Member Type and Tenure Effects in the Bank of England's MPC

Jan Marc Berk[Υ]
Economics and Research Division
De Nederlandsche Bank

Beata Bierut
Economics and Research Division
De Nederlandsche Bank

Ellen E. Meade
Department of Economics
American University

December 2011[*]

JEL codes: D71, D72, E52, E58
Key words: Central banking; Monetary policy committees; Bank of England; Voting

Abstract: Most studies of the voting behavior of the Monetary Policy Committee of the Bank of England are based on average voting patterns over time. We supplement those static studies with an analysis using dynamic voting patterns of individual members as we believe this better captures the repetitive nature of monetary policy decisions. We find that the voting behavior of internal and external members is statistically different but only in the final (or third) year of external members' terms. The MPC could therefore benefit more from external thinking and expertise by lengthening the terms of external members. Based on the findings of Gerlach-Kristen (2009), this would increase the predictability of UK policy rates.

[Υ] Address all correspondence to this author.
[*] Email: J.M.Berk@dnb.nl. The authors would like to thank Michael Ehrmann, Petra Gerlach-Kristen, seminar participants at the Bank of Norway, the Netherlands Bank, the Universidad de Alicante, and participants at the Western Economic Association annual conference for comments, and Petra Gerlach-Kristen and Christopher Spencer for sharing their datasets.

1. Introduction

The deliberation of monetary policy committees is a topic addressed in a small but growing literature on the internal functioning of central banks. Blinder (1998, 2004) lays out many of the important questions. A number of papers have examined the Bank of England's Monetary Policy Committee (MPC) because it publishes not only meeting minutes but also votes by individual (including preferred settings for the policy rate in the event of dissent) and macroeconomic forecasts that accompany the policy decision taken at each meeting.

In this paper, we examine the voting behavior of the MPC, focusing on the distinction between internal and external members. The Blair government introduced externals into the Bank's monetary policy decisionmaking process to ensure that the MPC would benefit from expertise garnered outside the central bank (see Bank of England, 1997). Prior research has focused on average voting patterns of monetary policymakers over time and found that the votes cast by the five internals on the MPC, who are career central bankers, differ significantly from those cast by the four externals, who are required to come from outside the Bank. We contribute to this literature by taking up an issue that to date has received little research attention: how the experience members have gained in serving on the MPC (denoted as a "tenure effect") is related to their type of membership. By taking a dynamic perspective, we seek to put earlier explanations of the differential voting behavior of externals and internals into context.[1] The dynamic perspective is also consistent with the repetitive nature of the monetary policymaking process. Monetary policy committees meet periodically to decide on interest rates; members may adjust their voting behavior over time, simply because they have gained expertise by participating in a collective decisionmaking process (see Sibert, 2006). Finding evidence for dynamics in voting might also carry normative implications for the composition of actual committees, related to the length of members' terms of appointment and the staggering of those terms.

[1] For example, significant tenure effects could be difficult to reconcile with the argument that background characteristics cause different voting patterns of internals and externals; see Hansen & McMahon (2008).

Estimation of a pooled voting panel for 1997-2008 indicates that the well-known static result that internals and externals differ in their voting behavior arises from the initial years of the MPC combined with the voting behavior of internals after their third year on the committee. By correcting for these factors and examining dynamics together with membership type, we find that the voting behavior of internal and external members differs, but only in the final year of external members' terms when they prefer lower interest rates relative to internal members. This pattern is consistent with a committee in which inexperienced members initially vote with the majority and only begin to vote in line with their own views once they have gathered experience (and perhaps self-confidence). Berk and Bierut (2010) demonstrate that this constitutes rational behavior on the part of monetary policymakers.

The policy implication is that, since it takes time for the benefits of external thinking and expertise to surface in external members' voting patterns, these benefits could potentially be increased through an increase in the length of their term in office. Moreover, in light of Gerlach-Kristen's (2009) finding that external dissents are helpful in predicting future UK policy interest rates, an extension of terms for external members could arguably improve the predictability of monetary policy. This could be welfare-enhancing, due to more stable and better anchored inflation expectations (Woodford, 2003). Finally, our results provide support for a staggering of appointments in order to ensure that committee composition always includes more experienced and thus more independent-minded members.

