

# Has Riksbank monetary policy been predictable? Evidence from estimated reaction functions

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For monetary policy to be effective, it should be predictable. How can central banks assess and contribute to the predictability of monetary policy? In this article, we discuss how estimated reaction functions can be used in the preparation of monetary policy decisions. More specifically, we discuss how reaction functions estimated on Swedish real-time data can complement market expectations to improve the understanding of monetary policy predictability. We do this by comparing and discussing the deviations between the actual policy rate and what reaction functions imply. To obtain a robust picture of the Riksbank's reaction function, we present several estimates based on different measures of inflation and the output gap.

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## 1 Predictability contributes to an effective monetary policy

Monetary policy will be more effective if economic agents understand how the central bank adjusts the policy rate based on economic developments. A good understanding facilitates economic planning among firms and households by enabling them to form their own judgement about how interest rates might evolve in the future. This is one of the main reasons why central banks nowadays devote considerable resources to explaining how they see future economic developments and how they might act in different situations to achieve their monetary policy objectives.<sup>1</sup>

But how can one determine if monetary policy is predictable? Perhaps the easiest way to do this is to monitor market reactions when an interest rate decision is communicated. In efficient financial markets, an expected decision should already be

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\* Many thanks to Matilda Kilström for her valuable contribution and to Jakob Almerud, Mikael Apel, Carl Andreas Claussen, Mattias Erlandsson, Peter Kaplan, Stefan Laséen, Henrik Lundvall, Anna Seim, Ulf Söderström and Anders Vredin for valuable comments on earlier drafts. The opinions expressed in this article are the sole responsibility of the authors and should not be interpreted as reflecting the views of Sveriges Riksbank.

<sup>1</sup> This strive for transparency regarding the conduct of monetary policy stands in stark contrast to the way monetary policy was conducted a few decades ago. During the time of Alan Greenspan's time as chair of the Board of Governors, for example, the US Federal Reserve was at times perceived as trying to say as little as possible about the principles of interest rate setting. See, for example, Blinder and Reis (2005).

reflected in current pricing, while an unexpected decision gives rise to more significant market reactions. Another, more structured approach is to examine whether the development of the policy rate can be explained by a small number of macroeconomic variables, which are precisely the variables that the central bank is tasked with stabilising. One could say that such a more structured analysis tries to capture the systematic part of monetary policy.<sup>2</sup>

If a stable relationship can be found between the policy rate and a few key macro variables, monetary policy can be said to follow a *simple rule*. A simple monetary policy rule thus describes how a central bank adjusts the policy rate on average in relation to a few key economic variables. In the economic research literature, different variants of the so-called Taylor rule are common examples of simple rules.<sup>3</sup> In these specifications, the central bank is assumed to set the policy rate as a linear function of inflation and resource utilisation. The parameters of this relationship can either be assumed (as Taylor did) or estimated econometrically. In the latter case, we choose to refer to the estimated relationship as a *reaction function*.

It is important to emphasise that Taylor rules and estimated reaction functions are strong simplifications of how monetary policy is conducted. There are key features of the conduct of actual monetary policy that are not captured in the simple linear relationships. For example, since monetary policy works with a lag, policy decisions are often guided by forecasts. Furthermore, it is not self-evident that simple rules should be perceived as normative, i.e. as descriptions of a desirable or optimal monetary policy.<sup>4</sup> Normative analyses of inflation targeting present the central bank's monetary policy task as minimising a loss function (often formulated in terms of the deviation of inflation from the inflation target and the output gap), with the functioning of the economy as a constraint and the policy rate as an instrument. The outcome for the setting the policy rate then becomes a complicated function, not only of the deviation of inflation from the target and the output gap, but also of important parameters in the description of the economy.<sup>5</sup>

A simpler way to get an idea of how a central bank determines the level of the policy rate is thus to estimate reaction functions. This is a method used by economists both inside and outside central banks. The focus then is often on whether the central bank

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<sup>2</sup> Mervyn King, Governor of the Bank of England from 2003 to 2013, argued that central banks should endeavour to teach markets *how* to think and not *what* to think, see King (2005).

<sup>3</sup> Jonsson and Katinic (2017) show that the Riksbank's monetary policy has followed a Taylor rule relatively well for the period 1995–2016 if the long-term real interest rate is allowed to vary over time.

