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WHAT'S IN A SECOND OPINION?

SHADOWING THE ECB AND THE BANK OF ENGLAND[*]

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ABSTRACT

One way of evaluating how well monetary authorities perform is to provide the public with a regular and independent second opinion. The European Central Bank (ECB) and the Bank of England are shadowed by professional and academic economists who provide a separate policy rate recommendation in advance of the central bank announcement. We explore differences between shadow and actual committee decisions based on an adapted Taylor rule and report a few systematic differences. The shadow committee of the ECB tends to be relatively less inflation averse than the ECB's Governing Council. Perhaps most significantly our interpretation of the stance of the shadow committees is sensitive to the use of real time data, especially during the global financial crisis.

1. Introduction

Central to the conduct of 'good' monetary policy is credibility. Not surprisingly, interested observers of central banks have difficulties coming up with adequate indicators of the extent to which markets and, more generally, the public understands, agrees with or is surprised by the policy decisions taken by monetary authorities. One way of evaluating how well monetary authorities perform is to provide the public with a regular and independent second opinion. The European Central Bank (ECB) and the Bank of England (BoE) are both shadowed by a group of professional and academic economists. These shadow committees provide independent advice about the upcoming setting of the monetary policy instrument in their respective economies. Their remit is not to predict what the central bank will do. Instead, these bodies aim to provide a second opinion about the appropriate stance of monetary policy. A shadow Monetary Policy Committee (SMPC) for the BoE has met since 1997[1] while the shadow Governing Council (SGC) of the ECB has published its recommendations since 2002.[2]

After describing how these shadow committees operate, highlighting possible differences vis-à-vis the central banks they shadow, we systematically evaluate the second opinion provided by the two shadow councils relying on three sets of tests. First, we estimate Taylor (1993)-type rules (TR) for the shadow committees and central banks and compare them. Second, we examine the determinants of consensus within a shadow committee. Finally, we consider sources of disagreement between the policy rate recommendations and subsequent settings by the actual monetary policy committees.

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[1] A separate shadow committee of the BoE, the TIMES MPC, has operated since 2002 but, as this is written, we have not been able to compile sufficient data to undertake the kind of empirical study presented below. See, however, Koo, Paya and Peel (2012) who report that the TIMES MPC largely agrees with its BoE counterpart, based on only 18 observations.

[2] To our knowledge, there are only six economies for which a 'second opinion' about monetary policy decisions is available: Australia, Canada, the euro area, New Zealand, the U.K., and the U.S. Moreover, with the exception of the U.S., there has been no attempt at evaluating the advice provided by shadow monetary policy committees. For several reasons, we focus on the shadow councils for the euro area and the U.K. First, as we explain below, the lessons from the U.S.'s shadow open market committee cannot be compared with those of the other shadow committees. Second, the time series for Australia (since 2011) and New Zealand (since 2012) are too short to evaluate these shadow councils in a systematic way. Finally, separate work is currently under way by the authors to analyze the work of Canada's C.D. Howe's Monetary Policy Council which, in contrast to the euro area and U.K. shadow councils, also provides recommendations for the setting of the policy rate over the next twelve months. See http://www.cdhowe.org/display.cfm?page=monetarySynopsis. The second author is a member of that Council since January 2008.

The evidence suggests that there are a few systematic differences between shadow and actual committee decisions. First, the shadow committee of the ECB tends to be relatively less inflation averse than the ECB's Governing Council. We also find that our interpretation of the positions taken by both the shadow and formal monetary policy committees are sensitive to the reliance on real time data. It is notable that both the shadow and central bank policy committees became very responsive to real economic conditions during the global financial crisis (GFC).

Second, we find that consensus within a committee is far easier to reach when there is no pressure to change the policy rate. Indeed, rises or falls in policy rates negatively affect consensus. Furthermore, departures from the consensus are apparent when the results are disaggregated according to whether the committee members are professional or academic economists.

Third, while the specifications considered are unable to explain differences in policy rate recommendations between the shadow and formal committees of the BoE, the same result does not hold in the ECB's case. Indeed, we report strong evidence that the SGC is more activist than its counterpart. Moreover, a larger degree of consensus within the SGC and a larger share of German participants bring about a greater likelihood that the two committees will agree.

The rest of the paper is organized as follows. Section 2 briefly explains the organization, role and functions of shadow committees and concludes that their aims are quite different from those of the committees they shadow. Section 3 summarizes the data and offers a few stylized facts. Section 4 presents the empirical specifications and highlights some of the challenges that emerge when interpreting the work of shadow committees. Section 5 describes the results. Section 6 concludes.

2. Shadow Monetary Policy Committees

The original idea for second guessing monetary policy possibly came from Karl Brunner and Alan Meltzer when, during the 1970s, they formed the Shadow Open Market Committee (SOMC) of the U.S. Federal Reserve in response to what 'monetarists' at the time perceived to be an ill-fated 'Keynesian' style policy of volatile money growth and persistent inflation (see

Meltzer 2000). The original intention was to meet twice a year and to produce a policy statement as well as position papers on a wide variety of economic issues presented by committee members.[3] Poole, Rasche and Wheelock (2011) revisit the advice given by the SOMC and conclude, relying on a New Keynesian style framework, that the SOMC's monetarist advice would have yielded less inflation and milder output losses for the U.S. economy compared with the actual policy implemented by the Fed. However, the SOMC's work cannot be compared with the shadow committees considered in this paper as the latter groups are tightly focused around monthly recommendations for future policy rates.

2.1 Shadow Committee of the Bank of England

The BoE obtained operational independence to set the course of monetary policy in 1997. The Monetary Policy Committee (MPC) was created as the vehicle used by the BoE to set the policy rate on a monthly basis (http://www.bankofengland.co.uk/monetarypolicy/overview.htm). Members of the committee are individually accountable under the legislation governing the BoE's operations and mandate. The BoE's MPC consists of 9 members, four of whom are external members appointed by the Chancellor of the Exchequer. Minutes are released shortly after each meeting and these contain information about the views of individual members. The policy rate is announced after a vote has been taken based on a motion put forward by the Governor. Since March 2009 the motion includes not only a recommendation for the next Bank Rate setting but also a vote about the size and direction of quantitative easing (QE).