In the next section, we review the literature on MPC voting and provide some stylized facts about the time pattern of voting. In section 3, we discuss our empirical framework and data. In section 4, we present estimation results and robustness checks. Section 5 concludes.

2. Literature review and stylized facts of MPC voting

Much of the literature on the Bank of England's MPC has analyzed static voting behavior and focused on the differences between the votes cast by the five internals (who are career central bankers) and those cast by the four externals (who come from diverse backgrounds, generally serve part-time, and do not have administrative responsibilities). Internals serve terms that range from three to five years in length, as the Governor and two Deputy Governors are appointed to a term of five years, while the two other internal members are appointed for three years. Externals are appointed to three-year terms. Both types of members can be re-appointed, although in actual fact, re-appointment is relatively rare for both internal and external members. Thus, the average tenure over our sample is around 41 months for an internal member and 25 months for an external member.

Gerlach-Kristen (2003), Spencer (2006), and Harris and Spencer (2008) document the differences in voting behavior between internal and external members, and show that externals are more likely to dissent for lower interest rates. This is important because, as already mentioned, Gerlach-Kristen (2009) demonstrates that the dissents cast by external MPC members are helpful in predicting future changes in policy interest rates. Predictability of policy in turn helps to better manage the expectations of economic agents.[2]

What lies behind the different voting patterns of internals and externals? The possible sources investigated in the literature include differences in career backgrounds or skills, information sets, incentives (reputation effects), and/or models of the economy. Some studies have examined this question using a pooled panel of MPC votes, where the dependent variable has generally been either members' preferred level for the policy rate or a discrete indicator of it;[3] in this sort of framework, differences between internal and external members are detected with a dummy variable. Other studies have estimated individual monetary policy reaction functions in

[2] The latter is welfare-enhancing, if performed optimally (Woodford, 2003).
[3] A binomial indicator represents agreement or dissent with the policy proposal, whereas a multinomial indicator captures in addition the direction of the dissent.

order to look directly at the member-specific weights placed on inflation and output gaps; in this latter framework, differences between internal and external members are detected by comparing reaction function parameters.

Harris and Spencer (2008), paralleling the work of Havrilesky and Schweitzer (1990) for the Federal Reserve's policy committee, examine whether background characteristics, such as years spent in academia, finance, government, and so on, can account for the differences in voting patterns. In a panel setting, they find that such characteristics cannot fully explain voting differences, and that a dummy variable for membership type remains a large and highly significant determinant of dissents despite the inclusion of background effects. Using a simulation approach, Gerlach-Kristen (2009) re-produces the pattern of MPC votes by employing an asymmetric reaction function in which externals place a higher weight on output deviations when output is below (rather than above) potential.

While Goodhart (2005) discusses a monetary policy reaction function for the MPC policy rate, several recent papers present reaction functions for individual policymakers. Bhattacharjee and Holly (2006) find significant heterogeneity in the parameters on inflation and output in MPC members' reaction functions. In contrast, Riboni and Ruge-Murcia (2008) find that members are homogeneous with respect to policy preferences but heterogenous with respect to their type of membership and career backgrounds. Besley, Meads, and Surico (2008) also find no heterogeneity in policy preferences; however, they do find differences in the sensitivity to the lagged interest rate (usually interpreted to represent interest rate smoothing) and in the intercept term, which they construe as a measure of experience. Due to the absence of heterogeneity in policy preferences, Besley and his co-authors conclude that the type of membership (internal versus external) does not explain the observed differences in voting patterns.[4]

Because some policymakers serve on the MPC for only a short time, studies that estimate individual reaction functions typically only examine a subset of the membership. Bhattacharjee

[4] They also find no support for background experience in academia or the UK Treasury.

and Holly (2006) estimate reaction functions for five MPC members; Riboni and Ruge-Murcia (2008) dropped six officials. Besley *et al.* (2008) made a less restrictive assumption examining members with tenure on the MPC of at least two years, which results in dropping only three policymakers.[5]

To date, the dynamic pattern of MPC member voting has not received much attention. Groth and Wheeler (2008) examine dynamics in a study of interest rate activism and find no support for "learning" or the degree of gradualism in MPC policy. In their study, learning is represented as a dummy variable equal to unity when tenure is 36 months or more. Because externals are appointed to three-year terms that are typically not renewed, the change detected by Groth and Wheeler is primarily determined by the behavior of the internal members. Hansen and McMahon (2008) examine whether MPC members' experience on the committee is important for preferred changes in the policy interest rate. Using a panel approach, the authors find that experienced externals prefer lower interest rates relative to other MPC members – internals and inexperienced externals (the two groups are statistically indistinguishable from one another). While the threshold level for experience reported in the paper is the first 12 months on the MPC, Hanson and McMahon report that their results are robust to shorter and longer measures of experience.

