

Outsiders at the Bank of England's MPC

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August 14, 2007

Abstract

The monetary policy committee (MPC) of the Bank of England, which was established in May 1997, consists of five internal and four external members. We study the voting record and show that insiders dissent rarely and typically for higher rather than lower rates, whereas outsiders dissent more often, prefer lower rates and disagree with the majority when economic growth slows. Moreover, their dissents forecast future interest rate changes. We show that a model in which outsiders dislike output below potential more than output above replicates the observed voting pattern well.

Keywords: Monetary policy committees, Bank of England, outsiders.

JEL Classification: D71, E52, E58

*The views expressed in this paper are the author's and do not necessarily reflect those of the Swiss National Bank. I thank Katrin Assenmacher-Wesche, Severin Bernhard, Urs Birchler, Stefan Gerlach, Charles Goodhart, Charlotta Groth, Lavan Mahadeva, Ellen Meade, Samuel Reynard and SNB seminar participants for helpful comments and Chris Jeffery for help with the data. Swiss National Bank, Börsenstrasse 15, 8022 Zürich, Switzerland, petra.gerlach@snb.ch.

1 Introduction

On June 6, 1997 the monetary policy committee (MPC) of the Bank of England (BoE) took its first interest rate decision. Figure 1, which plots the repo rate set by the BoE, the output gap and the targeted rate of inflation, shows that macroeconomic developments in the UK have been highly favourable since, which some observers have attributed to the establishment of the MPC.^{1, 2} While monetary policy today is set by a committee in many countries, the BoE's MPC is unusual since it has both internal and external members. The internal members are the Governor, the two deputy governors, who are appointed by the Queen, and two executive directors, whom the Governor appoints after consultation with the Chancellor of the Exchequer. As outside members the committee has had a number of distinguished economists, drawn from academia and the private sector and appointed by the Chancellor. Tucker [40] states that

"[t]he appointment to the Committee of four outside experts ... underlined
the architectural role of democratically elected ministers." (p. 7)

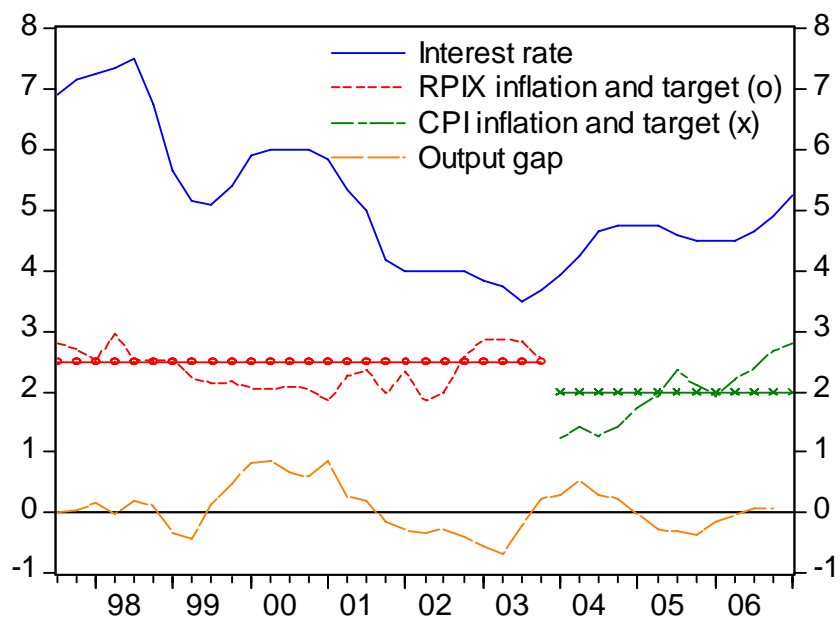
The inclusion of outsiders thus was seen as a measure to legitimate the economic power yielded by the central bank, whose officials, after all, are not selected in a democratic fashion. Tucker's statement suggests that insiders and outsiders might have different characteristics, which raises the question how the external members impact on interest rate decisions.

There are two competing views of the outsiders' role in the decision process of the MPC. The first is that they are not systematically different from the insiders and thus vote in much the same way as the internal committee members, so that any differences between insiders' and outsiders' views are random. Despite this, of course, outsiders improve monetary policy as suggested by Condorcet's jury theorem, which states that a committee whose task it is to take a decision based on imperfect information tends to

¹We plot two inflation series since the inflation target set annually by the Chancellor of the Exchequer was defined up to December 2003 in terms of the retail price index excluding mortgage interest payments (RPIX) and thereafter in terms of the consumer price index (CPI).

²See Bank of England [3], King [27] and Lomax [29] for recent discussions. King [25] reviews the impact of the change to inflation targeting in 1992.

Figure 1:
Macroeconomic conditions



Note: Quarterly data, 1997Q3 to 2007Q1.

Output gap constructed using the HP filter.

perform better, the more members it has.³ This hypothesis is supported by experimental evidence: Blinder and Morgan [8] demonstrate in an experimental paper that increasing the size of an MPC from four to eight members improves the quality of interest rate setting. It should be noted that if increasing the size of the MPC is the outsiders' only contribution to the quality of monetary policy, they might equally well be replaced by further insiders.

The second view is that outsiders' assessment of what level of the interest rate to set differs systematically from the insiders' view. If, as is the case of the BoE, there are more insiders on the committee than outsiders, external members should under this view dissent more often from the majority than insiders.

This paper studies the voting behaviour of internal and external policymakers using ten years of data. Given that the MPC has set interest rates 120 times in the sample, and has had 25 members, the findings are unlikely to depend on the voting pattern of a few members.⁴ Section 2 discusses why insiders and outsiders might differ in their voting behaviour. Section 3 provides a brief review of the literature on the BoE's MPC.

Section 4 describes insiders' and outsiders' voting patterns. We establish in Section 4.1 that outsiders dissent more often, as they should if there are systematic differences between internal and external members and if there are more internal than external committee members. Outsiders moreover tend to dissent in favour of lower, and insiders in favour of higher, interest rates. Section 4.2 turns to the time pattern of dissents and shows that outsiders are faster to change rates than insiders and that their votes forecast future interest rate changes. Insiders' dissents do not contain additional information on future monetary policy. Section 4.3 explores the determinants of dissents. We show that conflicting demands on insiders' time, resulting from the broad range of tasks assigned to them, do not appear to matter for their voting behaviour. We moreover establish that outsiders tend to vote for lower rates than the majority when economic growth falls below potential. There thus is evidence of asymmetric preferences.

³This result holds as long as the members' views are not perfectly correlated.

⁴This was a problem in early analyses of the MPC. Speaking on the MPC's fifth anniversary, King [26] suggested that differences between insiders and outsiders were due to three external policymakers. However, the results presented here are robust to their exclusion.

Section 5 presents a model of interest rate setting in a committee that assumes a symmetric loss function for insiders but an asymmetric loss function for outsiders. In particular, outsiders are assumed to respond more to a negative than a positive output gap. We then simulate the model and show that it replicates the actual voting pattern rather well. Section 6 concludes.

2 Potential differences

There are at least five reasons why outsiders might behave differently from insiders. First, the two groups of policymakers may disagree about the inflation target and the desirable GDP growth rate. However, since the BoE's inflation target has been set by the Chancellor of the Exchequer as CPI inflation of 2% (2.5% of RPIX inflation up to December 2003), it seems unreasonable to assume different inflation targets, and the discussion in the press concerning "hawks" and "doves" appears of little relevance.⁵ Equally unlikely, MPC members may disagree about the objective for output growth. Given that efforts to raise growth above potential yield in the long run inflation without increasing GDP (see Kydland and Prescott [28] and Barro and Gordon [5]), insiders' and outsiders' views on this point should not differ systematically.⁶ Moreover, while uncertainty may lead policymakers to disagree about the exact size of potential output, such differences in view should be random and not be related to a policymaker's internal or external status.

Second, and more plausibly, the relative weight attached to the goals of inflation and output growth stabilisation may differ between the internal and external members. Rogoff [33] suggests that it may be optimal to appoint as central bankers individuals who are "conservative" in the sense that they attach a greater weight to inflation stabilisation than the population as a whole.⁷ In the model presented in Section 5, which also assumes that policymakers dislike sudden interest rate changes, outsiders attach a smaller relative

⁵The Bank of England Act [2] specifies as main objective of monetary policy price stability and as secondary goal the support the economic policy of Her Majesty's Government, including its objectives for growth and employment.