The SMPC examined in this study is an undertaking of the U.K. *Institute of Economic Affairs* (http://www.iea.org.uk/smpc) and was created in July 1997 shortly after the BoE became independent of the Treasury. As of this writing the SMPC consists of a total of 14 members who represent both professional and academic economists in the U.K. The SMPC meets either in person or electronically a few days before the MPC to provide its recommendation based on a majority vote. Like its counterpart at the BoE, minutes of the meetings and individual comments are recorded and published. Organizers of the SMPC ensure that each meeting

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[3] There were no committee meetings from 1998 to 2005 and after 2006 only the policy papers remained. Archival documents and other related materials from the reconstituted SOMC are available at http://shadowfed.org/.

records 9 votes to match the number of votes at the BoE's MPC meeting. Table 1 provides a summary that contrasts the information provided by the MPC and SMPC. It is not entirely clear what the voting mechanism is. However, it appears that a motion is made (e.g., to hold the rate) and votes are casted in an unspecified order.[4]

Table 1: Shadow Monetary Policy Committee for the Bank of England

	MPC	SMPC
Statement	yes	yes
Voting Record	yes	yes
Minutes	yes	yes
Press Conference	no	no
Forecast	quarterly	no

2.2 Shadow Committee of the European Central Bank

In case of the ECB, monetary policy decisions are delegated to a Governing Council (GC) which meets since January 1999 to set the course of monetary policy on a monthly basis. The GC consists of an Executive Board (EB), made up of six members, and the Governors of the 17 euro area central banks (as of January 2011). Hence, potentially 23 members make monetary policy decisions. Nevertheless, the EB is responsible for monetary policy decisions and prepares the work of the GC for the policy rate decisions expressed in terms of the rate on main refinancing operations (MRO). The ECB announces its monetary policy decision and a press conference is held shortly after the meeting. Between 1999 and 2001 there were two announcements per month although generally only one pertains to the actual policy rate setting (http://www.ecb.int/press/govcdec/mopo/previous/html/index.en.html). Beginning in 2002, only one announcement is made regarding the setting of the MRO rate. Minutes are not

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[4] In private correspondence, Charles Goodhart and David Smith of the SMPC pointed out the tendency for some of the members of the shadow committee to display 'monetarist' leanings. Accordingly, the TR may not represent an accurate reflection of some of the members' thinking over time (also see Smith 2007). This suggests to us that persistent differences between the SMPC and the MPC may well emerge as a result of ideological differences. We are neither able to put an ideological label on each SMPC member nor do we have independent information on members' ages or educational background. In any event, monetarists will aspire to some form of price stability and will subscribe to the existence of a short-run trade-off that exists between inflation and the real side of the economy that underpins the TR.

released and the ECB acknowledges that its decisions are based on consensus (e.g., see Moutot, Jung and Mongelli 2008).

The SGC operates through the German publication *Handelsblatt* (http://www.handelsblatt.com/politik/konjunktur/shadow-council/). The group was founded in 2002. The SGC meets approximately 1 week before the ECB announces its own monetary policy decision. The meeting is held via a telephone conference call and the SGC consists of 15 academic and professional economists. While there is no voting as such, the recorded opinion of the SGC is based on a tally of recommendations made at the meeting with a journalist acting as a non-voting Chair. Occasionally, commentary from some of the SGC members is recorded but there is no formal press release. The 'minutes' record various issues in the euro area and elsewhere that pre-occupy members of the SGC. A novel element of the SGC is that its members are encouraged to supply a current year and one year ahead inflation and real GDP growth forecast for the euro area with the mean value for the group being reported. In addition to the recommended current setting, SGC members have recently been providing an interest rate bias over a 3 month ahead horizon.[5] This is a form of forward guidance that is not yet provided by the ECB. Finally, also on an irregular basis, there is sometimes an article that provides an early indication of the concerns that the SGC will discuss at its next meeting. Table 2 compares the GC with the SGC.

Table 2: Shadow Monetary Policy Committee for the European Central Bank

	GC	SGC
Statement	yes	no (press release)
Voting Record	no	yes
Minutes	no	no (press release)
Press Conference	yes	no
Forecast	quarterly	monthly

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[5] Unfortunately, the available time series is too short for use in the present study.

3. Data and Stylized Facts[6]

Data were collected at the monthly frequency from the respective shadow committee websites listed in the previous section with additional data collected from the websites of the BoE and the ECB. As explained below, we also employ inflation and real GDP growth forecasts from *The Economist*'s Poll of Forecasters in case of the U.K. Because of data limitations we are unable to begin the sample from the very first meeting of either shadow committee. Hence, the sample for the SMPC begins in January 2002 and ends with the October 2010 recommendation, yielding 77 observations. Similarly, the first observation for the SGC dataset is January 2006 and the sample also ends with the October 2010 MRO recommendation, resulting in 52 monthly observations.

3.1 Shadow Committee of the Bank of England

Table 3 provides some summary statistics describing the BoE's SMPC. Figure 1a plots the SMPC's recommended interest rate settings (solid line) against the actual ones set by the BoE (diamonds) and Figure 1b shows the range of individual recommendations in the SMPC.

Table 3: Descriptive Statistics for the U.K.

	Mean	Std. Dev.	Skewness	Minimum	Maximum
SMPC Proposal	3.56	1.95	−0.72	0.50	5.75
MPC Target Rate	3.51	1.96	−0.69	0.50	5.75
10 Year Real Bond	1.50	0.52	0.15	0.43	2.80
Inflation Forecast Gap	0.16	0.45	0.80	-0.88	1.50
GDP Forecast Gap	0.09	1.26	−1.66	−4.05	1.55
Voting for Proposal (%)	0.70	0.20	−0.28	0.11	1.00
Share of Professionals (%)	0.43	0.11	0.10	0.11	0.67

Note: Dataset contains all SMPC proposals from February 2002 to September 2010 (77 observations). Note that the BoE changed its inflation measure and target during our sample. Until the end of 2003, the (midpoint of its) inflation target was 2.5% annual growth of the Retail Price Index. Since 2004, the (midpoint of its) inflation target is 2% annual growth of the Harmonized Index of Consumer Prices. Inflation and GDP forecasts (with a 12 month horizon) are obtained from The Economist's Poll of Forecasters. The output gap is derived from a constant growth trend (1.5% annually).

