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**Working Paper**

## Is there wisdom in a second opinion? Shadowing the ECB and the Bank of England

MAGKS Joint Discussion Paper Series in Economics, No. 31-2011

**Provided in Cooperation with:**

Faculty of Business Administration and Economics, University of Marburg

*Suggested Citation:* Neuenkirch, Matthias; Siklos, Pierre L. (2011) : Is there wisdom in a second opinion? Shadowing the ECB and the Bank of England, MAGKS Joint Discussion Paper Series in Economics, No. 31-2011, Philipps-University Marburg, Faculty of Business Administration and Economics, Marburg

This Version is available at:

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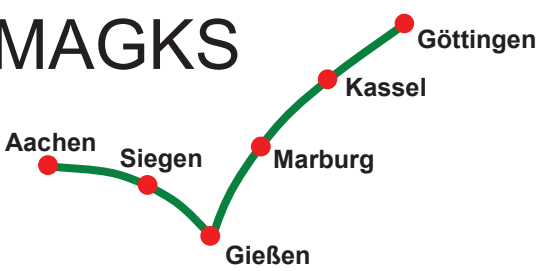
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IS THERE WISDOM IN A SECOND OPINION?  
SHADOWING THE ECB AND THE BANK OF ENGLAND<sup>\*</sup>

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[First Draft: MAY 2011]

This Draft: AUGUST 2011

<sup>\*</sup> Research for this paper was carried out in part while the first author visited the Viessmann Centre in 2010. Siklos is also grateful to many central banks over the years where some of the data used in this study were collected. The second author gratefully acknowledges financial assistance from a CIGI-INET research grant.

## ABSTRACT

The European Central Bank (ECB) and the Bank of England (BoE) are shadowed by professionals and academic economists who provide a separate policy rate recommendation in advance of the central bank's announcement. We explore differences between shadow and actual committee decisions based on an adapted Taylor rule and report a few systematic differences especially in the case of euro area shadow committee when the data are disaggregated according to the background of the shadow members, and when the member's country of origin is considered. The shadow committee of the ECB also tends to be relatively less inflation averse than its UK counterpart, at least vis-à-vis the respective policy making bodies. Perhaps most significantly our interpretation of the stance of the shadow committees is sensitive to the use of real time data.

Keywords: Monetary policy committees, Taylor rules, central bank communication

JEL Classification codes: E52, E58, E61, E69

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## 1. Introduction

It is almost superfluous to point out that recent observers of central bank behaviour typically resort to some version of the well-known Taylor rule (Taylor 1993) to express their views about the current stance of monetary policy. Indeed, reliance on such a policy rule has become ubiquitous as a short-hand description of how monetary policy is carried out. All that is needed is an estimate of the inflation rate (perhaps measured in deviation from a target), and a proxy for the output gap (or, occasionally an unemployment gap) to obtain a prediction of what the appropriate policy rate should be. To be sure, there are several complications that arise when considering the best way to make a policy rate prediction based on such a rule, such as how to proxy the output gap, how forward-looking is the central bank, and the implications of resorting to revised data over real-time data. Other questions that have been raised include the estimation method that yields the most reliable coefficients, and whether the original specification needs to be augmented to include other variables such the exchange rate or asset prices, to name some of the most important considerations that have been raised in the vast literature on the subject. Finally, there is the matter of how aggressive central banks are when conducting monetary policy as revealed by how much interest rate smoothing actually takes place.<sup>1</sup>

In spite of the sheer volume of empirical research built around Taylor rule type specifications there is one road that has so far not been travelled. To our knowledge, there are

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<sup>1</sup> While there is, to our knowledge, no general survey of the literature available, Clarida, Gali, and Gertler (1999), Orphanides (2008), and Asso, Kahn, and Leeson (2010) discuss virtually all of the relevant issues and debates surrounding Taylor rules. For an overview of the interest rate smoothing debate see, for example, Rudebusch 2002, 2006), and Castelnuovo (2003).

only four economies where a 'second opinion' about monetary policy decisions is available.<sup>2</sup> They are: the U.S., Canada, the euro area, and the U.K. Moreover, with the exception of the U.S., there has been no attempt to evaluate the advice of their respective shadow monetary policy committees.<sup>3</sup> As we will argue below, the lessons from the U.S.'s shadow open market committee are not comparable to those of the other shadow committees.

The main hypothesis of the paper is simply stated, namely that one way of establishing how well monetary authorities perform, and evaluate the wisdom of their policy stance, is to provide the public with a regular and independent assessment of their decisions. The European Central Bank (ECB) and the Bank of England (BoE) are both shadowed by a group of professionals and academics who provide independent advice about the upcoming setting of the monetary policy instrument in both economies. The remit of these shadow committees is not to predict what the central bank will do. Instead, the aim is to provide a second opinion about the appropriate stance of monetary policy. The shadow Monetary Policy Committee (SMPC) for the BoE has met since 2002 while the shadow Governing Council (SGC) of the ECB has published its recommendations since 2006. After describing how these shadow committees operate, highlighting the differences with how both central banks actually make decisions, we go on to present some empirical evidence based on a variant of the Taylor rule (TR) formulation.

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<sup>2</sup> We are specifically referring to an organized committee that offers a recommendation about the course of monetary policy in advance of the actual policy rate announcement and not the usual opinions expressed by professional or academic economists whose advice may be sought at irregular intervals by the media.

<sup>3</sup> Work is currently underway by the authors to analyze the work of the C.D. Howe's Monetary Policy Council which provides a recommendation for the setting of the policy rate (an overnight rate) for Canada. See <http://www.cdhowe.org/display.cfm?page=monetarySynopsis>. The second author is a member of that Council since January 2008.

Poole (2006), among others, has pointed out, that the TR is a useful way of understanding the extent to which many central banks have become more predictable in the last decade especially. Although there are some challenges in applying a TR to understand the policy proposals made by shadow monetary policy committees, including in the U.K.'s case, dealing with the recent period of Quantitative Easing (QE), the evidence suggests that there are a few systematic differences between shadow and actual committee decisions but also many similarities. This could be because monetary policy has, in fact, become more predictable in recent years in spite of the ongoing turmoil in financial markets and the world economy more generally. Alternatively, the members of the respective committees effectively coordinate their predictions about what the appropriate stance of monetary policy ought to be because they are greatly influenced, as a group, by the rhetoric and data provided by the central banks they are shadowing with consequences reminiscent of the predictions in the model developed by Morris and Shin (2002). Nevertheless, we do report that the shadow committee of the ECB tends to be relatively less inflation averse than its UK counterpart, at least vis-à-vis the respective policy making bodies. Whether the presence of a formal inflation target for the UK can explain this difference is unclear. Additionally, we find that our interpretation of the position taken by both the shadow and formal monetary policy committees is very sensitive to the reliance on real time data. In particular, we report that both committees were very responsive to real economic conditions as the impact of the global financial crisis of 2007-2009 was being felt in both economies examined. As explained below, such an interpretation requires resorting to real time data. Indeed, we report some interesting divergences between shadow committees and their

counterparts who actually implement such decisions when we examine several vintages of data since late 2007.