⁶See McCallum [30] on how central banks "just ... do it", i.e. avoid the inflation bias.

⁷Tucker [40] states that BoE staff care "passionately about the benefits of price stability" (p. 5).

weight to inflation in the loss function than the insiders. This makes it optimal for them to react more strongly and faster than the internal MPC members to deviations both of output from potential and of inflation from target.

Third, the insiders' and outsiders' loss function may not have the same functional form. A number of authors have suggested that policymakers react more to output if it is below, rather than above, potential (see e.g. Cukierman and Gerlach [13], Dolado, Maria-Dolores and Naveira [14], Gerlach [16] and Surico [38]), for instance because political pressure is higher to end recessions than booms. If external members' preferences are asymmetric with respect to the output gap in that they attach the same relative weight as the insiders to positive gaps but a larger weight to negative gaps, outsiders should be faster to cut interest rates when the economy grows below potential, but equally ready as insiders to raise them during booms.

Fourth, policymakers' resources may also explain systematic differences in the voting behaviour of insiders and outsiders. While it seems unlikely that one group of MPC members is better skilled to set interest rates than the other, insiders have a larger staff, but also responsibilities other than interest rate setting. Some external members have worked full-time for the MPC, while others have continued part-time in their old jobs. Tighter resource constraints imply higher uncertainty about the appropriate level of interest rates, which Gerlach-Kristen [20] shows leads to more interest rate smoothing. While it is a priori unclear whether the conflicting demands on insiders' time or the relatively small number of BoE staff working for the outsiders is more important, neither seems to matter empirically.

Fifth, strategic behaviour might also explain systematic differences in the voting records of insiders and outsiders. It has been argued that being on the MPC is an opportunity to raise one's profile, in that taking extreme positions in the interest rate vote guarantees press coverage. This incentive might be particularly strong for outsiders, whose term on the MPC is limited.⁸ The voting pattern also might depend on the order in which committee members speak, since it may for the individual MPC member be opti-

⁸Outsiders are appointed for three-year terms, which can be, but rarely are, renewed. Only Kate Barker, DeAnne Julius and Steve Nickell have been reappointed.

mal not to reveal all information depending on when in the discussion he speaks.⁹ In this situation, the individual policymakers' information set can differ from the information common to all committee members, which translates into different patterns of dissent. Taking into account such considerations goes, however, beyond the scope of this paper.

3 Literature review

The literature on the MPC of the BoE is still limited.¹⁰ Cobham [11] provides a general overview of monetary policy in the UK in the period 1975 to 2000. Chadha and Nolan [9] use data before and after the creation of the MPC to assess whether a change to more transparent monetary policy caused an increase in the volatility of interest rates in financial markets, but find no evidence in support of this hypothesis. Cobham [12] makes use of the minutes that are published for each MPC meeting to study the reasons for interest rate smoothing. He concludes that uncertainty and serially correlated shocks seem to be the reason why the MPC smooths rates.

Most papers on the BoE's MPC make use of the voting record, which is published monthly and which reports the votes of the individual committee members. Gerlach-Kristen [19] studies data spanning June 1997 to January 2003 and finds that dissents in the MPC forecast interest rate changes. Thus, if a minority of committee members today favours an interest rate cut, it is likely that policy will be loosened at the next MPC meeting. Financial markets are found to respond to the publication of the voting record, thus updating their assessment of future policy changes. Gerlach-Kristen [18] uses data up to April 2003 and shows that outsiders dissent more frequently from the majority than insiders and tend to do so in favour of lower rates. Spencer [36] studies the voting record under Governor George, whose tenure ended in June 2003, and establishes that the differences in voting between insiders and outsiders are statistically significant. He also shows that MPC members who used to work in the private sector or for NGOs tend

⁹For an overview of strategic behaviour incentives in MPCs and on the broader social science literature on committees, see Sibert [35]. On information cascades, see also Ottaviano and Sørensen [32].

¹⁰For a discussion of the US Federal Open Market Committee, see for instance Chappell, McGregor and Vermilyea [10].

to vote for lower rates, while policymakers with a background as a public sector employee often dissent in favour of tighter policy.

Several studies model reaction functions for individual MPC members. Bhattacharjee and Holly [7] estimate reaction functions for Willem Buiter, David Clementi, Eddie George, DeAnne Julius and Mervyn King, who served together on the committee from September 1997 to May 2000. The authors find that the outside members (Willem Buiter and DeAnne Julius) attach more weight on the output gap than the insiders. Bhattacharjee and Holly [6] also identify heterogeneity in voting behaviour when estimating a reaction function with fixed individual effects for all policymakers between June 1997 and December 2003. Spencer [37] estimates separate reaction functions for insiders and outsiders during Governor George's tenure. Using several specifications for the reaction function, he finds that insiders are more likely to raise interest rates in response to an increase in inflation than outsiders and that outsiders are faster to cut rates when inflation declines. Outsiders moreover appear to respond more strongly to changes in GDP growth.

4 The voting record

Between June 1997 and April 2007 interest rates in the UK were changed on 33 occasions: on four occasions rates were cut by 50 basis points, on 13 occasions they were reduced by 25 basis points and on 16 occasions they were increased by 25 basis points. Interestingly, on no occasion were they raised by 50 basis points, suggesting that the BoE might be willing to cut interest rates faster than to raise them.

The committee consists of five insider members and four external experts.¹¹ Insiders tend to serve longer on the MPC: they have on average taken part in 52 policy decisions, outsiders in 32.¹² Decisions are taken by a majority vote. Before November 1998, dissent-

¹¹There were fewer than nine MPC members between June 1997 and May 1998, in September 2002 and from April to September 2006.

¹²It might be suspected that longer serving members care more about the committee's reputation and therefore vote more often with the majority. However, while longer serving MPC members indeed tend to dissent less frequently than policymakers with short terms, a regression that explains the frequency

ing members simply indicated whether they favoured tighter or looser monetary policy than the majority. Since then, they have explicitly voted for an alternative level of the policy interest rate. All dissents but one have been by 25 basis points (Willem Buiter voted in March 1999 for a rate that was 40 basis points below the rate actually set). The voting outcome is published two weeks after the MPC meeting.¹³

4.1 Asymmetry of dissents

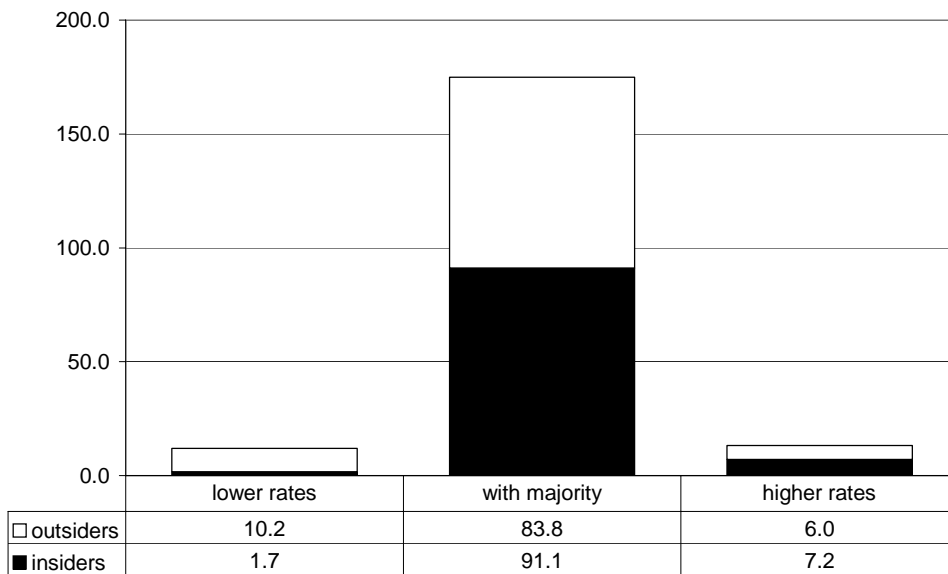
We start our analysis of the voting record by asking whether insiders and outsiders follow the same voting pattern. Figure 2 shows how often insiders and outsiders voted with the majority, how often they voted for lower, and how often for higher, rates. Of the 1049 votes cast in the monthly MPC meetings over the whole sample, 587 stem from insiders and 462 from outsiders. The figure suggests that insiders vote more frequently with the majority than outsiders (91.1% of all votes vs 83.8%). Outsiders tend to dissent in favour of interest rate reductions (10.2%) rather than increases (6.0%). Insiders, by contrast, dissent more frequently for higher than lower rates (7.2% vs 1.7%).