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[6] We plan to post some of the data used in this study on the Central Bank Communication Network's website, http://www.central-bank-communication.net/.

Figure 1a: MPC Target Rate Setting and SMPC Target Rate Recommendation
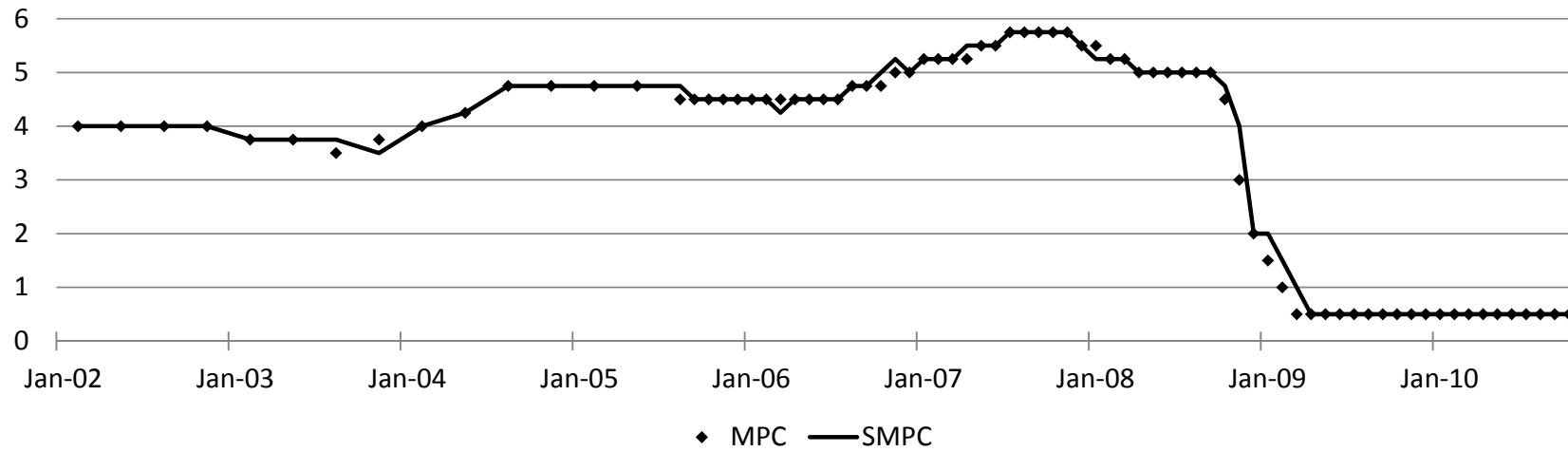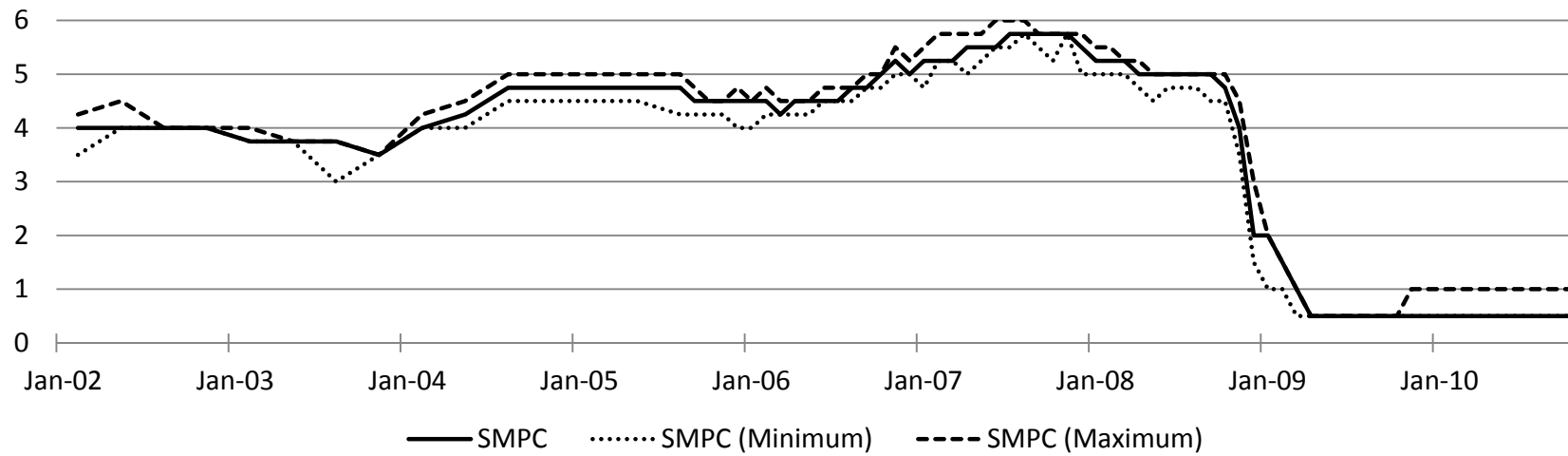

Figure 1b: Range of Individual SMPC Target Rate Recommendations

There are few differences between the median recommendations of the BoE's SMPC and its MPC counterpart. Disagreement with the BOE's MPC tends to rise when rates are rising and is more subdued when they fall. Nevertheless, differences between the two committees are small, assumably owing to the practice of changing policy rates in increments of 25 basis points. Moreover, it appears that the upper and lower bound of individual policy rate proposals is remarkably close to the median value of recommended policy rates. This should come as no great surprise as each time the MPC sets the policy rate this always requires the SMPC to reset its next decision conditional on the prevailing policy rate set by the MPC. Consequently, some SMPC members might be tempted to form their proposal possibly based on a policy rate level they may not consider adequate.[7] A further complication is that members who disagreed with the actual decision of the MPC may, subsequently, find the BoE's arguments credible thereby removing the earlier disagreement. Obviously, in the empirical work presented below, we cannot properly account for all of these complications.[8]

3.2 Shadow Committee of the European Central Bank

Table 4 shows descriptive statistics for the ECB's SGC. Figure 2a plots the SGC's recommended interest rate settings (solid line) against the actual ones set by the ECB (diamonds) and Figure 2b indicates the range of individual recommendations in the SGC.

