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The Tyranny of the Tenths. The Rise and Gradual Fall of Forward Guidance in Sweden 2007-2018

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The Tyranny of the Tenths.

The Rise and Gradual Fall of Forward Guidance in Sweden 2007-2018

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Abstract: This paper examines the Swedish experience of forward guidance 2007-2018. We focus on three interrelated issues: first, the effects of forward guidance on the discussion within the Board of Directors of the Riksbank, second, on the communication between the Riksbank and the public, and third, on the interest rate expectations held by various groups in Swedish society. We conclude that forward guidance has had negative effects on the dialogue within the Board as well on the communication between the Riksbank and the public. In addition, forward guidance has failed to affect expectations about interest rates in a systematic and significant way. We trace the roots of these consequences to the inability of the Riksbank to forecast its future policy rate three years ahead with any reasonable accuracy. The Riksbank has learned from this dismal performance and partially abandoned forward guidance, returning to a focus on the rate of inflation – as it did prior to the introduction of forward guidance.

Key words: Forward guidance, central bank communication, interest rate forecasting, inflation targeting, the Riksbank, monetary policy, Sweden.

JEL codes: E40, E43, E47, E50, E52, E65.

The Tyranny of the Tents.

The Rise and Gradual Fall of Forward Guidance in Sweden 2007-2018

1. Introduction¹

Forward guidance has become a widespread policy tool for inflation targeting central banks. The purpose of forward guidance is to influence the public's expectations about future short term interest rates and via these expectations also to affect long term interest rates.

Commonly, a distinction is made between qualitative and quantitative forward guidance (see e. g. Andersson and Hofmann, 2009). Qualitative forward guidance is the use by central banks of speeches and texts to indicate future interest rate changes. Quantitative forward guidance is the announcement by a central bank of its forecast of the future policy rate. Qualitative forward guidance has been standard practice among central banks for many years.

Quantitative forward guidance became popular in recent years, pioneered by the Reserve Bank of New Zealand in 1997 and followed by Bank of Norway in 2003. After the Financial Crisis of 2008, central banks including the Federal Reserve, the ECB, the Bank of Japan and the Bank of England have followed suit. The Federal Reserve under Janet Yellen emerged as a proponent of forward guidance. ECB formally adopted forward guidance in 2013.²

The Swedish central bank, the Riksbank, embraced quantitative forward guidance in 2007. Since then, it has regularly published a forecast of its policy rate (the repo-rate) stretching three years into the future.

The purpose of this study is to evaluate the Swedish experience of forward guidance between 2007 and 2018.³ We focus on three central issues. First, how did forward guidance impact on the work *within* the Board of Directors, the policy setting board of the Riksbank? Second, how did forward guidance affect the Riksbank's communication with the public? Third, did the Riksbank achieve its aim to affect the public's expectations of future interest rates?

¹ We would like to thank among others Robert Boije, Urban Bäckström, Lina Fransson, Thomas Franzén, Per Frennberg, Oskar Grevesmühl, Göran Hjelm, Thomas Hagberg, Jesper Hansson, Mats Kinnvall, Jesper Lindé, Lars Nyberg, Ulf Söderström, Anders Vredin, Andreas Wallström, Clas Wihlborg and Annika Winsth for constructive as well as critical comments. The responsibility for the conclusions rests solely with us.

² See ECB (2014).

³ The Riksbank evaluated its experience with forward guidance in Riksbank (2017). Without providing significant evidence, the conclusion was that it had been a success. However, this report did not consider the three issues considered in this study: the effect of the forward guidance strategy on the discussion within the Board, on the communication of the Riksbank with the public and the effect of forward guidance on the expectations of households, employers and labour unions. See

http://archive.riksbank.se/Documents/Rapporter/Riksbanksstudie/2017/rap_riksbanksstudie_170620_eng.pdf

We adopt a broad approach in our study. Usually, empirical evaluations of forward guidance are concentrated on the impact on future interest rates – not on the internal workings of the central banks and on their external communication strategy.⁴

Our analysis shows that forward guidance had a negative effect on the internal discussion within the Board and on the Riksbank's external communication with the public. In addition, forward guidance failed to have a significant and systematic effect on the expectations of the public. It did shift the focus in the Riksbank's communication away from the policy target of two percent inflation to the policy instrument, the repo-rate. The Riksbank's gradual retreat from a strong focus on forward guidance is a clear sign of an understanding of these policy failures. The Riksbank has not abandoned forward guidance, but by 2019 it has clearly lost in importance.

The remainder of the paper has the following outline. In Section 2, we discuss the arguments for and against forward guidance. In Section 3, we consider the introduction of forward guidance in Sweden. In Section 4, we examine the accuracy of the Riksbank's policy-rate forecasts. In Section 5, we discuss the effect of forward guidance on the work within the Riksbank. In Section 6, we examine the effect of forward guidance on the Riksbank's external communication. In Section 7, we model the effect of forward guidance on the policy-rate expectations of money market participants, employer organizations, labour unions, and households. Section 8 concludes the paper.

2. Forward guidance - arguments for and against

For a long time, the conventional wisdom held that central banks should not publish forward-looking information. Such information would reduce the efficiency of monetary policy. Publishing forecasts of future policy rates could also be seen as a promise and tie the hands of the policy-makers who would become reluctant to change opinion after they had committed to a specific policy forecast (Blinder et al, 2001). In the 1990s, this view was put into question. An efficient central bank should be as transparent and open as possible by providing forward guidance (see e.g. Dincer and Eichengreen, 2007).

A number of arguments for forward guidance were put forth such as: i) it would make monetary policy more effective by allowing policy-makers to influence long-term interest rates in the economy, not just short-term rates, ii) it would provide useful information for the public about future policy rates and thus reduce the public's forecast errors, and iii) it would offer a communication tool for central banks to justify the policy adopted, and iv) it would make it easier to hold central banks accountable (see e. g. Svensson, 2014).

Arguments against forward guidance emerged as well. Most important, it is highly unlikely that policy-makers are able to forecast their own future actions with sufficient precision in a world of uncertainty. For example, Goodfriend and King (2015, p 90) claimed that "central banks cannot predict their own actions, not because they behave erratically, but because they cannot

⁴ In addition, there is a large volume of work on the theory of forward guidance which we ignore here as it is not relevant for our study.

predict developments in the economy to which they must respond”. In addition, the public must understand that all forecasts are uncertain and forward guidance is not a promise, it is a guide (e.g. Reifschneider and Roberts, 2006, Williams, 2006).⁵

To sum up, there are arguments for and against the use of forward guidance. In our view, the proper way to evaluate forward guidance is to turn to the empirical evidence. We do so by examining the Riksbank’s experience of forward guidance.

3. The introduction of forward guidance in Sweden

Inflation targeting was introduced in Sweden in January 1993 following the abandonment of the fixed exchange rate for the Swedish *krona* in November 1992. Over the years, the Riksbank’s inflation target and monetary policy strategy have been modified on a number of occasions.⁶ Changes include a revision of the target itself in 2010 when the Riksbank abolished the tolerance band of plus/minus one percentage point. Another alteration occurred in 2017 when the Riksbank re-introduced the tolerance band, now called a variation band, of plus/minus 1 percentage point around the target and altered the inflation target from the CPI to the CPI with a fixed mortgage rate (CPIF).⁷

In the 1990s, the Riksbank’s policy strategy slowly evolved as the Bank learnt how to implement an inflation targeting policy. By 2000, the first phase of experimentation was completed and the Riksbank settled on its policy approach. The policy was forward-looking, aiming to reach the inflation target in one to two years. Forecasts became an integrated part of the Riksbank’s policy strategy. It developed forecast models of inflation and economic growth. The forecasts were based on the assumption that the policy rate would remain constant throughout the forecast period. This assumption gave rise to a simple rule-of-thumb: if the inflation forecast was above the target, the Riksbank raised the policy rate, if it was below, the policy rate was lowered (Riksbank, 2000).