Since the voting pattern may have changed over time, we also present a subsample analysis, with the sample split given by the change in Governor in June 2003. Figure 3 shows the same analysis for Governor George's tenure (74 observations) and for Governor King's tenure (46 observations). One interesting finding is that insiders and outsiders have voted roughly equally frequently with the majority under Governor King (85.7% vs 90.4%), whereas insiders were clearly more likely to do so under Governor George (91.6%

of dissents with the term length and a dummy variable for outsiders finds that only the latter variable is significant. Thus, the length of service does not appear to matter for the frequency of dissents.

¹³While we focus below on the differences in voting between insiders and outsiders, the MPC members can be grouped by other characteristics as well, such as for instance age, gender or academic background. In the interest of brevity, we do not discuss the impact of these factors on the voting pattern in detail. However, young MPC members (defined as aged under 53, which is the average age of all MPC members up to date) and women tend to dissent more frequently than older and male policymakers. While young policymakers equally frequently dissent for higher and lower rates, women tend to vote for lower rates. The latter result is subject to a small sample bias as there have only been four female MPC members. Finally, the voting pattern of academics is not statistically different from that of other MPC members (see also Spencer [36]).

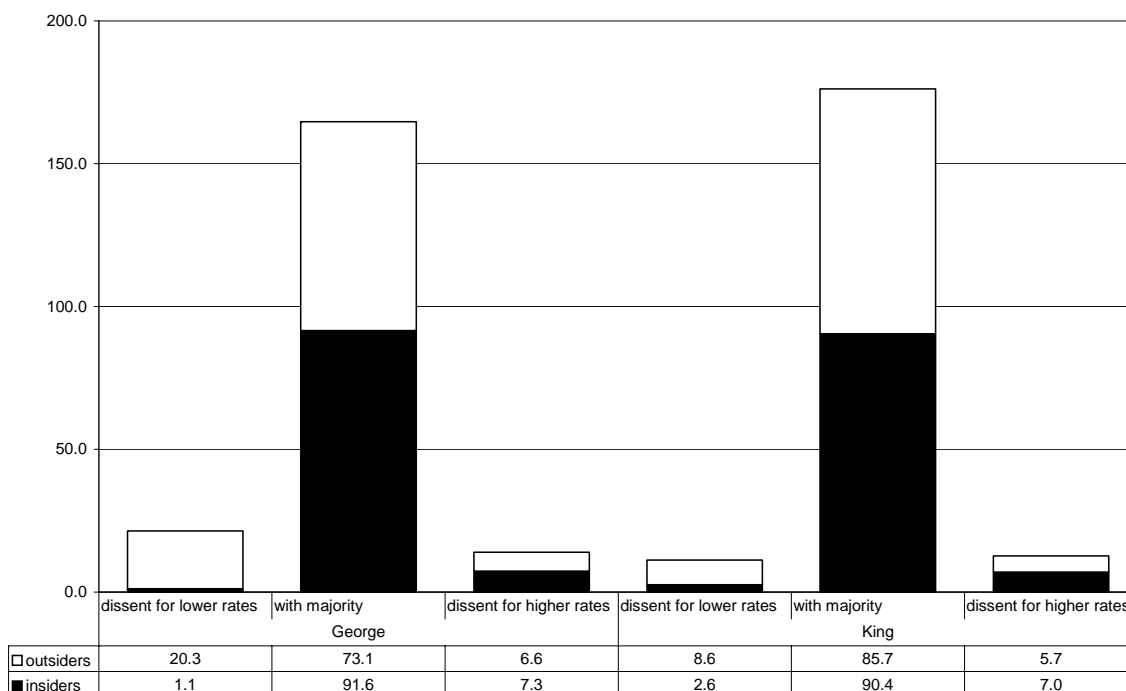
Figure 2:
Voting pattern over whole sample



Note: Sample June 1997 to April 2007. "with majority" includes not only votes with the majority when interest rates are unchanged but also votes with the majority when the decision was to tighten/loosen policy. Correspondingly, "lower rates" refers to dissents for loosening when rates were held constant and to votes for larger cuts when rates were being reduced.

vs 73.1%). Another striking finding is that while outsiders voted more than three times as frequently for lower than for higher rates under Governor George, this ratio has fallen to below 2:1 under Governor King. Insiders' dissents have also become more symmetric under Governor King. In interpreting these changes in voting pattern, it has, however, to be borne in mind that the subsample results may depend more on the stage of the business cycle than the full sample findings.

Figure 3:
Voting patterns under Governor George and Governor King

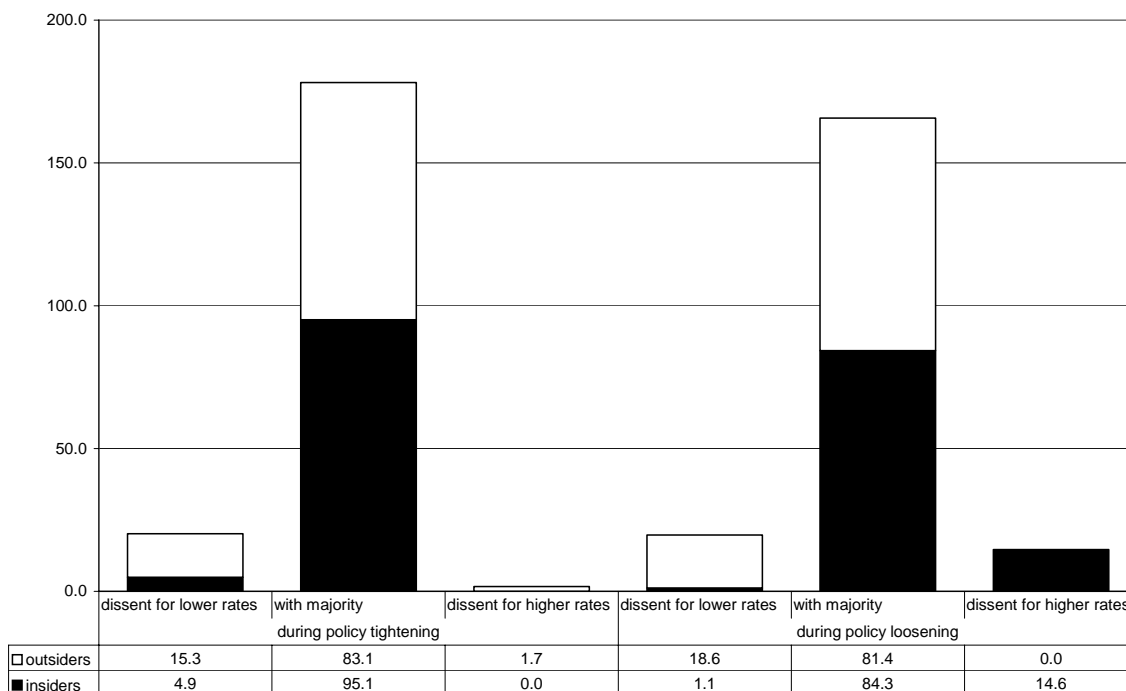


Note: Voting patterns under Governor George (June 1997 to June 2003) and Governor King (July 2003 to April 2007). "with majority" includes not only votes with the majority when interest rates are unchanged but also votes with the majority when the decision was to tighten/loosen policy.