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 of the group behave. Indeed, we find that departures from the consensus are apparent, in the case of the ECB's shadow Governing Council (SGC), when the results are disaggregated according to whether the committee members are professional or academic economists, as well as possibly being a function of the country of origin of the shadow member. At the risk of exaggerating the importance of this result this finding may well have implications for current and future governance challenges faced by the ECB. In the case of the UK there is a marked contrast in the way both committees respond following the start of the financial crisis. In particular, it is becoming less clear that the Taylor rule, even if it adapted slightly to account for the period of quantitative easing, provides the usual signals about how the policy rate is set.

The rest of the paper is organized as follows. The following section briefly explains the organization, role, and functions of shadow committees focusing on the US Shadow Open Market Committee (SOMC) and concludes that its aims are somewhat different from those of the committees they shadow whose functions are also briefly described. Section 3 provides the background to the specifications being considered highlighting some of the challenges faced when interpreting the work of shadow committees through the TR filter. We also summarize the data, and provide a few stylized facts. Section 4 describes the results while section 5 concludes.



## **2. Shadowing Monetary Policy and Monetary Policy Committees**

### *2.1 Monetary Policy Committees and the Origin of Second Guessing: the Shadow FOMC*

Increasingly, central banks are governed by a committee structure. Even in a few countries (e.g., Canada) where a Governor is statutorily responsible for monetary policy decisions there sometimes exists a committee-like structure to help the Governor make a policy rate decision. Paralleling the growing importance of committees in the formulation of monetary policy has been the apparent consensus among policy makers and academics about what constitutes best practice in monetary policy (e.g., see Clarida, Gali, and Gertler 1999, and Goodfriend 2007). These two developments may well have combined to give the appearance that monetary policy is conducted in a similar fashion in the industrial world although, as shown in the following section, differences clearly emerge at least in how rates are set, their level, and changes over time. Moreover, theory also suggests that how committees are formed, their size, voting procedures, the type of member (i.e., external versus central bank officials), and the manner they are appointed, all influence committee wide decisions.

While the theoretical literature offers some guidance there is little in the way of a consensus about the implications of committee structure for the conduct of monetary policy. For example, Sibert (2003), and Mihov and Sibert (2006), find that monetary policy committees (MPCs) where votes are released improve social welfare in part because this serves to improve committee members' reputations. Additional work by Gerlach-Kristen (2006) largely supports this conclusion. However, the positive externalities derived from a committee structure face

difficulties when committees are 'too' large.<sup>4</sup> Committee size also complicates decision-making when consensus is required and committee members are not in a collegial frame of mind (Blinder 2007, Amato, Morris, and Shin 2002). Moreover, there is a risk that clarity in monetary policy communication can be threatened when there are potentially too many individuals who make pronouncements about monetary policy that come into conflict with a single monetary policy objective. While experimental evidence (e.g., Lombardelli, Talbot, and Proudman 2002), and Blinder and Morgan (2000), broadly supports the notion that group decisions are superior to ones delivered by a single individual, differences arise depending on the manner in which decision-making is structured (e.g., Riboni and Ruge-Murcia 2010). An excellent survey of the advantages and drawbacks of the committee structure in monetary policy and the challenges in communicating policy is Blinder, Ehrmann, Fratzscher, de Haan, and Jansen (2008).

The original idea for second guessing monetary policy follows from the Shadow Open Market Committee (SOMC) of the U.S. Federal Reserve formed by Karl Brunner and Alan Meltzer during the 1970s, in response to what the so-called 'monetarists' at the time perceived to be an ill-fated 'Keynesian' style policy of volatile money growth and persistent inflation (see Meltzer 2000). It was intended that the SOMC would meet twice per year, and that a policy statement would accompany a meeting where the members would present position papers on a wide variety of economic issues that were not restricted to matters dealing with monetary policy alone. Hence, as needs arose, the SOMC would also comment on fiscal policy especially if it was felt to influence the conduct of monetary policy and inflation more generally. Like the shadow committees in the U.K. (see below) and Canada membership consists of academics and

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<sup>4</sup> Borrowing from the psychology literature, Sibert (2006) concludes that most MPCs are indeed too large.

professional economists. There were no committee meetings from 1998 to 2005 and, after 2006, when meetings resumed, only the policy papers remained with policy statements no longer accompanying SOMC meetings. Archival documents and other related materials from the reconstituted SOMC are available at <http://shadowfed.org/>.

Poole, Rasche, and Wheelock (2011) revisit the advice given by the SOMC, relying on a New Keynesian style framework, and conclude 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 practiced by the then Fed. Partly because of the structure of the SOMC's deliberations, and in part because their advice tended to gravitate around medium-term objectives (e.g., low and stable inflation, money growth goals) their work cannot easily be compared with the shadow committees considered in this paper whose work is more tightly focused around recommendations for future policy rates.

## *2.2 Shadow Committees of the Bank of England and the European Central Bank*

The Bank of England obtained its independence to set the course of monetary policy in 1997 and the Monetary Policy Committee was created as the vehicle used by the BoE to set the policy rate and the course of monetary policy on a monthly basis (<http://www.bankofengland.co.uk/monetarypolicy/overview.htm>). Members of the committee are individually accountable under the legislation governing the Bank of England'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 of the meetings are released shortly

after each meeting and these contain information about the views of individual members.<sup>5</sup> When the policy rate (i.e., the Bank Rate) is announced it is 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 continuation of quantitative easing which the BoE defines as consisting of the purchase of government and corporate bonds to inject more liquidity into the economy (<http://www.bankofengland.co.uk/monetarypolicy/assetpurchases.htm>).

The SMPC is an undertaking of the 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 membership 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 publishes its decision 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 are published (see <http://www.iea.org.uk/smpc/minutes>). Those who organize the SMPC ensure that each meeting records 9 votes to match the number of votes at the BoE's MPC meeting. Table 1a provides a summary that contrasts the functions of the MPC versus the SMPC. It is not entirely clear what the voting mechanism is, however, it appears that there is a motion (e.g., to hold the rate) that is voted on in an unspecified order.

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<sup>5</sup> Until 1998 the average lag with which minutes were released was approximately 5 weeks. Thereafter, following some consultations, the minutes have been released the second week after each MPC meeting.

Turning to the ECB, its Governing Council also meets on a monthly basis to set the course of monetary policy and these decisions have been reported since March 1999. Monetary policy decisions are delegated to a Governing Council (GC) which consists of an Executive Board (EB) made up of six members and the Governors of the 17 euro area central banks (as of January 1, 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 the decision is posted alongside a press conference that is held shortly after the meeting and is normally led by the ECB President together with the Vice-President. 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>). Thereafter, beginning in 2002, only one announcement is made regarding the setting of the rate on MRO. Minutes are not released and the ECB openly acknowledges that its decisions are based on consensus (e.g., see Moutot, Jung, and Mongelli 2008).