<sup>4</sup> In the US debate, it is common to see Taylor rules as normative. The Taylor rule was launched at a time when the monetary policy debate often centred on norms versus discretion in monetary policy decision-making. Taylor (1993) argued that his rule was better than discretionary policy. Later research on US data has also shown that simple rules work well in large macroeconomic models (see, for example, Taylor and Williams 2010). A similar consensus on simple rules estimated on Swedish data does not appear to exist, although there are several studies that have estimated simple rules, both in single-equation estimates and in large macro models, see for example Jonsson and Katinic (2017) and Corbo and Strid (2020), respectively.

<sup>5</sup> See, for example, Svensson (2011) for a description of inflation targeting based on a target function formulated in terms of inflation and the output gap. Woodford (2003) assumes a welfare-maximising objective function.

is deviating from its reaction function, i.e. deviating from what is considered 'normal' given economic developments.

In this article we estimate reaction functions and show how such estimated reaction functions can be used in the internal deliberations that precede a monetary policy decision to discuss the predictability of the Riksbank's monetary policy. At the time of the monetary policy decision, the amount of information on the current state of the economy is limited. We therefore present estimates of the Riksbank's reaction function based on real-time data since 2009.<sup>6</sup> That is, instead of using the latest estimate of the output gap, we use the assessment available at the time. In addition, we estimate a few different versions of the reaction function, with different measures of inflation and the output gap, to allow for different perspectives among the members of the Executive Board and to obtain a more robust picture of the historical reaction function.<sup>7</sup> We then use the estimated reaction function to make projections of what the policy rate would be set for the next period if the Riksbank followed its historical policy rule, and compare these, together with prevailing expectations on the financial markets, with the actual outcome of the policy rate. As suggested in Almerud et al. (2026), such real-time reaction functions can be included as one element (of several) in the internal monetary policy preparation to discuss whether future interest rate decisions can be considered predictable in the short term. Such an analysis is not necessarily about rating policy predictability based on differences between, on the one hand, the interest rate projections and, on the other hand, the envisaged policy and market expectations. Rather, it is about highlighting such deviations to deepen the discussion and facilitate communication that increases understanding of the monetary policy conducted.

The rest of this article has the following structure. Section 2 provides a brief introduction to simple rules and reaction functions and the real-time estimates that form the basis for the subsequent analysis. Section 3 compares projections from the real-time reaction functions and market expectations with the actual path of the policy rate. The analysis shows that the reaction functions have at times painted a picture of a systematic policy that differs from the actual interest rate policy pursued, particularly during the period when the policy rate was close to the effective lower bound. We discuss how the Riksbank's communication was used to explain some of the deviations. Section 4 summarises.

## 2 Evolution of the policy rate according to simple monetary policy rules and reaction functions

Simple monetary policy rules are often used to describe how monetary policy *on average* tends to be affected by economic developments. The best-known example is the Taylor rule, which was introduced over 30 years ago (see Taylor 1993 and English

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<sup>6</sup> Since 2026 the Riksbank publishes real-time forecasts on its website, see [Forecasts and outcomes | Sveriges Riksbank](#). See also Berg et al. (2004) for earlier analysis on real-time estimated reaction functions.

<sup>7</sup> Brès et al. (2026) also estimate reaction functions on Swedish data. They apply novel techniques in that they use expectations from surveys among professional forecasters of future policy rates, inflation and the output gap, as well as expectations from financial markets.

et al. 2003). According to the Taylor rule, the central bank sets the policy rate as a function of current inflation and its deviation from the inflation target, resource utilisation and the long-term real interest rate, i.e.

$$(1) \quad i_t = r_t^* + \pi_t + \beta_1(\pi_t - \pi^*) + \beta_2(y_t - y_t^*),$$

where  $i_t$  is the nominal policy rate,  $r_t^*$  is the long-term real interest rate,  $\pi_t$  is the inflation rate,  $\pi^*$  is the inflation target,  $y_t$  is a measure of real activity (e.g. the level of GDP) and  $y_t^*$  is potential real activity, implying that  $(y_t - y_t^*)$  in the case of GDP is the so-called output gap. In the original formulation in Taylor (1993), the long-term real interest rate was assumed to be constant, but it is now more common to see it as time-varying. A further change compared with Taylor (1993) is the inclusion of so-called interest rate smoothing, which takes account of the fact that the policy rate tends to be adjusted gradually.<sup>8</sup> With this addition, the policy rate is determined as follows

$$(2) \quad i_t = \gamma i_{t-1} + (1 - \gamma)[r_t^* + \pi_t + \beta_1(\pi_t - \pi^*) + \beta_2(y_t - y_t^*)],$$

where  $\gamma$  is the degree of interest smoothing. The parameters  $\gamma$ ,  $\beta_1$  and  $\beta_2$  can either be set to predefined values or estimated.<sup>9</sup>