Figure 4 analyses the voting pattern when interest rates are being cut separately from the pattern when they are being raised. Both insiders and outsiders vote more frequently with the majority when rates are rising (95.1% and 83.1%) rather than falling (84.3% and 81.4%). Both when policy is loosened and tightened do outsiders tend to dissent for lower rates (18.6% and 15.3% of all occasions, respectively). They have never in sample dissented for higher rates when policy was being loosened and rarely when it was tightened

(1.7%). Insiders tend to dissent for lower rates when policy is being tightened (4.9%) and for higher rates when it is being loosened (14.6%). When rates were increasing already, insiders never voted for even tighter policy, and they dissented on 1.1% of all occasions for looser policy when interest rates were being lowered. It thus appears that while outsiders consistently dissent in favour of lower rates, insiders dissent for higher rates during episodes of policy loosening and lower rates during tightening. Thus, insiders tend to slow down interest rate adjustments. The outsiders' tendency to dissent in favour for lower rates, by contrast, has led the press to classify many of them as "doves" (e.g. Economist [15] and Money Week [31]).

Figure 4:
Voting patterns during policy tightening and loosening



To assess whether these differences in pattern are statistically significant, we perform a series of tests. We first explore whether insiders and outsiders are equally likely to dissent, i.e. whether the proportion of votes cast by outsiders for a rate lower or higher than the one actually set, $P_{lower}^{out} + P_{higher}^{out}$, equals the proportion of dissenting votes cast

by insiders, $P_{lower}^{in} + P_{higher}^{in}$. We test the null hypothesis

$$H_o: P_{lower}^{out} + P_{higher}^{out} = P_{lower}^{in} + P_{higher}^{in} \quad (1)$$

for the whole sample, for the subsamples for the two governor and for periods of policy loosening, unchanged policy and policy tightening. The test rejects for the full sample and Governor George's governorship as well as for episodes of constant and increasing interest rates. Under Governor King and when rates are being cut, however, insiders and outsiders are equally likely to vote with the majority. The results, shown in Table 1, suggest that insiders' and outsiders' voting patterns differ significantly.

Table 1:
Do insiders and outsiders dissent equally often?

Full sample	0.000
Governor George	0.000
Governor King	0.149
During policy loosening	0.638
During unchanged policy	0.000
During policy tightening	0.027

Note: p-value for $H_o: P_{lower}^{out} + P_{higher}^{out} = P_{lower}^{in} + P_{higher}^{in}$.

Next we test whether policymakers are more likely to dissent in favour of lower or higher rates, i.e. whether

$$H_o: P_{lower}^k = P_{higher}^k \text{ for } k = all, in, out. \quad (2)$$

Table 2 shows the test statistics for the six different samples for the committee as a whole and for insiders and outsiders separately. The committee as a whole votes symmetrically under Governor King, and also when rates were constant or falling. The test rejects for the full sample, Governor George's tenure and episodes of policy tightening. If we look at insiders and outsiders separately, the test rejects in all samples except for outsiders under Governor King, who tend to dissent roughly equally frequently for lower and higher rates.

Overall, however, insiders significantly more frequently vote for a tightening rather than a loosening of monetary policy, while the outsiders' votes follow the opposite pattern.

Table 2:
Are the histograms symmetric?

	all members	insiders	outsiders
Full sample	0.010	0.000	0.000
Governor George	0.000	0.000	0.000
Governor King	0.521	0.027	0.288
During policy loosening	0.228	0.000	0.000
During unchanged policy	0.528	0.000	0.006
During policy tightening	0.000	0.040	0.006

Note: p-value for $H_o: P_{lower}^k = P_{higher}^k$ for $k = all, in, out$.

Table 3:
Do insiders and outsiders dissent equally often for lower/higher rates?

	for lower rate	for higher rate
Full sample	0.000	0.571
Governor George	0.000	0.750
Governor King	0.011	0.599
During policy loosening	0.000	0.000
During unchanged policy	0.000	0.443
During policy tightening	0.050	0.313

Note: p-value for $H_o: P_l^{out} = P_l^{in}$ for $l = lower, higher$.

Tables 3 compares directly insiders' and outsiders' dissents by testing

$$H_o: P_l^{out} = P_l^{in} \text{ for } l = lower, higher, \quad (3)$$

i.e. whether outsiders' and insiders' likelihood to vote for lower, or higher, rates is the same. Outsiders vote significantly more frequently than insiders for lower rates in all

samples. The hypothesis that insiders and outsiders dissent equally frequently in favour of higher rates is only rejected for periods of policy loosening.

Overall, there is strong evidence that the differences in voting behaviour between insiders and outsiders established earlier are statistically significant.

4.2 Timing of dissents

This section analyses the timing of insiders' and outsiders' dissents. We start by computing the hypothetical interest rate resulting from the votes cast only by the insiders or outsiders, respectively. In interpreting these hypothetical interest rate paths, two points should be borne in mind. First, insiders and outsiders influence each others' views of the state of the economy and the appropriate stance of policy in the discussions that precede the vote on the interest rate. Therefore, the hypothetical rates do not represent how policy would have been set had there been only insiders or outsiders on the committee. Instead, they capture any differences in view remaining after the MPC's deliberations. Second, if for instance the outsiders would in one month have liked to loosen policy, while the committee as a whole decided to keep rates stable, the external members might in the next month vote for an even larger interest rate reduction than they would have if rates had been cut in the first instance in order to compensate for the in their view overly tight policy over the last month. Thus, the hypothetical interest rates display a certain path dependence.

Comparing the actual policy rate with the rate constructed from the majority of the insiders' votes, one finds that the two variables coincide almost all of the time (and we therefore do not present them in a graph).¹⁴ However, this is not surprising if one remembers that the insiders form a majority in the committee and thus in principle always could outvote the outsiders. Over the whole sample, the actual and the hypothetical rates differ on only five occasions: in August and September 2000, insiders would have raised interest rates by 25 basis points above the actual rate. In August 2001 and 2005, they would have kept interest rates stable when in fact they were decreased, and in January

¹⁴We assume that dissents prior to November 1998, when MPC members disagreeing with the majority simply voted for "higher" or "lower" rates, were by 25 basis points.

2007 they preferred stable rates when policy was tightened instead.

Figure 5:

Actual and hypothetical interest rate set by outsiders only

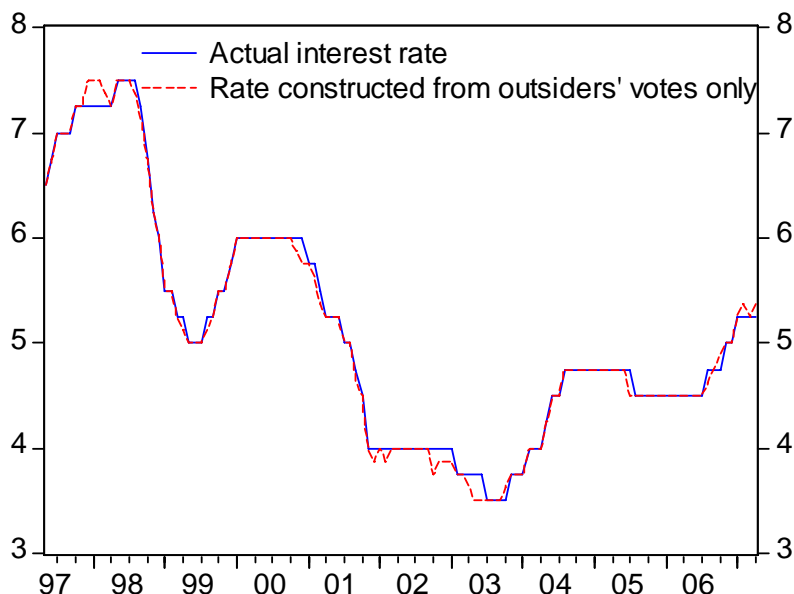


Figure 5 shows the rate resulting from only the outsiders' votes and supports the notion that outsiders are less hesitant to change interest rates than insiders.¹⁵ The rate preferred by outsiders differs on 28 occasions from the actual rate, and it tends to change prior to movements in the actual rate if policy is loosened. Thus, the differences in view that remain after deliberation concern largely the timing of policy adjustments.¹⁶

4.2.1 Are insiders slower to change rates?

We now turn to the econometric analysis of the voting record and explore whether insiders are statistically significantly slower than outsiders to change interest rates. We also ask whether outsiders' dissents correspondingly forecast future policy adjustments. To this

¹⁵The time series plots show for September 2001 an interest rate change, which was not decided in that month's regular meeting (when rates were held stable) but in the emergency meeting following the terrorist attacks. The econometric analysis treats these two decisions separately.