The SGC operates through the German publication *Handelsblatt* and, while the original language of the publication is German, considerable information about the SGC is also available in English (<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. A

journalist acts as a non-voting Chair. Occasionally, commentary from some of the SGC members is recorded but there is no formal press release while the ‘minutes’ record the various issues in the euro area, and elsewhere, that pre-occupy some members of the SGC. Members are encouraged to supply a current year and one year ahead inflation and real GDP growth forecasts for the euro area and the mean value for the group is reported. In addition to the recommended current setting SGC members have recently been indicating the direction of bias for interest rates over a 3 month ahead horizon. Finally, at least until fairly recently and on an irregular basis, there is often an accompanying article that provides an early indication of the concerns that the SGC will discuss at its next meeting. Table 1b compares the GC with the SGC.

### **3. Data, Stylized Facts, and Empirical Specifications**

#### *3.1 Data and Stylized Facts<sup>6</sup>*

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 Bank of England and the ECB. As will be explained below we also employ inflation forecasts from *The Economist’s* Poll of Forecasters. Because of data limitations we were 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. This yields 77 observations. Similarly, the first observation for the SGC dataset is for January 2006 and the sample also ends with the October 2010 MRO recommendation resulting in 52 monthly observations.

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<sup>6</sup> We plan to eventually post some of the data used in this study on the Central Bank Communication Network’s website, <http://www.central-bank-communication.net/>.

Since Orphanides (2001) it has become widely recognized that, since decisions are based on data that are available to policy makers at the time, estimated policy rules based on revised data may give a misleading picture of the intended stance of monetary policy. Therefore, we also utilize a series ‘vintages’ for output or the output gap<sup>7</sup> to determine the sensitivity of our results to data that both the shadow and actual policy committees had at their disposal. The data were obtained from the OECD’s real-time database (<http://stats.oecd.org/mei/default.asp?rev=1&lang=e>). In what follows we effectively assume that both the shadow committee and the respective ‘original’ decision making body have the same information set. While some argue that central banks possess an information advantage over the public, including the ‘experts’ that sit on the shadow committees, it is far from clear that this is the case. What is undoubtedly correct is that the resources available to decision-makers in central banks<sup>8</sup> are comparatively larger than those available to most shadow committee members. Actual policy rate decisions are based not only on estimates of, say, the relative importance of aggregate demand and supply shocks and a series of inflation or output growth forecasts based on a suite of models and scenarios, among other pieces of information, but ultimately on committee members’ judgment which is difficult to quantify.

Finally, while the BoE faces an explicit inflation target set by the Government, the ECB has defined its own objective for price stability. Tables 2a and 2b provide some summary statistics describing the BoE’s SMPC together with a few comparisons with the BoE’s MPC while Figure 1a plots the SMPC’s recommended Bank Rate settings against the actual ones set by the BoE.

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<sup>7</sup> Inflation and interest rate data either are not revised or the revisions are not considered to be large enough to influence the results of estimated policy rules.

<sup>8</sup> This comparative advantage may not extend, however, to the external members of the BoE’s MPC.

Table 2b and Figure 1b repeats the exercise for the ECB's SGC and the actual GC's policy rate settings.

There are few differences between the median recommendations of the BoE's SMPC and its MPC counterpart. Moreover, it appears that a substantial majority support the policy rate proposal defined as the median value of recommended policy rates. This should come as no great surprise as it must be recalled that each time the MPC sets the policy rate this always requires the SMPC to reset its decision conditional on the prevailing policy rate set by the MPC. To some extent this rule extends to the MPC which takes the last decision as given whether it supports it or not. Nevertheless, other than for those members of the SMPC whose recommendations exactly matched those of the MPC, the remaining members of the shadow committee are required to form their proposal possibly based on a policy rate level they may not consider adequate. Indeed, a further complication is that members who disagreed with the actual decision of the MPC may well, subsequently, find the BoE's arguments credible thereby removing the earlier disagreement.

Obviously, in the empirical work presented below we cannot observe all of these factors. Consequently, we consider several variants of policy rules to control for the extent to which there is disagreement, or consensus, within each one of the two shadow committees considered. Figure 1a gives an impression of the discrepancies between the Bank Rate set by the BoE and the median together with the range of policy rate recommendations made by the SMPC. It is interesting to note that, while differences between the two committees tend to be small, in part owing to the practice of changing policy rates in increments of 25 basis points,



disagreement with the BOE's MPC tend to rise when rates are rising and are more subdued when they fall.

Next, we turn to summary statistics for the ECB's SGC in Table 2b and Figure 1b. Once again, for previously discussed reasons, there are few systematic differences between the GC's policy rate settings and those recommended by the SGC cousins. As is the case for the BoE's SMPC, the SGC displays a considerable amount of apparent consensus with the recommended policy rate which, on average, is supported by almost 80% of the SGC. Unlike the SMPC, however, a substantial plurality of the membership is made up of professional economists.

While it is often pointed out that the ECB remains a 'young' central bank it is equally true is that independence and inflation targeting represent relatively recent regime changes at the BoE. Nevertheless, in contrast to the BoE's experience, disagreements between the shadow committee and its formal counterpart at the ECB tend to become more visible when the policy rate is falling. Finally, since the ECB is a supra-national central bank, and given the role of country of origin in creating biases in one direction or another in setting the stance of monetary policy, it is worth considering the distribution of the SGC's membership according to nationality. By this metric, on average, almost 30% of SGC members are from Germany. We investigate the role of nationality in the subsequent empirical work. It is worth noting that, while there is considerable presence from France followed by other EMU countries, the membership of the SGC also includes almost 20% on non-euro area economists (see Figure A1 in the Appendix).

### *3.2 Estimated Specifications*

Next, we turn to the estimated empirical specifications. As noted in the introduction, it is convenient to consider some version of the Taylor rule partly because the literature has gravitated in this direction as a short-hand expression used to evaluate the conduct of monetary policy. Under the present circumstances there may be an even more compelling reason to rely on this kind of metric. After all, whereas members of shadow committees presumably become involved in these kinds of deliberations not only because they share an academic or a professional interest in monetary policy and, hopefully, have the reputation and expertise to pronounce opinions on the subject, it is less likely that they are able to think about the correct stance of monetary policy on a full-time basis. Furthermore, there exists a considerable difference in the location of 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 Taylor rules.

The availability of individual votes also permits us to delve more deeply into committee behaviour. In principle, one could estimate a Taylor rule for individual committee members. However, the average term of several members is brief enough to make this approach impractical when attempting draw broad conclusions about committee performance. Instead, we consider whether there are observables that can be used to explain how much consensus there exists in the respective shadow committees examined. Consensus is defined according to the share of recommendations, as a percent of the number of votes, identical to the median recommendation. Although it is interesting to consider what explains consensus within a

committee it is equally interesting to explore sources of disagreement with policy rate decisions taken by central banks. Disagreement, defined as a non-zero differential between the policy recommendation of the shadow committee and the monetary policy committee, tends to be more noticeable when central banks enter a period of rising or falling policy rates. We examine below whether there is any empirical support for this form of asymmetric behaviour.