From a communication point of view, this rule of thumb was a success. As argued by Apel, Heikensten and Jansson (2007, p. 37) “[t]he approach the Riksbank adopted worked satisfactorily on the whole as far as communication was concerned. The assumption of a constant instrumental rate was pedagogic in that the forecasts spoke straightforwardly about the need for monetary policy action.”

From a modelling point of view, the assumption of a fixed policy rate was unrealistic. Over time, the Riksbank began to relax this assumption. The first step was taken in 2005. Rather than using the fixed rate assumption, the Riksbank shifted to using the money market expectations

⁵ Giavazzi and Mishkin (2006) recommended that the forecast of the future policy rate should be presented as a band, not as a point estimate, to illustrate the uncertainty.

⁶ Andersson and Jonung (2018) provide a history of inflation targeting in Sweden between 1993 and 2017, the first quarter of a century of this type of monetary regime.

⁷ For a discussion of the arguments for and against the use of a tolerance band in the Swedish context., see Andersson and Jonung (2017).

of the future rates in the forecast models instead.⁸ Giavazzi and Mishkin (2006) concluded in their review of the Riksbank's policy that it would be better if the Riksbank made its own forecasts of the future policy rate rather than relying on money market expectations.

The Riksbank accepted their advice and produced its first own forecast in 2007. By now, the Riksbank publishes three forecasts each year with a forecast horizon of three years. The Board of Directors decides on the interest rate path at their policy meetings. The Riksbank's DSGE model of the Swedish economy, RAMSES, provides vital information on which the forecasted path is based (Goodfriend and King, 2015).

The introduction of forward guidance was complemented by an entirely new policy and communication strategy, replacing the strategy that had evolved from the Riksbank's first experience of inflation targeting. In the new strategy, forward guidance took central stage. The old simple rule-of-thumb approach that if the inflation forecast was above the target, the Riksbank would increase interest rates, and vice-versa, was abandoned. The new assumption imposed on the models was that "that the repo rate will develop in such a way that monetary policy can be regarded as well-balanced. In the normal case, a well-balanced monetary policy means that inflation is close to the inflation target two years ahead without there being excessive fluctuations in inflation and the real economy" (Riksbank, 2007a, p. 3).

In the new communication strategy, the focus shifted from the inflation forecast (i.e. from the target variable) to the interest rate forecast (i.e. to the policy instrument). Previously, the Riksbank's communication has focused on whether the inflation forecast was above or below the targeted level. Now, the Riksbank began to publish interest rate forecasts with two decimal points accuracy three years into the future. Each forecast thus included, from 2007 and onwards, both a point estimate and the 50 percent, 75 percent, and 90 percent confidence bounds. The commonly used 95 percent confidence bound was not published.

Giavazzi and Mishkin (2006) warned the Riksbank against publishing a point estimate that would create the illusion that the Riksbank can forecast its own policy rate with great accuracy. The Riksbank, however, had greater confidence in the public's ability to understand the uncertainties that all forecasts include stating that "that the uncertain nature of assessments is now widely understood, as is the circumstance that new information is liable to entail appreciable changes in the conditions for monetary-policy decisions" (Apel, Heikensten and Jansson, 2007, p. 38).⁹

With the introduction of quantitative forward guidance, the Riksbank also abandoned qualitative forward guidance. Previously, members of the Board of Directors used public speeches to hint at possible changes in the repo-rate in the near future (Rosenberg, 2007b and Riksbank, 2007b).

⁸ Jansson and Vredin (2003) examined early the role of publishing central bank's interest rate forecasts.

⁹ Rosenberg (2007a) provided additional arguments against the view that publishing the repo-rate path may hurt the Riksbank's credibility.

In our opinion, the introduction of forward guidance in 2007 and the abolishment of the tolerance band in 2010 should be viewed as part of a movement towards greater reliance on formal econometric models and a stronger belief among the members of the Board in the ability of the Riksbank to fine-tune the Swedish economy through monetary policy (Andersson and Jonung, 2018).

4. The accuracy of the Riksbank's policy rates forecasts 2007-2018

It is trivial to state that forecasting future economic developments is difficult, in particular in times of crises, such as the Financial Crisis in 2007/08 and the euro crisis in 2010/12. The Riksbank's lack of forecast accuracy is a clear demonstration of this difficulty. Most of the Riksbank's forecasts have proven to be incorrect as demonstrated in Figure 1.

[FIGURE 1]

Every forecast, together with the actual repo-rate, is shown in Figure 1. The repo-rate is the black curve while the respective forecasts are displayed in color. Prior to the Financial Crisis of 2007-08, the forecasts one year into the future were reasonably accurate and captured the tightening of monetary policy that took place from early 2007 until September 2008. The forecasts were also fairly on the mark once the financial crisis had begun to unfold. When the immediate crisis was over and the Swedish economy began to recover, the Riksbank raised its policy rate, as its forecasts also indicated it should do. From 2007 to 2011, the one-year ahead forecasts were reasonably precise.

During the six-year period 2012-2017, all forecasts with a horizon of at least 12 months have been incorrect. The error is not simply one regarding the exact level of the policy rate. The error concerns also the direction of the changes of future interest rates. Every forecast has shown a tightening of policy while the actual interest rate has continued to fall.

The pattern in Figure 1 of falling actual rates while projected rates kept on rising was eventually nicknamed the "hedgehog" by actors on the financial markets (*Svenska Dagbladet*, 2016).¹⁰

Has the repo-rate remained within the Riksbank's forecasted confidence bounds? Here, the Riksbank has been more successful as the policy rate has stayed within the bounds most of the time. However, the bounds are so wide that they offer little guidance. For example, the repo-rate in April 2018 was -0.5 percent. According to the Riksbank's forecast, in three years-time the repo-rate will be between -2.7 percent and 4.8 percent with 90 percent probability. The last time the repo-rate deviated from this band was in 1996. The forecasted 90 percent probability band is thus not more accurate than saying that the policy rate in the future is likely to be within the observed limits during the last twenty years. In other words, the Riksbank expects the interest rate to deviate from the historical record with a 10 percent probability – a forecast that contains very limited information.

Figure 1 demonstrates a major problem with forward guidance. Forecasts are reasonably accurate when the economy follows a stable traditional business cycle pattern. In this case, the

¹⁰ <https://www.svd.se/ingves-anglok-skenar-vidare>

forecasts are also of little value to the public as it is relatively easy to form expectations in a stable environment. The forecasts became highly inaccurate, not just in terms of the point-estimate but also in terms of the future direction of the changes of the rates, when the economy is hit by large and unexpected shocks, the case when the public would benefit most from forward guidance.

Part of the problem with the forward guidance of the Riksbank is that most econometric forecast models are based on the idea of mean-reversion. The Swedish economy is expected to return to a historical average over time, often within the three-years forecast horizon. The forecast error becomes large when the economy does not return to its historical average. In other words, the forecasts are as good (or bad) as the recent past was a reliable guide to the future.

To sum up, judging from Figure 1, the Riksbank has not been successful in forecasting its own future policy rate. Except for a brief and uneventful period, the forecasts have systematically failed to forecast not only the level of the policy rate but also the direction of the change of the policy rate. We trace the roots to this problem to the impossibility of forecasting the unexpected. The 2010s has been a period of repeated unexpected shocks that few had foreseen in advance. No forecast model, no matter how advanced, can predict the unexpected.¹¹ Models can only map a future path for the economy based on the assumptions of no unexpected events, and that the economy will behave in the future as it has in the past. The failure of the Riksbank to forecast the future path of its policy-rates is thus not due to inadequate forecast models, but due to the impossibility to forecast an uncertain future. No other forecast model would have performed substantially better.

