Effects of monetary policy

Björn Andersson and Henrik Lundvall

SVERIGES RIKSBANK

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The background material for the monetary policy decision includes analyses of various policy alternatives and conceivable economic scenarios. An important starting point for these analyses is the assessments of the size of the effects monetary policy has on inflation and the rest of the economy. These effects are difficult to measure, and the Riksbank regularly evaluates the analysis on which the assessments are based. One element of this work has involved estimating the effects using new methods that can be set against updated estimates made with more traditional methods. The results of these studies will be used as a starting point for the assessments made in future work on policy and scenarios. The methods give similar results in many ways, but they differ on certain points. It is important to be aware of the uncertainty of the effects.[1]

Authors: Björn Andersson and Henrik Lundvall, who work at the Monetary Policy Department[2]

Naturally, the effects of monetary policy on inflation and the rest of the economy is a fundamental issue for the Riksbank. This partly concerns the Riksbank needing to have a good understanding of the so-called transmission mechanism for monetary policy. The transmission mechanism describes the way in which a monetary policy measure, such as a change in the policy rate, affects the economy via market rates, asset prices and the exchange rate and further to activity in the economy and to inflation.[3]

Regardless of the precise form of this transmission, the Riksbank also needs to have a good understanding of the magnitude of the effects on inflation and the rest of the economy. This is essential to be able to calculate the effects of various conceivable decisions on the policy rate and to construct scenarios, something the Riksbank does in connection with the monetary policy decisions to evaluate different policy alternatives and assess risks. Apart from presenting a main scenario with accompanying monetary policy, the Riksbank has also started to include alternative scenarios on a

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[1] Economic Commentaries are brief analyses of issues with relevance for the Riksbank. They may be written by individual members of the Executive Board or by Riksbank staff. Staff commentaries are approved by the relevant head of department, while Executive Board members are themselves responsible for the content of the commentaries they write.

[2] This Economic Commentary is based on modelling and development work at the Riksbank carried out by Jakob Almerud, Erik Berggren, Dominika Krygier, Henrik Lundvall, Stefania Mammos, Mambuna Njie and Ingvar Strid. The authors are grateful for contributions to the Commentary and for other valuable input. We would also like to thank Marie Hesselman and Tanja Lind for their useful comments.

[3] The transmission mechanism is often described in terms of different channels through which monetary policy acts. A description of these can be found at www.riksbank.se under Monetary policy/What is monetary policy?

more regular basis in its Monetary Policy Reports to help communicate its assessments clearly.[4] One of the roles of alternative scenarios is to illustrate how the monetary policy plan would have to be changed if developments were to diverge considerably from the main scenario.

The Riksbank regularly assesses the effects monetary policy is assumed to have on inflation and the real economy in the scenarios and a number of studies have recently been carried out with this aim. The focus has been on the effects of adjustments to the policy rate, and the work has partly taken place in light of the economy having just been through a period of strongly rising inflation and a contractionary monetary policy. One of the objectives has been to obtain results from new methods and new data that can be compared with updated calculations from more traditional methods whose results are usually considered reasonable. The Riksbank will incorporate the results of these studies into its future analyses of policy alternatives and work on scenarios. The aim of this Economic Commentary is to present an overview of the results of two of the studies, while also discussing the challenges that arise when the effects of monetary policy are calculated.[5]

The importance of separating cause and effect

The underlying relationships in the macroeconomy are complex and it is difficult to separate cause and effect. It is therefore a challenge to identify the effects of a change in the Riksbank's policy rate on economic variables such as GDP, employment and inflation. When the Riksbank adjusts the policy rate, this affects GDP and inflation. At the same time, other changes in the economy affecting GDP and inflation will influence the policy rate set by the Riksbank. The Riksbank often adjusts monetary policy because something else has changed in the economy that makes it necessary to adjust the policy rate to bring inflation close to the target of 2 per cent. To be able to isolate the effect of monetary policy on inflation, it is necessary to control simultaneously for changes in other factors.

There are various methods for calculating the effects of monetary policy

As the effects of monetary policy cannot be observed directly, they must be estimated using statistical methods. Several such methods are used in the academic research lit-

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[4] For example, see the article "Alternative scenarios in the Monetary Policy Report" in the Account of Monetary Policy 2023.

