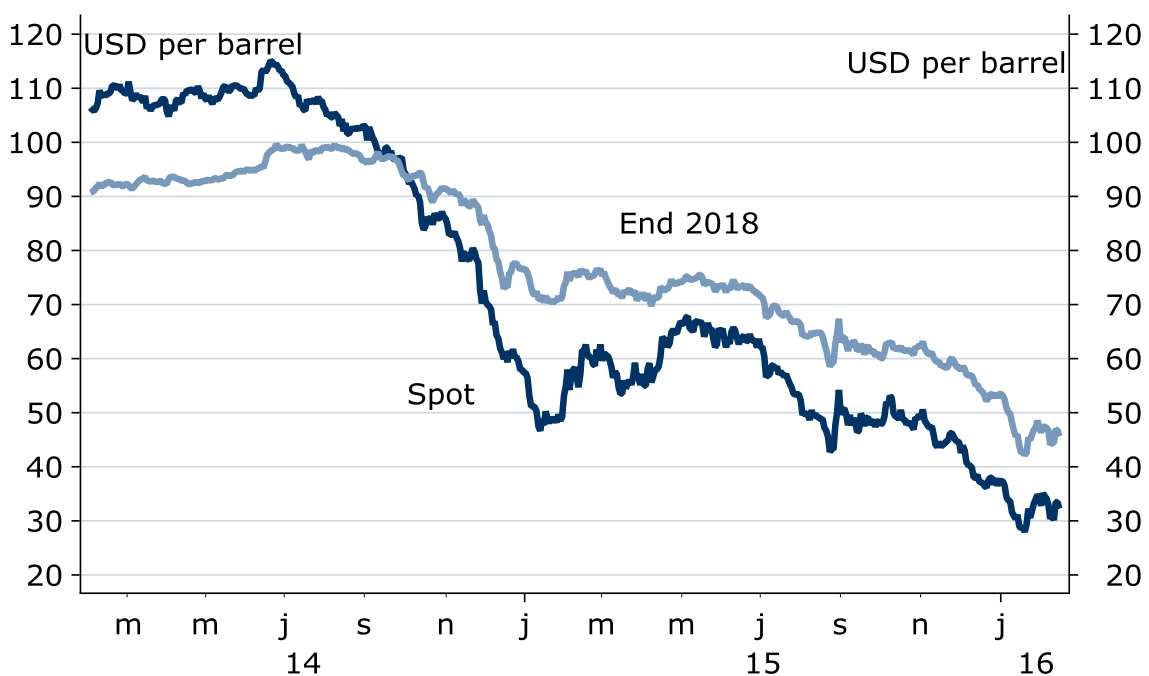
Maybe now is also the time for a more thorough review of the way in which Norges Bank is communicating. We have no wish to scrap neither the interest rate path nor the interest rate account, but they did not contribute to a predictable monetary policy through 2015. Oil prices seem to be crucial for the outlook also when looking ahead, but we have very little idea of how a further drop will affect the policy rate path.

Chapter 1. Introduction: Tumbling Oil Prices and Macroeconomic Policy

During 2015 the oil price continued its decline. Since the summer of 2014 the price has fallen from around 120 dollars per barrel to around 30 dollars. This is of course dramatic for an oil-producing country such as Norway. Norges Bank has cut its policy rate twice during the year by 0.25 percentage points and the interest rate forecast has been lowered successively throughout the year.

The situation has grown worse as time has moved on. This can be seen from the development of the forward prices of oil, which have fallen continuously.

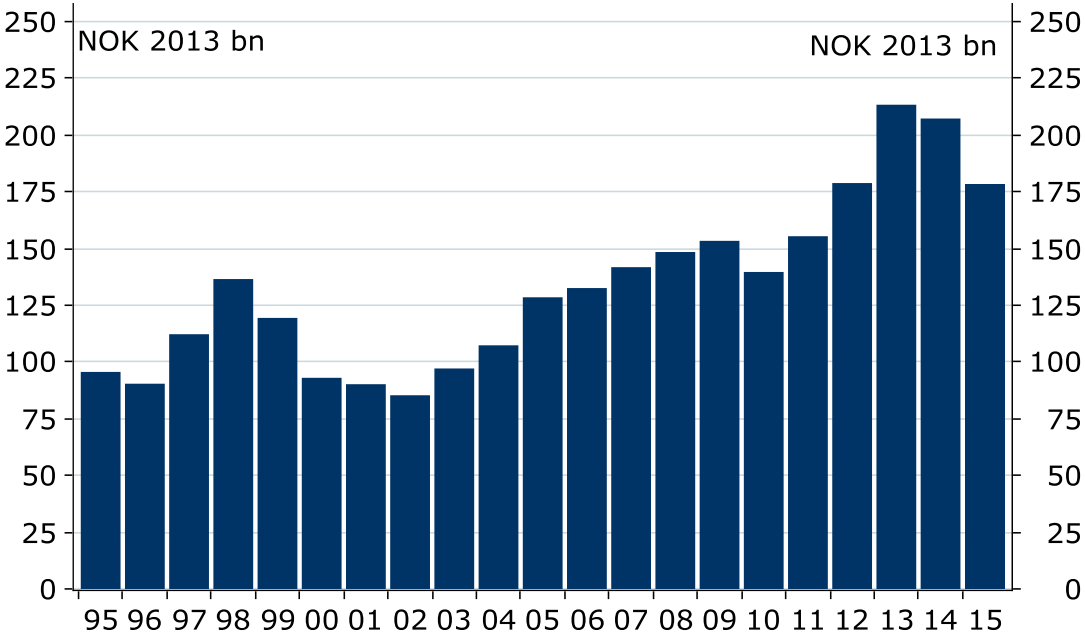
Chart 1 Brent oil prices. Spot and end 2018 price



Kilde: NBW and Macrobond

The oil age is not over in Norway. Existing fields will continue their operations for decades. Also, development costs are coming down, so new fields will probably be developed if the oil price picks up as indicated by the forward prices. It is noteworthy that oil investments in 2015 roughly correspond to the investment level in 2012 – so even though the fall has been sharp, the boom years with extremely high levels of oil investments lasted only a short period of time. The weakening of the NOK has better equipped the Norwegian oil-related industry to compete for those projects that will actually be realized. This said, we think it prudent to base macroeconomic policy on the assumption that low oil prices will be sustained for some period of time and that the activity in the oil sector will never quite return to the levels of the years before the oil price started to fall in 2014.

Chart 2 Oil investment NOK 2013 prices



Source: NBW and Macrobond

By and large, we think Norges Bank’s response to the oil price tumble has been sensible. Both the key policy rate and the expected interest rate path have been lowered gradually. Interest rates are expected to be cut further, but not by enough to close the output gap by 2018. Inflation will first overshoot the inflation target, but then fall below it. Forecasts for key rates, output gap, core inflation and import weighted NOK from the latest Monetary Policy Report (MPR 4/15) are given below. We also give the forecast for the same variables in an alternative scenario which will be discussed below in connection with the robustness criterion.

Chart 3 Key policy rate forecast from MPR 4/15. Baseline and alternative scenario

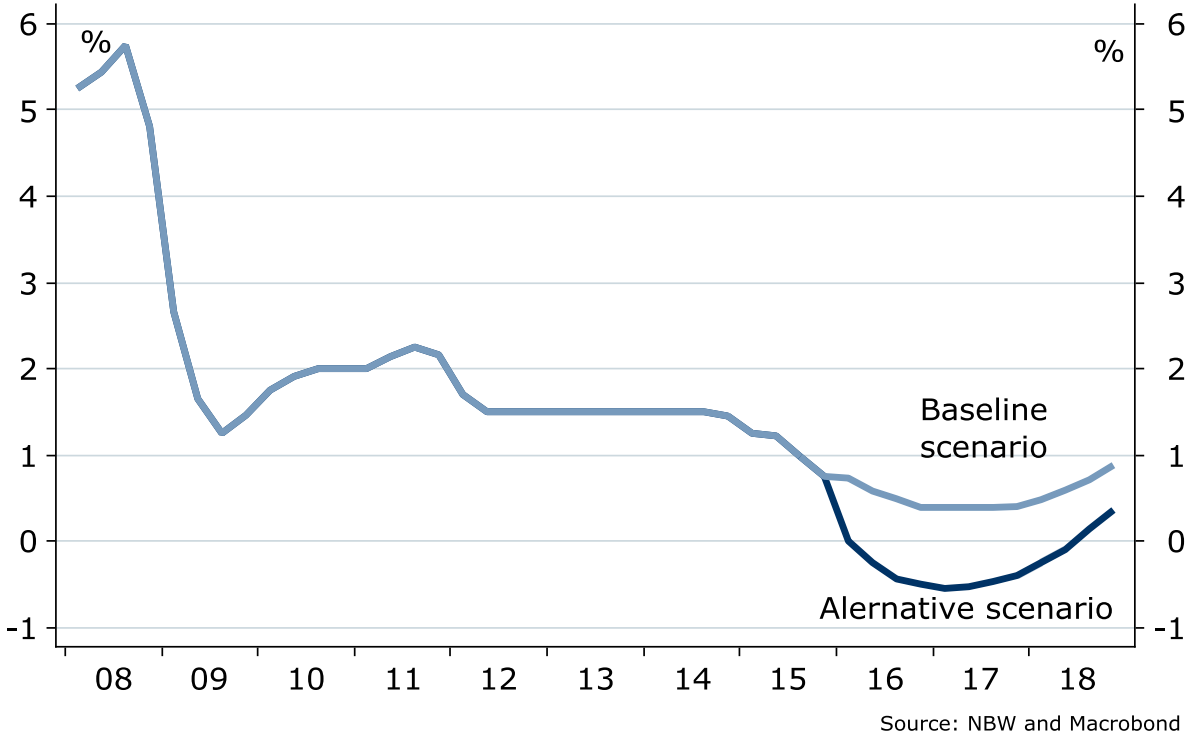


Chart 4 Output gap forecast from MPR 4/15. Baseline and alternative scenario

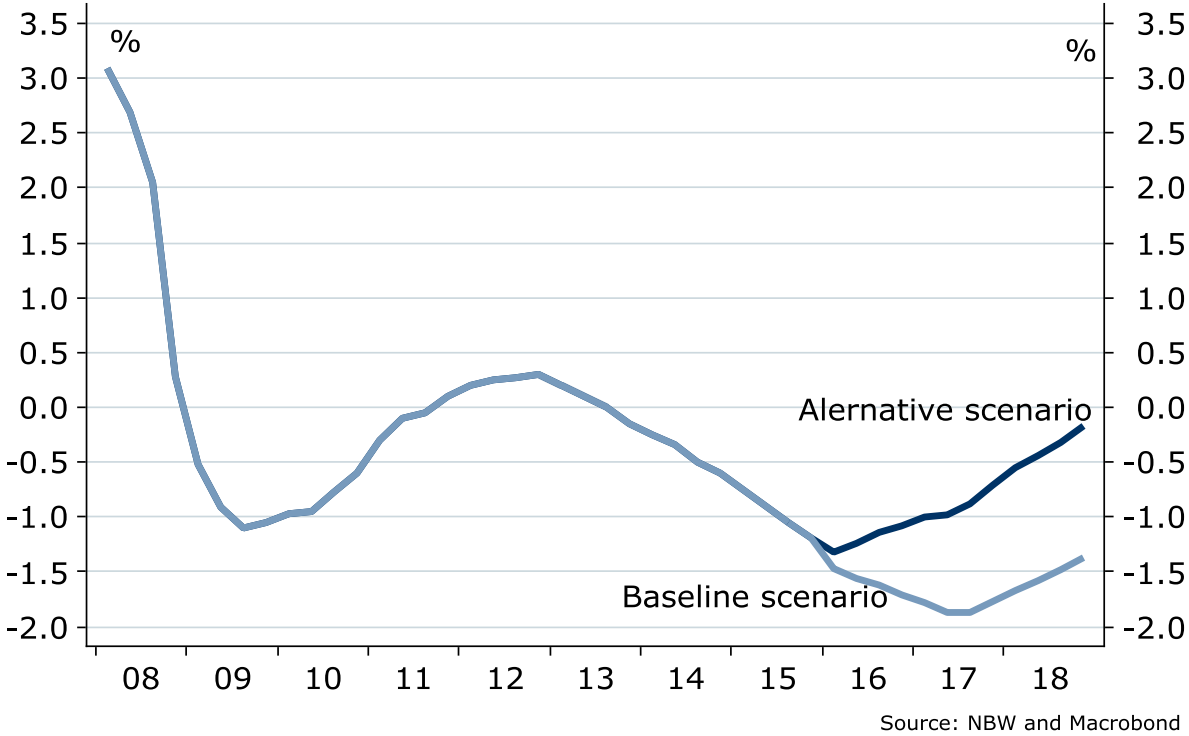
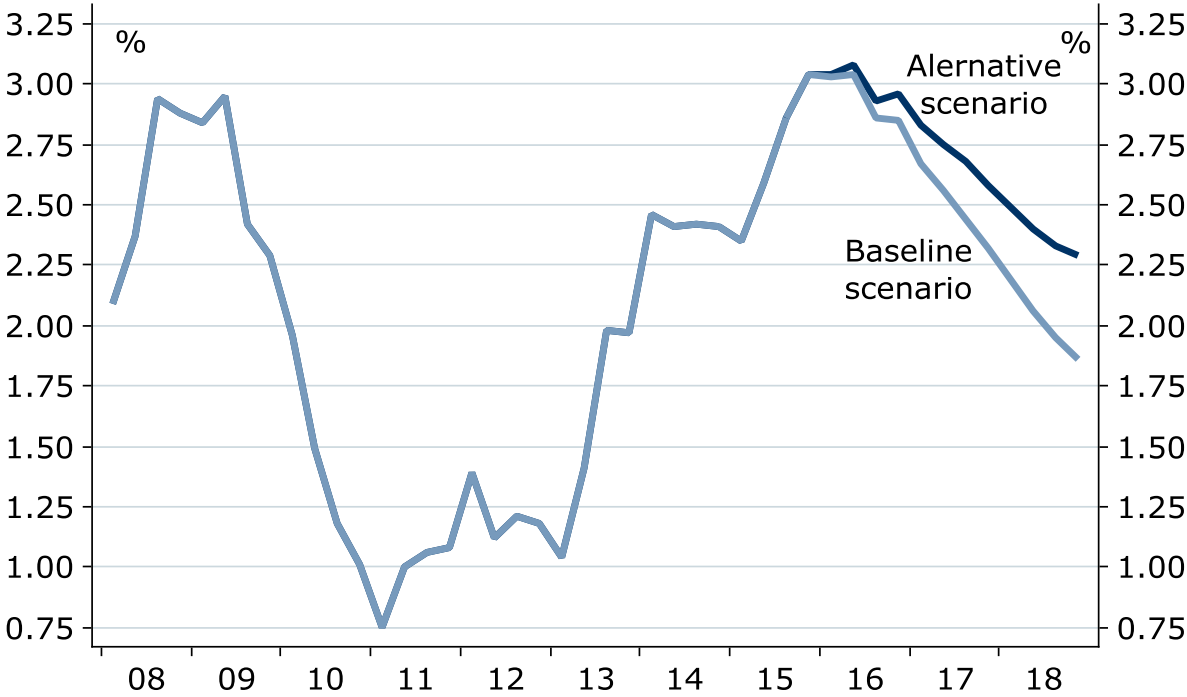


Chart 5 CPI-ATE forecast from MPR 4/15. Baseline and alternative scenario



Source: NBW and Macrobond

Chart 6 Import weighted exchange rate. Baseline and alternative scenario



Source: NBW and Macrobond

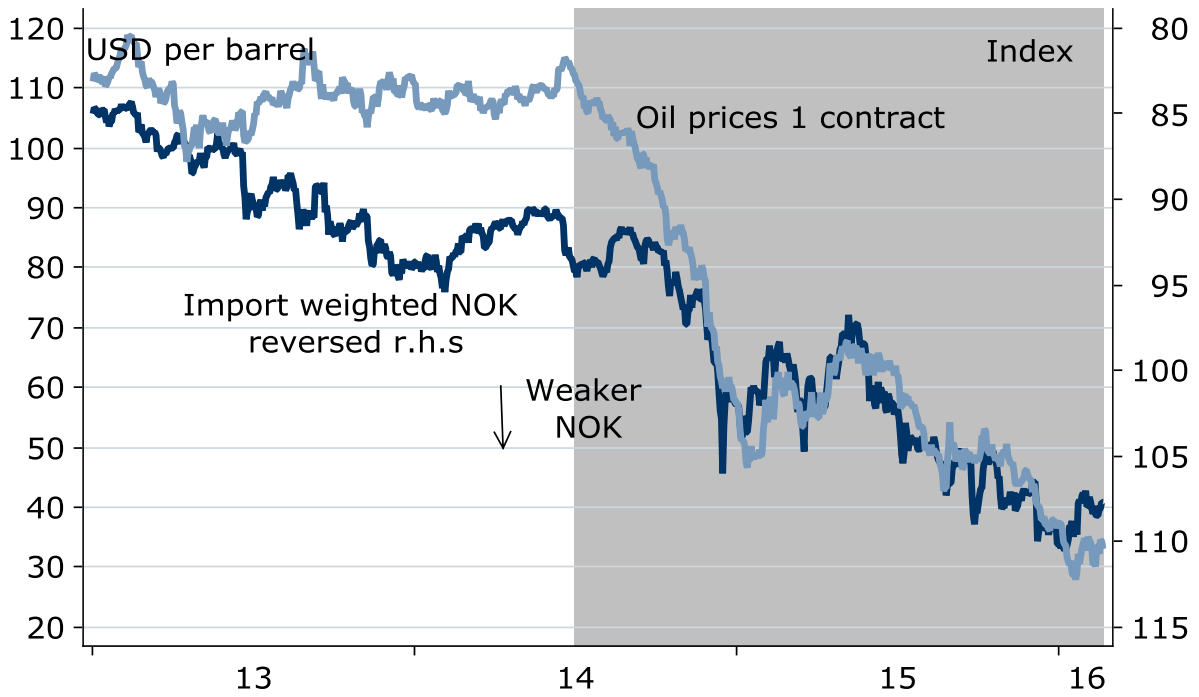
Still, there are issues that can be discussed. In this introductory chapter, we will start out by discussing a few aspects of macroeconomic policymaking in view of the negative oil price shock. First, we discuss the mandate of Norges Bank, then we discuss the so-called robustness criterion, and finally we discuss the arguments for slow adjustment of the policy rate.