¹⁶Gieve [22] points out that "[t]he pace as well as the direction of any [interest rate] change is therefore a matter for discussion in most MPC meetings" (p. 6).

purpose, we measure dissents in the committee as follows:

$$skew_t^{all} = \frac{1}{N} \sum_{j=1}^N (i_{j,t} - i_t),$$

where N is the number of MPC members, i_t the policy rate and $i_{j,t}$ the vote cast by policymaker j .¹⁷ The variable *skew* thus measures for each period the size of dissent in the MPC. A positive *skew* implies that there are dissents in favour of a higher interest rate than that set by the majority.¹⁸

We then split this average dissent into the part due to insiders' votes and that due to outsiders' votes, so that

$$skew_t^{in} = \frac{1}{N} \sum_{j=1}^n (i_{j,t} - i_t)$$

and

$$skew_t^{out} = skew_t^{all} - skew_t^{in},$$

where we assume for convenience that the first n members of the MPC are the insiders.

Figure 6, which plots $skew_t^{in}$ and $skew_t^{out}$ together with the change in the policy rate, suggests that insiders have on occasion favoured constant interest rates when the MPC as a whole voted for a change (this is most clearly visible in August 2005). Thus, $skew_t^{in}$ tends to be negative when interest rates rise and positive when they fall. To test whether this pattern is statistically significant, we regress

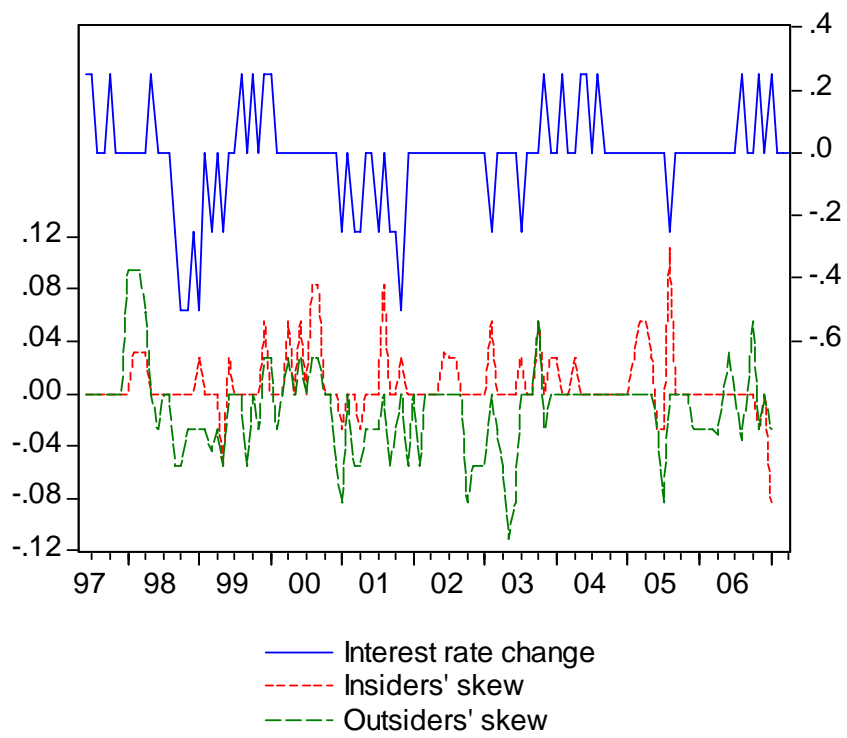
$$skew_t^k = a + a_0 \Delta i_t + a_1 |\Delta i_{t-1}| + e_t, \quad (4)$$

with $k = in, out$. We expect a significant negative estimate of a_0 for the insiders. Since policy tends to be adjusted in several consecutive steps, it seems likely that dissents are rarer once a tightening or loosening cycle has started. We include the absolute value of the past change of the interest rate to allow for this possibility and expect a negative estimate of a_1 . Table 4 shows that for the whole sample, insiders' tendency to vote for constant rates when the MPC as a whole decides to adjust policy is highly significant. Moreover,

¹⁷See also Gerlach-Kristen [19].

¹⁸If there are dissents, they tend to be all either in favour of loosening or tightening. Only on three occasions, in 1998 and 1999, were there two minorities with opposing views that cancelled one another in the calculation of $skew_t$.

Figure 6:
Interest rate changes and insiders' and outsiders' skews



there is some weak evidence that the likelihood of insiders to dissent is smaller once a tightening or loosening cycle has started. Outsiders' views, by contrast, seem unaffected by these factors. Considering the data generated under Governor George and Governor King separately, we find again no impact of the interest rate change on outsiders' votes. Insiders were likely to dissent for no change in policy under Governor King, but not under Governor George.¹⁹

Table 4:

Regression output for equation (4)

$$skew_t^k = a + a_0\Delta i_t + a_1|\Delta i_{t-1}| + e_t$$

k	full sample 1997:6 to 2007:4		Governor George 1997:6 to 2003:6		Governor King 2003:7 to 2007:4	
	in	out	in	out	in	out
a_0	-0.046*** (0.015)	0.007 (0.022)	-0.022 (0.017)	0.008 (0.029)	-0.125*** (0.032)	-0.042 (0.033)
a_1	-0.033* (0.017)	-0.019 (0.025)	-0.031 (0.020)	-0.031 (0.033)	-0.021 (0.034)	0.043 (0.036)
\overline{R}^2	0.069	-0.010	0.018	-0.011	0.236	0.025

Note: OLS estimates. */**/** denotes significance at the ten/five/one percent level. Constant not reported.

4.2.2 Do outsiders' votes forecast future policy?

If insiders are more hesitant to change interest rates, outsiders' votes should forecast future policy changes. To test this hypothesis, we run

$$\Delta i_t = b_s skew_{t-1}^k + b_i \Delta i_{t-1} + u_t \quad (5)$$

¹⁹We do not present a subsample analysis for period of policy loosening/tightening since there are too few non-zero observations for $skew_t$ to run regressions.

for $k = in, out$.²⁰ The lagged change in the interest rate is included to account for any serial correlation in interest rate changes that is not explained by $skew_{t-1}^k$. Table 5 presents the output for the whole sample and the two subsamples under Governors George and King. We estimate equation (5) as an ordered probit since interest rates are changed in steps of 25 or 50 basis points. To assess how well our model forecasts monetary policy, we compute a contingency table for how often equation (5) correctly predicts Δi_t and present the unconditional and the conditional probability of correct predictions discussed in Kim, Mizen and Thanaset [24].²¹

The regressions show that $skew_t^{in}$ is significant only in the full sample and under Governor George, while $skew_t^{out}$ is highly significant in all samples. Thus, outsiders' dissents predict future monetary policy changes, whereas insiders' dissents contain less clear information about future policy. The conditional probability of correct predictions shows that all specifications except that for insiders under Governor King help predict interest rate changes.²² Outsiders' dissents under Governor King have been particularly informative about interest rate changes, with a conditional probability of 59.7%.²³

To compare the information content of $skew_t^{in}$ and $skew_t^{out}$ more directly, we report

²⁰It should be noted that Δi_t refers to the interest rate change at the current MPC meeting and $skew_{t-1}^k$ to the voting outcome of previous month's meeting, which is published two weeks after the actual vote.

²¹The unconditional probability is computed as $\frac{1}{T} \sum_{t=1}^T \mathbf{1}(\widehat{\Delta i}_t = \Delta i_t)$, where T is the sample length. Since most months the interest rate was left unchanged, however, any model that frequently forecasts $\Delta i_t = 0$ obtains a large unconditional probability, whether it successfully predicts actual changes or not. The conditional probability is given by $\frac{1}{4-1}(cp_{-50bp} + cp_{-25bp} + cp_{0bp} + cp_{+25bp} - 1)$, with $cp_m = \sum_{t=1}^T \mathbf{1}(\widehat{\Delta i}_t = m)\mathbf{1}(\Delta i_t = m) / \sum_{t=1}^T \mathbf{1}(\Delta i_t = m)$, where m takes the values -50, -25, 0 and +25 basis points. This statistics attaches less weight to frequently realised outcomes. In the present application, it therefore yields larger values for models that predict interest rate changes (rather than constant rates) correctly. A conditional probability larger than zero suggests that the model under consideration is useful for predicting monetary policy adjustments.