In what follows then we estimate the following specifications. They are:

$$i_t^r = (1 - \rho)(\alpha r_t + \beta_0 \tilde{\pi}_{t+j|t} + \beta_1 \tilde{y}_{t+j|t}) + \rho i_{t-1}^{CB} + \theta \mathbf{X}_t + \varepsilon_t \quad (1)$$

$$\text{Consensus}_t = \delta_0 + \delta \mathbf{X}_t + u_t \quad (2)$$

$$\text{Disagreement}_t = \Pr[i_t^{SC} - i_t^{CB} \neq 0 | \mathbf{Z}_t] = \kappa_0 + \kappa_1 \mathbf{X}_t + \eta_t \quad (3)$$

Equation (1), for the most part, follows a standard Taylor rule with an interest rate smoothing parameter  $\rho$ , where the policy rate,  $i_t$ , is set either by the central bank (CB) or the shadow committee (SC). However, note that to the extent that there is interest rate smoothing, both committees must set the current period policy rate according to the level set by the central bank in period  $t-1$ . In addition, based on the persuasive evidence in Clarida (2010), the real interest rate,  $r_t$ , is time varying and is based on the real return yield on 10 year German government bonds, considered the benchmark for the euro area, and a similar yield based on the U.K. counterpart bond.<sup>9</sup> The determinants include an inflation gap,  $\tilde{\pi}$ , which is observed inflation at time  $t$  the stated inflation target in the BoE's case (see Table 2a) and 2% in the case

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<sup>9</sup> This modification reflects a growing acknowledgement that the so-called 'neutral' interest rate is likely time-varying. See, for example, Laidler (2011) and the evidence based on real-time data shown below further supports the notion of a changing neutral interest rate.

of the ECB.<sup>10</sup> The Harmonized CPI (HICP) is used to measure inflation in both economies, although prior to 2004, the U.K. inflation rate is based on the rate of change in the retail price index. Since neither central bank's mandate requires that the inflation target be met every period, an alternative is to replace the stated inflation target with the one year-ahead inflation forecast from *The Economist* Poll of Forecasters while, in the case of the ECB's SGC, we can rely on the mean forecast published as part of the published minutes of the SGC meeting. Since the data are monthly the forecasts are for 12 months ahead (i.e.,  $t+12$ ) conditional on information available at time  $t$ .

As is well-known the output gap is an unobservable series. We follow past practice by proxying this series in a number of different ways to test the sensitivity of our results. First, owing to the relatively short sample, we use a simple deviation from a constant trend output (1.5% annually). Alternatively, we follow much of the literature in employing a Hodrick-Prescott filter with the standard smoothing parameter of 14,400 for monthly data. Third, we also obtain estimates based on real GDP growth forecasts again from the same two sources used that provide us with inflation forecasts.

Finally, we consider two other determinants of  $i_t$ , namely the role played by the nationalities represented on the shadow committee in the case of the ECB's SGC, while for both shadow committees examined here, we also consider the influence of the mix of professional versus academic economists on the committee.

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<sup>10</sup> 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>.

When equation (1) relies on inflation and output growth forecasts the specification can be estimated via least squares. However, in the usual case where future inflation, unobserved at time  $t$ , replaces a forecasted value, it is the usual practice to rely on GMM estimation. Moreover, since the estimated specification includes a time varying real interest rate and an augmented version adds additional variables that may be endogenously related to the policy rate these considerations provide further motivation for relying on GMM estimation.<sup>11</sup> An important consideration, more often than not under-emphasized in this kind of empirical work, is the importance of 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 (e.g., M3), and lags of an interest rate (EONIA) in the case of the euro area. When resorting to UK data, the sterling overnight interbank rate or SONIA takes the place of the EONIA and we also add lags of the nominal U.S.-U.K. exchange rate.

Next, equation (2) considers the sources of consensus in committee decisions. As discussed above, consensus is defined as the fraction of total votes at any given meeting that match the median recommendation published by the shadow committee. As with the policy rule estimates, we consider the two observable sources of consensus, namely the representation of professionals on the committee and the share of German nationals in the case of the ECB's SGC. Moreover, the specification considers whether the consensus differs as between a rate rises or declines, in order to detect whether the consensus is asymmetrically determined and, finally,

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<sup>11</sup> Comparisons between GMM and OLS estimates suggest relatively few differences in the conclusions.

whether larger proposed changes in the policy rate threaten consensus relative to smaller and, presumably, more gradual changes. Hence, we can write

$$\mathbf{X}_t = \{\text{Pros}_t, \text{Nat}_t, \text{Cut}_t, \text{Rise}_t, \text{Size}_t\} \quad (4)$$

Where **Pros** is the share of professional economists who vote at each meeting, **Nat** is the share of German nationals in the ECB's SGC, **Cut** and **Rise** are shadow committee median recommendations that support a cut (or a rise) while **Size** represents the step in percent (e.g., 0.25). Equation (4) is estimated via OLS.

Finally, equation (3) transforms non-zero differences between the actual and recommended policy rates into a [0,1] binary variable to estimate, via probit, whether the probability of a disagreement between the shadow and formal monetary policy committees is a function of the same set of observables used in equation (4).

#### 4. Results

Tables 3a and 3b present the estimates of equation (1) for the BoE and the ECB, respectively.<sup>12</sup> In the case of the BoE the results shown in Table 3a make allowances for the possibility that the stance of monetary policy is affected by the introduction of Quantitative easing (QE) in 2009. There are three notable results for the U.K. case. First, the Taylor principle

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<sup>12</sup> We relegate to the Appendix estimates (Table A1) when the bodies being examined do not smooth interest rates. The differences in the coefficient estimates are relatively small in the case of the ECB except that both the SGC and the GC react much less forcefully to the output gap than when smoothing is assumed. In the BoE's case, both committees respond far less aggressively to inflation and the output gap once the era of QE arrives than in the case where smoothing is permitted. Since the explanatory power of the BoE regressions is largely unchanged while that of the ECB specifications drops precipitously once we drop interest rate smoothing there is possibly a case to be made that the latter central bank, and its shadow committee, practices interest rate inertia while its counterparts in the UK do not.

holds for both the MPC and the SMPC. That is, a one percent rise in the inflation gap produces either an actual policy rate or a recommended increase of more than one percent, but only during the era that precedes QE. Indeed, during the QE period, neither the SMPC nor the MPC react to either the inflation or output gaps. As we shall see below, this result changes substantially when real-time data are employed. The respective committees appear to react to something else that is not accounted for in any of the specifications considered. Finally, given the same set of forecasts, the degree of inflation aversion is the same on both committees, at least in statistical terms.<sup>13</sup>

Turning to the ECB specifications shown in Table 3b we find that, as in the case of their cousins in the U.K., the Taylor principle is the guiding principle for reacting to inflation shocks. However, unlike the SMPC, the SGC is less inflation averse than is the GC and the margin of difference is statistically significant. More interestingly perhaps is the finding that the professionals who sit on the committee are less inflation averse than their academic counterparts but that the German nationals on the committee are on average more hawkish than the other members of the SGC.