Table 1 provides information on MPC votes by member type for non-overlapping 12-month tenure intervals based upon meetings from June 1997 through December 2008 (1228 votes, 140 meetings, and 26 policymakers). Based on dissent rates, inexperienced externals behave very differently from their internal counterparts: externals dissented nearly 23 percent of the time in their first 12 months of policymaking, compared with only 5.5 percent for internals. As tenure on the MPC rises, the percentage of dissents cast by the two member types becomes somewhat more similar, but this is *not* because external members become more like internal members; rather, it is because the frequency of dissent by internals rises sharply. However, the

[5] Alan Budd, Howard Davies, and David Walton.

dissent rate is still very different for the two types: in the third year of tenure, dissents are 13.5 percent for internals and almost 26 percent for externals. Therefore, it is logical that studies using discrete indicators of agreement and disagreement find that member type is an important determinant of voting behavior.

Table 1 also provides information on the mean difference (in basis points) between the policy rate (the outcome of the MPC meeting) and the policymaker's preferred rate by tenure year. This difference is statistically significant for both internal and external members in their first three years on the MPC. Internals prefer rates that are higher than the policy rate outcome in their first three years on the committee, whereas externals prefer rates that are lower than the policy rate in tenure years 2 and 3, and the differences is more than 4 basis points. However, in their first year on the MPC, externals are similar to internals in that – taking the average rate preference across all policymakers in each group – they would prefer somewhat higher interest rates. But, without question, using the preferred level of the policy rate to examine differences between the member types tends to make internal and external members appear more similar than does an examination of their dissenting votes.

Nearly all externals remain on the MPC for one term or less (that is, 36 or fewer months) which can be seen in Table 1 by the sharp drop in the number of total external votes after the third tenure year.[6] Only five individuals cast the 35 votes and 8 dissents registered by external members during their fourth tenure year.[7] Chart 1 illustrates how rapidly the composition of MPC membership becomes unbalanced after the third tenure year. Because re-appointment of externals is infrequent and we are investigating the voting dynamics for both types of members, we focus our empirical analysis of dynamics on the first 36 months of tenure. We regard this

[6] It has been pointed out repeatedly that the *de facto* maximum tenure of externals (three years) owes to academics being unable to secure a leave of absence for more than three years. See the UK Treasury Committee Report "MPC of the Bank of England: Ten Years on" and the Bank of England's response to this report (Bank of England, 2007).

[7] These members were Christopher Allsopp, Kate Barker, DeAnne Julius, Steve Nickell, and Sushil Wadhwani. Allsopp and Wadhwani left after 37 months. Only Barker and Nickell were formally re-appointed and served for more than four years.

sample truncation as necessary to avoid biasing the empirical results with the voting behavior of a few internals who have been reappointed repeatedly.[8]

We employ an additional sample truncation to eliminate so-called start-up effects. Monetary policy decisionmaking by committee was introduced in the UK in June 1997; inaugural MPC members obviously started out with little or no experience in collective decisionmaking, and it took some time before members flowed in and out of the committee, thereby introducing differences in tenure. As any study of the effects of tenure would require some variation in tenure among members, we correct for start-up effects by dropping the first 36 meetings from our analysis. The two sample truncations – dropping votes after the third tenure year and for the first 36 MPC meetings – leaves us with a sample of 494 votes cast in 104 meetings by 22 policymakers between August 2000 and December 2008.[9]

3. Empirical framework and data

Our basic empirical model relies upon the conventional monetary policy reaction function first suggested by Taylor (1993) and refined in Svensson (1997) and other studies:

$$i_t = \alpha_1 + \alpha_2 i_{t-1} + \alpha_3 E_t(\pi_{t+h} - \pi^*) + \alpha_4 E_t(y_{t+k} - y^*) + \varepsilon_t \qquad (1)$$

The (nominal) policy interest rate (i_t) is the outcome of the monetary policy decision taken at time t, and is a function of the forecast made at time t for the gap of inflation from its target $E_t(\pi_{t+j} - \pi^*)$ at time (t + j) and the time t forecast for the gap of output from potential $E_t(y_{t+k} - y^*)$ at time (t + k). A lagged value of the policy rate is included to correct for serial correlation, and typically has been justified in the literature as capturing central bank efforts to smooth interest rates.