Once again, there are few systematic differences between the GC's policy rate settings and those recommended by their cousins on the SGC. Disagreement between the shadow committee and its formal counterpart at the ECB tends to become more visible when the policy rate is falling. The SGC displays a considerable amount of visible consensus with the recommended policy rate which is on average supported by almost 80% of the SGC (the SMPC consensus rate is about 70%). In contrast to the SMPC, a substantial plurality of the membership is made up of professional economists. Finally, it is worth considering the

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[7] To some extent, this extends to the MPC which takes the last decision as given although not all of its members might have approved the chosen policy stance.
[8] It has been suggested to us that the incentives of shadow committee members differ from members who sit on the formal policy making committee. This may be true since, for example, the MPC members belonging to the BoE are individually accountable for their decisions. Moreover, the extent to which shadow members seek out visibility might also differ from their counterparts at the central bank.

distribution of the SGC's membership according to nationality as the country of origin may create a bias in one direction or another. By this metric, on average, almost 30% of SGC members are from Germany.[9] As a consequence, we investigate this form of German influence in the subsequent empirical work reported below.

Table 4: Descriptive Statistics for the Euro Area

	Mean	Std. Dev.	Skewness	Minimum	Maximum
SGC Proposal	2.57	1.30	−0.21	0.50	4.25
GC Target Rate	2.61	1.27	−0.17	1.00	4.25
10 Year Real Bond	2.22	1.00	0.35	0.49	4.47
SGC HICP Forecast Gap	−0.24	0.64	−0.23	−1.40	1.00
SGC GDP Forecast Gap	−0.47	1.40	−1.30	−3.85	0.97
Voting for Proposal (%)	0.78	0.18	−0.55	0.33	1.00
Share of Professionals (%)	0.68	0.11	−0.17	0.50	0.93
Share of Germans (%)	0.29	0.06	0.22	0.20	0.41

Note: Dataset contains all SGC proposals from January 2006 to September 2010 (52 observations). Inflation and GDP forecasts (with a 12 month horizon) are obtained from the SGC press releases. The output gap is derived from a constant growth trend (1.5% annually).

4. Empirical Specifications

4.1 Monetary Policy Reaction Functions

It is convenient to consider some version of the Taylor Rule for several reasons. First, the literature has gravitated in this direction as a short-hand expression used in evaluating the conduct of monetary policy. Second, it is less likely that shadow council members are able to consider the correct stance of monetary policy on a full-time basis.[10] Finally, there exists a considerable difference in the responsibility for policy mistakes with the stakes presumably much greater for the central bankers. Consequently, it seems appropriate to consider the kind of rule of thumb approach implicit in the application of TRs.

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[9] That is, their affiliation places them in Germany. We have no way of knowing, for example, whether these individuals are German nationals. It is worth noting that there is considerable presence from members affiliated in France, followed by members from other EMU countries. The membership of the SGC also includes almost 20% of non-euro area affiliated economists.

[10] Nevertheless, members of shadow committees are involved in these kinds of deliberations due to their academic or professional interests in monetary policy and have the reputation and expertise to pronounce opinions on the subject on a regular basis.

Figure 2a: GC Target Rate Setting and SGC Target Rate Recommendation
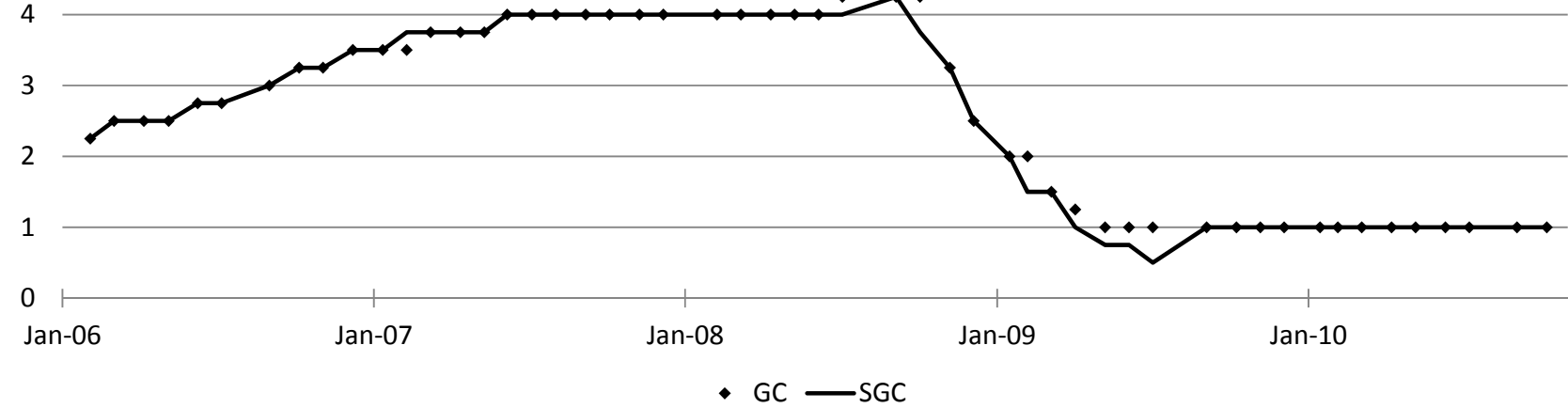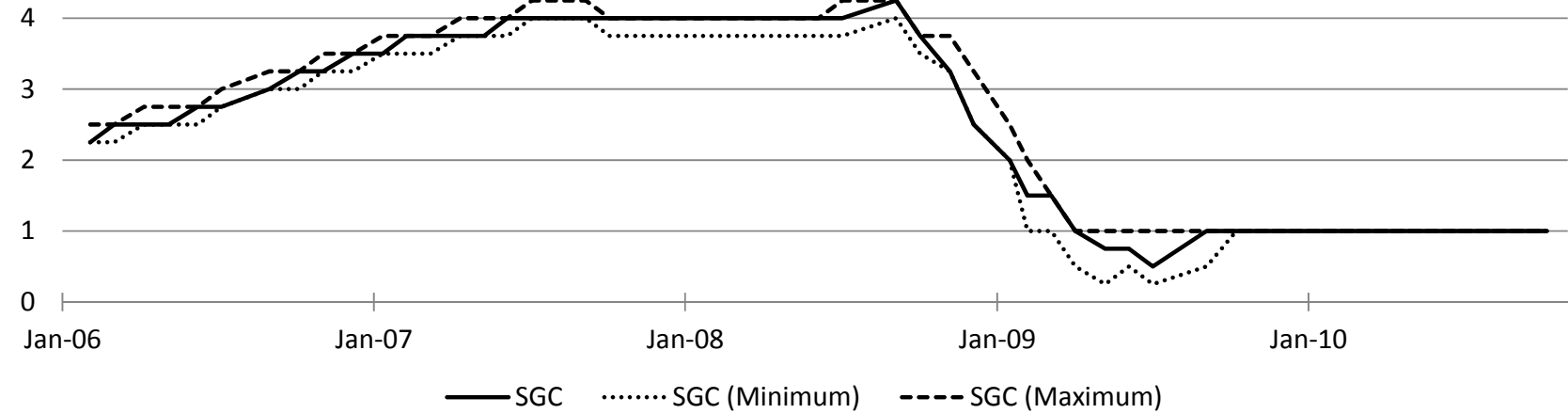