The Taylor rule specifications considered so far are unable to deal with the question of what drives differences in views about the appropriate policy rate recommendation. As noted above, while the ECB favours the consensus view of monetary policy decision-making the BoE's

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<sup>13</sup> We also separately consider the impact of using alternative inflation forecasts for the SMPC (results are shown in Table A2 in the Appendix). The source of these forecasts appears to have no influence on reaction function estimates for the SMPC while the type of forecast has a statistically significant influence on how the MPC sets the policy rate. For example, the MPC reacts far more strongly to an inflation forecast based on constant market interest rates than one based on the Economist's Poll of Forecasters. Moreover, the MPC does not react to inflation forecasts conditioned on prevailing views about market interest rates.

governance model permits disagreements to be aired in public. Hence, Tables 4a and 4b provide estimates of the determinants of consensus building factors inside each shadow committee relying on equation (2). For the SMPC what is notable is that the share of professionals on the committee has an insignificant influence<sup>14</sup> on consensus in policy rate settings. Moreover, while consensus is always lower when rates change as opposed to remaining unchanged, rate rises versus rate reductions do not appear to make a difference to the degree of consensus nor is the contemplated size of the policy rate change statistically significant. The results are rather different in the case of the SGC, as shown in Table 4b. Hence, 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 prompt more agreement among committee members. It is likely, however, that these results reflect the rapid reductions in policy rates in the aftermath of the global financial crisis.

Next, we examine the sources of disagreement between the shadow and formally constituted monetary policy committees. Equation (3) serves as the specification of interest and estimates are shown in Tables 5a and 5b. One notable difference between the two central banks is that while we are unable to confidently estimate sources of systematic differences between the SMPC and the MPC the proposed specification performs considerably better in the case that compares the ECB's shadow with the formally constituted GCs (Table 5b).

Returning to the BoE's experience we do conclude that disagreement between the two committees appear to be influenced by how much consensus exists within the shadow

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<sup>14</sup> The share of professionals is marginally significant in Model (2).



committee. It would appear that when there is a considerable amount of consensus within the SMPC the likelihood of disagreement with the MPC declines. One interpretation is that when overall economic signals are clear, presumably leading to greater consensus, both committees are more inclined to make the same policy recommendation. While the same result is found for the ECB's committees there are at least two other conclusions that can be drawn from the estimates shown in Table 5b which do not match the findings based on U.K. data. First, and perhaps most importantly, the SGC is more likely to be activist than its GC counterpart. Not surprisingly, this has implications for the degree of interest rate smoothing of the respective committees since, as seen from the earlier results shown in Table 3b, the interest rate smoothing parameter of the GC is larger than for the SGC. Also interesting is the result that 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.<sup>15</sup>

To date we have relied on data, especially for output, that neither the shadow nor the actual decision-making bodies of the two central banks considered in this study could have had when making policy rate recommendations. In other words, it is instructive to consider the performance of both the shadow and formal committees when real-time data are used. Given the momentous events of the past few years it is even more important therefore to consider what the shadow committees reacted to as the global financial crisis (GFC) developed. Again this necessitates reliance on real-time data.

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<sup>15</sup> As an alternative to the specifications shown in Table 4 we also estimated version of equation (1) for the most dovish and most hawkish proposals made at each committee meeting. The details are relegated to an Appendix (Table A3). The conclusions largely confirm the findings discussed above. Hence, a considerable amount of consensus is evident in both the shadow and formally constituted committees. Interestingly, however, the hawks on the SMPC remain hawkish in their response to both inflation and the output gap even when the UK enters the period of QE.

The real-time results are provided in Tables 6a and 6b for a selection of vintages. These were selected to coincide with meetings prior to or immediately following some defining event such as the eruption of the Greek debt crisis in 2010 or the introduction of QE in the UK in 2009. In the BoE's case the most noticeable impact from the reliance on real-time data is that it clearly reveals that, following the introduction of QE, the output gap ceased to be relevant to the SMPC at least until September 2010. Even then, the implied tightening of monetary policy was far less aggressive than prior to the introduction of the QE era. Similarly, any reaction to inflation in the manner advocated by the Taylor principle ceases to be apparent though this change largely pre-dates the introduction of QE. In contrast, the MPC appears to treat the neutral real rate to be statistically not different from zero, in recognition of the belief among many central banks since 2008 that trend output likely experienced a permanent fall. Furthermore, while the reaction of the SMPC to the output gap is modest to zero at best following the eruption of the crisis the MPC was on course to tighten policy as the economy appeared to show signs of improvement, at least until late 2010.

Turning to the ECB's experience, with the possible exception of the March 2008 vintage when commodity price developments were weighing heavily on central bankers' views about the future inflation outlook, the SGC did not recommend policy rates based on inflation news. Instead, output gaps dominate policy rate recommendations and the estimated coefficients based on real time data are considerably larger during the November 2007 through June 2010 period than when the revised data are employed (see Table 3b). In 2010, by the time the effects of the GFC subside, the Taylor principle reasserts itself with the SMPC reacting primarily to inflation shocks while GDP gaps once again play a lesser role. Finally, it is also very interesting to

note 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. Turning to the estimated rules for the GC we find that the 10 year real bond parameter only becomes statistically significant for the September 2010 vintage. Overall then, when the real-time and revised data estimates are contrasted with each other we find that the intercept estimates are highly sensitive to the use of real time information. Two other differences between the SGC and the GC emerge from the real-time data approaches. First, while both committees respond positively to the output gap the size of the response changes significantly across vintages and it is not the case that one committee's response is always higher or lower than that of the other committee. Next, the ECB's GC is seen to respond relatively more aggressively to the inflation gap in the latest vintage considered presaging the ECB's tightening in 2011. Overall then, there is something to be gained by a reliance on real time data when estimating reaction functions.

## **5. Conclusions**

Central to the conduct of 'good' monetary policy is credibility. Not surprisingly, interested observers of central banks have had difficulty coming up with adequate indicators of the extent to which markets and, more generally, the public understands, agrees with, or is surprised at times by the policy rate decisions taken by the monetary authorities. This paper considers these questions by evaluating how shadow monetary policy committees perform in relation to their statutorily mandated counterparts. We examine the record of the shadow committees of the Bank of England and the European Central Bank.

Four sets of tests are considered. First, we estimate Taylor type rules for both shadow and formal committees and compare them to each other. Next, we consider what drives the degree of consensus within a *shadow* committee. Third, we consider sources of disagreement between the policy rate recommendations and subsequent settings by the actual monetary policy committees. Finally, we consider how our interpretation of the stance of monetary policy is influenced by the resort to real-time data. The latter offers a truer picture of how committee members view the outlook for the economy at the time policy rate setting decisions are made.

Our salient conclusions are as follows. While differences between shadow and formal monetary policy committees do not persist there exist clear differences in the factors that influence policy rate settings between the two groups. For example, the ECB's shadow Governing Council is less inflation averse than its cousin and this may be partly explained by the number of professionals who sit on the shadow committee. Indeed, a factor that offsets the relatively lower rate of risk aversion of the SGC is the fraction of German nationals on the committee. Assuming this result is somewhat representative of how the ECB actually sets policy there are clear governance implications for the ECB's monetary policy performance.