5. The effect of forward guidance on the internal work of the Board of Directors

Judging from the minutes of the Board of Directors at the Riksbank, forward guidance was initially taken seriously by the members of the Board. For four years, 2009-2013, forward guidance framed the internal discussion. This dominance is demonstrated by Figure 2, displaying how frequently the path of the future policy rate (*räntebanan*), inflation (*inflation*) and unemployment (*arbetslöshet*) were mentioned per page in the minutes of the Board.¹² Figure 2 starts in 2006, the year before forward guidance was initiated, and ends in March 2018.

[FIGURE 2]

The rate of inflation (*inflation*) dominated the dialogue prior to 2007. Once forward guidance was introduced, the number of references to the interest rate path began to increase while inflation was talked about less and less. Between late 2008 and 2012, the interest rate path was discussed as much, if not more than the rate of inflation. Thereafter the dominance of the interest rate path started to decline slowly. From 2016 and onwards, the discussion reverted back to the same pattern as prior to 2007 with more focus on inflation and less on the interest rate forecast. Unemployment was a concern during 2010 and 2014, but otherwise not mentioned to any large extent.

¹¹ King (2016) uses the concept "radical uncertainty" to describe the inherently unpredictable future.

¹² We include all terms that relate to inflation and unemployment such as inflation forecast and unemployment forecast.

The strong focus on quantitative forward guidance between 2008 and 2012 clearly affected the work of the Board. The review by Goodfriend and King (2016) brings out disadvantages of interest rate forecasting: some members of the Board tended to be reluctant to change their views on future interest rates for fear of contradicting the forecast path they had argued for during the previous meeting, even when new information was available.

The focus of the deliberations shifted towards the interest rate forecast after the introduction of forward guidance. As Goodfriend and King (2016, p. 89) put it: “[t]here is something surreal about the precision of the guidance provided by individual board members as to the future path of the repo rate when contrasted with the sheer uncertainty about the future and the fact that markets took rather little notice of the published path in determining their own expectations”.

Members of the Board could spend much time arguing with each other over whether the interest rate forecast several years into the future should be a few tenths of a percentage points higher or lower. The fact that each forecast is surrounded by large forecast errors, likely of several percentage points, were hardly considered in these discussions. This line of argument reflected a strong belief in monetary policy fine-tuning, where even the smallest change in a forecast will have measurable effects on the economic outcome.

This focus on decimals was not lost on some members of the Board. Henry Ohlsson, member of the Board since 2015, discussed the tendency towards strong belief in the policy rate forecasts of individual members, baptizing this propensity as “the tyranny of the tenths” – excessive attention to the second decimal point of the policy rate forecast. In his opinion, policy should focus on general trends, not on the tenth of the decimals.¹³

To sum up, forward guidance had a harmful impact on the deliberations of the members of the Board of Directors. They lost track of the target of monetary policy, the rate of inflation, by focusing on the future behaviour of the policy rate. The internal discussion centred on the policy–rate forecast despite of a dismal track record for the forecasts from 2011 and onwards. Eventually, the deliberations within the Board gradually turned away from forward guidance as this strategy ran into major forecast failures as displayed in Figure 1.

6. The effect of forward guidance on the Riksbank’s communication with the public

The introduction of forward guidance influenced not only the debate *within* the Riksbank. It also had an effect on the Riksbank’s communication with the world *outside* the Bank. The shift in focus away from inflation to policy rate forecasts within the Board is clearly visible in the changing appearance of the Riksbank’s web page (see Appendix A) and in the media reports on monetary policy.

The Riksbank’s web page has been redesigned a couple of times. The design has been relatively stable between these remakes. Appendix A contains six examples of the main page (the start page or front page), i.e. the first page a visitor to www.riksbank.se encounters from 2001 to 2018.

From 2001 to 2009, under the old policy and communication strategy, the first piece of information a visitor came upon was the rate of inflation. A permanent feature on the main page

¹³ See Riksbank (2016).

was a picture of a gauge displaying the present rate of inflation and whether it was within the Riksbank's tolerance band valid at that time.

Although forward guidance was introduced in 2007, the focus on inflation was kept on the web page until 2010 when a major reshape took place. At that time, the inflation gauge was replaced by a figure illustrating the forecasted interest rate path reflecting the focus on the interest rate forecast in the Riksbank's communication with the public.¹⁴ Beginning in 2013, the deliberations of the Board slowly began to move away from forward guidance. It took until 2018, however, before the figure on the interest rate path was removed from the webpage. From 2018 and onwards, neither the actual rate of inflation nor the interest rate forecast is shown on the start page.

[FIGURE 3]

The shift in focus displayed on the Riksbank's webpage and in the Board's deliberations is also registered in the media reporting about the Riksbank and monetary policy. Figure 3 shows the number of news articles on the Riksbank, which contain the words interest rate forecast (*räntebana*) and inflation (*inflation*) between 1995 and 2018.

Roughly 130 articles about the Riksbank and the rate of inflation were published in Swedish media outlets, such as newspapers and magazines, every month from 1993 to 2008.¹⁵ The introduction of forward guidance caused a spike in the number of articles about the interest rate forecast in 2007 before it declined. During the focus by the Board on forward guidance from 2009-2013 (grey area in Figure 3), the number of articles on interest rate forecasts again increased to 30 to 40 per month. The amount of articles on inflation declined by more than half, to roughly 50 per month.

While inflation was still a major theme, the interest rate forecasts reached almost parity during the four years when the Riksbank was focused on forward guidance. The decline in attention to forward guidance on the Board in the period after 2013 is also reflected in the media coverage, where the number of inflation articles again rose to 130-150 per quarter while the number of forward guidance articles dropped to an average of 9 per quarter.

The similarity between Figure 2 and 3 demonstrates how important the discussion within the Board was for its communication with the public. When the Board of directors concentrated on forward guidance, this spilled over to the media commentary. This focus was reversed in 2013-2017, when the Board dialogue and press coverage reverted to a form more similar to the pre-2007 pattern, before forward guidance was introduced.

7. The effect of forward guidance on interest rate expectations

The aim of forward guidance is to influence the expectations of future interest rates held by the public. Next, we test if changes in the Riksbank's interest rate forecast have affected the expectations of households, employer organizations, labour unions, and money market

¹⁴ For historical webpages from the Riksbank see https://web.archive.org/web/20090101000000*/www.riksbank.se

¹⁵ Media data is collected from *Retriever Medieanalys* (www.retriever.se). All major Swedish print outlets are included in the database as well as major online outlets from the year 2000.

participants. First, we use a Granger-causality test to reveal if household expectations adjusted, following a change in the Riksbank's policy rate forecast. Second, we estimate a simple regression model where we model how household expectations were affected by the forecasts and the Riksbank's actual repo-rate.^{16 17}

We use expectations data for households collected by the National Institute of Economic Research and expectations data for employers, labour unions, and money market participants from the *Prospera* survey. Data is collected quarterly for all groups. Households are asked to state their expected mortgage rate two years from now. The other groups are asked to express the expected repo-rate two years from now. Expectations data for households therefore do not fully match the period for the Riksbank's forecasts for the repo-rate. To control for this mismatch, we include the profit margin on mortgages of the commercial banks as a control variable when we model household expectations.

As data on expectations are collected quarterly, quarterly data are used in our regressions. A limitation of our study is that we can only test if a change in the Riksbank's interest rate in one quarter has an effect on expectations in the subsequent quarter(s). We cannot test if there is an effect within the quarter.¹⁸

7.1 Granger causality tests

The Granger causality test examines if a change in one time series is followed by a change in another series. A variable is said to Granger cause another variable if there is such a relationship. We expect that changes in the Riksbank's forecast Granger cause changes in household expectations if the forward guidance of the Riksbank has an effect on household expectations.

The results from this test is presented in Table 1a for the full period 2007-2018, and in Table 1b for the years 2010-2018 as household expectations are available only from 2010 and onwards.