Figure 2b: Range of Individual SGC Target Rate Recommendations

In the following analysis, we assume that the shadow committee and the corresponding central bank decision making bodies have the same information set. One might argue that central banks possess an information advantage over the public including the 'experts' who sit on the shadow committees. What is undoubtedly correct is that the resources available to decision-makers in central banks are comparatively larger than those available to most shadow committee members.[11] However, actual policy rate decisions are based ultimately on committee members' judgment which is largely unobservable and is likely not based solely on estimates generated from a suite of models and scenarios.[12]

We estimate the following specification along the lines of Clarida, Gali and Gertler (1998):

$$i_t^\tau = (1-\rho)\big(\alpha r_t + \beta_0 \tilde{\pi}_{t+12|t} + \beta_1 \tilde{y}_{t+12|t}\big) + \rho i_{t-1}^{CB} + \varepsilon_t \qquad (1)$$

Equation (1), for the most part, follows a standard TR[13] with an *interest rate smoothing parameter* (ρ) where the policy rate (i_t^τ) is set either by the central bank or recommended by the shadow committee. Both committees must set the current period policy rate according to the level set by the central bank in the previous period (i_{t-1}^{CB}). Taking into account the persuasive evidence in Clarida (2012), the *real interest rate* (r_t) is time-varying and based on the real return yield on 10 year German government bonds as benchmark for the euro area and a similar yield for the U.K.

The determinants of the TR include an *expected inflation gap* ($\tilde{\pi}_{t+12|t}$) defined as the twelve month ahead inflation forecast minus the stated inflation target in the BoE's case (see Table 3) and minus 2% in case of the ECB.[14] Due to the relatively short sample, we use a simple deviation from a constant output growth trend (1.5%) as proxy for the unobservable twelve

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[11] This comparative advantage may not extend to the external members of the BoE's MPC.

[12] There is one advantage that the MPC and the GC have over their shadow counterparts since there is a gap of several days between the announcement by the second guessing committee and the central banks. However, we cannot control for the impact of possible news arrival during this gap.

[13] We chose not to add an exchange rate variable. Research on estimated as well as optimal TRs (e.g., see Clarida 2001, Collins and Siklos, 2004) suggest that adding this series does not make much difference to inference based on the standard TR specification.

[14] The ECB defines price stability as follows: "In the pursuit of price stability, the ECB aims at maintaining inflation rates below, but close to, 2% over the medium term." See http://www.ecb.europa.eu/mopo/intro/html/index.en.html.

month ahead *expected output gap* ($\tilde{y}_{t+12|t}$).[15] In case of the ECB, we can rely on the mean forecast published as part of the SGC press release. For the U.K., we use the one year ahead forecasts by The Economist.[16]

One potential problem with the right-hand side variables is that they might be correlated with the error term leading to biased estimates of the coefficients. As a consequence, Equation (1) is estimated via the Generalized Method of Moments.[17] An important aspect is the selection of valid instruments (e.g., see Siklos and Bohl 2009, and references therein). After considerable experimentation we chose lags of inflation, industrial production, a broad monetary aggregate and the overnight interest rate. In case of the U.K., we also add lags of the nominal U.S.-U.K. exchange rate.

Since Orphanides (2001) it has been acknowledged that estimated policy rules based on revised data may give a misleading picture of the intended stance of monetary policy. In particular, policy makers, including the 'experts' who sit on shadow committees, base their decision on data at their disposal at the time each committee meets. Hence, it seems essential to try and account for the fact that key data, notably real GDP data, are revised over time. Therefore, we also examine different 'vintages' for the output gap[18] to determine the sensitivity of our results to data that both the shadow and actual policy committees had at their disposal at the time of the decision.[19] However, there is the drawback of potentially losing many observations when using a particular vintage instead of the whole time series. As a consequence, we present two sets of results. To provide an overview, we first estimate reaction functions using a constant output growth target and all available observations. Second, we give

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[15] We also considered employing the Hodrick-Prescott (1997) filter with the standard smoothing parameter of 14,400 for monthly data. However, employing this filter assumes perfect knowledge of all future output observations since it estimates trend output based on a two-sided filter. Furthermore, the abrupt decline in output at the beginning of the GFC leads to imprecise estimates during that period.

[16] As part of our robustness tests, we also employed the BoE's own forecasts and forecasts by Consensus Economics. Similarly, we were also using The Economist's and Consensus Economics data in the ECB case. Results are relegated to the Appendix but the overall conclusions are unchanged.

[17] Comparisons between GMM and OLS estimates suggest relatively few differences in the conclusions. Results are relegated to the Appendix.