In this article, we focus on how simple monetary policy rules/reaction functions can be used on an ongoing basis in the monetary policy formulation process to check the predictability of monetary policy. The idea is that a simple rule ahead of each decision occasion is used to answer the question “What would the policy rate be set at, given current assessments of economic conditions, if the Riksbank follows its historical reaction pattern?”.<sup>10</sup>

To put the reaction function into a form that can be used in a concrete decision-making situation and to be able to compare its implied interest rate with the actual decision, we update the reaction function one quarter from current forecasts/assessments.<sup>11 12</sup> The projected policy rate implied by the real-time reaction function can then be written as

$$(3) \quad i_{t+1,t} = \gamma i_t + (1 - \gamma) [\hat{r}_{t+1,t}^* + \hat{\pi}_{t+1,t} + \beta_1(\hat{\pi}_{t+1,t} - \pi^*) + \beta_2(\hat{y}_{t,t} - y_{t,t}^*)],$$

<sup>8</sup> The gradual adjustment of policy rates (“interest rate smoothing”) is an established empirical fact, see, for example, Lowe and Ellis (1997). See Dotsey et al. (2022) for a broader discussion on interest rate smoothing.

<sup>9</sup> In a previous study on Swedish data, Jonsson and Katinic (2017),  $\gamma = 0$  and  $\beta_1$  and  $\beta_2$  are assumed to be 1.5 and 0.1 respectively.

<sup>10</sup> Reconciling actual monetary policy with estimated rules has long been an element of monetary policy preparation, both at the Riksbank and at other central banks. What is new here is that the successively updated estimates are based on real-time data.

<sup>11</sup> Historically, the Riksbank has taken more than one monetary policy decision during certain quarters. To simplify our exercise, our reaction functions are based only on the last decision of each quarter. The decided interest rate will only take effect in the next quarter.

<sup>12</sup> The projections based on Riksbank forecasts of the output gap and inflation in the near term are allowed to affect the interest rate projection. But they are not to be considered as endogenous policy choices as they are normally based on indicator-based models and temporary variations in data.

where the notation  $x_{t+1|t}$  refers to a projection of the variable  $x$  for time  $t + 1$  (the next quarter) based on the information available at time  $t$  (the decision quarter). Information on inflation rates is published monthly and with a relatively short lag, and often only the inflation rate for the last month of the quarter is missing at the time of the decision.<sup>13</sup> Information on the output gap is more difficult, as national accounts are published with a longer lag. In this case, more comprehensive assessments are needed. To avoid introducing unnecessary uncertainty from the estimation of the current economic conditions, we let the reaction function consider the output gap of the previous quarter.<sup>14</sup>

As mentioned above, the parameters in the equations above can either be calibrated (i.e. reasonable values are set based on, for example, previous studies) or estimated econometrically. To try to capture the historical response pattern, we focus here on real-time response functions with estimated parameters rather than calibrated simple rules.

## 2.1 Real-time reaction functions

Before we can answer the question above - what policy rate would the Riksbank set if it follows its historical reaction function, given its current view of the long-term interest rate level, inflation and the output gap - we estimate the parameters of the following reaction function:

$$(4) \quad i_{t+1|t} = \hat{\gamma}_t i_t + (1 - \hat{\gamma}_t) [\hat{\beta}_{3,t-1} \hat{i}_{t+1}^* + \hat{\beta}_{1,t-1} (\hat{\pi}_{t+1|t} - 2) + \hat{\beta}_{2,t-1} (\hat{y}_{t|t} - y_{t|t}^*)].$$

In order to improve the empirical fit of estimated reaction function we assume that the decision maker is looking at a long-term nominal interest rate, which is here is approximated with a five-year swap rate in five years. In order to capture the downward trend in interest rates seen in the past decades, the parameter in front of the long-term nominal interest rate,  $\hat{\beta}_{3,t-1}$ , is allowed to be different from one. The parameters are estimated on data and the assessments of the trend in GDP available at the time, from the Q2 1993 to  $t - 1$ , where  $t$  goes from Q1 2009 to Q2 2025.<sup>15</sup>

Table 1 shows the parameter estimates for the decision point in Q2 2025. Results for six different estimates are shown, with different combinations of measures of inflation (CPIF and CPIF excluding energy) and the output gap (trends based on the Riksbank's assessment, a Hodrick-Prescott filter and a sixth-degree polynomial) as explanatory variables. Figure 4 in the Appendix shows the different measures of the output gap in real time.

<sup>13</sup> This indicates that the Riksbank's forecast is often a good approximation of the outcome for the decision quarter.