[TABLE 1]

The arrows in Table 1 show if a change in one variable is followed by a change in another variable one to two quarters later. For the full time period, we find that the Riksbank's forecast does Granger cause the expectations held by employers and labour unions. However, the Riksbank's forecast is in turn Granger caused by the expectations of money market participants.

¹⁶ Previous studies on the effect of the Riksbank's interest rate forecast on expectations have focused on financial market expectations. Here, we also consider the effect on the expectations held by households, employers and labour unions. Earlier studies for Sweden such as Beechy and Österholm (2012) concluded that forward guidance reduced money market forecasting errors. Kool and Thornton (2015) found no such effect. Åhl (2017) and Brubakk, Ellen and Xu (2017) concluded that unexpected changes in the forecast had an effect on near-term expectations but not on expectations further into the future.

¹⁷ None of the previous studies for Sweden have considered if household expectations are adjusted *before* the Riksbank's forecast as we test for in this study.

¹⁸ In our study, we find a strong effect of the lagged changes in the actual repo rate. The fact that we do not find a significant effect on the interest rate forecast is thus unlikely to be a result of our choice of lagging the explanatory variables.

In other words, changes to the Riksbank's forecast were expected by money market participants. At least for this group, the Riksbank has behaved in a predictable manner. Thus, the forward guidance through the policy rate forecasts did not have any effect as the money market had predicted the policy rate forecast changes *prior* to the Riksbank announcing them. For employers and labour unions, the forecast played a significant role according to these results.

Turning to Table 2, which shows the results for the period after the Financial Crisis (i.e. the period 2010-2018), we find a significantly different result. Again, we conclude that money market expectations Granger cause the Riksbank's expectations. They also Granger cause the expectations of households, employers and labour unions. The Riksbank's interest rate forecasts, however, do not Granger cause any series.

[TABLE 2]

Once more, it appears as if money market participants could predict changes in the repo-rate even before the Riksbank presented its forecast. Thus, the announced forecasts had little effect on their expectations. Households, employers and labour unions updated their expectations one to two quarters after the money market actors. But they did not adjust them after a change in the Riksbank's forecast. Based on these results, we conclude that the Riksbank's forward guidance did not have any significant effect upon the expectations of households in the period 2010-2018.

The most likely explanation why the expectations held by money market participants changed before the Riksbank's forecast is that the Riksbank has behaved in a predictable way. Money market participants have access to similar information as the Riksbank and based on the Riksbank's previous behavior they were able to predict the future policy path of the Riksbank. In this sense, the forward guidance offered by the Riksbank turned out to be superfluous.¹⁹

The difference between the results in Table 1 and Table 2 suggests that forward guidance was initially effective in influencing employers' and labour unions' expectations prior to 2010, but not thereafter. This absence of impact may be explained by a lack of credibility in the Riksbank's forecasts, an issue raised by Goodfriend and King (2016).

7.2 Regression results

The dependent variable in the regression models is the change in the expected interest rate in two years' time for one of the groups. As explanatory variables, we include the change in the actual repo rate, the change in the Riksbank's repo-rate forecast for two years into the future, and the lagged change in the expected rate for the respective groups.

Our regression models are given by:

$$\Delta i_{h,t}^e = c_h + \beta_{h1} \Delta r_{t-1} + \beta_{h2} \Delta f_{t-1} + \beta_{h3} \Delta i_{h,t-1}^e + \varepsilon_{ht}, \quad (1)$$

where $\Delta i_{h,t}^e$ is the expected interest rate two years from now by group h at time t , r is the repo-rate, and f is the Riksbank's forecast two years into the future. We estimate the models for the

¹⁹ Andersson and Hofmann (2009) found a similar result for the Riksbank, Norges Bank and the Reserve Bank of New Zealand.

full period 2007-2018, as well as for the shorter 2010-2018 period, to make the results comparable to the results from the Granger causality tests. The regression results are presented in Table 3.

[TABLE 3]

The Riksbank's interest rate forecast has a statistically significant effect in only one of the seven regression models: concerning money market expectations 2010-2018. However, the parameter has the wrong sign. It is negative, while it was expected to be positive. For all other models, the parameter is statistically insignificant. Changes in the actual repo-rate, on the other hand, do have a strong effect in all regression models, for both the full and the shorter time period. The sign of the parameter is positive as expected.

A concern with our regression model is that we have lagged our variables one quarter and therefore do not capture within-quarter effects. Åhl (2017) suggested that unexpected changes in the near-term forecast of the repo-rate have some effect on market expectations but not on long-term expectations, a result generally confirmed by Brubakk, Ellen and Xu (2017). Given the frequency of our data, we cannot explore such short-term effects. However, our results confirm that the forecast have no effect on long-term expectations. A key argument in favour of forward guidance is that it is supposed to affect long-term expectations and thus long-term interest rates. Our tests using Swedish data do not support this view.

7.3 Summary of the econometric evidence

Our econometric tests show that the Riksbank's forward guidance did not have any major systematic effects on the expectations of the future interest rate two years into the future as held by households, employers, labour unions and money market participants. Money market expectations changed prior to the Riksbank's forecast while the expectations held by the other groups followed money market expectations, not the Riksbank's forecasts.

Actual changes in the repo-rate did have an effect on expectations. If the Riksbank's changes in the repo-rate were expected, they should not have affected expectations. Given that they did, this result suggests that many of the Riksbank's interest rate changes were unexpected and thus unpredictable. This result is in line with the assessment by Goodfriend and King (2016) who maintain that central banks (and thus the public) cannot forecast their future behavior because the future is simply too uncertain. This view is also held by Issing (2012) who concludes that the publication of central bank forecasts of inflation several years ahead represents a "nirvana" approach. Forecasts for such long periods are impossible to make with any reasonable accuracy.

Our results confirm international studies demonstrating no or weak evidence of a systematic effect of forward guidance on the expectations of the public (see e.g. Filardo and Hoffman, 2014 and Kool and Thornton, 2015), although forward guidance may sometimes affect market expectations (see e.g. Kool and Thornton, 2015, Svensson, 2014, and King and Goodfriend, 2016).

8. Conclusions

Forward guidance was introduced in Sweden in 2007. Based on our analysis we conclude that it was a mistake.

Our analysis suggests the following conclusions based on the record from 2007-2018. The fundamental problem with forward guidance is the lack of precision of the policy rate forecasts, in particular those with a longer horizon than twelve months. From 2012 to 2018, the Riksbank failed to forecast correctly even the direction of the future path of the policy rate. The main argument in favour of forward guidance is that the central bank is thought to possess better knowledge about its future behavior than the public – using superior modelling capacity and judgement. Thus, according to this line of thinking, the central bank can help the public to form more accurate expectations by providing forward guidance. Our results show that this was not the case in Sweden. The Riksbank's forecasts were consistently far off the mark.

In addition, our econometric results suggest that the expectations of money market participants Granger caused changes in the Riksbank's rate. In other words, the Riksbank's forward guidance provided little or no additional information not already known to the public.

The failure of forward guidance gave rise to three negative effects on the quality of monetary policy. First, the move to forward guidance had detrimental effects on the working of the Board of the Riksbank. The tyranny of the tenths – the excessive belief that members of the Board were able to forecast the policy rate three years into the future with high accuracy - shifted the focus of the internal debate from the rate of inflation, the goal of monetary policy, to the policy rate, the main instrument of monetary policy. Members of the Board were not eager to update their views on the policy rate due to previous commitments to a specific path of the policy rate. In hindsight, the dialogue of the Board turned slightly absurd when members apparently thought they were able to forecast a policy rate far into the future with great precision while consistently failing to do so for a long stretch of time.

Second, the forward guidance strategy had a negative impact upon the Riksbank's communication with the public and on public debate on monetary policy by moving attention away from the inflation target towards the policy rate. This change of emphasis undermined public understanding of the inflation targeting of the Riksbank.