[5] Recently, the effects of monetary policy have also been analysed in Laséen et al. (2022), and in Laséen and Nilsson (2024).

erature. They have different advantages and disadvantages and give somewhat different results.[6] One of the aims of the Riksbank's work has been to compare the results of different methods. Here we present the results of both a traditional method that has been used by researchers for decades and a newer method that uses high frequency financial data to identify the effects of monetary policy.[7] Put simply, both methods use a statistical model, a so-called vector autoregression (VAR), to describe the development of the Swedish macroeconomy. The VAR model includes a few central variables – including GDP, unemployment, the exchange rate, inflation and the policy rate – and describes the relationship between these variables over time.[8] Apart from the Swedish variables, the VAR models in both studies also include a couple of variables that reflect international developments. The development of each individual Swedish variable depends on how the other variables in the model evolve. The variation in the policy rate that cannot be explained by other variables can be used to calculate the effects of monetary policy.

One important difference between the two methods concerns how these calculations are made. The first method uses assumptions of how monetary policy affects various variables in the short term. The Riksbank's study is based on the usual assumption that it is only the krona exchange rate that reacts immediately to changes in the policy rate, while GDP and other variables are affected with a certain time lag. The effects then reflect what happens to inflation and the rest of the economy when the policy rate is adjusted in a way that is unexpected, compared with how monetary policy, according to the model, usually reacts.

The newer method identifies unexpected monetary policy adjustments more directly and thus does not need to make assumptions about how the variables affect one another. The method uses information on how prices on financial markets changed during a short time interval in connection with the Riksbank having published new information on monetary policy. The new information may concern a new monetary policy decision or consist of minutes from the meeting where the decision was taken. Examining changes in market rates over a very short time interval around the time of publication by the Riksbank makes it more likely that these changes are a reaction to new information on monetary policy and not information on other changes in the economy.[9] Changes in various market rates identified in this way are then combined with the VAR model to estimate the effects of monetary policy on inflation and other economic variables.

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[6] A detailed discussion of the difficulties in identifying effects of monetary policy, various methods and their advantages and disadvantages can be found in Laséen and Nilsson (2024).

[7] For documentation of, and details on, the results of the analysis using the first method, see Berggren et al. (2024). The Riksbank will publish documentation of the analysis with the newer method later this year. The results presented here may be adjusted in the final version.

[8] However, the exact specification of the VAR model differs slightly between the two studies.

[9] Information on monetary policy includes decisions made by the Riksbank on the policy rate as well as assessments of monetary policy in the period ahead. The Riksbank's study uses so-called factor analysis to separate the effects of a policy rate adjustment from the effects of a change to the guidance on monetary policy going forward.

The results are relatively consistent, but differ on certain points

Figure 1 presents selected results with effects of monetary policy in the two studies described above. The figure illustrates the effects as impulse response functions. These show the effects – the response – on the exchange rate, GDP, unemployment and CPIF inflation each quarter five years ahead of an unexpected one percentage point policy rate increase by the Riksbank today.[10] It is assumed that nothing else happens to 'disturb' the economy after this impulse, the normal relationships between the variables in the model determine the dynamics and the policy rate gradually returns to what it was before the hike.

The light blue line in each field of the figure shows the result of the first study, here called BVAR. The red line shows the result of the study using the newer method, here called Proxy-VAR, which uses high-frequency financial data to identify the effects of monetary policy. The dashed blue line in the grey interval is the mean value of the light blue and red lines. The results of the two studies are similar and qualitatively the effects are completely consistent. They are also consistent with economic theory – when the interest rate is raised in an unexpected manner the exchange rate will become stronger, unemployment will be higher and GDP and inflation will be lower, compared with the development of these variables if the interest rate had not been raised.

In terms of size too, the effects resemble one another in certain dimensions. The effect on inflation is roughly the same. This applies both to how the effect changes over time and how much inflation is affected at most. According to both methods, the effect is greatest after about four quarters, when inflation is pushed down by about 0.5 percentage points by the rate rise. After this, the effect gradually abates.

According to both studies, the effect on the exchange rate is already relatively strong in the first quarters and it corresponds quite well with the effects on the exchange rate that usually arise directly after the Riksbank's monetary policy decisions. The effect on GDP is also approximately the same in the first quarters in both studies. The effect thus does not seem to be influenced much by the assumption in BVAR that there is no effect on GDP in the same quarter that the rate rise occurs.