<sup>14</sup> At times the output gap in the previous quarter is also missing at the time of the decision. In these cases, we have used the Riksbank's assumed development at the time.

<sup>15</sup> The trend in GDP is thus an assessment that is updated on an on-going basis. To handle uncertainty regarding the assessment of the trend we estimate several reaction functions with different trend assessments.

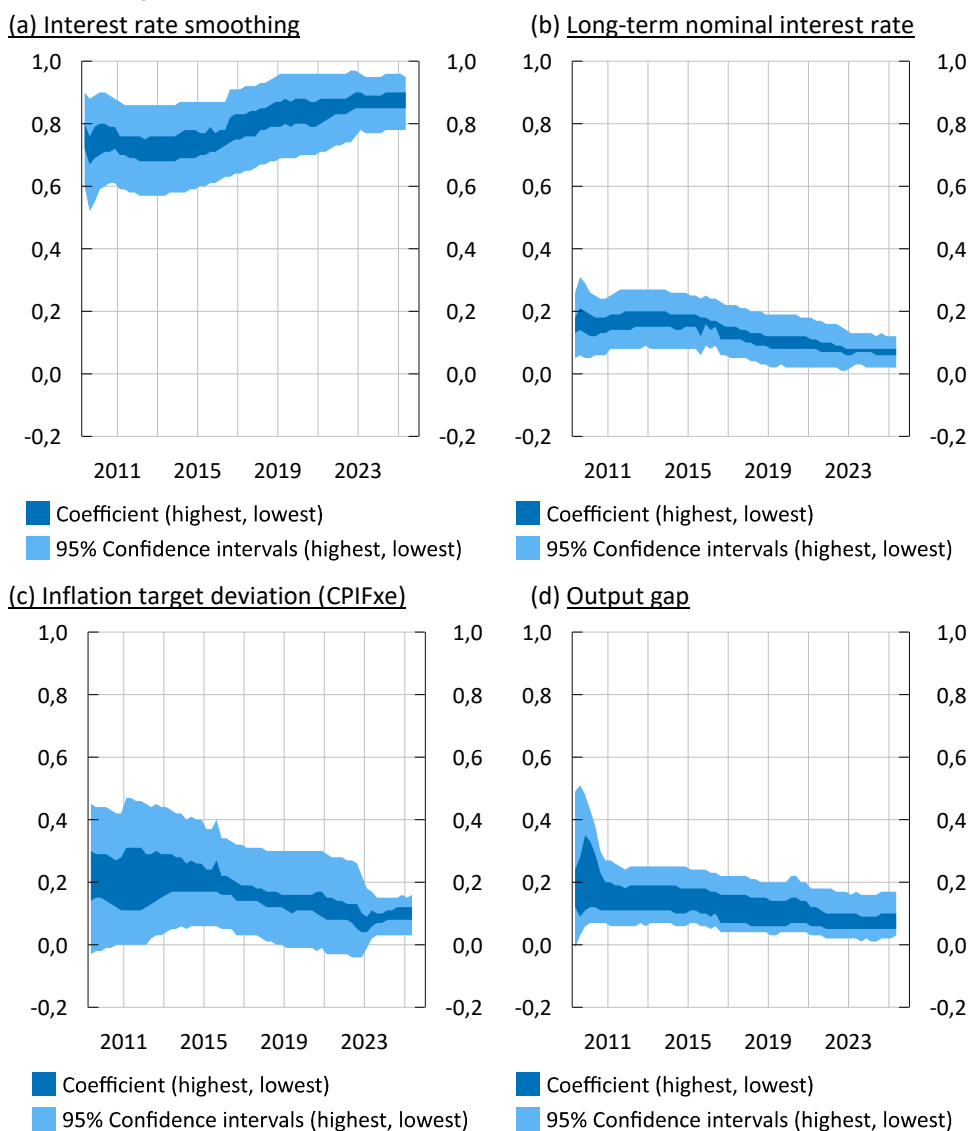
**Table 1. Estimated parameters of the reaction function with different measures of inflation and the output gap, for the period 1993Q2 – 2025Q2**

	Interest rate smoothing $\hat{\gamma}_{2025Q2}$	Long-term nominal interest rate $\hat{\beta}_{3,2025Q2}$	Inflation target deviation $\hat{\beta}_{1,2025Q2}$	Output gap $(\hat{\beta}_{2,2025Q2})$
Output gap, CPIFxe	0.88	0.08	0.11	0.06
Output gap, CPIF	0.90	0.07	0.09	0.05
Output gap (H-P), CPIFxe	0.84	0.09	0.11	0.10
Output gap (H-P), CPIF	0.87	0.07	0.08	0.09
Output gap (Polynomial), CPIFxe	0.85	0.08	0.12	0.09
Output gap (Polynomial), CPIF	0.87	0.06	0.09	0.08

Note. All parameters are significant at the 1-per cent level.