Norges Bank's Mandate: In Need of Review?

Norges Bank's mandate/operational target is to use monetary policy to stabilize inflation near 2.5% over time, while also considering employment and output. Inflation targeting in Norway is formulated in a quite a flexible way, with expressions as "near" the 2.5% target "over time", and Norges Bank also stresses that temporary disturbances will be overlooked. The bank also considers a third criterion called robustness, which includes having an eye on how house prices and debt evolve but which also takes account of uncertainty about how the interest rate works as a policy instrument. We will return to the robustness criterion below.

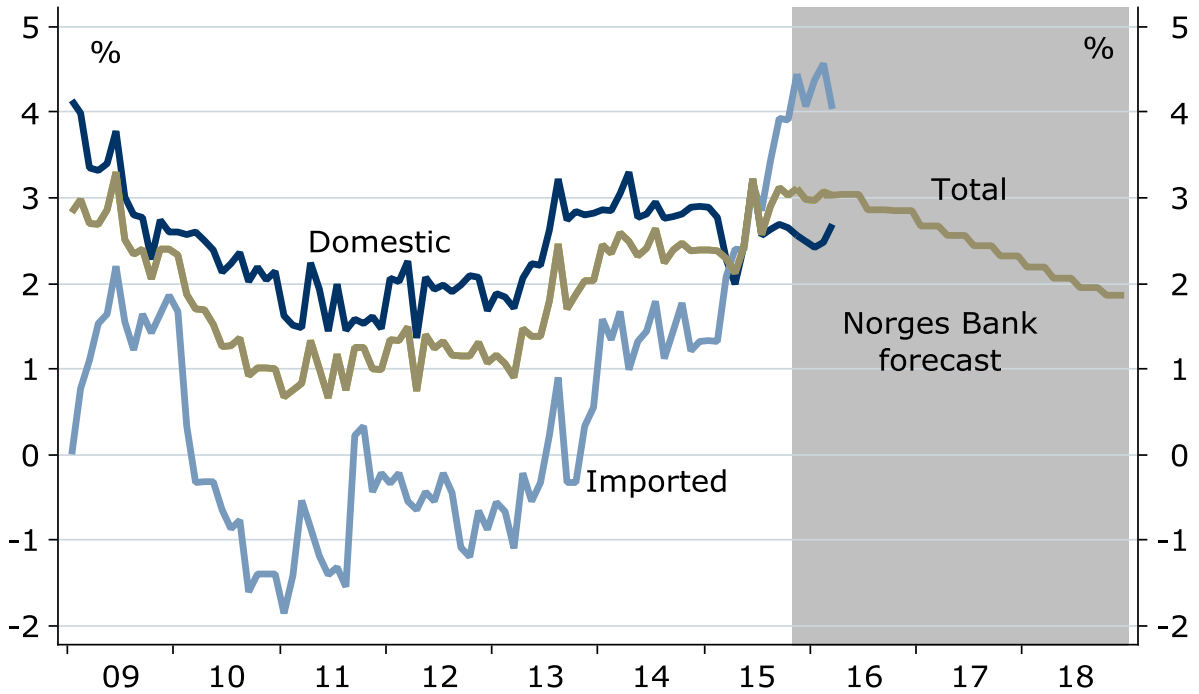
Adapting to the oil price tumble can be challenging if one takes inflation targeting too literally. Parallel with falling oil prices, the Norwegian currency, the NOK, has weakened considerably relative to other currencies. A 30% weaker currency can of course do miracles when it comes to regaining competitive power, but after two, three years of currency weakening, it is quite natural that inflation picks up – simply because imported goods become more expensive.

Chart 7 Oil price and import weighted NOK



Source: NBW and Macrobond

Chart 8 Core inflation y/y. Domestic and imported. Norges Bank forecast MPR 4/15



Source: Nordea Markets and Macrobond

Norwegian adjusted consumer price inflation is expected to reach 3% for a short period of time. Thereafter it is expected to fall to a level below the inflation target, around 2%, due to low wage increases given the oil-related economic downturn.

In the next chapter we discuss whether the exchange rate or nominal wage restraint should be the main vehicle that is used to restore international competitiveness in Norway. We conclude that one should hope for the brunt of the work to be done by exchange rate adaptation. Standard macroeconomic theory suggests that, in the medium term, exchange rates adjust so that countries regain competitive power. At the same time, the empirical truth of this proposition is debated, and it can often seem hard to predict how exchange rates will develop in the medium run.

Since the exchange rate instrument is perhaps a little bit blunt, many observers think it should be complemented by nominal wage restraint. The NOK has come down considerably in value, and Norges Bank and other observers expect some degree of mean reversion in the sense that the NOK will strengthen itself somewhat over the next couple of years. If one wants further strengthening of competitive power, nominal wage restraint is then the only way to go. If the oil price fall leads to a prolonged period of moderate wage settlements, this will in turn lead to low inflation for some time. Like Norges Bank, we favor a flexible approach to inflation targeting. If wage settlements are moderate in order to improve competitive power, and this leads to a period with inflation below target, we do not see this as a major problem. There is no hurry to get inflation up again by higher wage increases. In practical policymaking, this seems to be the stand of Norges Bank. It forecasts a period with overshooting of the inflation target due to the impact of the weak NOK. Then a period is expected to follow with undershooting partly due to low wage growth. Norges Bank does not seem to think that this is problematic.

But if inflation stays low for long, this will affect the credibility of the inflation target. What if wage restraint lingers on for quite some longer time than foreseen by Norges Bank. Will the bank then intervene to get inflation up again, to anchor inflation expectations “near 2.5%”? Or will the bank let the inflation rate establish itself in the range 1–2% over a number of years, thinking that any figure in the range 1–4% lies “near” the inflation target? Given current circumstances, we think Norges Bank’s monetary policy makes sense, but one should not forget the importance of anchoring inflation expectations. At some point inflation should return to the 2.5% benchmark – or the target level should be changed. We think the mandate could benefit from a clearer discussion of “escape clauses” for when and for how long it is acceptable to deviate from the inflation target.

When looking at the current situation, it is interesting to compare to the monetary policy experience in the early 2000s, not only in Norway but also in many other developed countries. In that period, inflation was very low, mainly because of the integration of China in world trade. For many manufactured goods, the Chinese share in imports increased sharply, in Norway and many other countries. This brought down imported inflation and also

total inflation. At that time, this led many countries with inflation targeting to reduce their policy interest rates, which in turn brought up assets prices of various sorts, and arguably, this was an important part of the foreplay leading up to the world financial crisis in the late 2000s. China's entry on the world trade scene could also have been termed a "temporary disturbance" that should have been abstracted from in monetary policymaking, but clearly it was not. Again, we think that a discussion of how Norges Bank should meet supply-side disturbances that influence imported inflation would make it easier to foresee monetary policy responses and help anchoring inflation expectations in a better way.

Norges Bank's mandate does not distinguish between inflation that comes from demand pressure from that which is rooted in supply side disturbances. Neither does the mandate discuss how homegrown and imported inflation should count when stabilizing inflation. Concentrating on domestic inflation would arguably have given us better monetary policy in the early 2000s. In the present context, a focus on domestic inflation would suggest that we should overlook imported inflation that comes from the weakening of the currency due to falling oil prices. However, if inflation falls due to moderate wage bargains in the wake of weak oil prices this would imply lower domestic inflation.

We think – 15 years after the current macroeconomic regime was introduced in Norway – it is time to evaluate the mandate and see if it needs to be reformulated. As mentioned, we think the current, quite flexible interpretation of the mandate is sound in the present economic circumstances. Norges Bank states that it will abstract from "temporary disturbances" when setting its policy rate. Supply-driven high or low inflation lasting a few years, as the low inflation following the China-shock and today's oil-price shock, could perhaps be denoted as temporary disturbances. A sharper formulated mandate could make monetary policy more predictable, and the impact of monetary policy on the economy is often thought to depend critically on the ability of the public to anticipate future policy.

If a discussion should be opened about Norges Bank's mandate, we think one should also discuss the present level of the inflation target at 2.5%. It is not clear to us that it is wise for a small country such as Norway to have an inflation target that differs from that of her neighbors. The ECB, for example, uses a 2% target. We would welcome a discussion of whether, and in that case when, it would be optimal to change the target.

The Robustness Criterion: Clarification Needed

As mentioned, flexible inflation targeting is typically taken to mean that policy execution takes account of the inflation level and also the unemployment level/the output gap. Norges Bank also uses a third criterion, dubbed "robustness". This seems mainly to refer to the developments of the housing market and debt levels, but not exclusively, which we will return to.

Norges Bank publishes two variants of its expected policy rate path – one based on pure flexible inflation targeting and one where the robustness criterion is added. In the figures above, the “alternative path” shows what the interest rate would have been if the robustness criterion had not been included.

As we see, the policy rate path would have been considerably different if it had not been for the robustness criterion. In the near future the policy rate would have been around a 100bps lower than without the robustness criterion – and in negative terrain. Correspondingly, the output gap would have been close to zero towards the end of the forecast period in three years’ time, which is not the case for the projected policy path.

We agree with Norges Bank that there are reasons to worry about house prices and debt levels. We have already mentioned how low interest rates participated in building up imbalances that led to the financial crises less than ten years ago. Norway also had its own banking crisis in the late 1980s, where a bursting housing bubble created severe macroeconomic problems. Today housing prices are seen as high, and household debt as percentage of household income has passed 200%. The Monetary Policy Report reports four indicators of financial risk: the credit gap, the house price gap, the commercial real estate gap and the wholesale funding gap (MPR 4/15, p. 45). The first three of those indicators signal an elevated level of risk, at least if one compares to historical averages.

The more difficult question is how and in what way monetary policy should take account of these risks. The question is if the vague robustness criterion is the right way to incorporate housing market concerns. Is the policy interest rate the correct instrument to address worries about housing market imbalances? Norway has introduced several other policy measures to influence housing prices. We have for example implemented restrictions on the level of own capital for housing loans and requirements for minimum down payment of loans. We could tax property more heavily, but this is often seen as politically difficult in Norway. Moreover, for example removing the possibility to deduct interest payments in taxable income is not a very continuous policy instrument. The introduction of property taxation in one form or another can lead housing prices to tumble dramatically, rather than stabilizing them.

Robustness considerations concerning housing prices have, so far, only been used to keep interest rates higher than they would have been absent such considerations. What happens if Norway, due to the decline in the oil price, enters a period of severe macroeconomic problems, perhaps a period of recession? Will house prices then be allowed to fall – or is stability the key objective, so that the interest rate will be set lower than it would have been, to keep house prices from falling from the high level they have today? Given the way Norges Bank presents this criterion, we think it is hard to know the answer to such questions.

Generally speaking, the way in which Norges Bank takes housing prices into account is not very transparent. If Norges Bank’s mandate had been changed as discussed above, for

example to overweight domestic inflation or to abstract from supply shocks of some years' duration, this would have influenced housing prices. Take for example the first years of the 2000s. Then imported inflation arguably counted too much in the objective function of various central banks, and low interest rates led to increases in house prices. If the interest rates had been higher, house prices would not have been less of a problem – so there would have been less need for an additional third criterion in monetary policy execution.

The robustness criterion is not solely a criterion about housing and asset markets. Norges Bank also states that the robustness criterion should take into account uncertainty about how the interest rate affects the economy. It is not easy to say whether uncertainty about the world or the macroeconomic modelling of the world should imply higher or lower interest rates, or policy rates that change fast or slow.

In the end, it appears that a robustness criterion that includes such disparate elements as it does, comes close to letting Norges Bank set whatever interest rate they find “in the best interest of the country”. Arguably, this introduces too much discretion in monetary policy execution. We will not conclude strongly here, but repeat our recommendation that a discussion of the mandate for monetary policy execution is opened up, and that the need to address housing prices and uncertainties could be included in that discussion.

Norges Bank has used discretion well. We do not object to Norges Bank taking into consideration a fuller view of the situation than inflation and the output gap when setting its policy rate. We simply argue that a clearer formulation of the objective function for monetary policy could make it easier to understand and predict central bank behavior under changed circumstances. This, in turn, could make it easier to form sound expectations of how interest rates and inflation will develop over time.

Slow Adjustment: A Value in Itself?

Norges Bank seems to value a slow adjustment of its policy rate. When we look at 2014/2015, we think that there were reasons for a gradual adjustment of the policy rate. The size and the duration of the shock were uncertain, so gradually lowering the key policy rate made sense.

We hear arguments in favor of such gradualism other than the gradual revelation of uncertainty, however. If one cuts rates quickly, one will sooner reach a level where rates cannot be cut further. Some point to this fact and argue that one should “save the ammunition” so that a rate cut could take place when you need it the most. This seems to build on a notion that the effects of rate cuts on exchange rates are temporary. Such an argument does not seem to tally well with standard economic theory where agents are assumed to be rational and forward-looking. We agree that the empirical behavior of exchange rates can be hard to understand solely by using economic theory. But even if one

realizes the shortcomings of economic theory, it is hard to base policy execution on ad hoc hypotheses that might constantly need to be adjusted in the face of changed circumstances.

Norges Bank's policy execution in 2015 seems on the surface to be a success. The gradual lowering of interest rates has gone together with some 30% drop in the value of NOK since the start of 2013, which clearly helps to avoid a much bigger economic downturn in Norway. We should note, however, that the weakening of the NOK started in 2013, well before oil prices and interest rates started to fall, so we do not know how much monetary policy has contributed to the fall, and especially not if gradualism has contributed to keeping the value of the NOK low.

So what about the imminent future? If gradualism is rooted in a wait-and-see approach to uncertainty, we think the situation is less uncertain, at least connected to oil prices, now than a year ago. Most observers do not envisage a rapid return to previous oil price levels. However, there is still uncertainty about how much the rest of the economy will be affected. So far unemployment has increased only in oil-related parts of the country and production figures indicate that it to a large degree is oil related industries which have been hit. Consumption growth held up well in 2015 and mainland exports are doing very well. Add to this that fiscal policy is expansionary. Still consumer confidence has fallen and there is real risk of strong secondary effects which could mean there is less of an argument for slow adjustment now than a year ago. However with an interest rate path with a bottom of 0.38% Norges Bank could soon be forced to adapt a more gradual approach. There are costs, uncertainties and limits connected to negative rates and other extraordinary measures (asset buying etc.) which means a gradual approach will be appropriate and such an approach was adopted by other central banks in similar situations.

The effect of monetary policy subsides with rates close to zero. That raises the question of whether Norges Bank alone could stabilize the economy or if fiscal policy should be used to a greater degree. That however should raise a more principal discussion. Norges Bank's lowering of interest rates has mainly stimulated the economy through weaker NOK which, one could argue, ease the restructuring of the domestic economy. Use of fiscal policy could have the opposite effect and should only be used if we see strong second-round effects of the oil downturn. So far, the increase in unemployment is probably best labeled frictional unemployment and probably unavoidable given the huge shock the economy has experienced. If one is serious about the needed restructuring, fiscal policy should be used with care and mainly be concerned with measures which ease the restructuring of the economy such as labor market measures. We also note that fiscal policy and labor market measures can be targeted at the most hit areas in Western Norway, while monetary policy affects all parts of the country in a more similar way.

Chapter 2. Oil Price Shocks, Monetary Policy and Wage Formation: Sharing the Burden of Adjustment

The Norwegian economy has some specific characteristics.

- Unions are strong and there is a tradition of centralized and coordinated wage bargaining.
- Oil production plays a big role.
- Norway has a floating exchange rate and the monetary policy regime is characterized as flexible inflation targeting. The main aim of monetary policy is to stabilize inflation as measured by the consumer price index but monetary policy also tries to stabilize real economic activity.

How should monetary policy be conducted in such an economy? How flexible should monetary policy be in the face of large shocks such as the recent decline in the oil price? How should the burden of adjustment be shared between monetary policy and wage formation?

The most important role of monetary policy is to provide a nominal anchor that affects expectations and guides wage and price setters. Until 1993 Norway had a fixed exchange rate which meant that the exchange rate was the nominal anchor. As described by the Aukrust model, the scope for wage increases was determined by international inflation and productivity growth in the sector producing tradable goods. But what is a reasonable rate of wage increase when we have a flexible exchange rate and there are large changes of the exchange rate as we have seen recently? Should the parties in the labor market look at competitiveness, real wage growth or the inflation target in order to find a benchmark for wages? Obviously, the answer to this question is closely related to how monetary policy is conducted.