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 affect consensus though only for the ECB's SGC is any asymmetry reported with consensus undermined when rate cuts are the order of the day as opposed to interest rate increases. A related result is that while it is difficult to explain differences in policy rate recommendations between the shadow and formal committees at the Bank of England, the same is not true for the ECB. Indeed, we

report strong evidence that the SGC is more activist than its GC counterpart but that larger changes in policy rates bring about a greater likelihood that the two committees will agree.

Finally, our interpretation of the decisions of shadow committees in particular is greatly influenced according to whether real time or revised data are used. A rather striking result is how sensitive the shadow committees' recommendations were as the global financial crisis emerged, reached a peak in 2009, and then 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 whose role is to provide a second opinion about the appropriate stance of monetary policy.

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

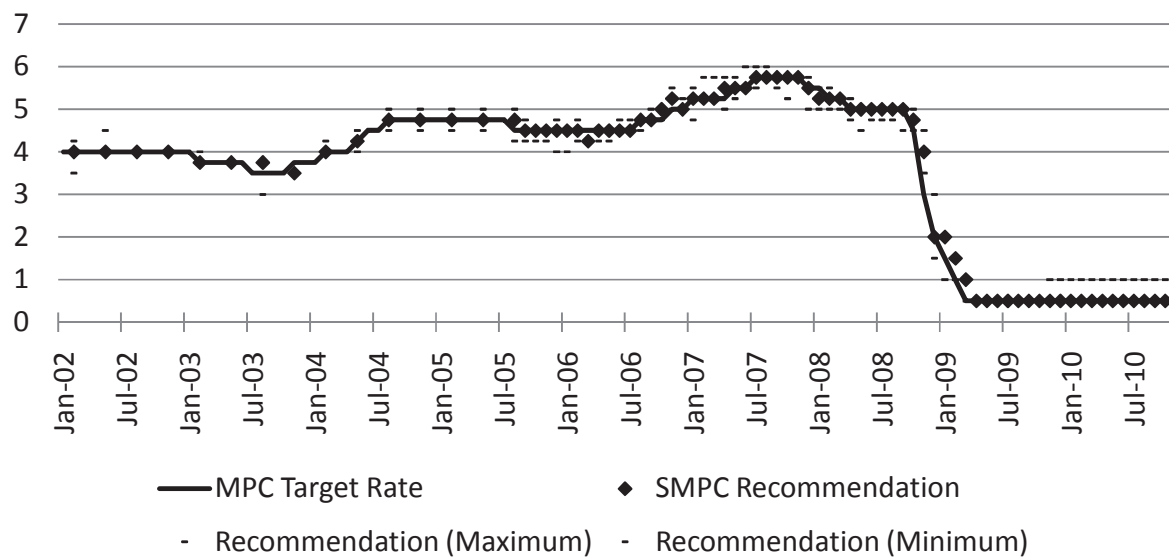
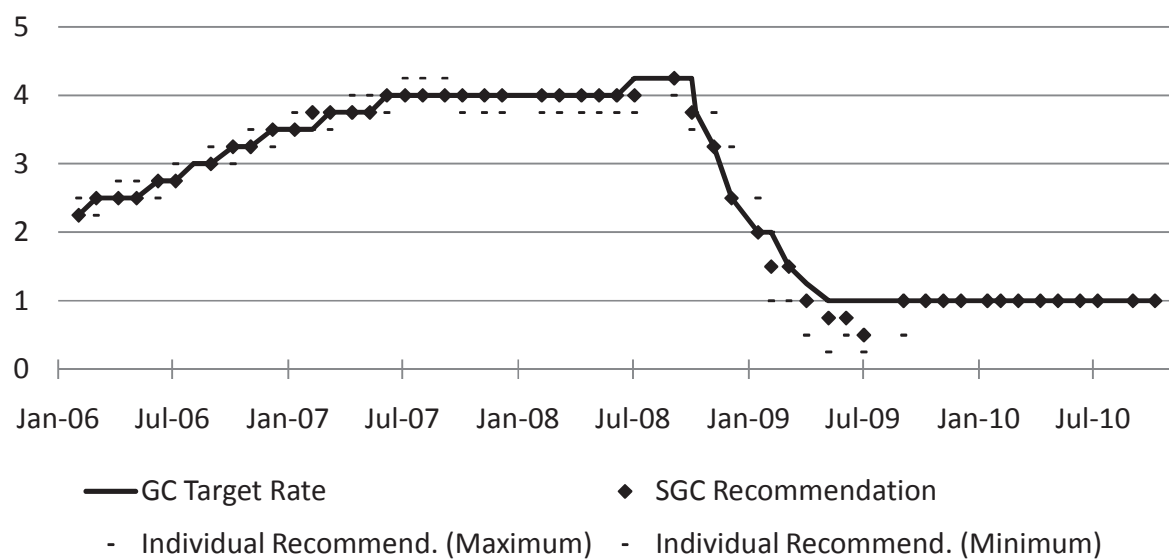


Figure 1b: SGC Target Rate Recommendation and GC Target Rate Setting



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

	<b>MPC</b>	<b>SMPC</b>
Statement	yes	yes
Voting Record	yes	yes
Minutes	yes	yes
Press Conference	no	no
Forecast	quarterly	no

Sample period: February 2002–October 2010 (77 observations)

**Table 1b: Shadow Monetary Policy Committee for the European Central Bank**

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

Sample period: January 2006–October 2010 (52 observations)

**Table 2a: BoE SMPC Descriptive Statistics**

	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
Difference	0.04	0.17	3.12	−0.25	1.00
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–September 2010 (77 observations). Note that the Bank of England 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.

**Table 2b: ECB SGC Descriptive Statistics**

	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
Difference	−0.04	0.14	−2.22	−0.50	0.25
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 SMPC proposals from January 2006–September 2010 (52 observations).

**Table 3a: SMPC Recommendations and the Taylor Rule: Equation (1)**

Dependent Variable	SMPC Proposal	SMPC Proposal	MPC Target Rate
IR Smoothing	0.952 **	0.886 **	0.898 **
10 Year Real Bond	0.506	1.782 **	0.541
Inflation Forecast Gap pre-QE	5.796 **	4.813 **	4.861 **
Inflation Forecast Gap QE	0.192	0.409	0.154
GDP Forecast Gap pre-QE	5.775 **	3.440 **	4.883 **
GDP Forecast Gap QE	-0.017	0.025	0.008
Share of Professionals	—	-0.261 **	—
S.E. of regression	0.110	0.126	0.169
Observations	77	77	77
R <sup>2</sup>	0.997	0.996	0.993
J-statistic	0.116	0.070	0.109

Note: \* and \*\* indicate significance at a 5% and 1% level, respectively. Newey-West (1987) standard errors are used.