Figure 1 provides a more comprehensive picture and shows how the parameters have evolved since 2009. The parameters have the expected signs and are significantly different from zero, with the exception of the parameter for the inflation target deviation in the years following the financial crisis (2009-2011) and in the period 2019-2022. Panel (a) of Figure 1 shows that interest rate smoothing has a high weight in the reaction functions and that it has gradually increased (thus affecting the interest rate projections of the reaction functions), while the trend for the other explanatory variables is the opposite. It is worth noting that the uncertainty surrounding the parameter of the inflation deviation clearly decreased with the rapid increase in interest rates in 2022 and 2023.

**Figure 1. Parameter estimates in the reaction function with gradually increasing estimation period**



Note. The dark blue fields refer to the highest and lowest parameter estimates in the reaction functions based on different measures of inflation (CPIF and CPIF excluding energy) and the output gap (trends based on the Riksbank's assessment, a Hodrick-Prescott filter and a sixth-degree polynomial). The light blue fields represent the upper and lower limits of the 95 per cent confidence intervals for the parameters. The estimation periods range from 1993Q2-2009Q1 to 1993Q2-2025Q2.

Source: The Riksbank, Statistics Sweden and own calculations.

The parameters in the Riksbank's reaction function thus change over time. This could be regarded as problematic if the hope of estimating a reaction function is to find a stable and time-independent description of the Riksbank's systematic monetary policy. Another approach is to see changes in the reaction function as natural in the light of structural changes in the functioning of the economy and the need for policies to deal with new economic shocks over time. In addition, the members of the Executive Board vary over the years, which may be reflected in changing reaction

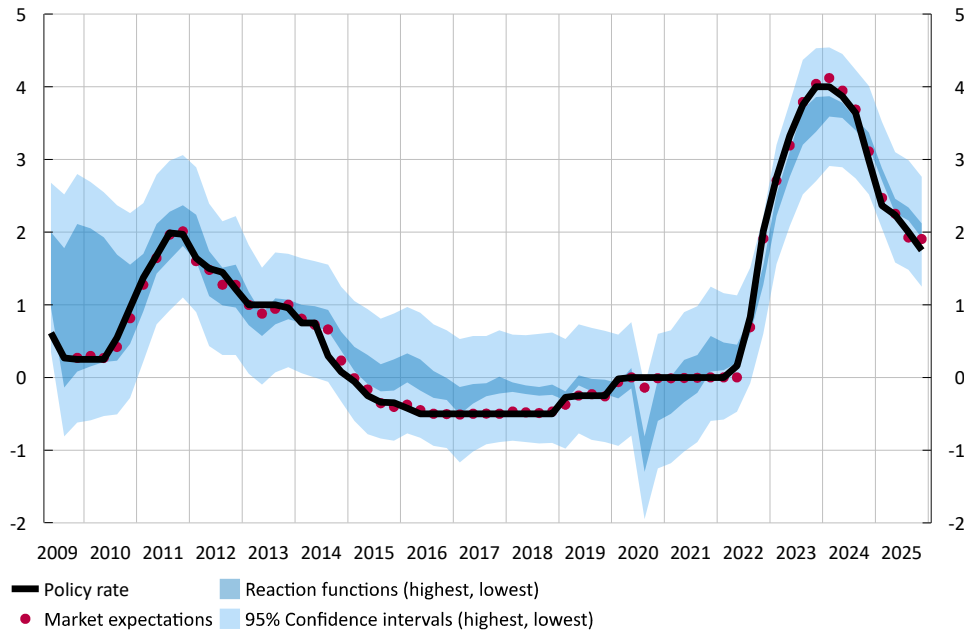
functions. However, we can conclude that the changes over time in the estimated parameters of the reaction function have been relatively small.

### 3 Reaction functions and the predictability of monetary policy

We can now use projections of the estimated reaction functions to illustrate the predictability of Swedish monetary policy in the short term. As mentioned above, one item in a checklist for a predictable monetary policy according to Almerud et al. (2026) is that, prior to a monetary policy decision, it identifies whether the forthcoming decision will deviate from the historical reaction pattern and from market expectations. If this is the case, it is likely that the decision may need to be clearly motivated by identifying what other factors that are seen to be of importance at the time of the decision. In other words, the predictability of monetary policy is improved by clearly justifying why the Riksbank deviates from its historical reaction pattern.