When the economy runs smoothly these questions may not be very pertinent. If inflation targets and productivity growth are similar in neighboring countries and there are no large shocks, Norway can trudge along with similar wage growth as other countries and a reasonably stable exchange rate. But when there are large shocks such as the recent fall of the oil price, changes in relative prices force us to think clearly about the objectives of monetary policy and the interaction between monetary policy and wage formation.

The focus in this chapter is on the macroeconomic effects of monetary policy, how monetary policy should deal with large macroeconomic shocks and its interaction with wage formation. Whether monetary policy should take account of other factors such as property prices and financial conditions is another issue which we abstract from in this chapter.

New Keynesian Models of the Open Economy

New Keynesian models such as that of Gali-Monacelli (2005) have become the standard models used to analyze monetary policy in the open economy. Norges Bank's model NEMO is a model of this kind; see Brubakk and Sveen (2008). Essentially, these models are modern, microfounded versions of the open economy IS-LM model but the central bank is assumed to set the interest rate. The money supply is implicitly assumed to adjust so as to be consistent with the interest rate set by the central bank.

As in the open economy IS-LM model, international financial markets are assumed to be highly integrated and uncovered interest parity holds. There is free trade in the goods markets, but goods produced in different countries are imperfect substitutes and price elasticities of exports and imports are limited. This means that a country cannot sell infinite amounts of exports at a given price. For the domestic producers to increase or decrease their market shares, relative price changes are needed. Put differently, some adjustment of competitiveness will be needed when there are real shocks that affect demand and supply.

Goods produced in different countries are sold at different prices and in the simplest model, prices of goods are set with a markup on marginal cost. Imports are bought at a given price in the world market so changes in the exchange rate are passed through immediately to import prices (producer currency pricing).

A key assumption is that there is "home bias" in consumption, i.e., that consumers in a specific country spend a larger share of their budget on goods produced in that country than consumers in other countries. Implicitly, this assumption reflects transport costs, language barriers and other factors that limit substitution between goods produced in different countries.

This way of thinking about international competition is relevant to large parts of manufacturing and services that produce differentiated goods which are subject to international competition. The model is consistent with the observation that there are large and persistent deviations from purchasing power parity.¹ Consumer price levels in different countries develop differently even if the prices are expressed in the same currency. Large deviations from purchasing power parity have been observed under flexible exchange rates and also within the European Monetary Union.

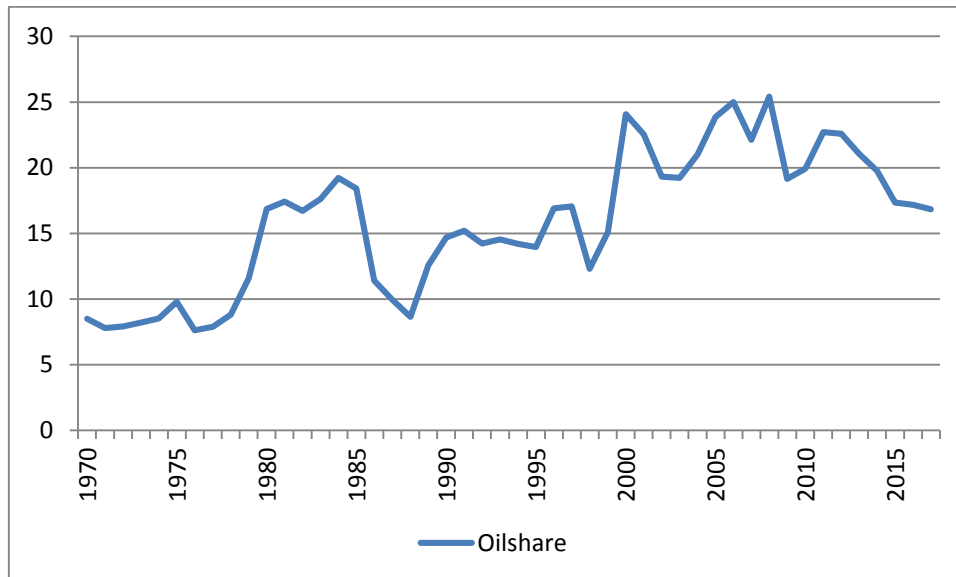
The Oil Sector and the Mainland Economy

Oil production plays an important role in the Norwegian economy. Chart 9 shows that offshore production as a fraction of GDP was 23 percent of GDP in 2012. According to OECD

¹ Purchasing power parity means that the consumption basket costs the same in different countries.

this share is projected to decline to 17 percent in 2017. Changes in this share reflect both volume and price changes.

Chart 9 Offshore production as a fraction of GDP, percent of value



Source: OECD Economic Outlook database. Values for 2016 and 2017 are OECD projections.

Oil production is different from manufacturing production in two ways.² First, oil is an essentially homogenous good and the price of oil in foreign currency can be taken as roughly exogenous when analyzing monetary policy in Norway. Second, it appears reasonable to take production and investments in oil production as given when analyzing monetary policy. Of course, monetary policy has some effects on the costs for oil producers but these effects are small compared to the effects of the international price of oil, the availability of oil resources, political decisions, and other factors that affect oil production and the associated revenue.

For these reasons, it is useful to think of the mainland economy as producing imperfect substitutes to foreign goods and to see the oil sector as a largely exogenous sector that affects the mainland economy in two ways:

1. much of the *income* from oil production goes to the government and generates demand for goods and services in Norway
2. the oil-producing sector generates demand for *inputs* in the form of goods, services and labor from the mainland economy.

² The arguments made here apply to other forms of raw material production but we focus on the oil sector because it is large enough to have a substantial macroeconomic impact.

A change in the oil price affects the domestic economy via both these channels, but how important are these effects?

As concerns the income effect, the institutional structure in Norway implies that the income from oil goes into a fund and only a small fraction of the total stock of resources in the fund is used in any given year. Thus, the direct effect on government spending is very small in the short run. This does not necessarily mean that the income effect on the Norwegian economy is negligible, however. If the oil price falls by 50 or 70 percent and this price change is perceived to be persistent, forward-looking consumers will react to the fact that their lifetime incomes decline. For a given path of future government expenditure, the expected present value of future taxes will increase one for one with the decline in the expected present value of future revenue from oil. Put differently, it is not only government spending out of the current oil fund that matters, but also the expected future additions to the fund.

Thus, the income effect on aggregate demand depends on i) whether the change in the oil price is perceived as permanent or transitory, ii) whether consumers are forward-looking and iii) the extent of home bias in consumption. Judging from the forward markets, the decline in the oil price is expected to be quite persistent. It will remain below 60 dollars for the forecasting horizon, which ends in 2018.

The second effect arises because the oil-producing sector generates demand for goods, services and labor from the mainland economy. According to NOU 2013:13 ("Holden III") net demand from the oil producing sector in the form of wage payments, demand for intermediate goods and investments constituted 12 percent of mainland GDP in 2012. A large decline in the oil price has large effects on production and investments in the oil-producing sector and this constitutes a large negative demand shock to for the mainland economy. Again, the effects will be larger if the decline in the oil price is perceived to be permanent. Note that this effect arises because the demand for inputs from the oil-producing sector has "home bias". If the oil-producing sector would buy most of its inputs and hire labor in the world market, the mainland economy would not be much affected via this input-demand channel.

This said, we should also note that Norwegian industry has developed expertise in certain tradable goods and services that are used by the oil industry and this section of industry has competed successfully in world markets. With a collapse of oil prices, foreign demand for these good and services falls and this adds to the effect of the oil price collapse on the mainland economy.

The bottom line is that, via both channels, a large decline in the oil price constitutes a large negative demand shock for the mainland economy. Monetary policy cannot do much about the oil sector; it should aim to stabilize the mainland economy.

Real Adjustment to an Oil Price Shock

When demand for some good decreases, a decline in its relative price is needed in order to stabilize production. If the relative price does not fall, there will instead be a larger decrease in production. When goods produced in different countries are imperfect substitutes, the same logic applies to goods produced in different countries. If there is a decline in demand for goods and services produced in the mainland economy of Norway, their prices have to decrease relative to the prices of goods and services produced abroad. If this does not happen, there will instead be a large decline in production, leading to underutilization of resources in the mainland economy. But how will this relative price adjustment be achieved?

We can think of two extreme ways of adjusting to the shock:

- A. We can have a period of low wage increases and low inflation with the exchange rate remaining roughly constant. Low wage increases will mean that prices of domestically produced goods rise more slowly and consumer price inflation will also be low. In the standard macro model with decentralized wage and price setting, a negative output gap is required in order for such a reduction in wage growth to occur.
- B. Alternatively, the exchange rate could do most of the adjustment. If the value of the currency decreases, this will help to stabilize mainland production and employment. In the simplest model, all the adjustment can be achieved by a depreciation of the currency. Note, however, that inflation will rise in this case because the depreciation of the currency raises import prices in domestic currency.

Sometimes, these two forms of adjustment are called internal and external devaluation and it is important to realize that they are alternative ways of achieving the same real adjustment. In both cases we have the same decrease in the real wage and the same improvement in competitiveness. Suppose, for example, that domestic wages need to fall 30 percent relative to foreign prices in order to improve competitiveness so that employment is stabilized. To simplify we assume that prices of domestic goods are proportional to wages and that exchange rate changes are fully passed on into domestic consumer prices of imports (possibly with a delay). Suppose further that one third of consumption consists of imported goods and that foreign prices are constant. Then the first adjustment path requires nominal wages to fall by 30 percent but since prices of domestically produced goods also decrease 30 percent, the consumer price level falls by 20 percent and the real wage falls by 10 percent. In case B, we instead see a 30 percent increase in import prices, raising the consumer price level by 10 percent and again reducing the real wage by 10 percent since the nominal wage is unchanged.

So both ways of adjusting lead to the same real adjustment but they have different implications for consumer price inflation, which falls in the first case and rises in the second case. In practice, we would expect to see an adjustment which is somewhere between these two extreme forms of adjustment after a large and persistent shock to aggregate demand.

Adjustment under Flexible Inflation Targeting

According to the law, the primary objective of monetary policy is low and stable inflation. The operational target is to keep consumer price inflation close to 2.5% over time (Forskrift om pengepolitikk FOR-2001-03-29-278). However, Norges Bank has a “flexible” inflation targeting regime which means that weight is also given to stabilizing production and employment. What does such a framework imply for the adjustment to a drastic decline in the oil price?

To think clearly about this, we consider a simplified model where the central bank can see the shocks and react to them. Furthermore, we assume that uncovered interest parity holds, which means that exchange rates adjust so that expected returns on loans in different currencies are equalized. This implies that the current exchange rate will depend on current and expected future interest rate differentials and on the expected long run level of the exchange rate. It follows that, by its choice of interest rate path, the central bank determines the exchange rate, so it can choose an adjustment path which is close to A, or close to B, or some intermediate path of adjustment. In practice, monetary policy affects the economy with long lags and policy makers face considerable uncertainty but we now discuss what the central bank should *try to* do.

Application of flexible inflation targeting as described above implies an adjustment which is somewhere between the two forms of adjustment described above. The central bank will allow the currency to depreciate but since this leads to an increase in import prices, inflation will increase as measured by CPI, and monetary policy will counteract this by accepting a negative output gap so that domestically generated inflation declines. What combination you choose depends on the weights you put on variation in inflation and production. The more weight you put on stabilizing production and employment, the more you let the exchange rate do the adjustment although this leads to temporary overshooting of the inflation target.

So the key question is *how flexible* inflation targeting should be in this situation. How much weight should be put on inflation relative to the output gap?

Optimal Adjustment to an Oil Price Shock

Since stable inflation is regarded as the primary objective of monetary policy, one might conclude that we should put most of the weight on keeping inflation close to the target.

Strict inflation targeting will imply that you try to find a path of adjustment where the increase in import prices is balanced by a decline in domestically generated inflation. But such an adjustment path will imply that, for some time, you have a negative output gap and low employment and this is undesirable. An alternative way to approach the questions is to consider the welfare-maximizing way of adjusting to the shock. Theoretical models tell us that strict stabilization of consumer price inflation is far from optimal (welfare-maximizing) in this situation. In the simplest model with producer currency pricing, the optimal policy is instead to stabilize some measure of domestic inflation (see Gali-Monacelli 2005 or Gali 2008, chapter 7). This means that we should focus on the rate of inflation for goods and services produced in the mainland economy and not worry about import prices. The intuition for this result is two-fold:

- i. By stabilizing domestic prices we minimize the distortions associated with domestic price adjustment. In the model, such distortions arise because firms change prices at different times, but we can think of this as representing various ways in which inflation distorts the information that is contained in the price system.
- ii. By stabilizing domestic inflation, we also stabilize the output gap.³

Under certain conditions, all the adjustment should be made by adjusting the exchange rate as described in alternative B above. So alternative B is not extreme but rather the optimal thing to do!

The point that one should focus on core domestic inflation has been made in previous reports in the Norges Bank Watch series (see e.g. NBW 2007 pages 18–22) and the basic logic appears to carry over to more complicated and realistic models. Two recent research papers develop more elaborate models for monetary policy analysis with an explicit oil-producing sector and their policy recommendations point in a similar direction. Ferrero and Seneca (2015) find that monetary policy should stabilize domestic inflation and the output gap of the mainland economy. Bergholt (2014) develops a model with wage rigidity. In such models, there is also a value in stabilizing nominal wages and Bergholt finds that monetary policy should assign a high weight to nominal wage stability.

The basic logic is simple and intuitive: what is needed is an adjustment of the relative price of goods and services produced in Norway – an improvement in competitiveness – and this is most easily achieved by adjusting the nominal exchange rate. We should not disrupt the domestic wage and price adjustment process or push the Norwegian economy into a deep recession when most of the necessary relative price adjustment can be achieved by letting the nominal exchange rate adjust.

³ Note that the converse is not true. If we would focus solely on stabilizing the output gap, we would lose control over inflation (see Gali 2008, chapter 1).

This, in fact, is the key advantage of having a floating exchange rate: that the exchange rate can function as a shock absorber and reduce the need to adjust domestic wages and prices when the economy is subject to real shocks. The problems in some euro area countries illustrate the problems that may arise when you remove this shock absorber.

In the simplest theoretical model, the necessary adjustment of the relative prices can be achieved without any decline in domestic activity. In practice, structural adjustment is necessary. The firms that are delivering goods and services to the oil sector need to contract and other firms need to expand and this process will necessarily involve some frictional and structural unemployment during the adjustment process. Some structural unemployment may also remain after the adjustment has been completed. So the adjustment will not be costless but there will necessarily be some decline in activity and employment that cannot be dealt with by monetary policy. To evaluate how much of the increase in unemployment that is unavoidable is a delicate judgement. Still, costs are minimized by letting the exchange rate do most of the necessary relative price adjustment.

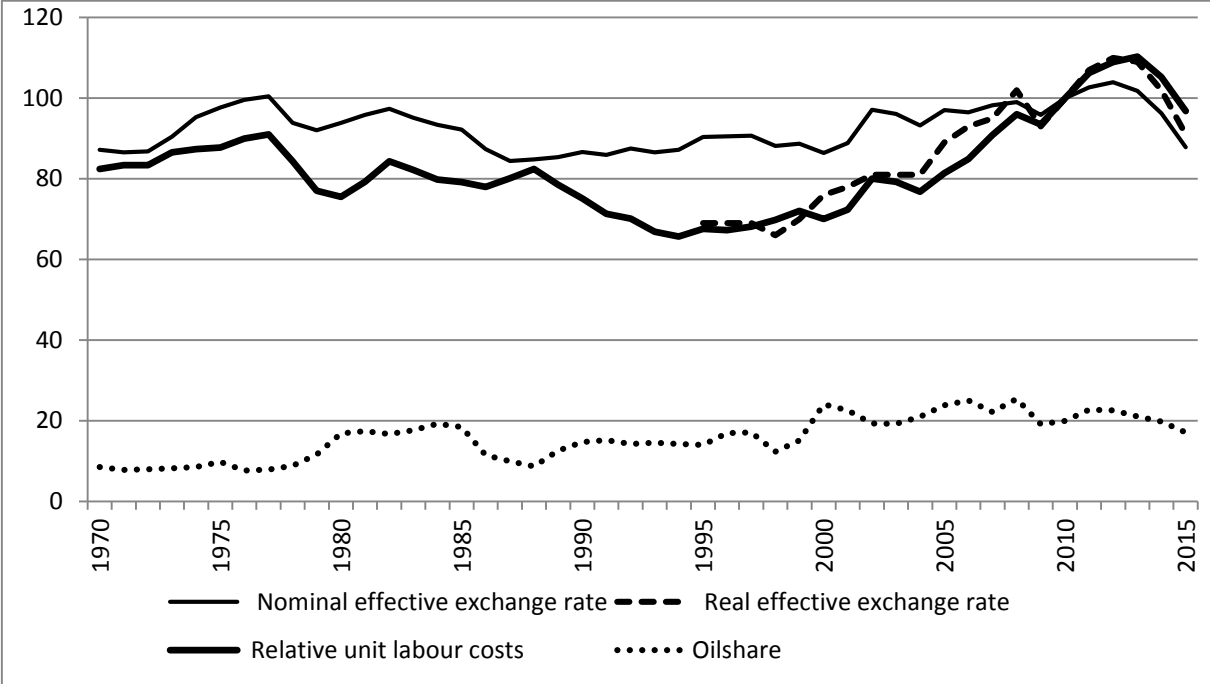
How large an interest rate response that is required along adjustment path B depends on the exact timing and permanence of the shock. It is interesting to note that if the shock is unexpected and completely permanent, the interest rate will remain unchanged in the simplest model. This follows from the uncovered interest parity condition, which says that the current exchange rate depends on expected future interest rate differentials and the expected long run level of the exchange rate. With a permanent and unexpected shock, the nominal exchange rate adjusts permanently and unexpectedly to a new level so there is no need for an interest rate differential. However, in the more realistic case when the shock is persistent but not permanent, the exchange rate depreciation will be followed by a gradual appreciation, and uncovered interest parity implies that the interest rate must be reduced and kept low for some time.