[18] Inflation data either are not revised or the revisions are not considered to be large enough to influence the results of estimated policy rules. While some recent papers (e.g., Molodtsova, Nikolsko-Rzhevskyy and Papell 2008) estimate TR using real time data, it is still relatively uncommon to see estimates based on vintage data.

[19] The data were obtained from the OECD's real time database (http://stats.oecd.org/mei/default.asp?rev=1&lang=e).

an impression of the real time decision faced by the (shadow) monetary policy committees using several vintages of a time-varying output gap.

4.2 Consensus within the Shadow Councils

Monetary policy committees are well known to be driven by the need to achieve consensus. Hence, it is also of interest to examine how the individual members set the recommended policy rate. In principle, one could estimate a TR for individual committee members. However, the average term of several members is brief enough to make this approach impractical. Instead, we consider whether there are observables that can be used to explain how much consensus exists within the shadow committees. Consensus is defined as the share of recommendations identical to the median recommendation (in percent). We then estimate the following specification:

$$Consensus_t = \delta_0 + \delta_1 X_t + \mu_t \quad (2)$$

$$X_t = \{MPC\ Votes_{t-1}, Pros_t, Ger_t, Cut_t, Rise_t, Size_t\} \quad (3)$$

$MPC\ Votes_{t-1}$ is the balance of votes in favor of the adopted policy stance by the MPC at its previous meeting (relevant only for the SMPC). $Pros_t$ and Ger_t are the shares of professional economists and members based in Germany (relevant only for the SGC) who vote at each meeting.[20] Moreover, the specification considers whether consensus is asymmetric as between a rate cut (Cut_t) or rise ($Rise_t$). Finally, $Size_t$ measures the change in the policy rate in percent (e.g., 0.25). We can then ask whether larger proposed changes in the policy rate threaten consensus relative to smaller, more gradual changes. Equation (2) is estimated via OLS.

4.3 Disagreement between the Shadow Councils and the Central Banks

We also explore sources of disagreement between the shadow council recommendations and the policy rate decisions taken by central banks. Disagreement is defined as a non-zero

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[20] There is a long history of studies of the behavior of US's Federal Open Market Committee members and their individual preferences which is akin to the attempt here to assess the importance of the background of committee members. See, for example, Chappell, Havrilesky and McGregor (2000). There is also some recent evidence for the UK's MPC (Berk, Bierut and Meade 2010). Note that in case of the SMPC, almost all members are based in the U.K.

differential between the policy recommendation of the shadow committee and the monetary policy committee. Figures 1a and 2a suggest that disagreement tends to be more noticeable when central banks enter a period of rising or falling policy rates. We examine if there is any empirical support for this form of asymmetric behavior and estimate the following specification:

$$Disagreement_t = \Pr[i_t^{SC} - i_t^{CB} \neq 0 | Z_t] = \kappa_0 + \kappa_1 X_t + \kappa_1 Consensus_t + \eta_t \text{ (4)}$$

Equation (4) transforms non-zero differences between the actual and recommended policy rates into a [0,1] binary variable. Probit estimations shed light on the question of whether the probability of disagreement between the shadow and formal monetary policy committees is a function of the set of observables in vector X_t. Finally, we add the degree of consensus within the respective shadow council as additional explanatory variable.

5. Results

5.1 Monetary Policy Reaction Functions

Tables 5 and 6 present the estimates of Equation (1) for the BoE and the ECB, respectively.[21]

Table 5: Monetary Policy Reaction Functions for the U.K.

Dependent Variable	SMPC Proposal		MPC Target Rate	
Interest Rate Smoothing	0.952	**	0.898	**
10 Year Real Bond	0.506		0.541	
Inflation Forecast Gap pre-QE	5.796	**	4.861	**
Inflation Forecast Gap QE	0.192		0.154	
GDP Forecast Gap pre-QE	5.775	**	4.883	**
GDP Forecast Gap QE	−0.017		0.008	
S.E. of Regression	0.110		0.169	
Observations	77		77	
R^2	0.997		0.993	
J-statistic	0.116		0.109	

Notes: * and ** indicate significance at a 5% and 1% level, respectively. Inflation and GDP forecasts (with a 12 month horizon) are obtained from The Economist's Poll of Forecasters. The output gap is derived from a constant growth trend (1.5% annually).

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[21] We relegate to the Appendix the case where the committees are assumed not to smooth interest rates. Again, the main findings of this study remain unchanged.

In case of the BoE, the results shown in Table 5 make allowances for the possibility that the stance of monetary policy is affected by the introduction of QE in 2009. There are three notable findings. First, the Taylor principle holds for both the MPC and the SMPC during the era that precedes QE. That is, a one percent rise in the inflation gap produces an increase of more than one percent in both the actual and recommended policy rates. Second, neither the SMPC nor the MPC react to inflation or output gaps during the QE period. The respective committees appear to react to something else that is not accounted for in the specifications considered. Finally, given the same set of forecasts, the degree of inflation aversion is the same in both committees, at least in statistical terms.

Table 6: Monetary Policy Reaction Functions for the Euro Area

Dependent Variable	SGC Proposal		GC Target Rate	
Interest Rate Smoothing	0.948	**	0.967	**
10 Year Real Bond	1.570	**	1.762	**
Inflation Forecast Gap	3.701	**	4.705	**
GDP Forecast Gap	2.246	**	1.363	**
S.E. of Regression	0.135		0.151	
Observations	52		52	
R^2	0.990		0.987	
J-statistic	0.184		0.173	

Notes: * and ** indicate significance at a 5% and 1% level, respectively. Inflation and GDP forecasts (with a 12 month horizon) are obtained from the SGC press releases. The output gap is derived from a constant growth trend (1.5% annually).

Turning to the ECB specifications in Table 6 we find that the Taylor principle is adhered to when reacting to inflation shocks. However, unlike the SMPC, the SGC is less inflation averse than the GC and the margin of difference is statistically significant. Finally, the impression of different reaction functions for the SGC and the GC is confirmed by a test of forecast unbiasedness. For that purpose, we consider the SGC recommendation as a proxy forecast for the actual GC interest rate decision and estimate the following equation using OLS:

$$GC\ Target\ Rate_t = \alpha + \beta\ SGC\ Proposal_t + \varepsilon_t \qquad (5)$$

The joint test for $\alpha = 0$ and $\beta = 1$ is rejected in the ECB case, whereas we cannot reject the null hypothesis of an unbiased forecast in the U.K. case.