Third, and perhaps most disturbing in our view, forward guidance turned out to be an inefficient instrument judging from our econometric tests. They reveal no significant consistent effect of forward guidance on the expectations of households, money market participants, and the organizations of employers and of labour. They did not respond to forward guidance for a number of reasons, like lack of knowledge about the forecasts, indifference to them and lack of credibility of the forecasts as they turned out to be highly inaccurate over time. The consistent failure of forward guidance in delivering ex post the policy rate path forecasted weakened the credibility of the Riksbank, serving as a ground for critical media comments on the Riksbank.

To sum up, our study suggests that the adoption of forward guidance in 2007 was a mistake. The Swedish evidence from ten years of forward guidance suggests it was “a bridge too far” in

the sense that interest rate forecasting turned into a threat to the credibility and implementation of the inflation targeting of the Riksbank. Eventually, the Riksbank seems to have reached this conclusion as well and has withdrawn from forward guidance, although the policy rate forecasts still are part of the activities of the Board.

To conclude on an optimistic note; policy making is a learning process. The Riksbank has experimented with forward guidance as a new policy tool for ten years. Gradually, the Bank has learnt that this tool involved unforeseen and unintended disadvantages. Adjusting to this insight by downplaying forward guidance, the Riksbank is likely to have strengthened the sustainability of its inflation targeting regime.

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Appendix A. The rise and fall of forward guidance as revealed by the Riksbank web pages

The Riksbank's web pages reveal the evolution of the policy strategy of the Riksbank in recent decades. This is seen from the selection of historical webpages from the Riksbank shown below, as collected from https://web.archive.org/web/20090101000000*/www.riksbank.se.

These web pages can be classified into three periods: first, a period of inflation focus (2001-2007), then of forward guidance (2010-2017), and finally, starting in 2018, of a broad policy perspective (2018). In the first period, inflation and how the inflation outcome related to the inflation target was always shown in a figure on the start page as an inflation gauge or inflation meter. See Figure A1 for an example. In the second period, the inflation meter was replaced by the policy rate forecast 36 months ahead, see Figure A2. In the third period, starting in 2018, no figure is displayed. Instead the focus is on the present repo rate.

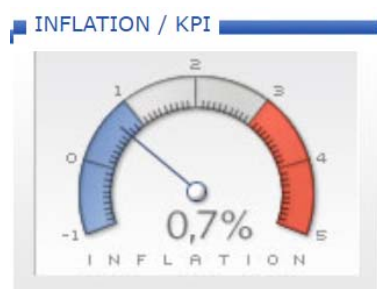


Figure A1. The inflation gauge of the Riksbank. Inflation outcome and inflation target. From August 25, 2004.

Note: The blue area in the figure indicates that the inflation rate is below the tolerance band of the inflation target, while the red area indicates that it is above. it

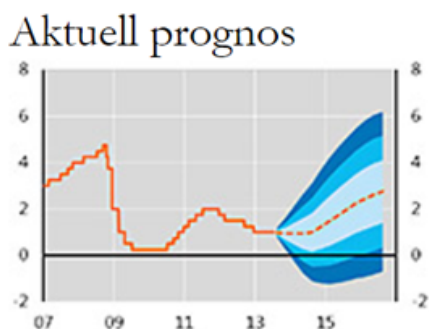


Figure A2. Interest rate forecast under the title of “Current forecast”. From August 20, 2013.

Note: The blue area in Figure A2 shows, respectively, the 50, 75 and 90 percent confidence band around the forecast. The 95 percent confidence band was never used by the Riksbank in its communication with the public.

A.1 Examples of historical webpages

A selection of the full historical webpages of the Riksbank is shown below for every three years. The Riksbank's web page stands out as stable over time with only minor alterations. In each picture of the webpage, the inflation gauge or the policy rate forecast figure is highlighted by a red box.

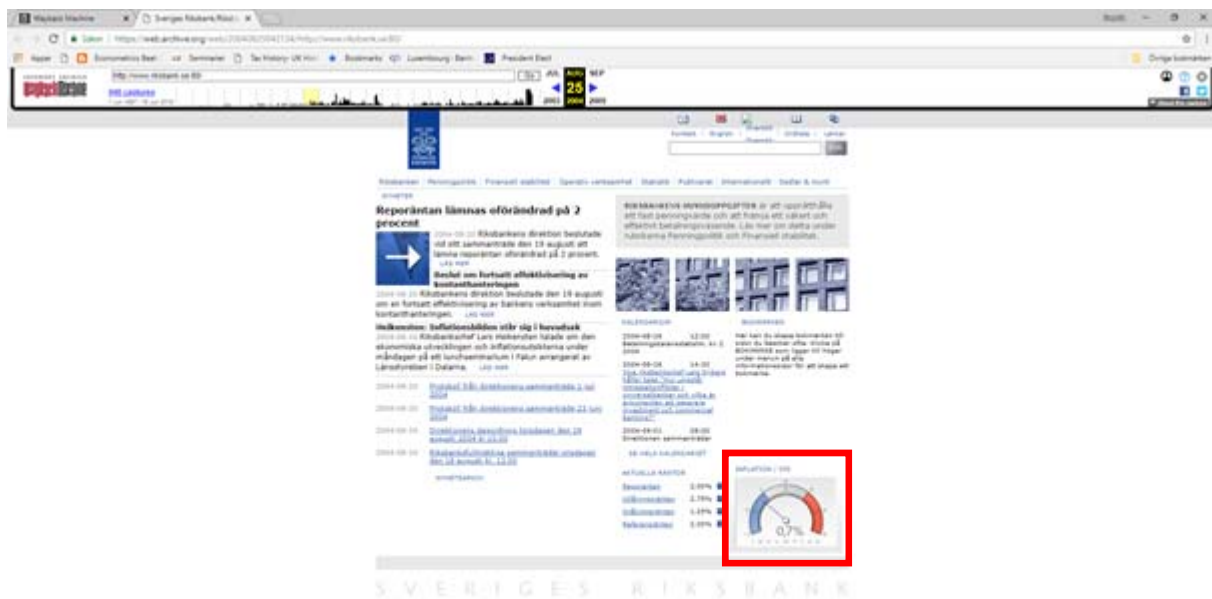
The webpages displayed are from July 20, 2001, August 25, 2004, August 15, 2007, August 14, 2010, August 20, 2013, August 16, 2016, and June 20, 2018.