But can we trust the financial markets to set the exchange rate at the right level so as to bring balance in the Norwegian economy? Financial markets are far from perfect, but the financial speculators have studied the same textbooks as we have. They understand that the Norwegian economy needs a large real depreciation and that only a fraction of this adjustment will come through wage moderation; hence most of the relative price adjustment must be done by the nominal exchange rate. They also know that, if this adjustment does not come about, there will be unemployment in Norway and Norges Bank will react by reducing the interest rate. Hence, the exchange rate reacts to oil prices and other shocks even before monetary policymakers have reacted to the shocks.

But what amount of depreciation will be needed? Chart 10 shows two measures of competitiveness: unit labor costs and the real exchange. Both index values were around 110 in 2013 as compared to 70 in the mid-1990s, suggesting that 36 percent real depreciation ($40/110$) would be needed in order to bring competitiveness back to the level of the 1990s. Such a large depreciation is probably not necessary, but what amount of depreciation that

will be needed is hard to say. We can make estimates but only time will tell us how much was enough. Ex post, it may look as if the exchange rate overreacted, or did not react enough, but this does not mean that agents in the financial markets did not make the best possible forecast.

Chart 10 Measures of Competitiveness



Source: OECD Economic Outlook database.

So What To Do?

The above analysis shows that strict inflation targeting leads to very different policy recommendations compared to thinking in terms of optimal policy. This conflict arises because, in the type of model described above, consumer price inflation is the wrong target. As discussed above, theoretical models tell us that we should instead have some measure of core domestic inflation (or wage inflation) as the main operational target of monetary policy. The key difference between CPI and some measure of domestic inflation is that CPI contains a large share (about 1/3) of imported goods and services.

Much of the time, the difference between CPI and domestic inflation is not very important. After all, most consumption goods are produced domestically and also the pass-through of import prices is slower than it is in the simplest model where import prices are determined in the world market (producer currency pricing). But recent developments in Norway illustrate that large real shocks force us to think about this distinction. If a 30 percent depreciation of the currency feeds through into import prices of consumption goods and the

import share is 1/3 this will raise the domestic consumer price level by about 10 percent. In practice, the pass-through will take time and it will be less than complete also in the long run, but still, rising import prices will have a substantial effect on the consumer price level.

The “China effect” in the beginning of this century is another case when the difference between CPI and domestic inflation mattered. As cheap imports from China flooded the world market, prices of clothes and other imported goods were reduced and the NOK was strong because of rising oil revenue. Then the question arose whether monetary policy should try to increase domestic inflation so as to stabilize consumer price inflation. That situation was the opposite of the one Norway faces now.

So if domestic inflation is what we should stabilize in the standard macroeconomic model, why does Norges Bank target CPI? Should we change the official target to some measure of domestic inflation? We think that there are good reasons why the operative target of monetary policy is formulated in terms of consumer price inflation.

1. The key argument for targeting CPI is that it is easy to understand: CPI is a price index for the basket of goods consumed by the typical consumer. Also, data for CPI is easily available at short frequencies, with a short time lag and it is comparable across countries. So, even if it would be technically feasible, and theoretically more appealing, to use some other index as the target it would be much harder to communicate to the general public what Norges Bank is doing and why.
2. This is related to the independence of the central bank. For the general public to accept that monetary policy is delegated to some experts at the central bank it is important that the mandate of the bank can be simply stated and easily explained.
3. One of the main points of inflation targeting is to anchor expectations. For this to work the target must be perceived as relevant and easy to understand. For unions, the consumer price index is important because it determines the real values of their wages.
4. Finally, it is not so easy to separate imported and homemade inflation in the statistics. Homemade goods may contain substantial amounts of imported inputs and transportation costs and trade margins are added to the prices of imported goods before they reach the consumers.

For these reasons, it may not be desirable to change the mandate and, in any case, we must take as given that 2.5 percent consumer price inflation is the operational target of monetary policy for the time being. Does that mean that Norges Bank has to pursue a non-optimal policy, leading to a recession in Norway that is deeper than necessary when the adjustment could be made at lower costs? Not necessarily. What is needed is to emphasize the flexibility of flexible inflation targeting.

Finding Flexibility

One way to achieve flexibility is to use escape clauses. Most central banks include some “escape clauses” when formulating their policy frameworks and Norges Bank is no exception. Monetary Policy Report 3/15 states that

“In general, the direct effects on consumer prices resulting from changes in interest rates, taxes, excise duties and extraordinary temporary disturbances are not taken into account.”
(page 4)

As an example, this clause can be used if there is an increase in the value added tax (VAT). If the VAT is increased, this will have a fairly immediate and temporary effect on inflation but there are good reasons why monetary policy should not react to changes in the VAT. First, the value added tax is not something Norges Bank can control. Second, monetary policy affects inflation with a substantial lag. It would make little sense to create a recession and reduce inflation below target in 1–2 years because the VAT was raised today.

But there is no mention of oil prices or import prices in the “escape clause” above. Comparing to an increase in the VAT we may also note that Norges Bank cannot really claim that rising import prices are beyond their control. Of course, Norges Bank does not directly control the exchange rate but monetary policy affects how the economy adjusts to shocks. So if the exchange rate depreciates and this raises consumer prices, Norges Bank cannot really claim that this has nothing to do with how monetary policy is conducted.

This may create a problem with respect to communication. For the general public and wage setters, it may appear unclear why Norges Bank allows inflation to rise above the target. As a result, the NB may be inclined to choose a path which is closer to A than would be desirable to maximize welfare.

One way to deal with situations like the present one would be to extend the escape clause cited above so as to increase flexibility in dealing with oil price shocks. One could add some formulation such as:

“Large changes in oil prices may lead to fluctuations in the value of the currency which affect import prices. Such shocks will also not be taken into account.”

Such an extension of the escape clause may appear complicated but it would make sense given the importance of oil prices for the Norwegian economy. In fact, most central banks publish price indices which exclude the direct effects of energy prices on CPI. If energy prices rise and this causes inflation to rise above the target the central bank will refer to the alternative index so as to explain why there is a temporary deviation from the inflation target. Since Norway is a big producer of oil, it is instead *lower* oil prices that raise inflation by weakening the value of the currency.

The problem, though, is that the more escape clauses we have, the less clear will the monetary policy regime be and this may undermine its function in anchoring expectations and threaten the independence of the central bank. For these reasons, it may be difficult to add an explicit escape clause.

Another way to increase flexibility is to let measures of domestic inflation and wage growth play a more prominent role in the discussion and motivation of monetary policy decisions. This way the central bank can signal that although consumer prices are the target over the longer run, other measures of inflation play an important role when dealing with shocks in the medium term. Emphasizing that the operational target should be reached “over time” also helps.

In any case – and however one motivates it – there is good reason to have a flexible approach to inflation targeting when adjusting to a large oil price shock and to let the exchange rate do most of the adjustment. Our understanding is that Norges Bank does indeed pursue a flexible rather than strict inflation targeting monetary policy and we support that.

Providing a Nominal Anchor for Wage Formation

As discussed in the beginning of this chapter, the most important role of monetary policy is to provide a nominal anchor for wage formation. The famous Aukrust model was formulated for a fixed exchange rate regime and prescribed that wage increases should be determined by international inflation for tradable goods plus the productivity increase in the tradable sector (hovedkursen).⁴ The basic idea was that this is the wage increase that is consistent with maintaining the competitiveness and profitability of the tradable sector. Market forces and egalitarian wage policies imply that wages rise at the same rate in the sheltered sector.⁵

But with a flexible exchange rate, the relation between wages and competitiveness becomes more complicated. As explained above, the preferred adjustment to a large real shock will typically involve a substantial change in the nominal exchange rate. If the guideline for wage formation is maintained competitiveness or some form of profit sharing, a large depreciation of the currency may lead some unions to conclude that there is plenty of scope for wage increases. But this would be an unfortunate outcome. The currency is depreciating because the economic outlook has worsened. In such a situation, we need lower – not higher – wage increases.

⁴ See Aukrust, Holte, Stoltz (1966) and Aukrust (1977). The model was applied to Sweden by Edengren, Faxén and Odhner (1969, 1970).

⁵ For recent discussions of the Aukrust model, see Norges Banks Inflasjonsrapport 3/2002, pages 28–29, Bjørnstad and Nymoén (2007, 2015), Mehлум (2012) and NOU 2013:13 (Holden III) pages 39–44 and 158–166.

Another possible starting point for thinking about wages is to aim for stable real wage growth, or at least to prevent a reduction of the real wage. But as we have explained above, a large negative demand shock means that a substantial improvement in competitiveness is needed and this may very well require a reduction in the real wage. If unions try to obstruct this adjustment by demanding compensation for imported inflation, this will only prolong the adjustment process and increase unemployment.

So if wage setters think in terms of preserving competitiveness at the current exchange rate, or safeguarding real wage growth, they may react in an undesirable way to a depreciating currency. To avoid such a reaction, monetary policymakers may choose to avoid a very large depreciation of the currency.

The basic problem here is that, with a flexible exchange rate, neither maintaining competitiveness at the current exchange rate, nor protecting real wages should be the starting point for thinking about wage formation.⁶

What Norm for Wages?

So how should we think about wage formation when we have a flexible exchange rate? What is a desirable rate of wage increase? Consider the following equations which are taken from Holden III:⁷

$$k = \Delta w - \Delta z_k - \Delta p_k^* - \Delta v$$

$$\Delta p_s = \Delta w - \Delta z_s$$

$$\Delta p_i = \Delta p_k^* + \Delta v$$

$$\pi = (1 - \alpha) \Delta p_s + \alpha \Delta p_i$$

The first equation defines the change (weakening) of competitiveness (k) as the change in the wage (Δw) minus productivity growth in the tradables sector (Δz_k) minus the change in foreign competitors' prices in foreign currency (Δp_k^*) and the change in the exchange rate Δv (the price of foreign currency). Note that we are not taking a stand on how prices are set in the sector producing tradable goods. In some markets, firms set prices based on costs and

⁶ Yet another alternative is to say that wages should rise at the same rate as in comparable countries. In Sweden, this norm goes under the name of the "Europe norm". Such a norm may lead to appropriate wage settlements if the inflation target and productivity growth are the same as in the chosen "comparable countries" and there are no large real shocks. Any deviation from these conditions will make the norm problematic, however. For a discussion and critique of the "Europe norm" see Gottfries (2010).

⁷ NOU 2013:13, pages 164–166, equations (1), (2), (4), (5) and (13).

higher wages mean that firms raise prices and lose market shares. In other markets, firms are price-takers in world markets but higher costs mean that firms supply less or leave the markets. Either way, loss of competitiveness will, ceteris paribus, lead to a decline in exports, production and employment in the sector producing tradable goods.

The second equation says that price growth in the sheltered sector (Δp_s) is determined by the wage increase minus productivity growth in this sector (Δz_s). The third equation says that imported goods are bought at a given price in the world market so the increase in the price of imported goods is the price increase of tradable goods in foreign currency plus the change in the exchange rate.

The last equation says that inflation, as measured by the consumer price index, is a weighted average of inflation in the sheltered sector and the rate of growth of import prices. The parameter α reflects the importance of imported goods in consumption and reflects the openness of the economy. For simplicity, we follow Holden III and assume that domestic consumers do not consume domestically produced tradable goods.

Setting $k = 0$ and assuming a fixed exchange rate ($\Delta v = 0$) the first equation gives us Aukrust's main course for wage inflation:

$$\Delta w = \Delta p_k^* + \Delta z_k .$$

With a fixed exchange rate, this is the wage increase that is consistent with maintained competitiveness and profitability in the traded goods sector. We have four equations that determine four endogenous variables: $\Delta w, \Delta p_s, \Delta p_i$ and π . Domestic inflation is anchored to foreign inflation via the profitability condition for the tradable sector.

But what if we have a flexible exchange rate and there are large changes in the exchange rate from one year to the next? What rate of wage increase will then be consistent with maintained competitiveness and balance of the real economy?

It is clear that large fluctuations in the exchange rate pose a challenge for wage negotiations.⁸ In terms of the system of equations above, we need to replace the fixed exchange rate assumption ($\Delta v = 0$) with another equation that determines the exchange rate.

One approach here is to say that the exchange rate is hard to understand. We just have to accept that it is what it is, or make some statistical forecast, and use that as input when discussing what wage increases we should have. Such an approach is very problematic,

⁸ TBU 2015:2 quotes a statement by the employers' federation (NHO): "There is uncertainty in the currency markets. Experience shows that such developments can quickly turn around. The current exchange rate should therefore not play a role in the wage settlements. Better prices in export markets should be used to improve the competitiveness and adaptability of the businesses." (page 54 in TBU 2015:2, author's translation)

however, because the exchange rate is a highly endogenous variable. If wages rise and there is a weak response by the central bank this will lead to a weakening of the currency. If wages rise and there is instead a strong response by the central bank, higher wage increases will lead to a higher real interest rate and an appreciation of the currency. Thus we cannot find a reasonable norm for wage increases without having an explicit theory of how the exchange rate is determined and this depends crucially on how monetary policy is conducted.

Treating the exchange rate as endogenous we have four equations and five endogenous variables so we need to add an equation representing monetary policy. This can be done in many different ways. One way to deal with the exchange rate is to note that it is the inflation target that is the nominal anchor, so we add an equation saying that that inflation is equal to the inflation target. This is done in Norges Banks Inflasjonsrapport 3/2002 (Hovedkursteorien i ny form, pages 28–29) and in NOU 2013:13 (“Holden III”, pages 164–166) and this is appropriate to describe the long run path for inflation and wage increases.

Here we use a somewhat more general version that allows for some medium-term flexibility in inflation targeting. We assume that Norges Bank carries out monetary policy in such a way that inflation is

$$\pi = \pi^{\otimes} - \theta k^o$$

where π^{\otimes} denotes the inflation target and k^o represents the *desired* change in competitiveness. The latter is the change in competitiveness that is necessary in order to stabilize production and employment in the mainland economy and it is taken as exogenous here. A positive value of θ represents flexibility in inflation targeting. The idea is that when some improvement of competitiveness (negative k) is required, the central bank will allow the currency to weaken, raising import prices and pushing inflation above the target, and conversely. This is in line with the reasoning above about the optimal way to adjust to major demand and oil price shocks. Combining these equations we get

$$\begin{aligned} \pi^{\otimes} - \theta k^o &= (1 - \alpha)(\Delta w - \Delta z_s) + \alpha(\Delta p_k^* + \Delta v) \\ &= (1 - \alpha)(\Delta w - \Delta z_s) + \alpha(\Delta w - \Delta z_k - k) = \Delta w - \Delta z - \alpha k \end{aligned}$$

where Δz is average productivity increase: $\Delta z = (1 - \alpha)\Delta z_s + \alpha\Delta z_k$. We can solve this equation for the resulting change in (weakening of) competitiveness:

$$k = \frac{1}{\alpha}(\Delta w - \pi^{\otimes} - \Delta z) + \frac{\theta}{\alpha}k^o.$$

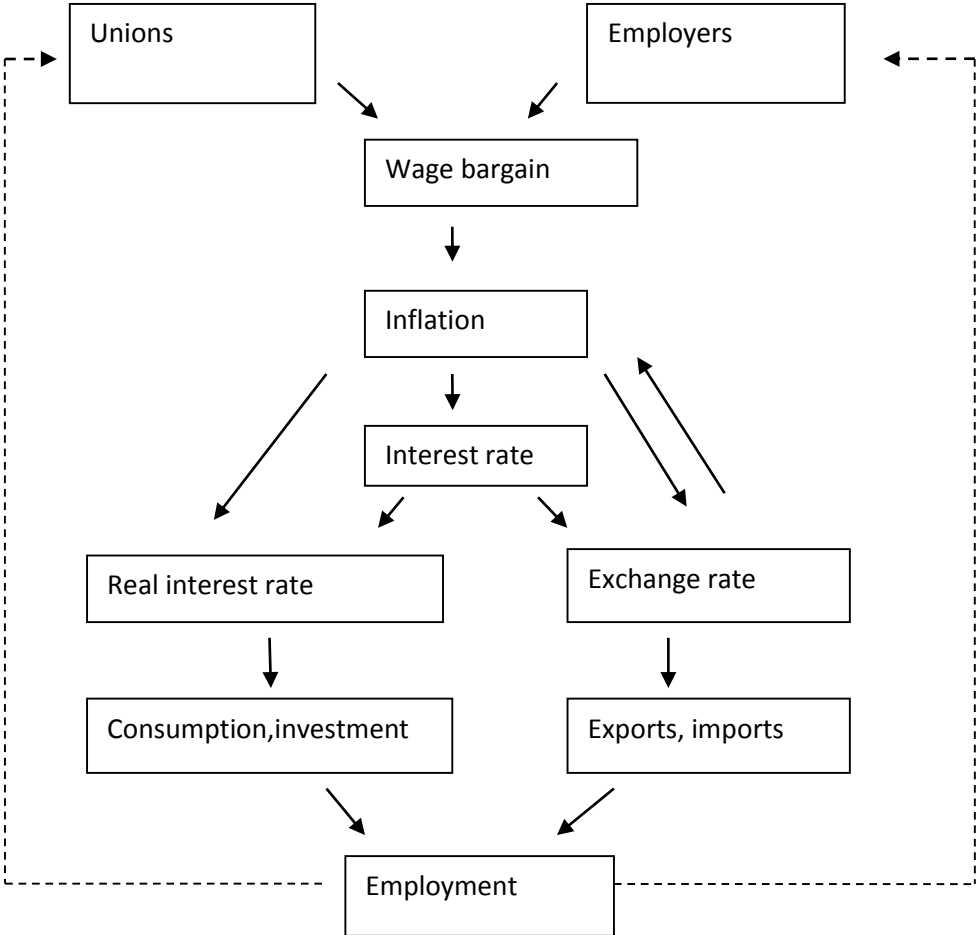
In order to interpret this equation, let us first assume that the economy is in balance and there is no desired change in competitiveness: $k^o = 0$. Then the wage increase that is

consistent with maintained competitiveness is given by the inflation target plus average productivity growth in the economy:

$$\Delta w = \pi^{\otimes} + \Delta z.$$

If wages increase more than this, competitiveness will be eroded (k will be positive). This happens via two channels. First, the wage increase has a direct effect on competitiveness. Second, when inflation exceeds the target value, the central bank will “lean against the wind” setting a high interest rate so as to bring inflation back towards the target value. A higher interest rate will lead to an appreciation of the currency (lower Δv) and erosion of competitiveness. This process is illustrated in Chart 11.⁹

Chart 11 Wage setting, monetary policy and employment in a flexible exchange rate regime



⁹ The solution for the exchange rate can be found in the appendix.