Against this background, using the reaction functions in Section 2, we have created a time series of stepwise real-time interest rate projections for the last monetary policy decision in each quarter. Figure 2 summarises the different interest rate projections from the estimated reaction functions in the dark blue field. The figure also shows market expectations ahead of each monetary policy decision and the actual outcome of the policy rate.

**Figure 2. The policy rate, projected policy rate according to estimated reaction functions and market pricing ahead of each meeting**



Note. The dark-blue field corresponds to the highest and lowest projected interest rates each quarter in the reaction functions. The light-blue field corresponds to the highest and lowest 95 per cent confidence intervals in the estimated reaction functions, but do not reflect uncertainty coming from the projections. Market expectations are measured by so-called RIBA contracts.

Source: The Riksbank, Statistics Sweden and own calculations.

So what can we say about the reaction function's projections of the interest rate compared with actual policy rate outcomes and with market expectations? To begin with, we note that the reaction function tracks actual interest rate policy relatively well during the period analysed, 2009-2025.<sup>16</sup> At the same time, there are periods showing clear deviations.

One example is the years after 2014, i.e. the years after the European debt crisis with low growth in the euro area and low inflation in most developed economies in the world. The implied interest rate of the reaction functions was above the actual policy rate (black solid line) from mid-2014 until the end of 2019 and was slightly negative only for a few years. The estimated reaction functions also gave a slightly higher weight to the output gap at that time than they did later (see panel (d) in Figure 1), which, all else being equal, gives a higher projected interest rate. But the Executive Board of the Riksbank made a different assessment, referring to the low inflation outlook and low inflation expectations (which are not part of the reaction function) and the risk that the credibility of monetary policy was about to deteriorate, see Andersson et al. (2022).<sup>17</sup> This was a stance that was well recognised in financial

<sup>16</sup> During 2009-2010 the dark-blue field is fairly wide. This is a consequence of the sixth-degree polynomial having a hard time to capture the trend in GDP during those years. See Figure 4 in the appendix. For those reaction functions that do not include polynomial-trend calculations, the deviation from the actual policy rate is small.

<sup>17</sup> See also the article "Why is it important that inflation rises towards the target?" in Sveriges Riksbank (2015) and, for example, Sveriges Riksbank (2017a, 2017b).

markets and therefore market expectations also differed from what the real-time reaction function implied.

Another example of relatively large deviations was during the pandemic year 2020. According to the reaction function, the interest rate would be negative, given the Riksbank's historical approach to the low inflationary pressures and the very weak development of the real economy. But the Riksbank, which the year before had raised the policy rate to zero after almost six years of a negative policy rate, chose not to cut the rate, arguing that additional monetary policy stimulus was not meaningful in an environment where demand had fallen as a result of lockdowns and widespread illness (see Sveriges Riksbank 2020, 2021). Instead, the Riksbank substantially increased its purchases of securities and took other measures to maintain the economy's credit supply. Market expectations initially deviated from how the policy rate developed but quickly adjusted following the Riksbank's communication on how it was thinking about monetary policy in this particular situation.

A third example concerns the period from the end of 2021, when the historical pattern of reaction would have been consistent with raising the policy rate. However, it took until the second quarter of 2022 before the policy rate was actually raised. This episode has been discussed in several evaluations, and external analysts argued that the Riksbank acted too late (see, for example, Hassler et al. 2023). In the autumn of 2021, when estimated reaction functions thus pointed to policy rate hikes, the Riksbank argued that weak figures on underlying inflation (other than those included in the estimation of the reaction function) continued to point to a weak inflation outlook and to an unchanged policy rate (see e.g. Sveriges Riksbank 2022). When inflation then picked up more broadly in early 2022, the Riksbank communicated well in advance of the monetary policy meeting in April and during the rest of the spring and summer that the policy rate would be raised rapidly. The aim was to allow companies and households to prepare for higher interest rates (see e.g. Sveriges Riksbank 2023). When the policy rate started to be raised in April 2022, it was also at a slightly faster pace and to a slightly higher level than implied by the reaction functions. Based on the Riksbank's communication, this was motivated by uncertainty about inflation dynamics (which also gave rise to unusually large forecast errors during the period) and concerns about the impact on inflation expectations.

A final example is the phase of policy rate cuts that started in early 2024. The reaction functions implied that they would take place at a slightly slower pace than was the case. At this stage, the Riksbank communicated that it had become more confident in the analysis of the economic shocks behind the sharp rise in inflation, the stabilising effect of wage formation and the fall in long-term inflation expectations (see e.g. Sveriges Riksbank 2024 and 2025). And inflation fell rapidly, which was reflected early on in the shorter-term (1-, 3- and 6-month) measures of inflation that became more prominent in monetary policy communication. The reaction functions include inflation measured over 12 months, which fell more slowly than the more short-term measures. All of this may help to explain why the policy rate was cut faster than implied by the historical reaction functions.