**Table 3b: SGC Recommendations and the Taylor Rule: Equation (1)**

Dependent Variable	SMPC Proposal	SMPC Proposal	MPC Target Rate
IR Smoothing	0.948 **	0.931 **	0.967 **
10 Year Real Bond	1.570 **	1.355 **	1.762 **
Inflation Forecast Gap	3.701 **	3.166 **	4.705 **
GDP Forecast Gap	2.246 **	1.490 **	1.363 **
Share of Professionals	—	-0.197 **	—
Share of Germans	—	0.586 **	—
S.E. of regression	0.135	0.134	0.151
Observations	52	52	52
R <sup>2</sup>	0.990	0.991	0.987
J-statistic	0.184	0.164	0.173

Note: \* and \*\* indicate significance at a 5% and 1% level, respectively. Newey-West (1987) standard errors are used.

**Table 4a: Determinants of Consensus in the SMPC**

	(1)	(2)
Constant Term	0.557 **	0.588 **
Share of Professionals	0.331	0.407 *
Proposal: Cut	—	−0.342 *
Proposal: Hike	—	−0.221 **
Proposal: Absolute Size	—	0.097
S.E. of regression	0.198	0.166
Observations	77	77
R <sup>2</sup>	0.032	0.345
AR Test	8.578 **	5.620 **
Heteroskedasticity Test	0.607	1.309

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

**Table 4b: Determinants of Consensus in the SGC**

	(3)	(4)	(5)
Constant Term	0.389 *	−0.042	0.303 *
Share of Professionals	0.580 *	0.856 *	0.768 **
Share of Germans	—	0.844	—
Proposal: Cut	—	—	−0.879 **
Proposal: Hike	—	—	−0.318 *
Proposal: Absolute Size	—	—	1.308 **
S.E. of regression	0.176	0.173	0.142
Observations	52	52	52
R <sup>2</sup>	0.122	0.173	0.464
AR Test	7.877 **	4.752 *	2.519
Heteroskedasticity Test	1.919	2.648 *	1.683

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

**Table 5a: Determinants of Disagreement Between the SMPC and MPC**

<b>Coefficients</b>	<b>(6)</b>	<b>(7)</b>
Constant Term	−0.089	0.910
Consensus	1.884 *	0.443
Share of Professionals	−0.477	0.265
Proposal: Cut	—	−1.162
Proposal: Hike	—	−0.963
Proposal: Absolute Size	—	0.161
<b>Marginal Effects</b>		
Consensus	0.442 *	0.096
Share of Professionals	−0.112	0.057
Proposal: Cut	—	−0.349
Proposal: Hike	—	−0.270
Proposal: Absolute Size	—	0.035
Observations	77	77
LR Statistic	4.310	9.380
Pseudo Log–Likelihood	−32.745	−30.226
Pseudo R <sup>2</sup>	0.063	0.135
Correct Predictions	63	63

Note: \*, and \*\* indicate significance at a 5%, and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

**Table 5b: Determinants of Disagreement Between the SGC and GC**

<b>Coefficients</b>	<b>(8)</b>	<b>(9)</b>	<b>(10)</b>
Constant Term	-14.539	-2.575 *	-12.976
Consensus	11.119 *	6.119 **	11.376 **
Share of Professionals	4.301	—	-4.251
Share of Germans	20.092 *	—	39.274 **
Proposal: Cut	—	-9.902 **	-5.241 *
Proposal: Hike	—	-4.548 **	-6.963 **
Proposal: Absolute Size	—	16.350 **	10.823 **
<b>Average Marginal Effects</b>			
Consensus	0.784 **	0.585 **	0.648 **
Share of Professionals	0.303	—	-0.242
Share of Germans	1.415 **	—	2.225 *
Proposal: Cut	—	-0.882 **	-0.470
Proposal: Hike	—	-0.683 **	-0.620 **
Proposal: Absolute Size	—	1.564 *	0.616 *
Observations	52	52	52
LR Statistic	13.110 **	192.940 **	202.240 **
Pseudo Log-Likelihood	-6.781	-8.834	-5.369
Pseudo R <sup>2</sup>	0.696	0.604	0.760
Correct Predictions	47	49	50

Note: \*, and \*\* indicate significance at a 5%, and 1% level, respectively. Huber (1967)/White (1980) robust standard errors are used.

**Table 6a: Taylor Rules for the SMPC and MPC in Real Time: Selected Estimates**

<b>SMPC / GDP Vintage</b>	<b>Sep-10</b>	<b>Jun-10</b>	<b>Apr-09</b>	<b>Dec-08</b>	<b>Jun-08</b>	<b>Mar-08</b>	<b>Nov-07</b>
IR Smoothing	0.954 **	0.994 **	0.880 **	0.953 **	0.935 **	0.928 **	0.964 **
10 Year Real Bond	2.126 **	-0.174	2.570 **	1.233	1.254 **	2.179 **	1.801 *
Inflation Forecast Gap pre-QE	2.028	7.216	1.349 **	1.931	0.573	4.972 **	4.597 **
Inflation Forecast Gap QE	-0.554	1.862	—	—	—	—	—
GDP Forecast Gap pre-QE	1.888	6.320	0.585 **	4.079 **	2.271 **	1.999 **	3.380 **
GDP Forecast Gap QE	0.258 *	-0.086	—	—	—	—	—
S.E. of regression	0.172	0.183	0.274	0.194	0.144	0.168	0.130
Observations	77	73	58	55	49	46	40
R <sup>2</sup>	0.993	0.991	0.928	0.926	0.948	0.933	0.956
J-statistic	0.125	0.117	0.133	0.168	0.198	0.162	0.180

<b>MPC / GDP Vintage</b>	<b>Sep-10</b>	<b>Jun-10</b>	<b>Apr-09</b>	<b>Dec-08</b>	<b>Jun-08</b>	<b>Mar-08</b>	<b>Nov-07</b>
IR Smoothing	0.942 **	0.910 **	0.964 **	0.941 **	0.973 **	0.932 **	0.994 **
10 Year Real Bond	-0.250	-0.515	0.830	0.942	1.377	1.839 **	1.617 *
Inflation Forecast Gap pre-QE	-0.275	3.931 **	-0.677	-0.303	2.794 *	3.195 **	4.019 **
Inflation Forecast Gap QE	0.720	0.284	—	—	—	—	—
GDP Forecast Gap pre-QE	4.979 **	5.340 **	4.014 **	3.562 **	3.794 **	2.171 **	4.800 **
GDP Forecast Gap QE	-0.100	-0.149 *	—	—	—	—	—
S.E. of regression	0.195	0.199	0.237	0.228	0.126	0.132	0.122
Observations	77	73	58	55	49	46	40
R <sup>2</sup>	0.991	0.990	0.955	0.906	0.959	0.957	0.959
J-statistic	0.061	0.117	0.165	0.124	0.168	0.151	0.220

Note: \* and \*\* indicate significance at a 5% and 1% level, respectively. Newey-West (1987) standard errors are used.