An interesting thing to note is that $1/\alpha$ is larger than unity. With inflation targeting, the effect of too high wage increases on competitiveness is in fact larger than it would be with a fixed exchange rate. The intuition behind this result is that a higher wage increase raises inflation in the sheltered sector so, to reach the inflation target, the central bank must pursue a policy that leads to appreciation of the currency and lower imported inflation. For inflation to be equal to the target, the currency must appreciate by $(1-\alpha)/\alpha$ times the wage increase so the total effect on competitiveness is $1+(1-\alpha)/\alpha=1/\alpha$. With $\alpha=1/3$ a one percent excess wage increase will lead to 3 percent weakening of competitiveness.¹⁰

Now consider a situation when the economy has been subject to a negative demand shock so that an improvement in competitiveness is needed. Setting $k=k^0$ we find the wage change that is consistent with the desired change in competitiveness:

$$\Delta w = \pi^{\otimes} + \Delta z + (\alpha - \theta)k^0.$$

When an improvement in competitiveness is required, wage moderation may be needed but how much depends on how monetary policy is conducted. With $\theta=\alpha$ no wage moderation is needed. This corresponds to the adjustment path B which was discussed above, where the central bank disregards imported inflation and domestically generated inflation is stabilized. This equation illustrates the complementary role of monetary policy and wage formation in achieving the desired change in competitiveness. In general, we would expect monetary policy and wage formation to share the burden of adjustment.

We can view the equation above as a *norm* for how much wages should increase. The scope for wage increases is determined by three factors:

- the inflation target
- normal productivity growth
- the real economic situation/ required changes in competitiveness.

When applying this in practice, three things should be noted:

First, Δz should be interpreted as *normal* productivity growth in the mainland economy. Because of labor hoarding, labor productivity fluctuates a lot from year to year but such fluctuations should be disregarded. So with an inflation target of 2.5 percent and normal productivity growth of 2 percent, normal wage growth will be 4.5 percent.

Second, there can be different reasons why changes in competitiveness may be required. If unemployment is high, an improvement in competitiveness may be needed. A bursting

¹⁰ A verbal argument along these lines is made in Holden III (NOU 2013:13) page 160.

house price bubble will lead to a fall in domestic demand; again competitiveness needs to improve so as to increase exports and compensate for the decline in domestic demand.

Third, we would typically think that the burden of adjustment would be shared between monetary policy and wage formation but that most of the adjustment is borne by the exchange rate. This way of reasoning implies that in the current situation, with a major decline in the oil price and a weak outlook for the economy, wage increases should be lower than the normal rate.

To sum up, there is no question that maintaining an appropriate level of competitiveness is extremely important in a small open economy but with a flexible exchange rate the effect of wages on competitiveness involves the reaction of the central bank. Wage increases which are too high to be consistent with the inflation target will force the central bank to raise the interest rate, the currency will appreciate, and competitiveness will be eroded. So in normal times, wages should be equal to the inflation target plus normal productivity growth. High unemployment or a negative demand shock will mean that competitiveness needs to improve and wage setters can help to ease this adjustment.

Flexibility vs Credibility

We have argued above that inflation, as measured by the consumer price index, is the natural target because it is easy to understand and a natural anchor for wage formation. In normal times, Norges Bank aims for 2.5 percent inflation so with 4.5 percent wage increase, workers get a 2 percent real wage increase, which is in line with productivity growth in the mainland economy.¹¹

But at the same time we have argued for a flexible approach to monetary policy in the medium term. In the face of major negative demand shocks, Norges Bank should allow the currency to depreciate although this raises import prices and erodes real wages. Sometimes, Norges Bank must “reach into the pockets” of the wage earners and take away some of their wage increases by allowing inflation to exceed the target. One may ask whether such flexible approach to inflation targeting will undermine the credibility of the monetary policy regime as wage earners see their real wages being stagnant or even decline.

We do not view this as a major problem. We think that, once you have established a solid low-inflation regime, monetary policy makers have considerable leeway to conduct policy in a flexible way. Unions must understand that real shocks require real adjustments and that, if oil prices remain low, they are in for some years of low or even negative real wage growth. If

¹¹ The specific number for productivity growth can be changed in this argument.

they try to resist that they will just make the adjustment more painful, with higher unemployment.¹²

So in the medium term, inflation targeting should be applied in a flexible way. If inflation rises above, or falls below the target for a couple of years this need not be a problem. But for the credibility of the regime, it is important that inflation eventually returns to the target value. If inflation stays persistently above or below the target value, this will undermine the credibility of the inflation targeting regime in the long run and uncertainty about the inflation target will transmit to uncertainty about the exchange rate.

Too Much Wage Moderation may be Counterproductive

We argued above that wage setters can help in the adjustment by applying wage moderation when the economy is subject to a negative demand shock. However, it is important to realize that too low nominal wage inflation may be counterproductive.

Economic theory tells us that it is the *real* interest rate that determines consumption and investment and also that it is the real interest rate that determines the real exchange rate.¹³ In a normal situation, too high wage increases will raise inflation above the target level and this means that the central bank will raise the interest rate more than inflation so that the *real* interest rate increases and this will have a negative effect on economic activity. Conversely, lower wage increases will lead the central bank to set a lower the interest rate and this will stimulate economic activity. So in normal times, wage moderation will have a positive effect on job growth.

But there is a limit to how low the interest rate can be. When the interest rate is at the lower bound, lower wage growth will raise the *real* interest rate instead of reducing it. This means that very low nominal wage increases will not help to stimulate employment.

This is illustrated in Chart 12 where we have wage growth on the horizontal axis and inflation and the interest rate on the vertical axis. We assume that inflation is wage growth

¹² TBU 2015:2 quotes LO as saying that “The outlook points to a weaker basis for real wage growth in Norway ... (and this) will imply lower wage growth.” (TBU 2015:2 page 54, author’s translation)

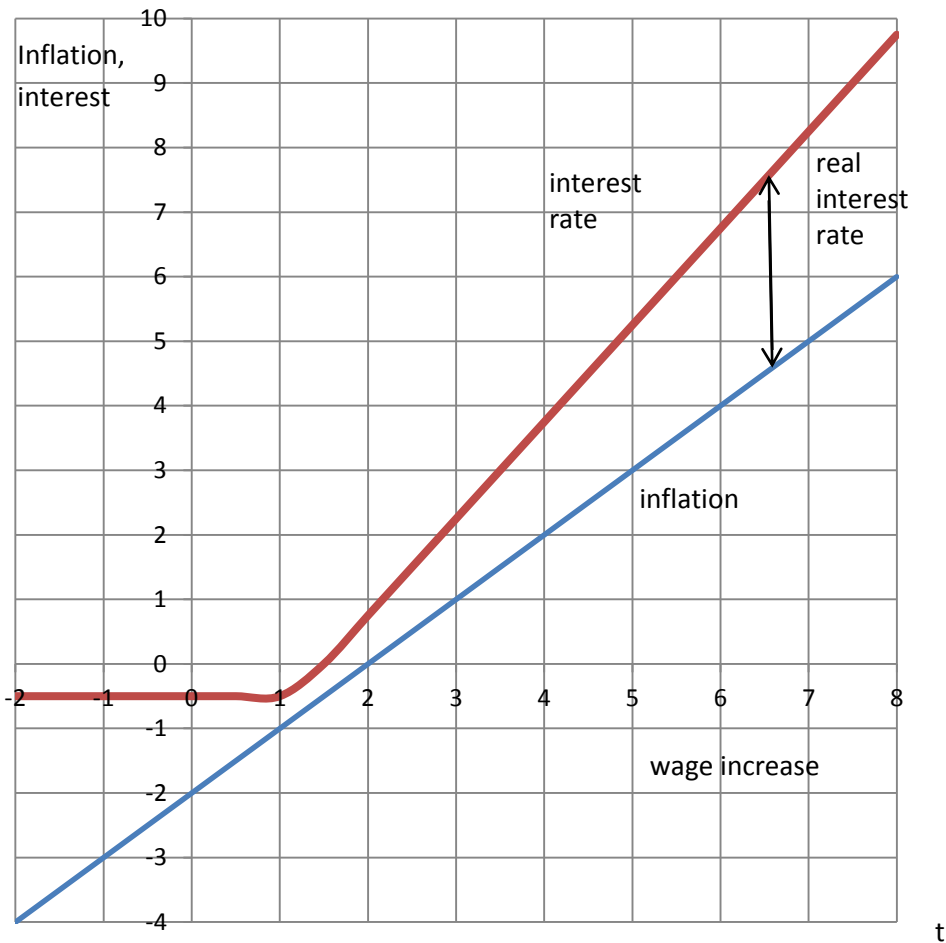
¹³The uncovered interest parity condition says that the interest in Norway, i , should be equal to the foreign interest rate, i^* , plus the expected change in the exchange rate Δv^e : $i = i^* + \Delta v^e$ where v is the price of foreign currency. The expected real interest rate is defined as $r = i - \Delta p^e$ where Δp^e is expected inflation. Similarly for the rest of the world: $r^* = i^* - \Delta p^{*e}$. (Prices and exchange rates are in logs.) The real exchange rate is the price level at home relative to the price level abroad: $q = p - p^* - v$. This gives us $\Delta q^e = r^* - r$ and thus $q = r - r^* + q^e$. Today's real exchange rate is determined by the expected real interest rate and the expected future real exchange rate. For a given given expected future real exchange rate, an increase in real interest rate leads to a real appreciation i.e. an increase in the domestic price level compared to the price level abroad.

minus productivity growth and that Norges Bank follows the “Taylor Rule” when it sets its monetary policy:

$$i = \bar{r} + \pi + \Phi_{\pi} (\pi - \pi^{\otimes}) + \Phi_y y.$$

Here i is the interest rate set by the central bank. The constant \bar{r} is a normal real interest rate, π is the inflation rate and π^{\otimes} is the inflation target. The coefficient Φ_{π} is positive and shows that if inflation exceeds the target value, the central bank reacts by raising the interest rate. Similarly, the coefficient Φ_y shows how the central bank reacts on the output gap y . As a simple case we assume that the output gap is zero and the normal real interest rate and productivity growth are both 2 percent and the inflation target is 2.5 percent. Following Taylor we set $\Phi_{\pi} = \Phi_y = 0.5$. Also, we assume that there is a lower bound on the interest rate at minus 0.5 percent. In the figure, the real interest rate can be seen as the difference between the interest rate and inflation.

Chart 12 The relation between inflation and the interest rate when the central bank follows the Taylor rule



With these assumptions, the normal situation is that wage growth is 4.5 percent, inflation is 2.5 percent and the interest rate is 4.5 percent so the real interest rate is 2 percent. If wage growth increases to 5.5 percent, inflation will increase to 3.5 percent and the central bank will raise the interest rate to 6 percent so the real interest rate will increase to 2.5 percent. A higher real interest rate will dampen economic activity and bring inflation back towards the target value. Similarly, lower wage growth will lead the central bank to reduce the interest rate more than inflation, so the real interest rate falls and this stimulates economic activity.

But when the lower bound on the interest rate binds, the central bank cannot react to lower inflation by reducing the interest rate. In such a situation, lower wage growth will still reduce inflation but since the interest rate cannot be reduced, the real interest rate will increase! In this numerical example, the lower bound on the interest rate starts to bind when wage growth is 1.2 percent. So in this numerical example, wage growth below 1.2 percent is counterproductive as a way to stimulate employment.¹⁴

With a negative output gap, the lower bound will be binding at a higher rate of wage growth. With an output gap of minus 2 percent, the lower bound on the interest rate binds at a wage increase equal to 1.8 percent. We can consider other numbers here but the basic point is that there is some point at which lower wage growth will not help to raise economic activity.

The bottom line is that, in the face of real shocks, unions will need to show “*real wage flexibility*” and they may very well have to accept a reduction of their real wages but too low *nominal* wage growth may be counterproductive. In the face of a large negative shock, nominal wage increases in the order of 2–3 percent may be appropriate. In June 2015, TBU projected wage increases to be 2.7 percent in 2015 and this appears to be a reasonable level in the present situation.

Pattern Bargaining (Frontfagsmodellene)

Norway has a strong tradition of centralized and/or coordinated wage bargaining which now takes the form of pattern bargaining with the agreement for industry workers setting the benchmark for wages (frontfagsmodellene). When discussing the usefulness and viability of this model, it is useful to separate several different aspects.

The first question is whether *coordination* of wage bargaining is a good idea. Here we can refer to international evidence suggesting that, in an economy with strong unions, coordination is valuable. Without coordination, there will be “leapfrogging” where each union tries to get a somewhat higher wage increase than the others. The result is that wages are raised until unemployment is sufficiently high to prevent a further increase in wage

¹⁴ Setting $i = -0.5$ we get $-0.5 = 2 + 1.5(\Delta w - 2) - 0.5 \cdot 2.5$.

inflation. This is not an undesirable outcome. (See e.g. Bjørnstad and Nymoen, 2015, for a discussion.)

The second question is *what norm* should be used when setting wages. We have argued above that, with a flexible exchange rate, it is the inflation target that is the nominal anchor and hence the wage setters should consider the inflation target and normal productivity growth in order to find a benchmark for wages. The real economic outlook and required changes in competitiveness should also be considered.

The third question is *who should be the wage leader* (frontfag). For pattern bargaining to work, there must be a wage leader who has the authority and ability to take responsibility for setting the pace of wage growth. The discussion of which sector should be the leader is outside the scope of this report, however.¹⁵

In the coming years, heterogeneous developments within the tradeable industry will create a challenge for pattern bargaining. While oil-related industries face difficult times, industries which are not oil-related have experienced a marked improvement in their competitiveness and their profits will increase. Insiders in the latter industries may think that they have the right to a share of the increasing profits.¹⁶

TBU

As a preparation for wage negotiations, Statistisk Sentralbyrå makes detailed analyses of recent wage trends and they also make forecasts for economic developments and inflation. The inflation forecast is an important input into the wage negotiation where much of the focus is on real wage developments. In the current situation, the parties have accepted an agreement which implies very limited growth of real wages.

Clearly, the real take-home pay is what wage-earners care about, but wage negotiations cannot focus entirely on real wages, because it would mean that wages would not be anchored in nominal terms. This could, in theory, have negative consequences. According to the projections made by Norges Bank, inflation will be below target and there will be a negative output gap in 2018. Looking at such forecasts, wage setters might conclude that inflation will be low and the economic outlook is bad so we need very low nominal wage increases or even wage cuts. But very low wage increases will lead to even lower inflation, and so on, and this could push Norway into a situation where the lower bound on the

¹⁵ Calmfors and Larsson Seim (2013) analyse wage leadership in the open economy. They find that, under inflation targeting, the outcome is independent of which sector is wage leader while in a monetary union, wage leadership by the non-tradables sector is more conducive to wage restraint. Gottfries (2010) argues more informally that it may be better if industry is the wage leader because that sector is hit more directly by rising interest rates and loss of competitiveness if wage inflation is too high.

¹⁶ Studies such as Nymoen and Rødseth (2003) and Forslund, Gottfries and Westermark (2008) show that historically, wages have adjusted to the available surplus in the Nordic countries.

interest rate binds and monetary policy becomes unable to stimulate the economy. This is not a desirable outcome because, as we have explained above, the exchange rate should bear the brunt when it comes to adjustment of competitiveness. Such a downward spiral can be avoided if the inflation target is seen as the anchor for nominal wage growth.