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[10] It is implicitly assumed in the two studies that the effects of increases and cuts in the policy rate are symmetrical. The result of a cut in the policy rate would thus, according to these estimates, be the same as those shown in Figure 1, but with the inverse sign. For reasons of comparability, the size of the change in the policy rate has been normalised to one percentage point.

Figure 1. Effects of monetary policy

Percentage points and per cent
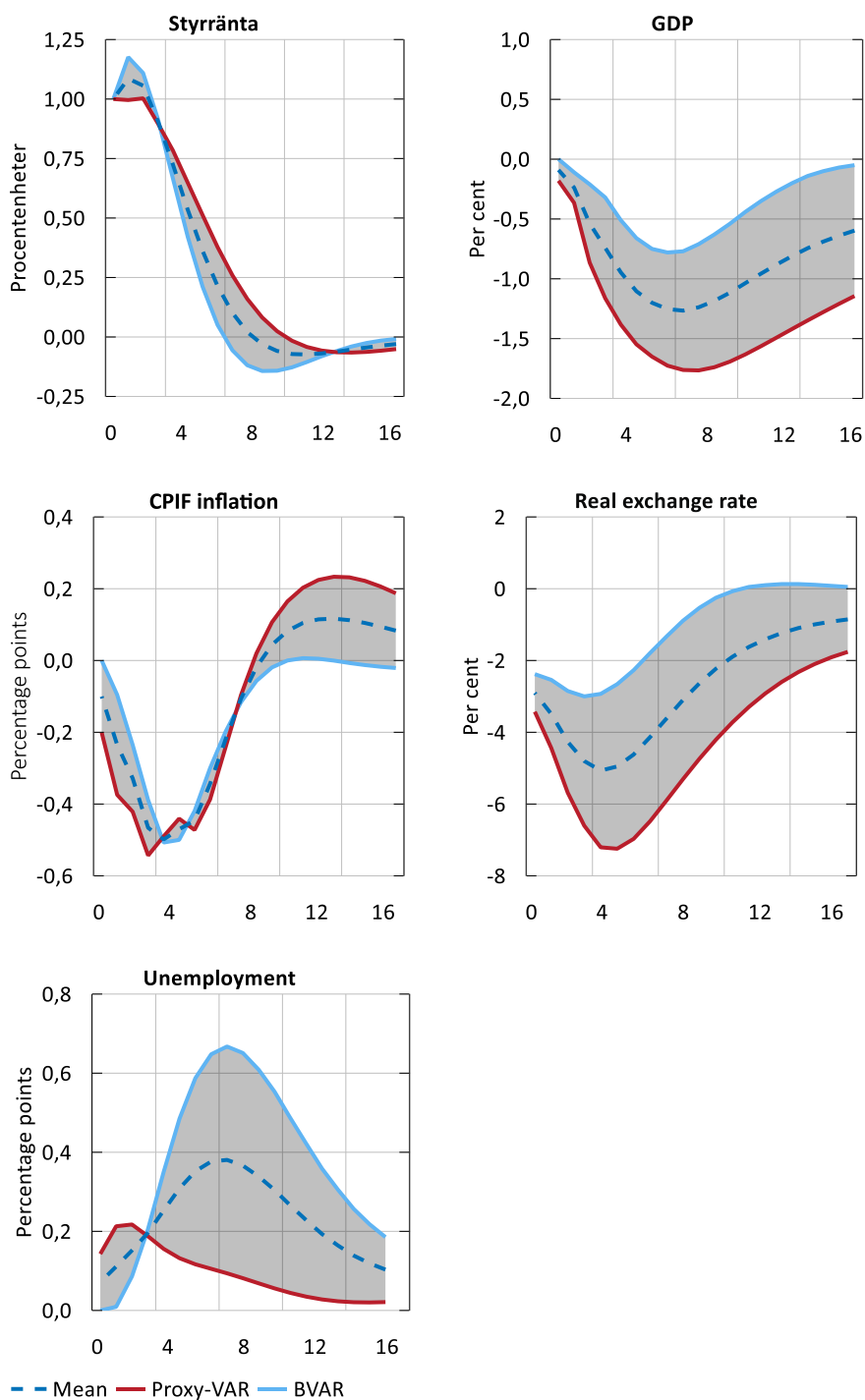
Note. The curves in the different fields show the estimated effect on each variable over 20 quarters when the policy rate is raised unexpectedly in quarter 0. The real exchange rate is the nominal exchange rate according to the KIX (krona index), adjusted for differences in price level between Sweden and the rest of the world. A lower value indicates a stronger exchange rate.