**Table 6b: Taylor Rules for the SGC and GC of the ECB in Real Time: Selected Estimates**

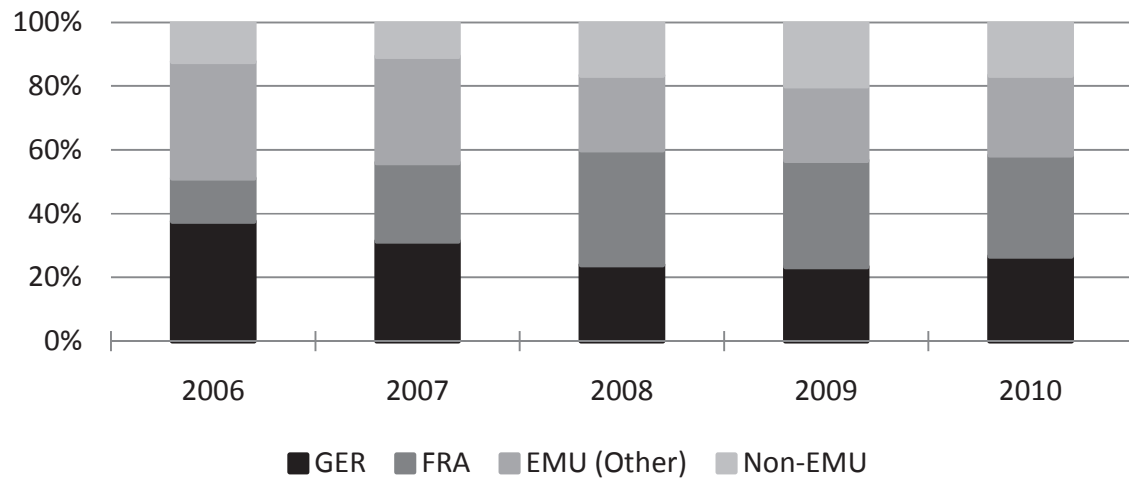
<b>SGC / GDP Vintage</b>	<b>Sep-10</b>	<b>Jun-10</b>	<b>Jun-08</b>	<b>Mar-08</b>	<b>Nov-07</b>
IR Smoothing	0.741 **	0.960 **	1.000 **	0.956 **	0.943 **
10 Year Real Bond	1.420 **	2.044 **	−1.018	0.495	0.598
Inflation Forecast Gap	2.382 **	2.573 *	1.418	3.341 *	2.844
GDP Forecast Gap	0.425 **	0.731 **	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 <sup>2</sup>	0.978	0.967	0.954	0.968	0.960
J-statistic	0.158	0.151	0.201	0.208	0.138

<b>GC / GDP Vintage</b>	<b>Sep-10</b>	<b>Jun-10</b>	<b>Jun-08</b>	<b>Mar-08</b>	<b>Nov-07</b>
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 <sup>2</sup>	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. Newey-West (1987) standard errors are used.

## Appendix

**Figure A1: National Representation in the ECB SMPC**



**Table A1: Taylor Rules Without Interest Rate Smoothing**

<b>BoE / Dependent Variable</b>	<b>SMPC Proposal</b>	<b>MPC Target Rate</b>
10 Year Real Bond	2.062 **	2.019 **
Inflation Forecast Gap pre-QE	2.755 **	2.667 **
Inflation Forecast Gap QE	-1.296 **	-1.105 **
GDP Forecast Gap pre-QE	1.452 **	1.480 **
GDP Forecast Gap QE	0.686 **	0.660 **
S.E. of regression	0.892	0.887
Observations	77	77
R <sup>2</sup>	0.803	0.809
J-statistic	0.114	0.124

<b>ECB / Dependent Variable</b>	<b>SGC Proposal</b>	<b>GC Target Rate</b>
10 Year Real Bond	1.509 **	1.518 **
Inflation Forecast Gap	3.615 **	3.644 **
GDP Forecast Gap	0.429 **	0.332 **
S.E. of regression	1.105	1.066
Observations	52	52
R <sup>2</sup>	0.319	0.340
J-statistic	0.203	0.206

Note: \* and \*\* indicate significance at a 5% and 1% level, respectively. Newey-West (1987) standard errors are used.

**Table A2: Taylor Rule Estimates Using Alternative Forecasts**

<b>BoE Forecasts (Market Interest Rate)</b>	SMPC Proposal	SMPC Proposal	MPC Target Rate
IR Smoothing	0.907 **	0.919 **	0.967 **
10 Year Real Bond Returns	0.755 **	0.868	0.911
Inflation Forecast Gap pre-QE	3.889 **	4.474 **	3.535
Inflation Forecast Gap QE	0.291	0.335	0.669
GDP Forecast Gap pre-QE	3.827 **	4.403 **	3.860 **
GDP Forecast Gap QE	0.046	0.052	0.107
Share of Professionals	—	0.123	—
S.E. of regression	0.157	0.161	0.241
Observations	77	77	77
R <sup>2</sup>	0.994	0.994	0.986
J-statistic	0.123	0.122	0.127

<b>BoE Forecasts (Const. Interest Rate)</b>	SMPC Proposal	SMPC Proposal	MPC Target Rate
IR Smoothing	0.958 **	0.931 **	0.930 **
10 Year Real Bond Returns	1.202 *	−0.479	0.537
Inflation Forecast Gap pre-QE	3.804	4.889 **	6.796 **
Inflation Forecast Gap QE	1.378	0.905	0.246
GDP Forecast Gap pre-QE	3.022 *	4.414 **	3.473 **
GDP Forecast Gap QE	0.093	−0.289	0.074
Share of Professionals	—	0.217	—
S.E. of regression	0.156	0.141	0.247
Observations	77	77	77
R <sup>2</sup>	0.994	0.995	0.985
J-statistic	0.075	0.060	0.076

Note: Results using the Economist's forecasts are shown in Table 3a. \* and \*\* indicate significance at a 5% and 1% level, respectively. Newey-West (1987) standard errors are used.

**Table A3: Taylor Rules for Most Dovish, Median and Most Hawkish Proposals**

<b>BoE / Dependent Variable</b>	<b>SMPC Minimum</b>	<b>SMPC Proposal</b>	<b>SMPC Maximum</b>
IR Smoothing	0.849 **	0.952 **	0.885 **
10 Year Real Bond	0.461 *	0.506	2.848 **
Inflation Forecast Gap pre-QE	3.425 **	5.796 **	2.635 *
Inflation Forecast Gap QE	0.379	0.192	4.380 **
GDP Forecast Gap pre-QE	2.872 **	5.775 **	2.005 **
GDP Forecast Gap QE	-0.058	-0.017	0.891 *
S.E. of regression	0.186	0.110	0.258
Observations	77	77	77
R <sup>2</sup>	0.991	0.997	0.983
J-statistic	0.119	0.116	0.117

<b>ECB / Dependent Variable</b>	<b>SGC Minimum</b>	<b>SGC Proposal</b>	<b>SGC Maximum</b>
IR Smoothing	0.873 **	0.948 **	1.000 **
10 Year Real Bond	0.949 **	1.570 **	2.311
Inflation Forecast Gap	1.556 **	3.701 **	7.506
GDP Forecast Gap	1.900 **	2.246 **	0.447
S.E. of regression	0.127	0.135	0.207
Observations	52	52	52
R <sup>2</sup>	0.991	0.990	0.977
J-statistic	0.171	0.184	0.155

Note: \* and \*\* indicate significance at a 5% and 1% level, respectively. Newey-West (1987) standard errors are used.