²²This contradicts Governor King's speech on the MPC's tenth anniversary, where he states that "[...] you can discount claims that disagreements can be used reliably to predict future movements in rates. Sometimes they do, sometimes they don't." (King [27] p.12)

²³The conditional probabilities are low when compared to those obtained by Kim, Mizen and Thanaset [24] because we do not include information on current inflation and the output gap.

Table 5:
Regression output for equation (5)

$$\Delta i_t = b_s skew_{t-1}^k + b_i \Delta i_{t-1} + u_t$$

	full sample 1997:6 to 2007:4		Governor George 1997:6 to 2003:6		Governor King 2003:7 to 2007:4	
k	<i>in</i>	<i>out</i>	<i>in</i>	<i>out</i>	<i>in</i>	<i>out</i>
b_s	3.668*** (1.225)	5.094*** (0.988)	3.492** (0.158)	3.946*** (1.128)	3.415 (2.136)	9.577*** (2.603)
b_i	0.904*** (0.203)	0.855*** (0.211)	0.876*** (0.228)	0.856*** (0.236)	0.503 (0.514)	0.421 (0.543)
loglik	-87.991	-77.688	-57.549	-53.183	-27.758	-19.536
UP	0.729	0.712	0.681	0.667	0.783	0.826
CP	0.022	0.076	0.070	0.056	0.000	0.597

Note: Ordered probit estimates. */**/** denotes significance at the ten/five/one percent level. UP denotes the unconditional probability of correct predictions, CP the conditional probability.

in Table 6 estimates of

$$\Delta i_t = c_{in} skew_{t-1}^{in} + c_{out} skew_{t-1}^{out} + c_i \Delta i_{t-1} + v_t \quad (6)$$

for the full sample and the two subsamples. In this direct comparison, $skew_{t-1}^{in}$ does not contain any information about future interest rate changes, whereas $skew_{t-1}^{out}$ is significant at the one percent level. Within the sample period, it thus was possible to predict future interest rate changes by focusing on the outsiders' votes alone. The conditional probability again suggests that the explanation power of the model was highest under Governor King.

Since the model in Section 5 implies that $skew_t^{out}$ should be most informative about future policy when economy is growing below potential, we also present separate estimates of equation (6) for the cases of economic activity above and below trend. Since GDP data are available only on a quarterly basis, we capture activity y_t by the deviation of the industrial production index from the Hodrick-Prescott filtered measure thereof.^{24, 25} The regression output shows that outsiders' dissents contain somewhat more information about future policy during downturns.²⁶ Similarly, the conditional probability indicates that equation (6) is particularly useful for forecasting interest rate changes when the economy is slowing down.

Having explored the time pattern of dissents, we now turn to their determinants.

4.3 Determinants of dissents

Section 2 argued that insiders' and outsiders' behaviour may differ because of different policy goals, different relative weights in the loss function, asymmetries in the loss function

²⁴This variable has a correlation with the output gap of 0.87 in quarterly data. We set the observations for May and June 2002 equal to zero because there seems to have been a measurement error. We also considered an economic sentiment indicator and the level and change in unemployment as a measure of activity, but they showed a weaker link with the output gap.

²⁵Output gap uncertainty makes the use of real-time data desirable, which, however, are not available on a monthly basis. In quarterly data, several level adjustments in the GDP series render a meaningful comparison of real-time and final data difficult.

²⁶However, a Wald test does not reject the hypothesis that the coefficient estimate for c_{out} is the same whether activity above or below trend.

Table 6:
Regression output for equation (6)

$$\Delta i_t = c_{in}skew_{t-1}^{in} + c_{out}skew_{t-1}^{out} + c_i\Delta i_{t-1} + v_t$$

	full sample	Governor George	Governor King	activity above trend	activity below trend
c_{in}	1.197 (1.412)	0.945 (1.852)	1.662 (2.722)	-0.752 (2.168)	3.094 (2.019)
c_{out}	4.745*** (1.068)	3.658*** (1.262)	9.410*** (2.678)	4.756*** (1.598)	5.177*** (1.581)
c_i	0.901*** (0.218)	0.875*** (0.240)	0.592 (0.611)	0.598 (0.374)	1.111*** (0.295)
loglik	-77.327	-53.053	-19.351	-35.384	-38.839
CP	0.720	0.694	0.826	0.796	0.859
UP	0.098	0.071	0.597	0.250	0.862

Note: Ordered probit estimates. */**/** denotes significance at the ten/five/one percent level. UP denotes the unconditional probability of correct predictions, CP the conditional probability. "Activity above trend" denotes situations when the output gap constructed from industrial production is nonnegative, "activity below trend" when it is negative. There are 64 observations for $y_t \geq 0$ and 54 for $y_t < 0$.

and different resources. We discussed that the first explanation is unlikely to be valid for the UK and therefore concentrate on the three latter.

We first explore the importance of different resources. Gerlach-Kristen [20] shows that policymakers who are uncertain about the state of the economy are slow to adjust policy. Insiders have other responsibilities than just setting interest rates and thus conflicting demands on their time, and this might account for their tendency to change interest rates slowly. Given that outsiders are faster to change policy, their relying on fewer staff than the internal members and the fact that they tend to work only part-time for the MPC apparently do not matter much.²⁷

To assess the importance of conflicting responsibilities on part of the insiders, we compare the voting pattern of the Chief Economist, whose main task is economic analysis, with that of the outsiders using the tests (1) and (3).²⁸ Table 7 reports for comparison also the test statistics for the Deputy Governor Financial Stability, whose responsibilities are arguably most removed from monetary policy issues.²⁹ We find that these two insiders dissent equally frequently as the outsiders but that they tend to vote for higher, rather than lower, rates. The fact that the Chief Economist's voting pattern differs from that of the outsiders and resembles that of the Deputy Governor Financial Stability suggests that time resources do not seem to give rise to the difference between insiders' and outsiders' voting behaviour.

Next, we study whether there is evidence for different weights or for asymmetries in the insiders' and outsiders' loss functions. To this end, we test a number of hypotheses. Hypothesis 1 assumes that the insiders' and outsiders' dissents are not related to either inflation relative to target or the output gap. Hypothesis 2 assumes that insiders and outsiders attach different relative weights λ to the output gap in the loss function. In

²⁷Only Willem Buiter, DeAnne Julius and Sushil Wadhvani were employed as full-time external MPC members.

²⁸Mervyn King was Chief Economist up to May 1998, John Vickers until September 2000 and Charles Bean has been in that position since. Money Week [31] notes that the current Chief Economist "stands out as the only Bank insider consistently to back the case for interest rate cuts".

²⁹David Clementi was Deputy Governor Financial Stability until September 2002, Sir Andrew Large until January 2006 and Sir John Gieves has been since.

Table 7:

Does the Chief Economist/Deputy Governor Financial Stability vote like an outsider?

	$j = \text{Chief Economist}$	$j = \text{Deputy Governor Financial Stability}$
$P_{lower}^{out} + P_{higher}^{out} = P_{lower}^j + P_{higher}^j$	0.373	0.400
$P_{lower}^{out} = P_{lower}^j$	0.142	0.011
$P_{higher}^{out} = P_{higher}^j$	0.000	0.000

Note: p-value for tests (1) and (3).

this case, the response coefficients in their optimal policy reaction function should not be identical and, since the insiders form a majority, the outsiders' dissents should depend on the current rate of inflation and on current activity. If there are instead asymmetries in the sense that insiders' and outsiders' λ , four cases have to be considered. Hypothesis 3 explores whether outsiders' dissents depend on $\pi_t - \pi_t^*$ and y_t when the output gap is negative. It seems plausible that outsiders dislike economic downturns more than insiders but share their preferences and thus λ when the economy is growing above potential. Hypothesis 4 tests whether insiders' and outsiders' reaction functions differ when the output gap is positive, and Hypothesis 5 presumes that they differ when inflation is below target. Hypothesis 6 again appears plausible since it assumes that the outsiders' voting pattern differs from the insiders when inflation is above target. This finding should be made if the outsiders' loss function is symmetric but insiders dislike inflation above target more than inflation below target.