So far we have relied on output data that neither the shadow nor the actual decision-making bodies of the two central banks would have at their disposal when making policy rate recommendations or decisions. Therefore, it is instructive to consider the performance of the shadow and formal committees when real time data are used. Given the events of the past few years this approach may yield insights into monetary policy reaction functions as the GFC took hold. The real time results are provided in Tables 7 and 8 for a selection of vintages. These coincide with meetings prior to or immediately following some momentous event such as (i) the beginning of the financial crisis, (ii) the bankruptcy of Lehman Brothers, (iii) the introduction of QE in the UK and (iv) the eruption of the Greek debt crisis in 2010.

Table 7: Monetary Policy Reaction Functions for the U.K. in Real Time: Selected Vintages

SMPC / GDP Vintage	Apr-09		Dec-08		Jun-08		Mar-08		Nov-07	
IR Smoothing	0.880	**	0.953	**	0.935	**	0.928	**	0.964	**
10 Year Real Bond	2.570	**	1.233		1.254	**	2.179	**	1.801	*
Inflation Forecast Gap	1.349	**	1.931		0.573		4.972	**	4.597	**
GDP Forecast Gap	0.585	**	4.079	**	2.271	**	1.999	**	3.380	**
S.E. of Regression	0.274		0.194		0.144		0.168		0.130	
Observations	58		55		49		46		40	
R^2	0.928		0.926		0.948		0.933		0.956	
J-statistic	0.133		0.168		0.198		0.162		0.180	

MPC / GDP Vintage	Apr-09		Dec-08		Jun-08		Mar-08		Nov-07	
IR Smoothing	0.964	**	0.941	**	0.973	**	0.932	**	0.994	**
10 Year Real Bond	0.830		0.942		1.377		1.839	**	1.617	*
Inflation Forecast Gap	−0.677		−0.303		2.794	*	3.195	**	4.019	**
GDP Forecast Gap	4.014	**	3.562	**	3.794	**	2.171	**	4.800	**
S.E. of Regression	0.237		0.228		0.126		0.132		0.122	
Observations	58		55		49		46		40	
R^2	0.955		0.906		0.959		0.957		0.959	
J-statistic	0.165		0.124		0.168		0.151		0.220	

Note: * and ** indicate significance at a 5% and 1% level, respectively. Inflation and GDP forecasts (with a 12 month horizon) are obtained from The Economist's Poll of Forecasters. The output gap is derived using the respective GDP vintage.

In the BoE's case, the most noticeable impact from the reliance on real time data is that during the second half of 2008 inflation ceased to be relevant to the SMPC, whereas the output

gap plays a more pronounced role. This finding is reversed after the introduction of QE when the coefficient for inflation becomes significant again. In contrast, the MPC's reaction to inflation becomes insignificant after June 2008 and remains so even after the introduction of QE. Besides a significant drop in March 2008, the coefficient for output remains more or less the same for the MPC. Finally, the importance of the real rate is clearly declining for the MPC as it was effectively treated as zero since June 2008.

Table 8: Monetary Policy Reaction Functions for the Euro Area in Real Time: Selected Vintages

SGC / GDP Vintage	Sep-10		Jun-10		Jun-08		Mar-08		Nov-07	
IR Smoothing	0.741	**	0.960	**	1.000	**	0.956	**	0.943	**
10 Year Real Bond	1.420	**	2.044	**	−1.018		0.495		0.598	
Inflation Forecast Gap	2.382	**	2.573	*	1.418		3.341	*	2.844	
GDP Forecast Gap	0.425	**	0.731	**	5.758	**	2.923	**	2.520	**
S.E. of Regression	0.202		0.238		0.135		0.117		0.133	
Observations	52		47		28		24		20	
R^2	0.978		0.967		0.954		0.968		0.960	
J-statistic	0.158		0.151		0.201		0.208		0.138	

GC / GDP Vintage	Sep-10		Jun-10		Jun-08		Mar-08		Nov-07	
IR Smoothing	0.877	**	1.000	**	1.000	**	0.954	**	0.973	**
10 Year Real Bond	1.522	**	1.750		−0.642		0.526		−0.010	
Inflation Forecast Gap	3.519	**	−0.938		1.478		3.374	*	7.421	*
GDP Forecast Gap	0.199	**	1.158	**	5.141	**	2.864	**	4.364	**
S.E. of Regression	0.146		0.209		0.135		0.116		0.131	
Observations	52		47		28		24		20	
R^2	0.988		0.973		0.955		0.968		0.960	
J-statistic	0.235		0.160		0.211		0.206		0.135	

Note: * and ** indicate significance at a 5% and 1% level, respectively. Inflation and GDP forecasts (with a 12 month horizon) are obtained from the SGC press releases. The output gap is derived using the respective GDP vintage.

Turning to the ECB's experience, the SGC did not recommend policy rates based on inflation news during the height on the financial crisis.[22] Instead, output gaps dominate policy rate prescriptions and the estimated coefficients based on real time data are considerably larger

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[22] A noticeable exception is the March 2008 vintage when commodity price developments were weighing heavily on inflation expectations.

during the November 2007–June 2008 period than when revised data are employed (see Table 6). In 2010, by the time the effects of the GFC subside, the Taylor principle reasserts itself with the SGC reacting primarily to inflation shocks while GDP gaps play a lesser role. Similar results are found for the GC where, in contrast to the SGC, the reaction to inflation is stronger for the November 2007 and September 2010 vintages but insignificant in June 2010. Finally, it is also very interesting that the neutral real interest rate is effectively treated as zero during the height of the crisis and once again becomes statistically significant after 2009.