Period 1. Inflation period, 2001-2009

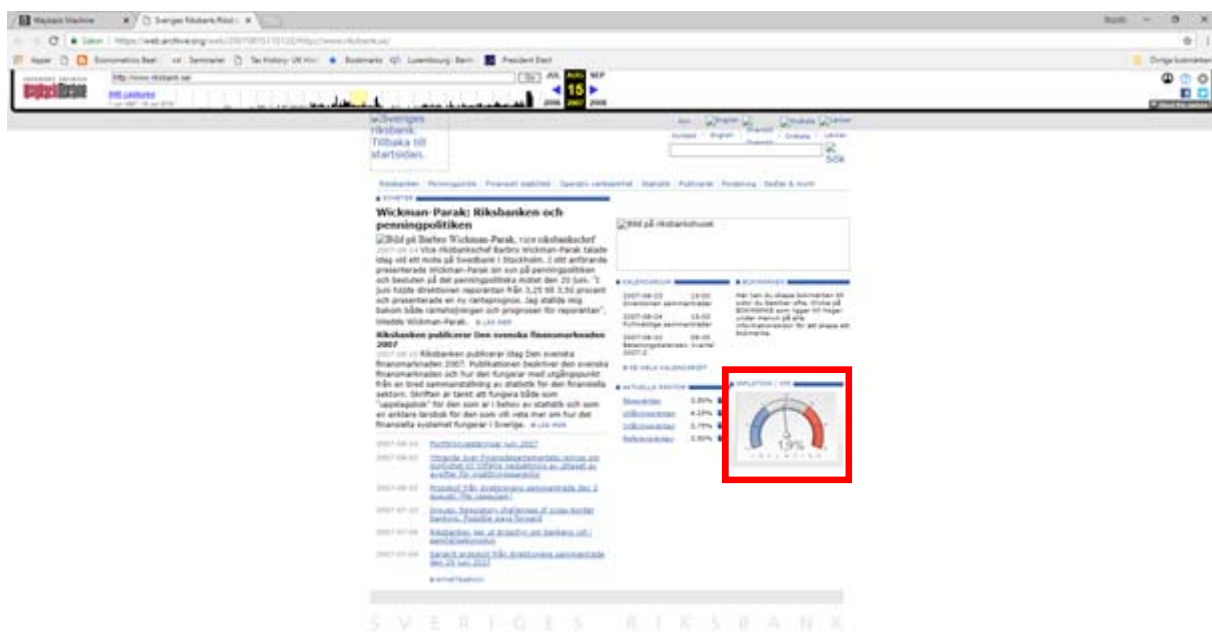
July 20, 2001



August 25, 2004

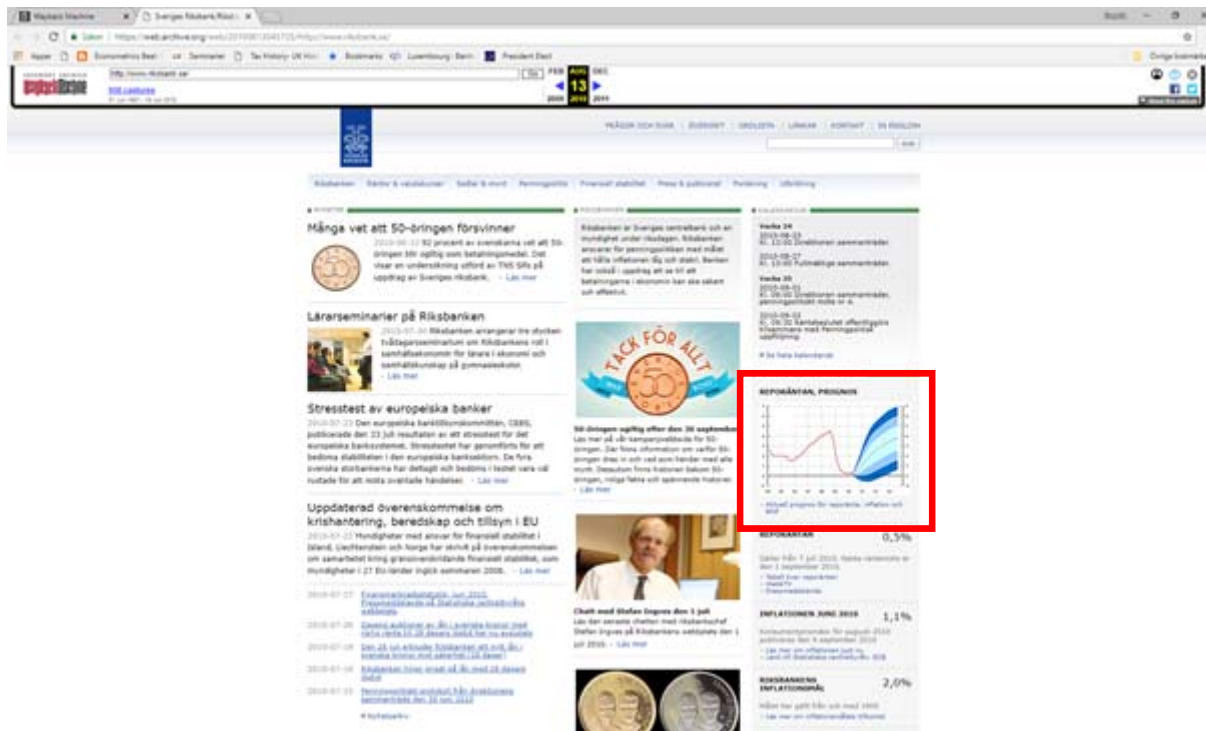


August 15, 2007

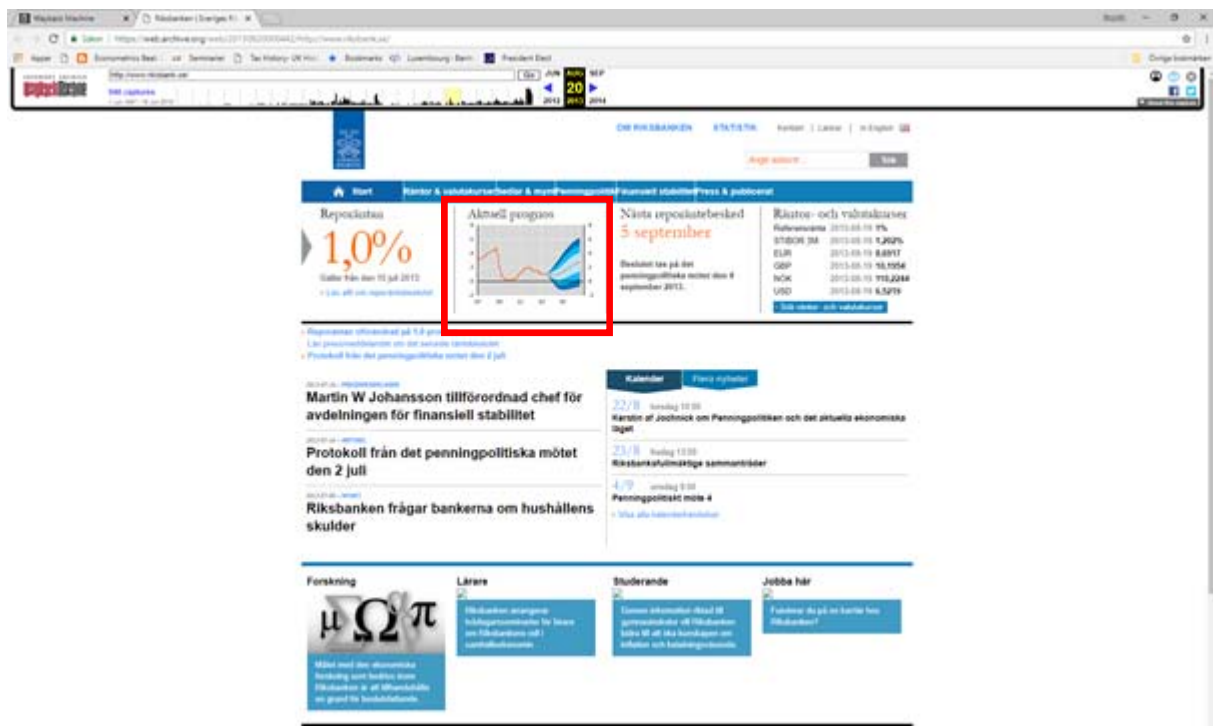


Period 2. Forward guidance (policy rate forecast) period, 2010-2017

August 13, 2010

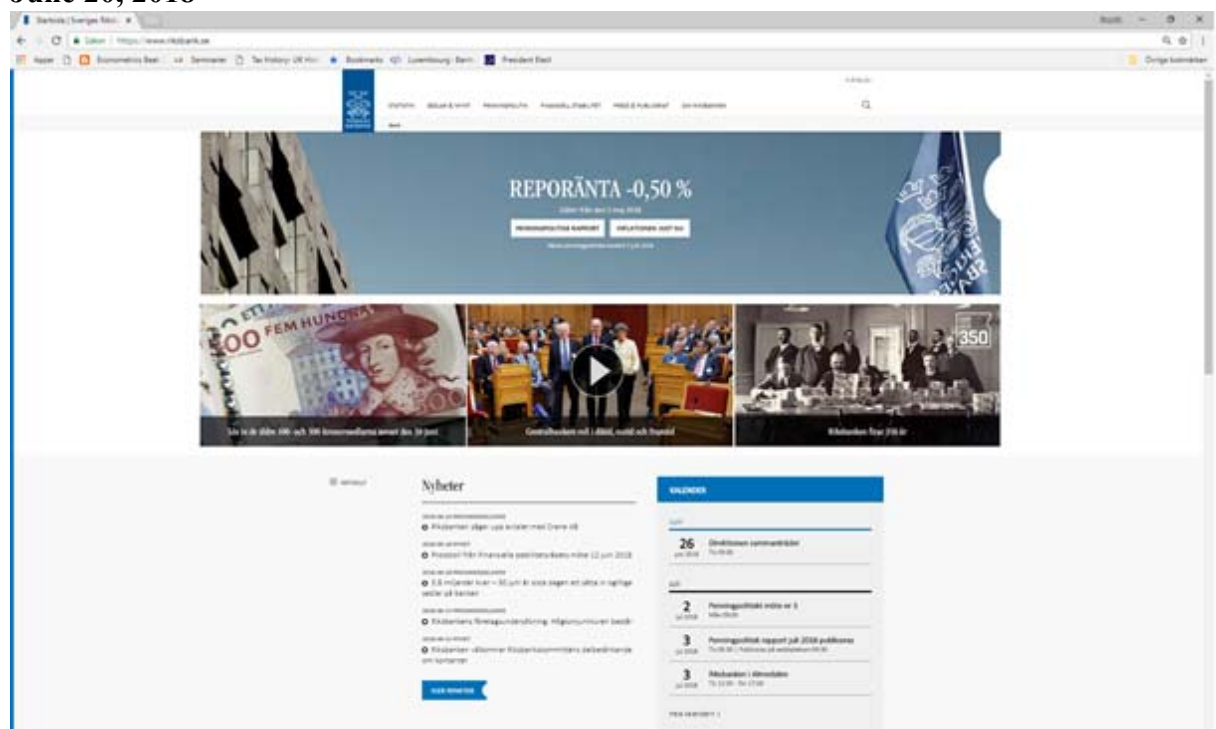


August 20, 2013



[illegible]

June 20, 2018



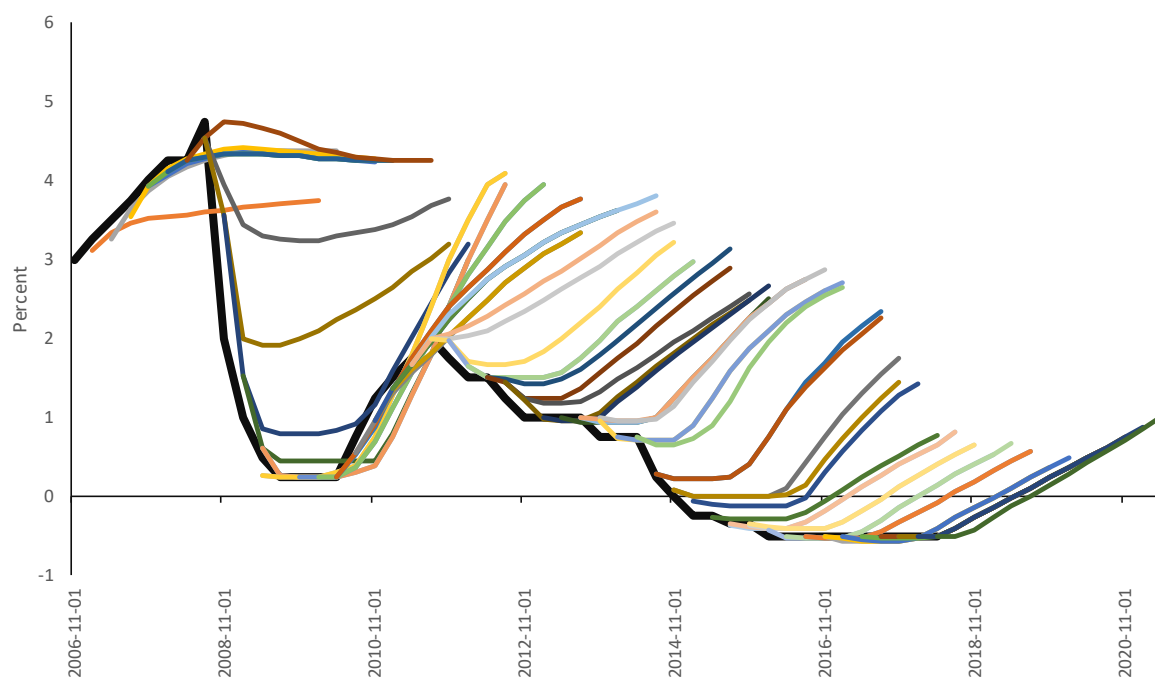