Summary

A persistent decrease in the oil price constitutes a major negative demand shock for the mainland economy. It affects both the income of the government (and indirectly consumers) and the demand for inputs to the oil-producing sector. To compensate for this, a major improvement of the competitiveness of the mainland economy is needed and this adjustment may very well require a reduction in the real wage.

Theoretical models suggest that most of this adjustment should be made by adjusting the nominal exchange rate. This way you avoid an unnecessarily large negative output gap in the mainland economy and disruption of the domestic wage and price adjustment process. Still, some temporary increase in unemployment is unavoidable as a result of labor market frictions and structural changes.

In the face of a large real demand shock it is important to apply inflation targeting in a flexible way. In the present situation this means that the nominal exchange rate is allowed to depreciate although this means that consumer price inflation will rise temporarily above the target because of rising import prices. In the long run, inflation should be brought back to the target, however.

It is the inflation target that is the nominal anchor in an inflation targeting regime. When the economy is in balance the rate of wage growth that is consistent with maintained competitiveness is equal to the inflation target plus normal productivity growth in the mainland economy. But wage setters should also take account of the real economic outlook. When there is a need to improve competitiveness, some wage moderation is desirable.

Too low nominal wage growth will be counterproductive, however, because of the lower bound on the nominal interest rate.

Recent Developments from the Perspective of Economic Theory

Looking at what has happened in the Norwegian economy over the past two years from the perspective of our theoretical models, we note that, in broad terms, the macroeconomic outcome is exactly what our models predict should happen after a major negative demand shock.

There has been a large decline in the exchange rate, the interest rate has been cut and wage growth has moderated. There is an increase in consumer price inflation which is due to an increase in import prices but this is projected to be a temporary effect. Nominal wage growth has declined and was projected to be 2.7 percent in 2015, which is lower than normal, but not extremely low. On the whole, Norges Bank and the in the wage setters are doing what they should do in this situation.

Exchange rate movements are often hard to understand and, much of the time, it is hard to relate exchange rate movements to fundamentals. In this case, however, the currency markets have done what they should do, at least in qualitative terms. Norway needed a substantial depreciation and the exchange rate is doing its job as a shock absorber. Whether the size of the depreciation is appropriate is very hard to say.

In fact, recent developments in Norway largely confirm the validity of standard economic theory. Three issues may be raised, however.

The first concerns the speed and magnitude of the interest rate response. This has been too weak if the ambition was to stabilize inflation and the output gap. According to the projections in Monetary Policy Report 4/15, inflation (as measured by KPI_JAE) and the output gap will both be below target at the end of the forecast horizon (2018). But Norges Bank's own simulations in Monetary Policy Report 4/15 (pages 30–31) show that a more aggressive interest rate response would have brought inflation and the output gap closer to the target values in 2018. Such a policy would have required negative interest rates in 2016 and 2017. The reason why such a more aggressive policy is not pursued is that monetary policy also has a third criterion called "robustness" which includes a concern for financial imbalances. This criterion was discussed in the introduction chapter of this report.

The second issue concerns the long run level of the inflation rate. While we agree with Norges Bank that inflation targeting should be applied in a flexible way, we view it as important to eventually return inflation towards the target value (2.5 percent) so as to maintain the credibility of the inflation targeting regime in the long run. We do not think that credibility of monetary policy is a major issue today, but if Norges Bank appears to accept that inflation stays permanently below the target, this will affect expectations. If markets come to believe that, in practice, the target is 2 percent rather than the official 2.5, why not 1.7 or 1.5? This is a slippery slope and uncertainty about the inflation target may also translate into exchange rate uncertainty.

The third issue concerns the timing and communication of the interest rate adjustments during 2015. Norges Bank was not very predictable but surprised the market in March and September. This issue is discussed in the next chapter of this report.

References

- Aukrust, Odd, 1977, Inflation in the open economy. A Norwegian model. I: Klein, L. B. og Sålant, W. S. red. *World Wide Inflation. Theory and Recent Experience*. Washington D.C., Brookings.
- Aukrust, O., Holte, F. og Stoltz, G., 1966, Innstilling II fra Utredningsutvalget for inntektsoppkjørene 1966. Vedlegg til St.meld. nr. 58 for 1966–67.
- Bergholt, Drago, 2014, Monetary policy in oil exporting economies, working paper, 5/14, CAMP, BI.
- Bjørnstad, Roger and Ragnar Nymoen, 2007, Den norske modellen for lønnsdannelse: Enda viktigere etter ny politikk, *Økonomisk Forum* 7, 4–13.
- Bjørnstad, Roger and Ragnar Nymoen, 2015, Frontfagsmodellen i fortid, nåtid og framtid, Rapport 1-2015, Senter for lønnsdannelse.
- Brubakk, Leif and Tommy Sveen, 2008, NEMO –en ny makromodell for prognoser og pengepolitisk analyse, *Penger og Kreditt* 1/2008, sid. 33–40.
- Edengren, G. K. Faxén and C. Odhner, 1969, Wages, growth and the distribution of income, *Swedish Journal of Economics* 71, 133–160.
- Edengren, G. K. Faxén and C. Odhner, 1970, *Lönebildning och samhällsekonomi*, Rabén och Sjögren, Stockholm.
- Forslund, Anders, Nils Gottfries and Andreas Westermarck, 2008, Prices, productivity and wage bargaining in open economies, *Scandinavian Journal of Economics* 110, 169–195.
- Ferrero, Andrea and Martin Seneca, 2015, Notes on the underground: monetary policy in resource-rich economies, Norges Bank working paper 2/15.
- Gali, Jordi and Tommaso Monacelli, 2005, Monetary policy and exchange rate volatility in an open economy, *Review of Economic Studies*, 72, 707–734.
- Gottfries, Nils, 2010, Fungerar den svenska lönebildningen?, *Bilaga till LU 2010:93*.
- Mehlum, Halvor, 2012, Med Aukrust fra Norge til Hellas og tilbake, *Sammfunnsøkonomen* 8, 4–8.
- Norges Bank, 2002, Hovedkursteorien i ny form, in *Inflasjonsrapport 3/2002*, sid. 28–29.
- NOU 2013:13, Lønnsdannelsen og utfordringer for norsk økonomi (Holden III).
- Nymoen, Ragnar and Asbjørn Rødseth, 2003, Explaining unemployment: Some lessons from Nordic wage formation, *Labour Economics* 10, 1–29.

TBU, 2015, Etter Intektsoppgjørene 2015, Oppsummering av mellomoppgjørene, rapport fra det tekniska beregningsutvalget for inntektsoppgjørene.

Appendix: The Exchange Rate under Flexible Inflation Targeting.

To solve for the exchange rate as a function of the wage increase we use the fact that

$$\pi^{\otimes} - \theta k^o = (1 - \alpha)(\Delta w - \Delta z_s) + \alpha(\Delta p_k^* + \Delta v).$$

We assume that sector shares and productivity growth are the same abroad as at home. Foreign wage inflation is assumed to be consistent with the foreign inflation target π^* . Then we have

$$\Delta p_k^* = \Delta w^* - \Delta z_k = \pi^* + \Delta z - \Delta z_k = \pi^* + (1 - \alpha)(\Delta z_s - \Delta z_k).$$

Combining these two equations we can write

$$\alpha \Delta v = \alpha(\pi^{\otimes} - \pi^* + (1 - \alpha)(\Delta z_s - \Delta z_k)) - (1 - \alpha)(\Delta w - \pi^{\otimes} - \Delta z_s) - \theta k^o.$$

and thus

$$\Delta v = \pi^{\otimes} - \pi^* - \frac{1 - \alpha}{\alpha}(\Delta w - \pi^{\otimes} - \Delta z) - \frac{\theta}{\alpha} k^o.$$

If the inflation target is higher than the target abroad, the currency will depreciate (Δv will be positive). If wage increases exceed the inflation target plus average productivity growth, the central bank will make the currency appreciate so as to stabilize inflation. If the central bank wants competitiveness to improve (negative value of k) the currency will depreciate.

Chapter 3. Predictability and Consistency in 2015

From the perspective of dampening the impact of the oil downturn on the economy, monetary policy in 2015 was a success. The lowering of interest rates has probably prevented a strong slowdown in consumption and in the housing market driven by lower real wage growth and reduced confidence. More importantly the strong NOK weakening means a drastic improvement in domestic firms' competitiveness. Nearly all the loss of competitiveness through the oil boom is reversed. This does not only mean stronger growth. If NOK remains weak, this is, as argued earlier, by far the easiest way to facilitate the needed restructuring of the economy following the drop in oil price.

Growth has admittedly slowed significantly and unemployment has increased. Capacity utilization is forecasted to be well under normal for a long period and inflation well below target. But given the shocks the economy has met, the downturn must be at least so far be labelled moderate. Unemployment has only increased in the four counties on the west coast with oil related employment above the national average, while it is close to flat or down in the rest of the country. With the large structural change facing the Norwegian economy it would be naive to believe one could avoid an increase in so called frictional unemployment.

The main aim of this chapter is, however, not to evaluate the real effect of monetary policy, but to assess whether it was well communicated, predictable and consistent.

Predictability is Important, but Could be in Conflict with Other Objectives

Norges Bank has since the introduction of the inflation target stressed the importance of being a predictable central bank. According to the theory a predictable central bank is a more effective central bank because monetary policy works through expectations. Norges Bank was among the first central banks to publish its own forecast for interest rates (the interest rate path) and predictability was of course the main reason for that. But it is well understood that if things turn out different than expected the interest rate path will change. Norges Bank has therefore gone far in trying to educate the market how its view will change with a different development than expected (its "reaction function"). In each Monetary Policy Report (MPR) Norges Bank publishes how much diverging economic factors have contributed to revisions of the interest rate path (the "interest rate account"). The idea is clearly to show how new information has changed the interest rate path. The general idea is that if the market knows Norges Bank's interest rate path and understands its reaction function, neither the decision nor the new interest rate path should be a big surprise. It will also give the interest rate forecast more credibility if it is well understood why it changes.

If this model is to work, Norges Bank has to be reasonably consistent over time and the objectives of monetary policy must be fairly stable. The inflation targeting regime makes sure that the objective of monetary policy is fairly stable. Still, the increased flexibility that

Norges Bank has adopted over the years, with more weight on financial stability, could easily make monetary policy less predictable and, at least for an outsider, less consistent. In every MPR Norges Bank explains how the risk picture affects monetary policy. To understand and predict how this risk picture changes and how it affects the interest rate path has to a large degree been impossible for outsiders. How much, say, a perceived increased risk of too high household debt affects the interest rate path is hard to know. It is not documented by Norges Bank in the way it has documented how inflation different from forecast has affected the rate path, for example. What triggers such a higher perceived risk? How is it accounted for in the interest rate account?

The main purpose of this chapter is to discuss whether monetary in 2015 was predictable and consistent. We do however understand that in the real world and especially now given the huge challenges that the Norwegian economy faces, consistency and predictability could be hard to achieve and possibly be in conflict with other objectives. That Norges Bank adopts a more flexible attitude and changes emphases in monetary policy depending on the challenges the economy confronts is sensible and might be worth its cost in the form of decreased predictability. But if that is the case Norges Bank might think through its way of communicating, which gives the impression of a rather stable objective and reaction function.

Overview over 2015

Norges Bank's executive board had six monetary policy meetings in 2015. At four of them (in March, June, September and December) a new Monetary Policy Report (MPR), with new interest rate forecasts, was also published. At the two intermediate meetings, in May and October, the Executive Board only assessed the recent economic developments, but gave no new forecasts.

During 2015, Norges Bank cut its policy rate twice by 25bps, in June and September, and the bank lowered significantly its forecasts for future rates. The interest rate path presented in December 2014 (MPR 4/14) had a trough at 1.13%, to be reached in the summer 2015, while the trough in the path presented in December 2015 (MPR 4/15) was at 0.39%, to be reached late 2016; see Chart 13.

Chart 14 illustrates the factors that contributed to the change in the interest rate path from December 2014 to December 2015. It is a summing up of Norges Bank's own interest rate accounts published in each MPR. Lower forecasts for total demand growth in the economy had the largest negative effect on the rate path. Lower demand pulled down the interest rate path in every MPR during 2015. It is however worth noting that the forecasts for 2015 for mainland demand, GDP growth, capacity utilization and registered unemployment are about the same in MPR 4/14 and MPR 4/15. In other words it is the outlook for the coming years which has deteriorated. A drop in oil prices by close to USD 30 per barrel during 2015

is probably one reason for the rather dramatic change in view. We will discuss later whether we see that as a satisfactory explanation.

In MPR 1/15 and MPR 2/15 Norges Bank reduced its forecast for current and future wage growth. Through 2015 the wage growth forecast was revised down $\frac{1}{2}$ percentage point for 2015, $\frac{3}{4}$ percentage points for 2016 and 1 percentage point for 2017. A more moderate wage settlement in 2015 seems to be one main reason for the downward revision, but a dampening effect from lower oil prices also seems important. In the interest rate accounts the effect on interest rates from lower wage growth is, at least in the short term, to some degree offset by the fact that actual inflation has been higher than expected (wages, current inflation etc. are lumped together in the interest rate accounts).

Expected future interest rates abroad fell further during 2015. Given no adjustment of Norwegian interest rates this would mean that NOK would be stronger and monetary policy in effect tighter according to Norges Bank's view. Lower rates abroad gave a significant contribution to the lowering of the interest rate path.

NOK depreciated strongly through 2015 and turned out much weaker than forecasted by Norges Bank. That dampened the downward revision of the rate path. Actually if we are to take the interest account literally key rates would currently have been zero and would have been forecasted to be -0.8% at end of 2016 if it were not for the fact that NOK has weakened significantly. This illustrates the importance that the weakening of NOK had for monetary policy in 2015.

Chart 13 Norges Bank's forecast for key rates in various MPR

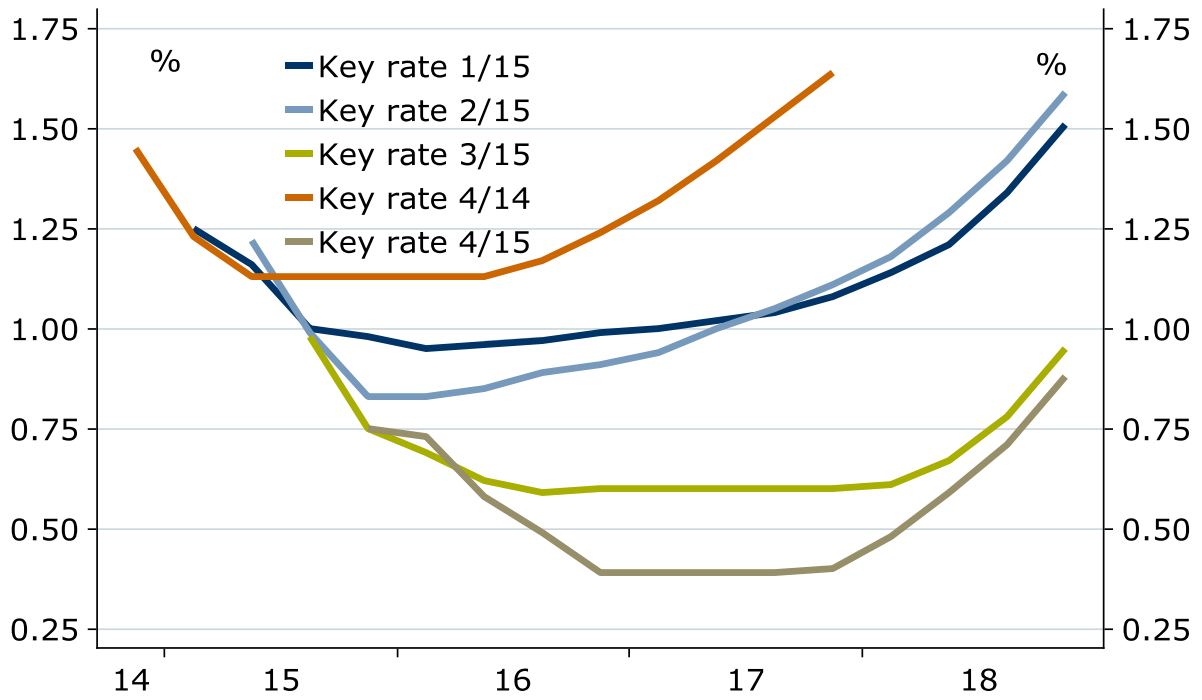
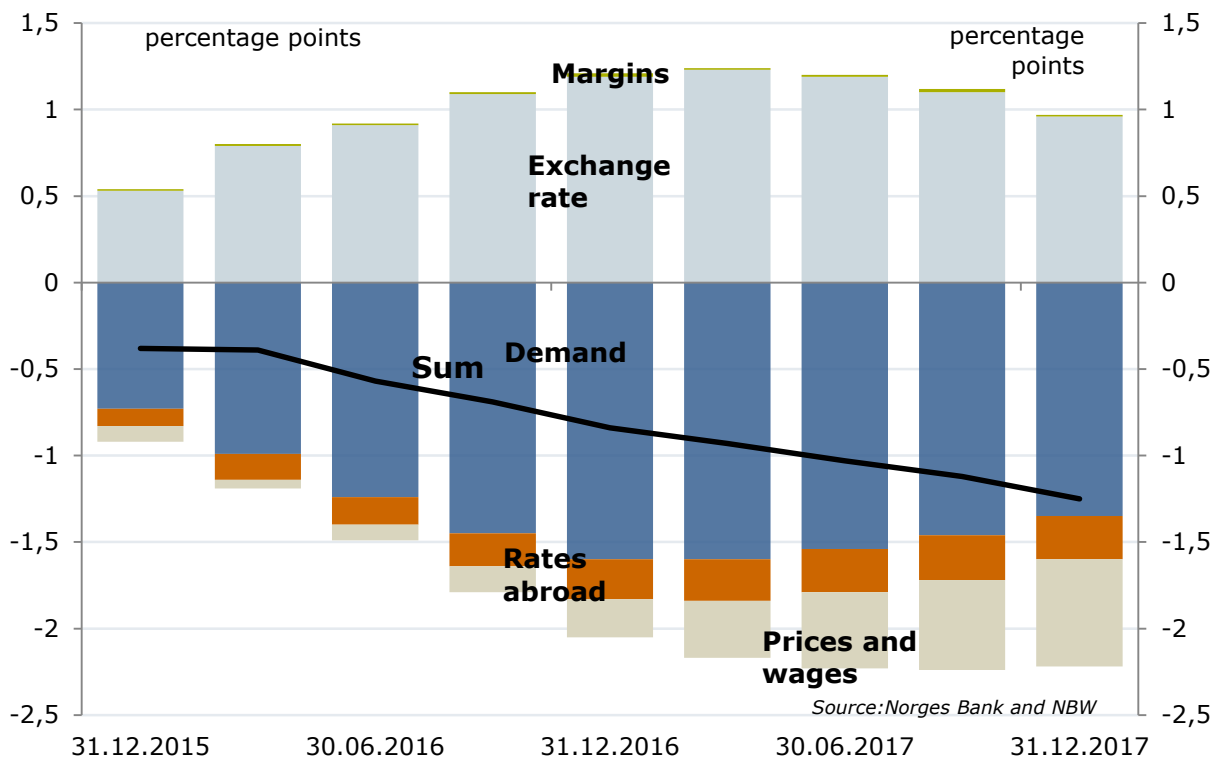