To assess whether insiders' and outsiders' loss functions differ, we regress $skew_t^{out}$ on the deviation of inflation from target and on the industrial production output gap. We measure inflation π_t by the annual change of the RPIX until December 2003 and as the annual change of the CPI thereafter and assume first an inflation target π_t^* of 2.5%, which was the official RPIX inflation target, and after December 2003 an objective of 2.0%, which has since been the official target for CPI inflation. To allow for the possibility that policymakers' reactions differ depending on whether π_t is above or below target and y_t

positive or negative, we define a dummy D_π that is unity whenever inflation is above target and zero otherwise and a dummy D_y that takes the value one if the output gap is positive and zero otherwise. We then fit

$$skew_t^{out} = f + f_\pi(\pi_t - \pi_t^*) + f_{\pi\pi}D_\pi(\pi_t - \pi_t^*) + f_{y\pi}D_y(\pi_t - \pi_t^*) + f_y y_t + f_{yy}D_y y_t + f_{\pi y}D_\pi y_t + w_t \quad (7)$$

to identify when outsiders dissent. There are six hypotheses to test:

Table 8:

Alternative hypotheses regarding the insiders' and outsiders' loss functions

H_0	Explanation
Hyp 1: $f = f_\pi = f_{\pi\pi} = f_{y\pi} = f_y = f_{yy} = f_{\pi y} = 0$	Dissents are random
Hyp 2: $f = f_{\pi\pi} = f_{y\pi} = f_{yy} = f_{\pi y} = 0$	Insiders' and outsiders' λ differ, but the loss functions are symmetric
Hyp 3: $f = f_{\pi\pi} = f_{\pi y} = 0, f_\pi = -f_{y\pi}, f_y = -f_{yy}$	Outsiders dissent when $y_t < 0$; otherwise they vote like the insiders
Hyp 4: $f = f_\pi = f_{\pi\pi} = f_y = f_{\pi y} = 0$	Outsiders dissent when $y_t \geq 0$; otherwise they vote like the insiders
Hyp 5: $f = f_{y\pi} = f_{yy} = 0, f_\pi = -f_{\pi\pi}, f_y = -f_{\pi y}$	Outsiders dissent when $\pi_t < \pi_t^*$; otherwise they vote like the insiders
Hyp 6: $f = f_\pi = f_{y\pi} = f_y = f_{yy} = 0$	Outsiders dissent when $\pi_t \geq \pi_t^*$; otherwise they vote like the insiders

The regression output and the p-values of the Wald tests for the six hypotheses are reported in Table 9. While none of the right-hand side variables per se is significant, the Wald tests allow us nevertheless to draw conclusions regarding the source of outsiders' dissents. We reject Hypothesis 1, and thus that insiders and outsiders have the same loss function, and Hypothesis 2, and thus that their loss functions are symmetric but differ with respect to the relative weight attached to the goal of output stabilisation. Hypothesis 3 is

not rejected (p-value of 0.76), indicating that outsiders tend to dissent when the output gap is negative. The parameter estimates of the two coefficients left unconstrained under this hypothesis, f_π and f_y , suggest that outsiders react more strongly to inflation and the output gap when $y_t < 0$. Hypotheses 4 and 5 are rejected by the data, but Hypothesis 6 yields a p-value of 0.17. The parameter estimates of $f_{\pi\pi}$ and $f_{\pi y}$, which are unconstrained under this hypothesis, are negative, indicating that outsiders tend to vote for lower rates than the insiders when inflation is above target, which is compatible with the view that insiders dislike inflation above target more than inflation below and therefore in this case favour tighter policy than outsiders.

Table 9:

Regression output for equation (7)

$$skew_t^{out} = f + f_\pi(\pi_t - \pi_t^*) + f_{\pi\pi}D_\pi(\pi_t - \pi_t^*) + f_{y\pi}D_y(\pi_t - \pi_t^*) + f_y y_t + f_{yy}D_y y_t + f_{\pi y}D_\pi y_t + w_t$$

Estimation							
f	f_π	$f_{\pi\pi}$	$f_{y\pi}$	f_y	f_{yy}	$f_{\pi y}$	\overline{R}^2
0.000	0.016	-0.013	-0.012	0.014	0.014	-0.018	0.064
(0.006)	(0.019)	(0.023)	(0.021)	(0.011)	(0.012)	(0.015)	
Hypothesis tests							
H_0							p-value
Hyp 1: $f = f_\pi = f_{\pi\pi} = f_{y\pi} = f_y = f_{yy} = f_{\pi y} = 0$							0.001
Hyp 2: $f = f_{\pi\pi} = f_{y\pi} = f_{yy} = f_{\pi y} = 0$							0.011
Hyp 3: $f = f_{\pi\pi} = f_{\pi y} = 0, f_\pi = -f_{y\pi}, f_y = -f_{yy}$							0.756
Hyp 4: $f = f_\pi = f_{\pi\pi} = f_y = f_{\pi y} = 0$							0.001
Hyp 5: $f = f_{y\pi} = f_{yy} = 0, f_\pi = -f_{\pi\pi}, f_y = -f_{\pi y}$							0.002
Hyp 6: $f = f_\pi = f_{y\pi} = f_y = f_{yy} = 0$							0.173

Note: Upper panel presents OLS estimates, June 1997 to April 2007, lower panel Wald test statistics.

In sum, the data reject the hypothesis that insiders' and outsiders' λ differs but suggest that asymmetric preferences matter. Since the p-value for Hypothesis 3 is much larger than that for Hypothesis 6, we assume in the following that outsiders have the same

preferences as insiders when the output gap is negative, but attach a greater weight to y_t in the loss function when it turns negative. We therefore explore next a model of interest rate setting by committee that explores whether asymmetric preferences of this kind can give rise to a voting pattern similar to the one observed.

5 Replicating the voting pattern

5.1 The model

We follow Svensson [39] and model the economy by assuming a simple backward looking Phillips curve given by

$$\pi_t = \pi_{t-1} + \alpha_y y_{t-1} + \varepsilon_t \quad (8)$$

with $\varepsilon_t \sim N(0, \sigma_\varepsilon^2)$ and an IS curve given by

$$y_t = \beta_y y_{t-1} - \beta_r (i_{t-1} - \pi_{t-1}) + \eta_t \quad (9)$$

with $\eta_t \sim N(0, \sigma_\eta^2)$. We assume that the inflation target is set to zero and that there is no uncertainty regarding the structure of the economy. Policymakers' period loss function is given by

$$L_t = \lambda_\pi \pi_t^2 + \lambda_y y_t^2 + \lambda_i (i_t - i_{t-1})^2. \quad (10)$$

The parameters λ_π , λ_y and λ_i capture the relative weights of the goals of inflation stabilisation, output stabilisation and interest rate smoothing.³⁰ In the baseline specification of the model we assume that λ_y and λ_i are identical for insiders and outsiders. In a second step, we assume that outsiders' λ_y is identical to the insiders' if the output gap is positive, but larger if it is negative, which matches the model of asymmetric preferences presented in Cukierman and Gerlach [13]. Their preferences thus become asymmetric.

Policymakers attempt to minimise equation (10) for all periods but discount future losses. They thus minimise the intertemporal loss function

$$\mathcal{L}_t = E_t \sum_{\tau=0}^{\infty} \delta^\tau L_{t+\tau}, \quad (11)$$

³⁰There is strong empirical evidence for interest rate smoothing. See Barker [4] and Goodhart [23] for a discussion regarding the BoE.

where δ is the discount factor, which lies between zero and unity. The optimal reaction function resulting from this minimisation equals

$$i_t = \gamma_\pi \pi_t + \gamma_y y_t + \gamma_i i_{t-1}, \quad (12)$$

where the γ s are functions of the parameters in equations (8) to (11). For the case of asymmetry, the parameters in equation (12) differ for outsiders depending on whether the output gap is negative or positive.