Source: The Riksbank.

In the studies, however, there are greater differences on the effects on the exchange rate and GDP in later quarters. At most, GDP decreases by 0.8 per cent according to BVAR, while GDP decreases by 1.8 per cent at most according to Proxy VAR. However, regardless of the difference in size, the maximum effect on GDP occurs approximately simultaneously in both studies, after about 8 quarters. According to BVAR, the effect on GDP has disappeared, in principle, after about 4 years, while the comparatively larger effect according to Proxy VAR takes longer to wear off. The greatest difference between the studies is the effect on unemployment. According to BVAR, unemployment increases by, at most, just over 0.6 percentage points after just over two years, which is about the same time as the effect on GDP bottoms out According to Proxy VAR, the peak effect on unemployment is smaller, about 0.2 percentage points, and occurs as soon as after a couple of quarters.

Apart from estimates of the size of the effects of monetary policy, the results can also provide insights into the transmission of monetary policy – for example, the effect on the exchange rate seems to be an important part of the mechanism according to both studies. However, the two studies provide results for the real economy that seem to emphasise different channels for transmission. The results from BVAR indicate that production falls in combination with falling employment. The results from Proxy VAR, in which the effect on unemployment is smaller and appears more rapidly, are instead more compatible with companies deciding to 'weather the storm' rather than reducing their workforces.

The estimated effects on inflation and other economic variables in Figure 1 are the effects of the Riksbank raising the policy rate unexpectedly, that is, the isolated effects of a rate rise. They do not necessarily reflect what happens to inflation and the rest of the economy in an economic upswing after the policy rate has been raised in a 'normal' way in conjunction with rising inflationary pressures in the economy. In such a situation, along with the effects of the Riksbank's rate rises, the economy is also affected by the forces driving the upswing itself. Mechanisms that make the effects on inflation arrive later than the effects on GDP and unemployment may then have greater significance than the effects in the figure indicate.

It is important to recognise that the effects are uncertain

An overall conclusion from the academic research is that there is considerable uncertainty over the size of the effects of various monetary policy measures. The grey interval in Figure 1 that illustrates the difference between the results reflects one source of this uncertainty, which concerns the selection of method and model. In addition, the results of the respective study are produced using statistical methods that in themselves contain uncertainty.[11] Both the light-blue and the red lines are midpoints in intervals, within which the effects lie with a certain probability.

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[11] The "true" relationship between the variables in the respective model is not known, but is estimated using statistical analysis of the outcomes of the variables during a certain period of time. Factors that affect

It is important to be aware of the uncertainty over the effects and not to draw too far-reaching conclusions from the results of a single study. Nonetheless, for the work on scenarios, the Riksbank has to make specific assumptions regarding the size of monetary policy effects. One way of making these assumptions more robust is not to rely on the results of a specific method or model but to weigh together results from different studies, as was done in the figure.

The Riksbank will incorporate the results of these studies in the work going forward and use these averaged effects as a starting point for calculating different types of scenarios. However, it is also important to always assess whether the effects seem reasonable in each specific scenario. For example, the results in the figure reflect the effects of a temporarily higher policy rate. It is highly likely that the effects would be greater if the change of monetary policy was more prolonged or perceived as such by households and companies. It is also possible that, in some situations, monetary policy could have effects that are genuinely difficult to capture, for example that it contributes to strengthening confidence in the inflation target.

References

Berggren, Erik, Stefania Mammos and Ingvar Strid (2024), "The effects of monetary policy in Sweden during the inflation targeting period: estimates with structural VAR models", Staff memo, August 2024, Sveriges Riksbank.

Laséen, Stefan, Jesper Lindé and Ulf Söderström (2022), "How much is inflation affected by monetary policy?", Economic Commentaries No. 13, Sveriges Riksbank.

Laséen, Stefan and Charlie Nilsson (2024), "How does the Riksbank's monetary policy affect the Swedish economy: does inflation rise when the interest rate is raised?", Staff memo, January 2024, Sveriges Riksbank.

the certainty of the estimates include the length of the period of time and how much the variables have varied during this period.