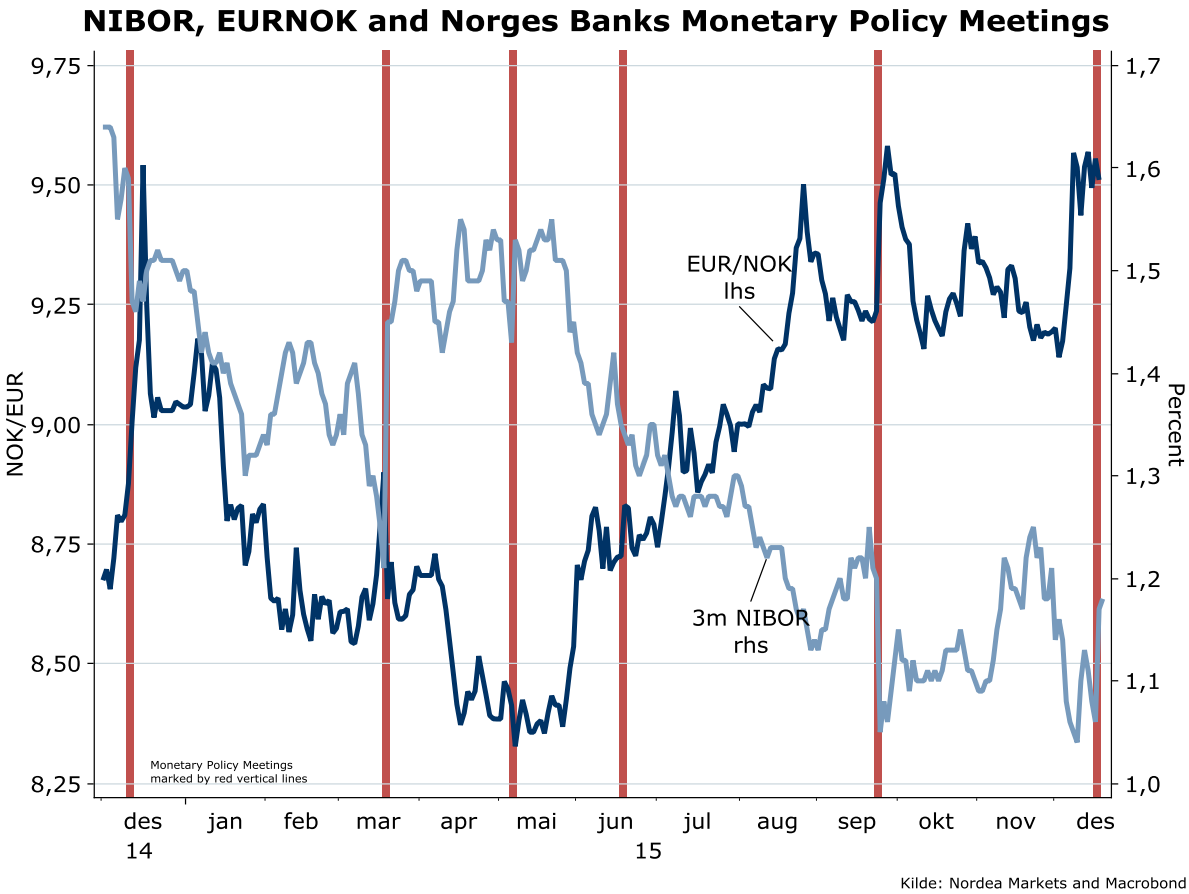
Chart 14 Factors behind changes in the interest rate forecast through 2015

Cumulative contributions from MPR 4/14 to 4/15



2015 was a year when market participants and analysts found it difficult to anticipate Norges Bank’s policy decisions. Based on the forecasts presented by Norges Bank in its MPR 4/14 a rate cut during the spring 2015 was widely expected, but the cut came later than expected by market participants. Neither was the market fully prepared for the second cut in September and analysts and market participants were split in their expectations ahead of the December 2015 meeting.

Chart 15 Market reactions to Norges Bank decisions through 2015



The Monetary Policy Meetings in 2015

After the steep decline in the oil price during the autumn 2014, Norges Bank revised down its growth forecasts significantly in the December MPR 4/14, and cut the policy rate to 1.25%. The rate cut reflected “that the outlook for the Norwegian economy is notably weaker than envisaged earlier” (Executive Board’s Assessment, December 11, 2014). At the same time, the Executive Board’s risk assessment was changed, from emphasizing the risk that increasing house prices and household debt could lead to a stronger downturn later on, putting more weight to the risk that the oil price decline could lead to a steeper downturn

than forecasted. Norges Bank accelerated a rate cut because of the change in the risk assessment.

Norges Bank's forecasts for interest rates are averages over the quarters. In MPR 2014 the forecast for Q1 2015 was 1.23% and for Q2 it was 1.13%. That is exactly half way between the level which was consistent with a cut by 25bps at the next meeting in March and the level implied by an unchanged rate at the meeting.

The market understands this as a 50% probability of another 25bps rate cut in March 2015 as opposed to 100% probability if the Q1 level was 1.21% and Q2 level 1.00%. Norges Bank knows that this is the way the market will think. These concepts are of course misleading, there is never 100% chance of a cut.

So how to understand the concept of a 50% probability for a rate cut? The interest rate path is contingent on the development being as Norges Bank expected. The usual interpretation of 50% probability for a cut is that only marginally stronger news would mean unchanged and marginally weaker a cut. A path with 100% probability for a cut would need significantly stronger news for the bank to leave rates on hold.

Market and analysts were convinced Norges Bank would cut at the **March meeting**. Current developments in the economy were not very different from Norges Bank's forecast, but oil prices had fallen further, the wage settlement indicated much lower wage growth than the Norges Bank December forecast and rates abroad had fallen. That NOK was weaker than expected was far from enough to counteract that. "Nobody" doubted that Norges Bank would lower the bottom in the interest rate path at least to 1% and the question analysts asked was how much more it would be lowered. There was even some talk about a 50bps cut at the meeting, but no analysts expected that.

Norges Bank did not cut rates at the March meeting and consequently had to raise the interest rate path for Q2 somewhat. NOK went stronger and 3 months NIBOR jumped 24bps from March 18 to March 19 (see Chart 15) indicating that the market priced close to zero probability for an unchanged interest rate. But at the same time Norges Bank lowered the interest rate path from Q3 and onward. The new bottom was 0.95% compared to the previous 1.13%. The path was consistent with a 100% probability for rates to reach 1% at the June meeting and 50% probability for it to be cut to 1% at the May meeting.

Norges Bank conclusion was in other words seemingly in line with what the markets had concluded. The news since December was clearly on the weak side and argued for lower rates. Still it did not cut, even though its signal in December was that only marginally weaker news would trigger a cut in March.

There is no clear explanation in the MPR for this seemingly contra-intuitive outcome. But at a meeting with analyst and market participants after the meeting where Norges Bank presented the MPR the following explanation was given. The development of the domestic

economy, apart from the wage settlement, such as unemployment, growth etc., had been close to the main scenario and with that some of the downside risk to the economy was removed. Norges Bank was therefore no longer in a hurry to cut rates as an insurance against the economy collapsing.

That is not a convincing explanation. When Norges Bank in December said it was 50% probability for a cut in March it was contingent on the economy developing as expected. In other words, when Norges Bank said there was 50% chance for a cut it was based on a development which would reduce the downside risks. With the economy developing as expected on most points, but some factor arguing for lower rates, it is still hard to understand why it did not cut in March.

The interest account was of no help here since it did not contain Q2, in contrast to the normal pattern. The interest account shows that news since December argued for lower rates in Q3 and onwards. It was probably not possible to construct these news so that they pointed upwards in Q2.

The decision not to cut together with the Governor's yearly speech, which emphasized the importance of the weak NOK, raised speculation that it was a tactical decision based on a goal to keep NOK weak as long as possible. A question we will return to.

The March decision also raised the question of whether the board felt any ownership of the interest rate path. One thing that complicated the picture is that the Executive Board in its assessment also gives some alternative guidance of its intentions for monetary policy in the short term. In MPR 4/14 and 1/15 the guidance was, in line with the tradition, given in the form of an interval for interest rates up to and including the next meeting with a MPR. This interval is normally 1 percentage point. In the 4/14 MPR the interval for the coming period was 0.75% to 1.75%, i.e. with a mid-point at 1.25% while the interest rate path indicated 1.13%. Was that a signal that the board saw the probability for unchanged at 1.25% rates as higher than 50%? Why not make an interval from 0.5% to 1.75% with a midpoint in line with the interest rate path?

Making such an interval seems unnecessary and hard to square with a rate path. What should the interval be with say 40% chance of a cut at the next meeting? Norges Bank left this way of communicating through intervals in MPR 2/15. It now gives a more qualitative assessment which indicates that it stands behind the rate part in the short term. In its assessment in MPR 2/15 the board said: *"The Executive Board's current assessment of the outlook for the Norwegian economy suggests that the key policy rate may be reduced further in the course of autumn."* That was in line with the interest rate path which gave a high probability of a cut during the autumn. Our conclusion is that by changing its way of communicating the board indicates that it has an active ownership to the interest rate path in the short term. We have no reason to believe that the situation was different before this

change in communication. The reason why it left this way of communicating through intervals was probably the problems connected to consistency with the rate path.

Viewed from the objective of being transparent and predictable the March decision seems to be one of the most controversial that Norges Bank has made. Based on our own appraisal and talks with analysts, there was a consensus that the news argued for lower rates, so an interest rate cut and a downward adjustment of the interest rate path appeared to be obvious.

There was uncertainty and predictions diverged for the outcome on the coming meetings too. But for these meetings there was more of a question of judging how Norges Bank's views had changed. In other words people who were wrong about the outcome on these meetings, was mainly wrong about how Norges Bank view on the economy had changed.

The Monetary Policy Meeting in May was an intermediate one, i.e. no new MPR or forecasts were published. Norges Bank had indicated a 50% probability for a cut in May in the March MPR. Both the market and analysts were split in the middle in their judgments whether Norges Bank would cut or not. Norges Bank kept interest rates on hold and a rise in the 3 month NIBOR by 9bps confirmed that market had given the outcome a close to 50% chance. The Board concluded in its assessment that *“So far, developments in the Norwegian economy have been broadly as expected. Consumer price inflation is close to 2.5 percent. Lower wage growth is weakening inflationary forces further out. On the other hand, household demand remains buoyant and oil prices have risen.”* But it clearly signaled that a June cut now was high by saying *“there are still prospects that the key policy rate will be lowered in June.”* At the press conference Governor Olsen went far in saying that the view from March was not changed and he said that that the probability for a cut in June at the latest was the same as indicated in March.

At the press conference Governor Olsen said that the option to cut rates already at the May meeting had been discussed. This information was however not a part of the written statement. We have had the impression that the stance of Norges Bank was that the press conference should clarify, but not give vital news not contained in the written material. Even if one could argue that it should be obvious that a cut was considered since it was given a 50% probability in March, we believe it was unfortunate that this was not part of the written material. Market participants should all have equal access to this kind of information at the same time regardless of whether they listen into Norwegian press conferences or not.

In its assessment, the Board also mentioned that *“the risk of a pronounced downturn in the Norwegian economy appears to have diminished somewhat”*. When questioned at the press conference, Governor Olsen clarified that this was compared to how the risk was assessed in December, not in March. It is unclear why this argument was contained in the May assessment since it referred to the development between December 2014 and March 2015 and therefore should not have any influence on whether to cut in May or June.

At the **June Monetary Policy Meeting** the policy rate was cut to 1.0%, as widely expected. In its assessments: *“The Executive Board notes that the analyses in this Report show that the outlook for the Norwegian economy is weaker than in March. The effects of lower oil prices and weaker demand from the petroleum industry appear to be somewhat more pronounced than assumed earlier.”* The Executive Board also announced that *“the key policy rate may be reduced further in the course of the autumn”*. The path published in MPR 2/15 indicated a cut already in September, with about a 70% probability.

The decision in June was widely expected, while the bank’s interest rate path was on the lower side compared to expectations. Lower forecasts for inflation, wage growth and GDP pulled the path down and this was only partly countered by the effects of a weaker NOK than expected. The bank’s risk assessment was about the same as in March.

During the summer and early autumn, the oil price declined again. Growth in the Norwegian economy developed about as expected, but Norges Bank’s regional network pointed to a somewhat weaker growth going forward. However NOK also weakened markedly and inflation surprised on the upside. At the **September Monetary Policy Meeting** Norges Bank cut the rate to 0.75%. At the same time it lowered the interest rate path strongly and by more than in any other MPR that year. It was a dramatic change in the outlook for domestic demand which was behind the lowering of the path. Lower demand pulled the bank’s interest rate path down by as much as ¾ percentage points at the most. Growth in real wages in 2016 was lowered by as much as ¾ percentage points which seems a large degree to be an oil effect.

This dramatic change in the outlook was hard to understand for outsiders. The downward revision due to weaker demand was not very different from the 1% point downward pull from weaker demand in the December report in 2014. Most observers would have problems understanding that the change in the outlook now was nearly as negative as in December 2014 when Norges Bank had to adjust to the new low oil price world. We will discuss later the problems outsiders had in predicting change in Norges Bank’s view through 2015.

Weaker NOK and higher inflation than expected did not outweigh Norges Bank’s much bleaker picture of domestic demand. The new path indicated another cut in the first half of 2016 with 60% probability.

The market was surprised by the rate cut in September despite the indications given by Norges Bank in June. It was registered that the oil price had fallen, but most market participants seemed to have assumed that this was countered by the marked NOK weakening and higher inflation. So far that year, Norges Bank had seemingly followed a strategy of holding back on actual cuts, but at the same time indicating further cuts. This is probably one reason why the indicated September cut was expected to be postponed. It seems to be Norges Bank’s strong downward revision of its growth forecast that came as a surprise.

The Monetary Policy Meeting in November was an intermediate one, i.e. no new MPR or forecasts were published. Norges Bank kept rates on hold as widely expected. That was in line with the September interest rate path which gave a very small probability for a cut already in November. The development in the economy had been a bit weaker than expected and expectations of rates abroad had fallen, but on the other hand NOK was weaker than expected. Add to this that the fiscal budget for 2016 pointed to a more expansionary fiscal policy than Norges Bank had based its forecast on. In its assessment, the board pointed to the various factors pulling in different directions, but offered no conclusion whether developments in sum pointed to a higher or lower interest rate path. At the press conference the Governor concluded that developments were fairly balanced, and he gave the impression that was why they left interest rates on hold at the meeting. He would not answer whether the chance for another cut further ahead had increased or not.

The market was again uncertain before the **Monetary Policy Meeting in December**, a meeting with a new interest rate forecasts. About half of the analysts expected a cut, while the market priced the probability of a cut somewhat lower than that. Norges Bank themselves had given a December cut a 25% probability in the September MPR. The reason why many still expected a cut was that oil prices had fallen further and Norges Bank had emphasized the importance of lower oil price on the September meeting. But on the other hand NOK was weaker than previously expected and fiscal policy was more expansionary than had been expected.