5.2 Consensus within the Shadow Councils

The TR specifications considered so far are unable to deal with the question of what drives differences in views about the appropriate policy rate recommendation. Whereas the ECB favors the consensus view of monetary policy decision-making, the BoE's governance model permits disagreements to be aired in public. Accordingly, Table 9 provides estimates of the determinants of consensus building factors inside each shadow committee relying on Equation (2).[23]

The share of professionals on the committee has a significant influence on consensus in policy rate settings for the SMPC. In contrast, consensus in the previous MPC meeting does not play a significant role. Moreover, while consensus is always lower when rates change as opposed to when they remain unchanged, rate rises versus rate reductions do not appear to make a difference. Finally, the contemplated size of the policy rate change is statistically insignificant.

The results are different for the SGC. Rate cuts create relatively more disagreement than rate hikes although both have the effect of reducing the degree of consensus in the committee. Moreover, the size of the proposed policy rate change also affects how much consensus exists in the committee. Hence, larger changes signal more agreement among committee members. However, it is likely that these results reflect the rapid reductions in policy rates in the

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[23] As one alternative, we also estimated a version of Equation (1) for the most dovish and most hawkish proposals made at each committee meeting. Furthermore, we tried identifying constant hawks and doves in the shadow monetary policy committees. However, there are relatively few observations and it is far from straightforward to identify individuals who are consistently hawkish or dovish. In any case, hawks react more strongly to inflation than their dovish counterparts, as one would expect a priori. The details are relegated to the Appendix.

aftermath of the GFC. Finally, the share of professionals in the SGC increases consensus, whereas the share of Germans on the committee has no significant influence.

Table 9: Consensus within the Shadow Councils

	SMPC		SGC	
Constant Term	0.494	**	0.437	
Last MPC Consensus	0.115		——	
Share of Professionals	0.384	*	0.695	**
Share of Germans	——		−0.279	
Proposal: Cut	−0.334	*	−0.895	**
Proposal: Hike	−0.213	**	−0.312	*
Proposal: Absolute Size	0.079		1.297	**
S.E. of Regression	0.167		0.143	
Observations	77		52	
R^2	0.351		0.467	
AR Test	5.462	**	2.612	
Hetero Test	2.083	*	1.440	

Notes: * and ** indicate significance at a 5% and 1% level, respectively. Newey-West (1987) standard errors are used if autocorrelation was detected.

5.3 Disagreement between the Shadow Councils and the Central Banks

Next, we examine the sources of disagreement between the shadow and formally constituted monetary policy committees using Equation (4). The estimates are shown in Table 10.

The results reveal that we are unable to explain a large portion of the variation in differences between the SMPC and the MPC. Nevertheless, the specification performs considerably better when the ECB's shadow is contrasted with the formally constituted GC. Disagreement between the two committees is found to be influenced by how much consensus exists within the shadow committee. When there is a considerable amount of consensus within the SGC, the likelihood of disagreement with the GC declines. One interpretation is that when overall economic signals are clear, presumably conducive to greater consensus, both committees are more inclined to make the same policy recommendation. The SGC is also found to be more activist than its GC counterpart. Not surprisingly, this has implications for the degree of interest rate smoothing of the respective committees since the interest rate

smoothing parameter of the GC is larger than for the SGC (see Table 6). Finally, the fraction of German nationals on the committee is positively and highly significantly related to the likelihood of producing a recommendation that both the GC and SGC would agree with.

Table 10: Disagreement between the Shadow Councils and the Central Banks

	SMPC	SGC
Consensus	0.096	0.648 **
Last MPC Consensus	0.111	——
Share of Professionals	0.043	−0.242
Share of Germans	——	2.225 *
Proposal: Cut	−0.340	−0.470
Proposal: Hike	−0.261	−0.620 **
Proposal: Absolute Size	0.020	0.616 *
Observations	77	52
LR Statistic	9.620	202.240 **
Pseudo Log-Likelihood	−30.151	−5.369
Pseudo R^2	0.138	0.760
Correct Predictions	63	50

Note: Table shows average marginal effects for the likelihood of the central bank agreeing with the shadow council recommendation. * and ** indicate significance at a 5% and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

6. Conclusions

This paper addresses how shadow monetary policy committees perform in relation to their statutorily mandated counterparts with a focus on the BoE and the ECB. Three sets of tests are considered. First, we estimate Taylor (1993)-type rules for the shadow committees and central banks and compare them. Second, we examine the determinants of consensus within a shadow committee. Finally, we consider sources of disagreement between the policy rate recommendations and subsequent settings by the actual monetary policy committees.

Our salient conclusions are as follows. First, there are few systematic differences between shadow and actual committee decisions. This could be because monetary policy has become more predictable in recent years. Alternatively, the members of the respective committees effectively coordinate their predictions about the appropriate stance of monetary policy because they are greatly influenced by the rhetoric and data provided by the central banks with

consequences reminiscent of the model by Morris and Shin (2002).[24] Nevertheless, there is one clear difference in the factors that influence policy rate settings. The ECB's SGC tends to be relatively less inflation averse and more activist than the Governing Council.

Our interpretation of the shadow committee proposals is greatly influenced by the use of real time or revised data. A striking result is how sensitive the recommendations were (i) as the global financial crisis (GFC) emerged, (ii) seemingly reached a peak in 2009 and (iii) began to recede in 2010. The estimates are a clear demonstration of the important role of real time data in evaluations of monetary policy, whether it is by those whose statutory responsibility is to render monetary policy decisions or individuals who provide a second opinion.

Second, we find that consensus within a committee is far easier to reach when there is no pressure to change the policy rate. In contrast, rises or falls in policy rates negatively affect consensus. Furthermore, changes in the degree of consensus are apparent when the results are disaggregated according to whether the committee members are professional or academic economists.

Third, while we are unable to explain differences in policy rate recommendations between the shadow and formal committees of the BoE the same result does not carry over to the case of the ECB. Indeed, we report strong evidence that the SGC is more activist than its GC counterpart. However, a larger degree of consensus within the SGC and a larger share of committee members based in Germany bring about a greater likelihood that the two committees will agree. At the risk of exaggerating the importance of this result, this finding may have implications for current and future governance challenges faced by the ECB and the functioning of monetary policy committees more generally.

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[24] In the present context this means that the longer inflation remains low and stable the less likely it is for outside observers to pay attention to anything other than communications from central banks.

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