Figure 1. The “hedgehog” of the Riksbank. The Riksbank repo-rate 2007-2017 and the Riksbank’s forecasted repo-rate path 36 months ahead, 2010-2021.

Note: The actual repo rate is the black line. All other lines in color are the forecasted future rate path.

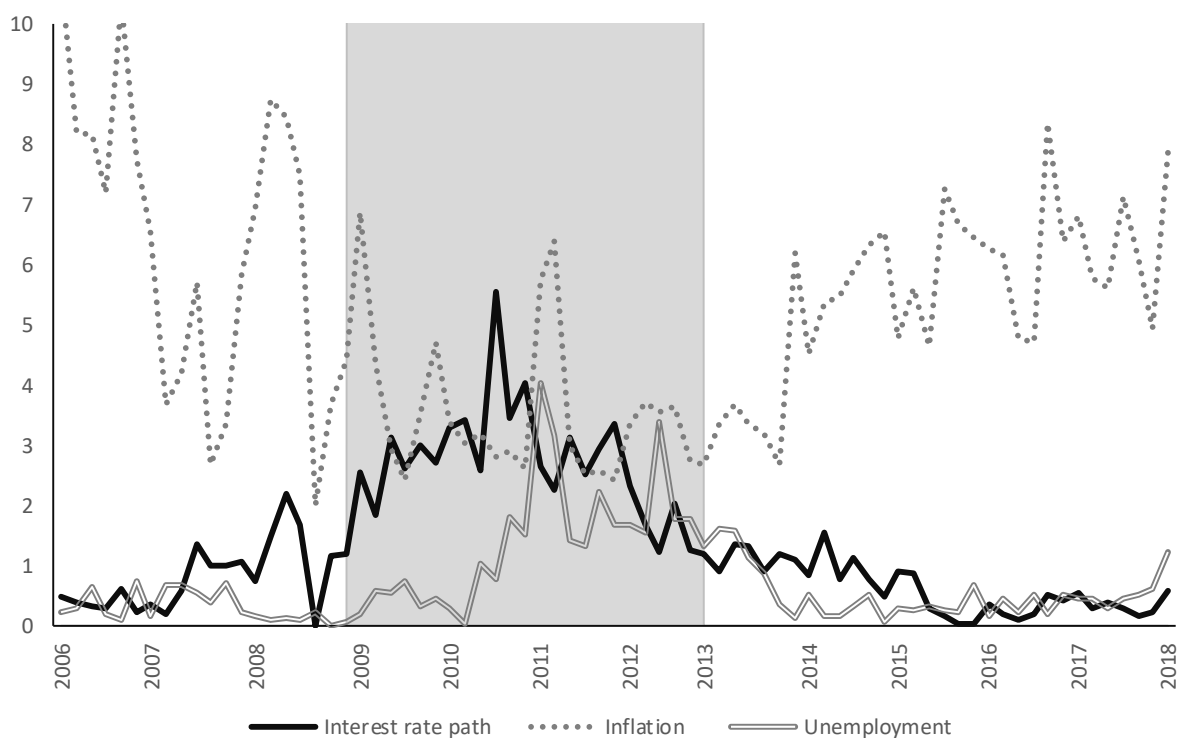


Figure 2. The number of times the interest rate path (*räntebanan*), inflation (*inflation*) and the rate of unemployment (*arbetslöshet*) is mentioned per page in the minutes of the Board of Directors of the Riksbank 2006-2018.