## How were reaction functions affected by the low interest rate period 2015-2021?

It may be worth recalling that the reaction functions do not take into account whether the Riksbank used other monetary policy instruments, such as securities purchases. From 2015 to 2022, it was mainly via adjustments to the Riksbank's securities holdings that the Riksbank calibrated monetary policy, while the policy rate was changed to a relatively small extent. Ideally, the reaction functions above would be estimated with a shadow rate, i.e. a calculation of how much the policy rate would have had to be lowered to achieve the same effect as the securities purchases (see De Rezende and Ristinemi 2023). The fact that the policy rate was adjusted relatively little when the securities portfolio was the more active monetary policy instrument, together with the fact that the policy rate was close to the effective lower bound, are possible explanations for the increase in the interest rate smoothing parameter in the estimated equations during this period (see panel (a) of Figure 1).<sup>18</sup>

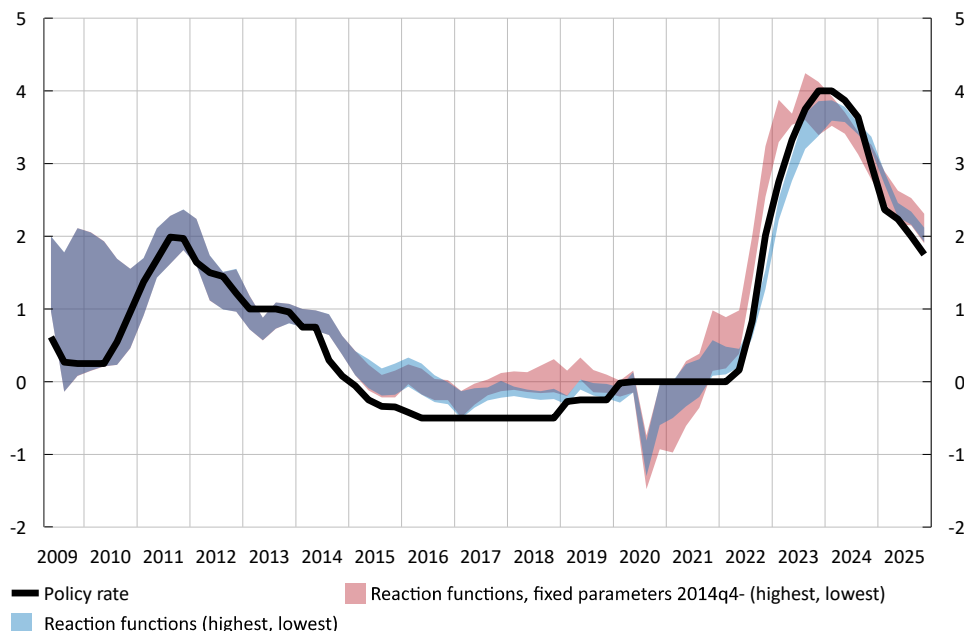
A simple way of illustrating how this might have affected recent interest rate projections is shown in Figure 3. The interest rate projections are based on parameter estimates estimated on data up to the start of the securities purchases, i.e. until the end of 2014, and are assumed to be constant thereafter. As can be seen from Figure 3, this exercise (the red field) implies a slightly different evolution of the implied policy rate from the reaction functions, with a tendency towards greater policy rate variability. For example, the deviation during the period of negative policy rates is even larger in 2018-2019. Another example is in 2022, when the projections are consistent with slightly earlier policy rate increases.

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<sup>18</sup> As an example, the standard deviation of the policy rate over the period 2015Q1-2019Q4 was 0.1 percentage points. This compares with the period 1993Q1-2013Q4, when the corresponding standard deviation was 2.4 percentage points.

**Figure 3. The actual policy rate and implied policy rates from reaction functions with time-varying and fixed parameters 2014-2025, respectively**

Per cent



Note. The light blue field refers to the same reaction functions as in Figure 3. The red field refers to the corresponding values for the implied policy rate, where the reaction functions from the 2015 Q1 decision point onwards are based on the same parameters as at the 2014 Q4 decision point.

Sources: The Riksbank, Statistics Sweden and own calculations.