Since decisions in the MPC are not taken unanimously, individual policymakers' views of i_t must differ. To model this in the simplest fashion, we assume that policymaker j votes for a rate that deviates from i_t by a random error $\omega_{j,t}$, so that

$$i_{j,t} = \text{integer}[4(i_t + \omega_{j,t})]/4$$

with $\omega_{j,t} \sim N(0, \sigma_\omega^2)$, where $\text{integer}[4(\bullet)]/4$ captures the fact that interest rates are set in steps of 25 basis points.³¹

5.2 Simulations

Next we simulate the model to compute the distribution of votes and to assess the forecasting power of the insiders' and outsiders' *skew*.³² Following Ball [1] we set $\alpha_y = 0.4$, $\beta_y = 0.8$ and $\beta_r = 1$, and we assume a discount factor δ of 0.98. The weights of the loss function are chosen to sum to unity. As Rudebusch and Svensson [34] we set $\lambda_i = 0.2$. We moreover assume a small weight of $\lambda_y = 0.1$ for the goal of output stabilisation. Correspondingly, we set $\lambda_\pi = 0.7$. For the case of asymmetric preferences, we set $\lambda_y = 1$ for outsiders whenever $y_t < 0$ and keep all other parameters constant. The variances of the shocks are set as $\sigma_\varepsilon^2 = \sigma_\eta^2 = 0.1^2$ and $\sigma_\omega^2 = 0.025^2$, where the latter assumption implies that policymaker j 's view of the optimal interest rate lies with 95% probability within ± 5 basis points of the true i_t . We simulate the model using 100,000 draws.

³¹If for instance $i_t + \omega_{j,t} = 3.6$, $\text{integer}[4 * 3.6]/4 = 3.5$. Gerlach-Kristen [20] discusses a more elaborate model with information exchange between the committee members.

³²We use the algorithms provided by Paul Söderlind for the case of commitment to solve the model.

5.2.1 Baseline simulation

We start out by assuming that insiders and outsiders share the same loss function. Given the parameter assumptions, we obtain as coefficients in the reaction function $\gamma_\pi = 1.09$, $\gamma_y = 0.61$ and $\gamma_i = 0.53$. Since i_t is determined by equation (12) and since insiders' and outsiders' dissents arise exclusively from the observation errors $\omega_{j,t}$, there are no systematic differences between the view of internal and external members regarding what level of the interest rate to set. Correspondingly, their voting patterns should be identical, and the simulations confirm this. Table 10 shows that the baseline scenario predicts for insiders too many dissents for lower, and too few for higher, rates. For outsiders, we simulate too few dissents in either direction. Turning to the subsample analysis, we find that outsiders' tendency to vote for lower rates during policy tightening and loosening is not matched and that during loosening we predict too many dissents for higher rates for the outsiders and too few for the insiders. Overall, the observed voting pattern differs significantly from the simulated pattern in 12 of the 18 cells in Table 10. A formal Pearson χ^2 test comparing the baseline and the empirical distribution clearly rejects that the observed pattern might be drawn from the simulated distribution (p-value of 0.000).³³

Regarding the timing of dissents, we find no role for the insiders' or outsiders' skew in forecasting future interest rate changes. Given that internal and external MPC members are assumed to form their view of what level of the interest rate to set in exactly the same way, this result is hardly surprising.

5.2.2 Asymmetric preferences

We now assume that outsiders have asymmetric preferences, which implies that the coefficients in equation (12) change for outsiders if $y_t < 0$. In particular, we obtain $\gamma_\pi = 1.17$, $\gamma_y = 0.73$ and $\gamma_i = 0.23$. Thus, outsiders respond more aggressively to both inflation and the output gap, and they moreover engage in less interest rate smoothing if output is below potential. We find that the simulations match the voting distribution much better

³³We consider the χ^2 statistics for 18-6=12 degrees of freedom since the share of dissents for higher rates can be computed from the share of dissents for lower rates and the share of votes with the majority for each of the six panels in Table 10.

Table 10:
Actual and simulated voting pattern

	Insiders			Outsiders		
	for lower rate	with majority	for higher rate	for lower rate	with majority	for higher rate
All observations						
Data	1.7	91.1	7.2	10.2	83.8	6.0
Base-	3.7	92.7	3.6	3.7	92.7	3.6
line	[1.8-5.9]	[89.8-95.3]	[1.8-5.5]	[1.9-6.0]	[89.8-95.4]	[1.7-5.8]
Asym-	2.7	91.2	6.1	16.7	80.2	3.0
metry	[1.2-4.8]	[87.8-94.3]	[3.2-9.2]	[10.1-24.4]	[72.5-87.5]	[1.2-5.4]
During policy tightening only						
Data	4.9	95.1	0.0	15.3	83.1	1.7
Base-	6.3	92.2	1.4	6.2	92.2	1.5
line	[1.9-11.8]	[86.2-97.1]	[0.0-4.2]	[1.6-12.1]	[86.1-97.2]	[0.0-4.8]
Asym-	5.3	92.9	1.8	9.1	89.1	1.8
metry	[1.4-10.3]	[87.6-97.1]	[0.0-9.2]	[2.9-16.8]	[81.6-95.9]	[0.0-5.0]
During policy loosening only						
Data	1.1	84.3	14.6	18.6	81.4	0.0
Base-	1.5	92.4	6.1	1.5	92.4	6.1
line	[0.0-4.6]	[87.1-96.9]	[1.8-11.5]	[0.0-4.8]	[86.3-97.1]	[1.6-12.1]
Asym-	0.6	87.0	12.4	25.2	70.7	4.1
metry	[0.0-3.3]	[78.2-94.2]	[5.4-21.2]	[11.4-39.6]	[56.0-84.7]	[0.0-9.7]

Note: All numbers in percent. Simulations based on 100,000 draws, assuming $\alpha_y = 0.4$, $\beta_y = 0.8$, $\beta_r = 1$, $\delta = 0.98$, $\lambda_\pi = 0.7$, $\lambda_i = 0.2$, $\sigma_\varepsilon^2 = \sigma_\eta^2 = 0.1^2$ and $\sigma_\omega^2 = 0.025^2$. Baseline simulation sets $\lambda_y = 0.1$, asymmetry case for outsiders only $\lambda_y = 1$ if $y_t < 0$ and $\lambda_y = 0.1$ otherwise. 95% bootstrapped confidence intervals in brackets.

under asymmetric preferences: only in one of the 18 cells are there significant differences between the actual vote and the simulation (the simulation continues to predict that outsiders dissent less often for higher rates than they do in practice for the full sample). A χ^2 test for the hypothesis that the observed voting pattern is a random draw from the simulated distribution yields a p-value of 0.049. The assumption of asymmetric preferences thus goes a long way towards replicating the observed voting pattern.

Asymmetric preferences also account for why the outsiders' $skew_t$ predicts future interest rate changes. Table 6 established that interest rate changes are predicted more accurately when the economy grows below rather than above trend, and our model predicts that outsiders smooth interest rates less than insiders when $y_t < 0$. Thus, they first dissent for an interest rate decrease, and only after a period or two do insiders also favour such a move. Consequently, outsiders' dissents are informative about future policy adjustments. During booms, when insiders and outsiders share the same reaction function, $skew_t^{out}$ should contain no information about future interest rate changes.

In sum, the assumption that outsiders have an asymmetric loss function with respect to the output gap appears to explain much of the observed voting pattern in the MPC. This implies that had there been no outsiders on the committee, the MPC would have cut interest rates more slowly during economic downturns.

6 Conclusions

Monetary policy in the UK is set by a committee with members from within the Bank of England and from without. We show that insiders and outsiders differ systematically with regard to their voting behaviour. This suggests that the presence of outsiders on the MPC has led to a different monetary policy than would have been set had there only been internal members. We demonstrate that output below potential apparently makes outsiders deviate in their voting pattern from the average MPC member. The simulation of a small model of interest rate setting suggests that assuming a symmetric loss function for insiders, but an asymmetric loss function with respect to the output gap for outsiders, replicates the observed distribution of votes rather well and explains why

outsiders' dissents forecast future interest rate adjustments. The impact of the outsiders on monetary policy thus appears to be to speed up the interest rate reaction when growth falls below potential.

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