Note: a: Inflation and unemployment includes all terms related to these such as inflation and unemployment forecasts.

b: Gray area shows the period when forward guidance dominated the discussion at the Board of Directors 2009Q1-2012Q4.

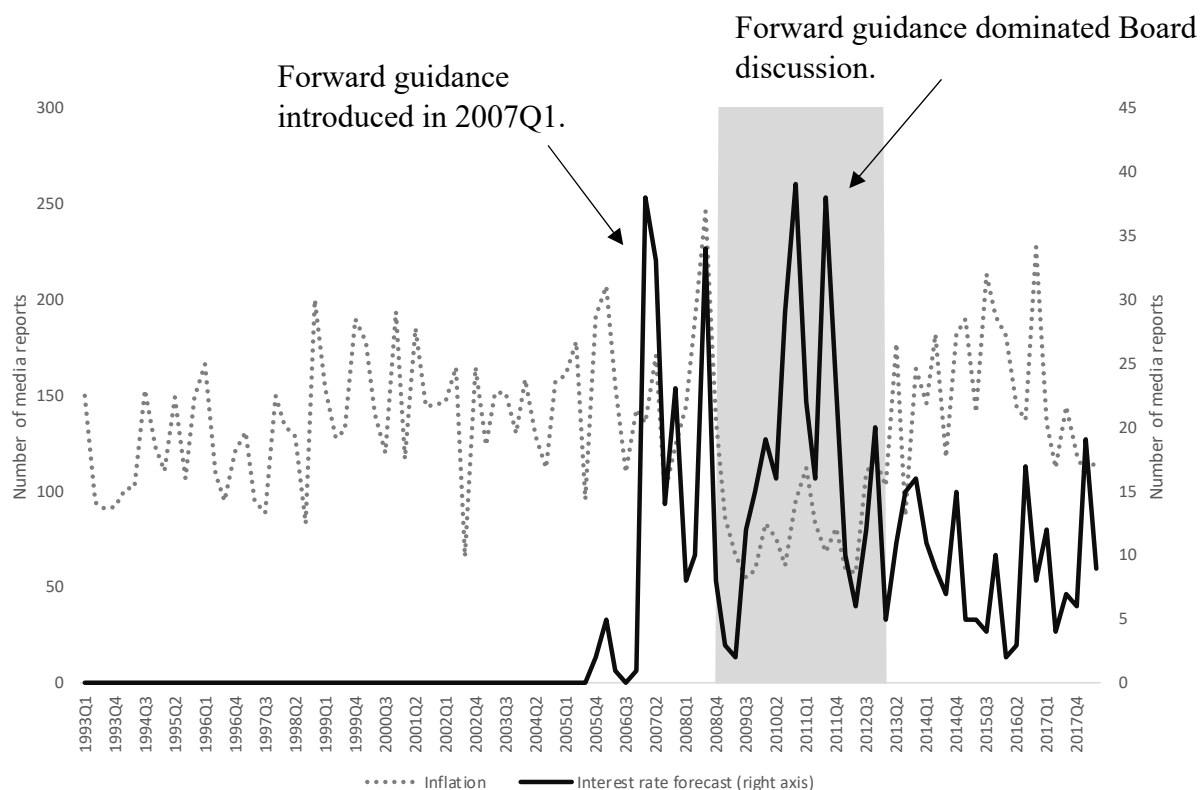


Figure 3. Number of media reports in the Swedish printed press, radio and TV that contains the words Riksbank, inflation (*inflation*) interest rate forecast (*räntebana*), 1993Q1-2018Q1.

Note: a: All terms including inflation such as inflation forecast (*inflationsprognos*) are included in the search.

b: Only media that were active during the entire period 1993Q1 to 2018Q1 are included in the analysis to make it comparable over time.

c: Gray area indicates the period 2009Q1-2012Q4 when forward guidance dominated the discussion in the Board of Directors.

Source: Retriever Medieanalys (www.retriever.se).

Table 1a. Granger causality test concerning expectations, 2007Q1-2018Q1.

	Riksbank (RB)	Employer (EMP)	Labour (LAB)	Money market (MM)
Riksbank	---	RB→EMP	RB→LAB	
Households				
Employers		---		
Labour unions			---	
Money market	MM→RB	MM→EMP	MM→LAB	---

Note: $x \rightarrow y$ indicates that a change in x was followed by a change in y after 1 to 2 quarters.

Table 1b. Granger causality test concerning expectations, 2010Q1-2018Q1

	Riksbank (RB)	Households (HOUSE)	Employer (EMP)	Labour (LAB)	Money market (MM)
Riksbank	---				
Households		---	EMP→HOUSE	EMP→LAB	
Employers			---		
Labour unions				---	
Money market	MM→RB	MM→HOUSE	MM→EMP	MM→LAB	---

Note: $x \rightarrow y$ indicates that a change in x was followed by a change in y after 1 to 2 quarters.

Table 2. The effect of repo-rate and interest rate forecasts on interest rate expectations of households, employer organizations, employee organizations and money market participants, 2007Q2-2018Q1.

	Δ Households	Δ Employer		Δ Employee		Δ Money Market	
	2010- 18	2007- 18	2010- 18	2007- 18	2010- 18	2007- 18	2010- 18
ΔRepo_{t-1}	.86*** (.26)	.62*** (.12)	.90*** (.26)	.60*** (.11)	.81*** (.27)	.37*** (.12)	.83*** (.19)
$\Delta \text{Riksbank forecast}_{t-1}$.04 (.19)	-.19 (.19)	-.30 (.18)	.18 (.19)	.03 (.17)	-.07 (.12)	-.29** (.13)
$\Delta \text{Expectation}_{t-1}$	-.24 (.21)	-.16 (.17)	-.38** (.18)	-.43** (.18)	-.59*** (.20)	.08 (.16)	-.03 (.14)
$\Delta \text{Profit}_{t-1}$	-.67 (.63)	---	---	---	---	---	---
constant	.04 (.05)	-.07 (.05)	-.03 (.05)	-.07 (.04)	-.02 (.05)	-.06 (.05)	-.01 (.03)
Adjusted R ²	.27	.47	.34	.58	.25	.19	.63
DW	2.09	2.23	2.57	2.27	2.18	1.56	2.68
Jarque Berra (p-value)	.63	.93	.64	.66	.02	.18	.83

Note: a: Two-years ahead expectations. Household expectations relate to the flexible mortgage rate.

b: Employer organizations, employee organizations and money market participants relate to the repo-rate.

c: No data for households available before 2010.

Table 3. The effect of repo-rate and interest rate forecasts on the interest rate expectations of households, employer organizations, employee organizations and money market participants, 2010Q2-2018Q1

	Δ Employer 2007-18	Δ Employee 2007-18	Δ Money Market 2007-18
Δ Repo _{t-1}	.90** (.39)	.48 (.37)	.45*** (.13)
Δ Riksbank forecast _{t-1}	-.19 (.44)	.10 (.41)	-.11 (.23)
Media _{t-1} \times Δ Riksbank forecast _{t-1}	-.01 (.02)	-.00 (.02)	.00 (.01)
Media _{t-1}	-.00 (.01)	.00 (.01)	-.00 (.05)
Δ Expectation _{t-1}	-.25 (.21)	-.48* (.23)	.06 (.17)
constant	.02 (.11)	-.08 (.10)	.07 (.09)
Adjusted R ²	.07	.04	.21
DW	2.05	1.91	1.73
Jarque Berra (p-value)	.80	.29	.08

Note: a: Two-years ahead expectations. Household expectations relate to the flexible mortgage rate.

b: Employer organizations, employee organizations and money market participants relate to the repo-rate.

c: No data for households available before 2010.