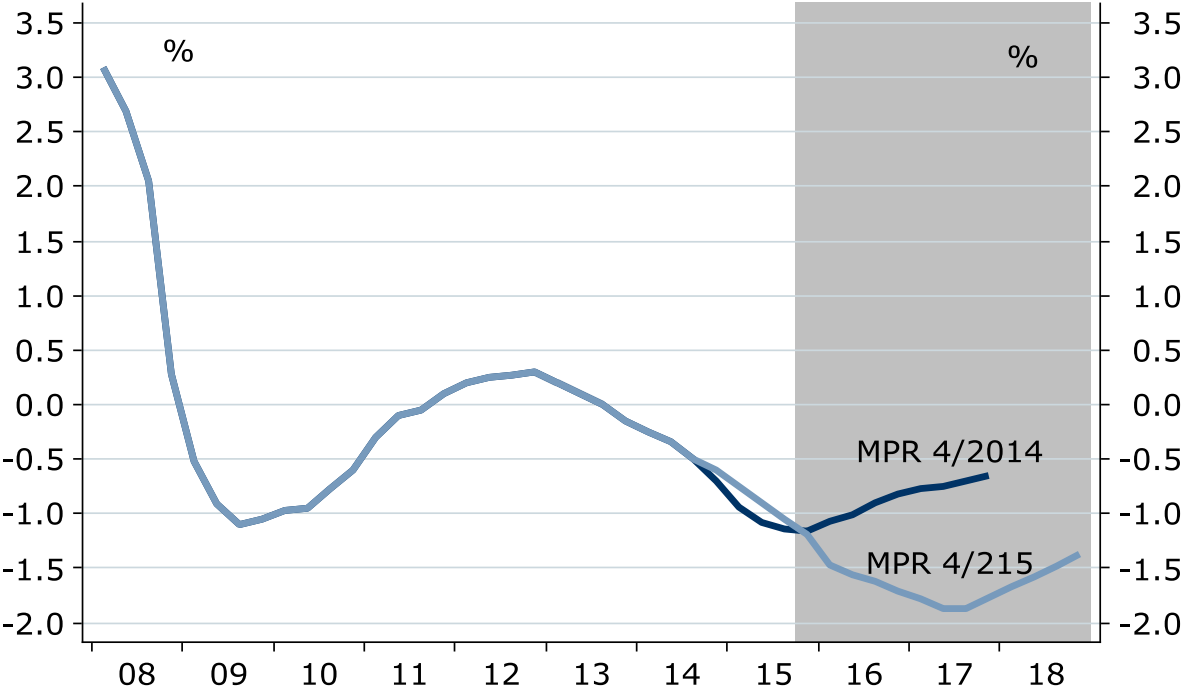
Norges Bank kept its key rates unchanged, but lowered its interest rate path quite significantly. The interest rate path indicated a slightly more than 50% probability of a rate cut at the March meeting and 100% before the summer. Then it indicates 40% probability for another cut in the autumn. Again Norges Bank painted a much bleaker picture of the domestic economy and *private* demand pulled down the interest rate path by 65bps at the most. Interestingly Norges Bank quantified the effect from higher public demand which pulled up the path by 10bps at the most. Norges Bank has always been rather clear, if fiscal policy turns out more expansionary this will raise interest rates – all else equal. But to quantifying it this way was a surprise. We see no problems with this and have not heard any complaints.

Not Possible to Read

If we compare the forecast for growth, unemployment and capacity utilization made for 2015 in MPR 4/14 with the one made for 2015 one year later in MPR 4/15 they are very close. In Chart 16 we compare Norges Bank's forecast for the output gap in the two reports. The output gap in Q3 2015 (which is the last quarter not being a forecast) is actually higher than forecasted in late 2014. This means that the massive downward revision of the interest rate path through 2015, due to weaker demand, in other words was not based on actual

developments surprising on the downside, but the reason is that Norges Bank turned much more pessimistic about the future.

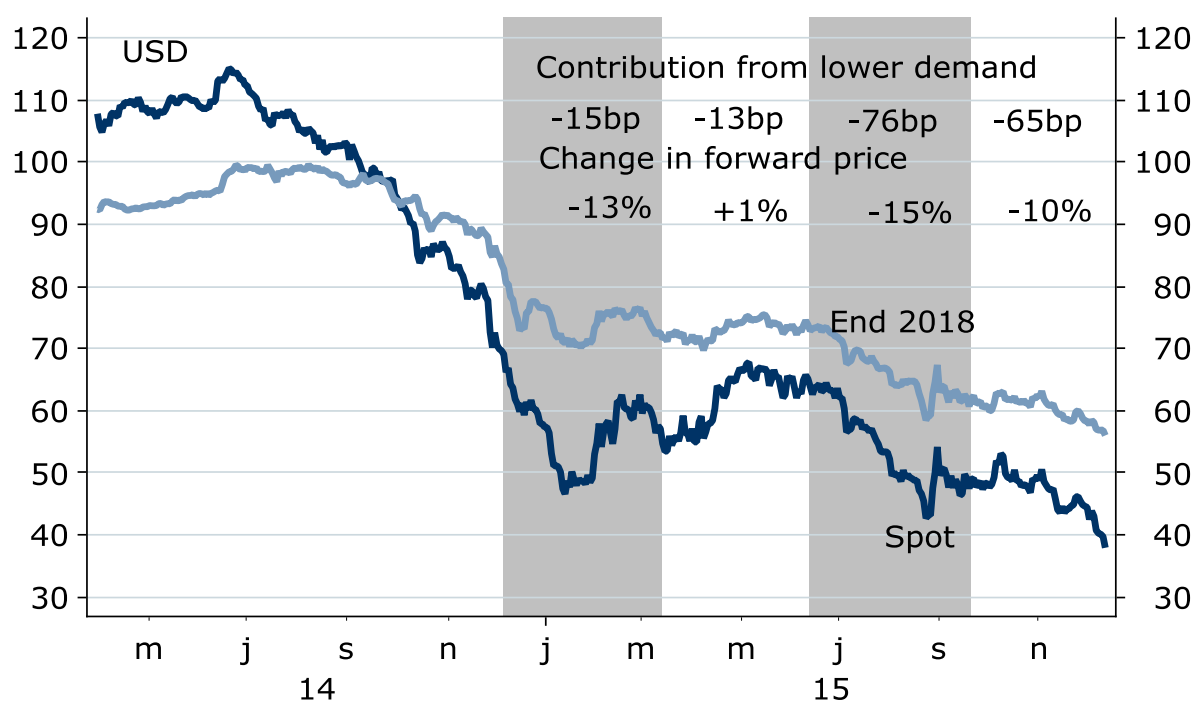
Chart 16 Output gap forecasts given by Norges Bank in MPR 4/14 and MPR 4/15



Source: Nordea Markets and Macrobond

Reading the 2015 MPRs one gets a clear impression that the drop in oil prices through 2015 is the reason for the sharp downward revision of future growth. In figure 3 we show the development of the oil price through the four periods between the monetary policy reports. We also compare the percentage change in oil price in each period to the downward revision made to the interest rate path (one year ahead) due to weaker demand. We have used the forward price and not spot prices since Norges Bank has indicated that it believes oil companies base their investment decisions on forward prices.

Chart 17 Oil price and the contribution from lower demand on the interest rate path



Kilde: Nordea Markets and Macrobond

As one can see, there is no link between the size of the oil price drop and the strength of the downward revision to the path. It seems that in the second half of 2015 Norges Bank's view turned much more pessimistic than its previous reactions to lower oil prices. One could argue that a given percentage drop in oil prices hurts more the lower is the price. Still, that a given percentage drop should hurt 5 times more if the initial level is USD 70 per barrel rather than USD 80 per barrel does not sound very convincing. That is actually how Norges Bank reacted if one compares the reaction in MPR 3/15 with that in MPR 1/15.

Looking more closely at the downward revision of the 2016 forecast through 2015 also makes it hard to explain the darker view with lower oil prices only. One main channel through which a lower oil price hits the economy is through lower oil investment. Mainland GDP growth in 2016 was revised down more than 1 percentage point through 2015 and lower oil investment can probably not explain more than ¼ percentage point.

One plausible explanation of the rather strong downward revision of the outlook for the economy is that Norges Bank just lost faith in its previous view that the downturn would be rather short-lived. Our impression is that Norges Bank relies more on models the longer the forecast horizon is and more on subjective judgments in short term. Maybe the models pointed to a fast return to trend growth? As time passed and 2016 got closer this assumption was replaced by a general feeling that the second round effects of lower oil-related activity would be stronger.

Whatever the reason, the model described earlier, that the market by knowing the reaction function could read how Norges Bank's interest rate path would change, did not work in 2015. It seems that Norges Bank just rethought its previous assumptions for reasons not possible to see for outsiders. This is probably not new and something one must accept. Our understanding of how the economy works is not static. Still our main conclusion is that the rather dramatic change in view especially through the second part of 2015 is not satisfactorily explained by Norges Bank. We still know very little about how Norges Bank will react to future changes in oil prices.

Norges Bank and NOK

At the December 2014 MPC meeting the oil price had fallen from USD 110 in the summer to 65 and forward prices told Norges Bank that it would only pick up gradually. This would most likely hit the economy and lead to increased unemployment and, in the longer run, lower inflation. But at the same time NOK had weakened by 5% since the summer. A weaker NOK would, if it lasted, give a much stronger and better suited stimulus to Norwegian economy than the effect on the domestic economy from the planned cuts in interest rates. Better suited because the economy would first and most be hurt by oil companies slashing investment. That would hurt oil related industries on the mainland which to a large degree are exposed to international competition. Weaker NOK means those firms either could win market shares in markets connected to oil or turn to other markets. A weaker NOK will also stimulate other industries which need workers with skills similar to those who lost their jobs in oil-related industries.

Through 2015 NOK weakened further and it is now about 15% weaker than before the oil price drop. That is much more than expected and Norges Bank has constantly been surprised by the weakness. In the Financial Stability report from October 2014 Norges Bank made a stress scenario where oil prices fell to USD 53 on average in 2015 and interest rates were cut to zero through 2015. In that scenario, the NOK weakened only marginally, most likely in line with standard UIP models. NOK is now more than 10% weaker than in that scenario.

Given an objective to soften the impact of the oil price drop on the business cycle the policy of gradually reducing rates has been successful. Since there are no good empirical models for exchange change rates we have no way of knowing what the situation had been with a much faster reaction. But given the situation in the exchange market in late 2014 a more aggressive attitude from Norges Bank in December would have risked more volatility with a significantly weaker NOK early on. Volatility and a sharp depreciation of NOK could have negative real economic effects. Firms with debt in foreign exchange could be hard hit starting a more or less voluntary deleveraging process. The market value of export firm's currency hedges would be strongly negative which means banks could tighten credit. Sharp movements in exchange rates would have meant sharp movement in the value of many

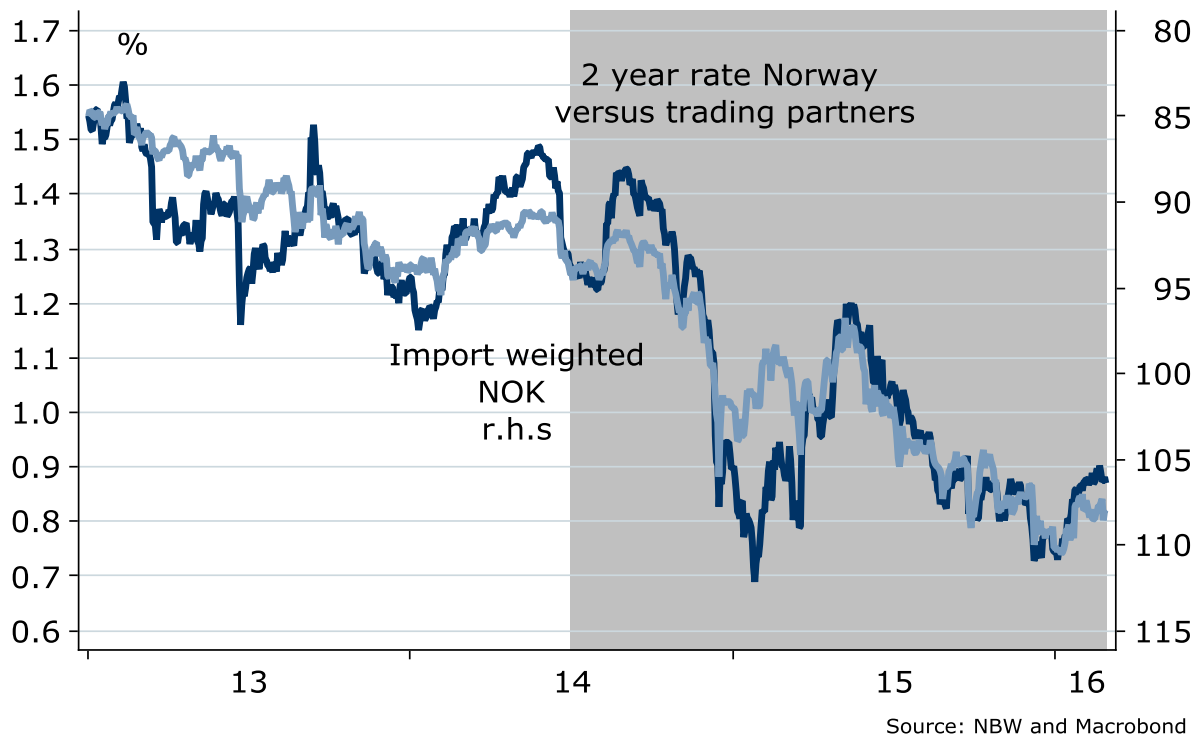
assets. We know from the financial crisis that falling asset price could start strong negative spirals. Volatility in the exchange rate could also mean increased uncertainty about future exchange movements among exporters. That could actually hinder investments.

The depreciation of NOK during the second part of 2014 was rather sharp. It is possible that Norges Bank thought it unwise to push it even weaker by lowering the interest rate path more than it did. By holding back and cutting interest rates slowly and lowering the rate path gradually Norges Bank could achieve a smoother weakening without the possibly negative effects from a sharp depreciation. A more gradual approach also means it will take longer time before zero rates are eventually reached. Norges Bank might have feared that it will end up in a situation close to what Riksbanken experience. Riksbanken lowered key rates through 2012, 2013 and 2014 before it reached zero late 2014. SEK depreciated through this period. Through 2015 interest rates were cut further and further into negative territory. Riksbanken is also buying assets and it has even threatened with exchange rate interventions. The clear target is to hinder a strengthening of SEK, but SEK has actually strengthened somewhat after negative rates were introduced. Being forced to adopt negative rates and buying assets to defend NOK is possibly something Norges Bank wished to avoid. The cost of negative interest rates and assets buying is unclear, but a growing concern.

We have no way of telling that Norges Bank has intentionally followed such a strategy. Still it is a view we meet. There is probably also a general view that NOK weakness is of special importance when setting rates currently and perhaps more than what follows from a more strict approach to the target. This view follows from the governor's yearly speech in February. He said: "Monetary policy cannot assume a primary responsibility for delivering the necessary structural changes in the Norwegian economy. But via the exchange rate channel, monetary policy can help facilitate the necessary restructuring process."

A wish to avoid a too fast and sharp currency depreciation together with a wish to avoid sounding too concerned and a general central bank preference for a gradual approach could explain that Norges Bank leaned toward a more positive view late 2014 and consequently why it had to revise its view so strongly downward through 2015. But it could also be the result of a general conservative attitude that a forecasters could choose when making forecasts in a situation with big uncertainties. Most other forecasters forecasted a rather short-lived downturn at the start of 2015.

Chart 18 2-year swap rates versus trading partners and NOK



Conclusion

It is hard to avoid the conclusion that 2015 was a bad year for Norges Bank in terms of predictability and consistency. It made a decision in March which few understood and no one foresaw. The meeting made it clear that shifts in risk assessment are not possible for outsiders to follow. There was a lot of uncertainty concerning several of the decision through the year. The rather strong downward revision of the interest rate path and the change in outlooks for demand in the second part of the year was also hard to foresee.

We have tried to come up with possible explanations for this. It could be due to a desire to move gradually. Whatever the reason, the cost is that forward guidance in the future may be less effective, simply because the experience through 2015 made the market trust the communication less. But maybe that is the price we have to pay for a more flexible central bank.

Apart from a general view on the way communication was handled through 2015 we have a few more concrete suggestions:

- On meetings, essential information such as whether any alternatives other than the actual decision were considered should be part of the written material and not only mentioned at the press conference.

- It is also important that answers at the press conference are precise and do not leave any doubt how the written statement should be interpreted.
- On intermediate meetings Norges Bank should try to conclude clearer whether news since the last MPR, in sum, argues for higher or lower rates looking ahead.

Maybe now is also the time for a more thorough review of the way in which Norges Bank is communicating. We have no wish to scrap either the interest rate path or the interest rate account, but they did not contribute to a predictable monetary policy through 2015. Oil prices seem to be crucial for the outlook also when looking ahead, but we have very little idea of how a further drop will affect the interest rate path. So how to improve communication seems essential. One should also consider using alternative ways to communicate especially about the risk picture. A better forward guidance for 2015 at the start of the year than the interest rate path would perhaps have been like this: "We do not know how the economy will react given the drop in oil prices. But it will most likely warrant more rate cuts. If things worsen fast we will move fast, but if growth weakens only gradually and second-round effects seem small, we will adopt a very gradual approach." With markets either so wrong about the actual outcome or divided one should also consider the possibility of communicating between meetings. It might only just create more noise, but it should at least be considered.

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17/2016	An Independent Evaluation of Monetary Policy in Norway Kjell Erik Lommerud Nils Gottfries Erik Bruce