#### 4 Reaction functions - a way to discuss the predictability of monetary policy

Estimated reaction functions have long been used at central banks and by market participants as a simple way to try to capture the systematic component of monetary policy. In this article, we discuss how estimated reaction functions can be used in the Riksbank's work to strengthen the predictability of monetary policy. We present estimated reaction functions based on Swedish real-time data for the period 2009-2025. The sequentially estimated reaction functions are used to create a time series of stepwise real-time interest rate projections. This time series, together with market expectations, is then compared with actual monetary policy to illustrate the predictability of monetary policy in the short term. In line with Almerud et al. (2026), such an analysis can be included as one element (of several) in the preparation of monetary policy decisions, with the aim of identifying deviations from a historical reaction pattern that may need to be justified and communicated.

The estimated reaction functions capture the development of the policy rate relatively well at an overall level. This suggests that monetary policy has been predictable in the sense that its development can be understood by developments in inflation and the output gap. However, the fact that interest rate smoothing is given such a large weight in the estimated reaction functions means that this interpretation should not be exaggerated.

Our analysis of the predictability of monetary policy indicates a high degree of predictability in the Riksbank's interest rate setting, even though this may partly stem from the fact that the policy rate did not vary very much during parts of the sample period and that asset purchases were used to calibrate the monetary policy stance. During the period we study, 2009-2025, there are however notable deviations between interest rate projections from the estimated reaction functions and market expectations on the one hand and actual outcomes on the other. One example concerns the period 2015-2019, when the estimated reaction functions favoured a slightly higher interest rate than was actually the case. During this period, the Riksbank referred to a low inflation outlook and weakening inflation expectations to justify a negative policy rate and securities purchases as necessary to stabilise inflation close to the target. Another example is during the pandemic, when the estimated reaction functions instead favoured a lower interest rate than was actually the case. At the time, the Riksbank communicated that it saw interest rate cuts as ineffective in a situation of lockdowns. What these examples clearly show is that reaction functions are not always consistent with the actual interest rate decision, but that they can be used to highlight deviations from the historical reaction pattern. In these situations, it is very important that the Riksbank communicates what other factors influence the decision, so that monetary policy becomes understandable and thus more predictable.

To end, a more complete analysis of ways to enhance the predictability of monetary policy needs to take into account additional factors. Actual monetary policy also tends to be largely guided by forecasts, which are not typically captured in reaction functions. History also shows that instruments other than policy rate changes can be of great importance, but these are not included in the analysis presented here. Finally, credible and consistent communication of the monetary policy strategy has a major impact on predictability, as was evident, for example, during the years of negative policy rates and large-scale securities purchases.

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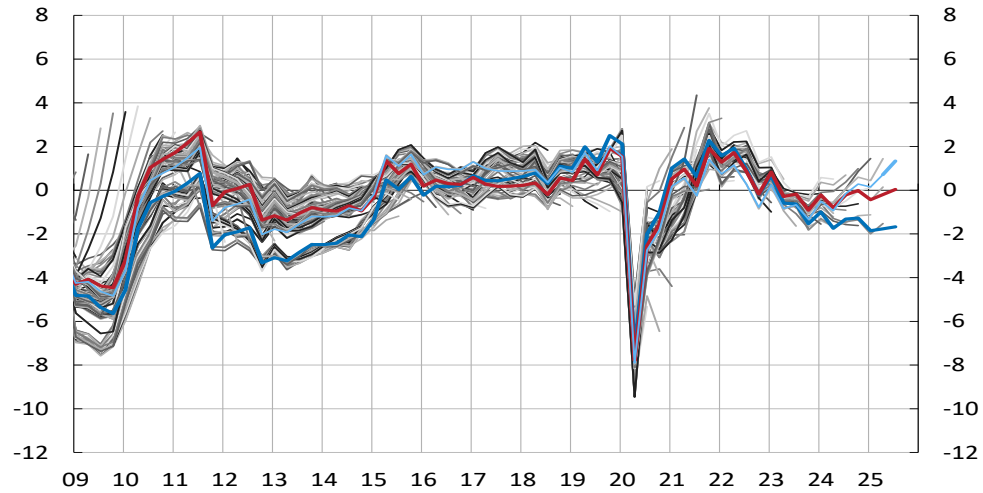
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## APPENDIX

**Figure 4. Different real-time measures of output gaps**

Percentage deviation from the trend



Note. The series show output gap series based on three different ways of calculating trend: (i) the Riksbank's assessment; (ii) a Hodrick-Prescott filter; and (iii) a sixth-degree polynomial. The latest estimated output gaps are highlighted in blue (the Riksbank's assessment), red (HP filter) and light blue (polynomial).

Source: Riksbank, Statistics Sweden and own calculations.