We estimate the conventional reaction function for the Bank of England in a pooled regression framework, as follows:

---

[8] Although re-appointment is rare, Charles Bean, Eddie George, Mervyn King, and Paul Tucker have tenure of 100, 74, 140, and 79 meetings, respectively, through December 2008.

[9] Our estimation sample begins in August 1997 due to the availability of the Bank's internal forecasts; thus, in truncating the sample for start-up effects, we drop meetings 3 through 36. One implication of correcting for start-up effects is that we lose the first three tenure years of policymakers appointed to the MPC at its inception, including Eddie George and Mervyn King.

$$R_{it} = \beta_1 + \beta_2 \text{Repo}_{t-1} + \beta_3 E_t (\pi_{BOE, t+2} - \pi^*) + \beta_4 E_t (y_{BOE, t+1} - y^*) + \beta_5 \text{Internal}_i + \varepsilon_{it} \qquad (2)$$

where R_{it} is the preferred policy rate of individual i at time t and Repo_{t-1} is the policy rate decided at the previous MPC meeting.[10] Our use of the lagged policy rate as an independent variable reflects an assumption that it is the committee's previous stance, rather than the individual's previous vote, that serves as the focal point for the individual's vote at the current meeting.[11] Obviously, equation (2) must be interpreted as a representation of movements in the votes cast by individual members, not as a guide for the actual conduct of policy.

For real-time forecasts of inflation and output, we rely upon the MPC itself. Since August 1997, the Bank of England has published (in its quarterly *Inflation Report*) committee forecasts for the four-quarter growth rates of inflation and real output for the current and subsequent eight quarters. Because the *Inflation Report* is published in the middle month of each quarter (February, May, August, and November), we use the forecast from each report beginning in the month it is published and for the subsequent two months.[12] As in Goodhart (2005), we use the forecasts formulated on an assumption of a constant interest rate, and like other studies (e.g. Harris and Spencer, 2008), we use the forecast mode (as opposed to the median or mean).

The MPC aims to achieve its inflation target over two years; thus, we use the 8-quarter-ahead forecast for inflation and subtract the target value to compute the inflation gap, which we denote $E_t (\pi_{BOE, t+2} - \pi^*)$. The MPC's inflation target was reduced from 2.5 to 2 percent in

---

[10] Votes cast at each meeting and the policy rate preferred by dissenters are available on the Bank of England's web site. Before June 1998, the Bank of England only provided the preferred direction for the policy rate in the event of a dissent and did not provide the level of the dissenter's preferred rate. The convention in the literature on MPC voting has been to assume that the preferred interest rate was 0.25 basis points different from the policy outcome (in the direction indicated by the dissent). We follow that convention in this paper. (When the data sample is truncated for start-up effects, there are no imputed rates for dissenters.)

[11] Besley *et al.* (2008) discuss this argument.

[12] For example, we use the forecasts from the August report when the dependent variable is members' preferred rates from meetings held in August, September, and October.

January 2004 when the targeted inflation index was changed from the retail price index excluding mortgage interest payments (RPIX) to the index of consumer prices (CPI).[13]

Because the transmission lag from output to inflation is about one year, we use a 4-quarter-ahead forecast of the output gap, which we denote $E_t\,(y_{BOE,\,t+1} - y^*)$.[14] We construct a real-time measure of the output gap by extending each vintage of real-time historical data for the level of real GDP first with the preliminary estimate of real GDP growth[15] in the quarter prior to the publication quarter of the *Inflation Report* and then with the growth rates projected in the *Inflation Report*. We apply a Hodrick-Prescott filter (with a smoothing parameter set equal to 1600) to each vintage of data to estimate the level of real-time potential GDP. Then we construct the real-time output gap as the percentage deviation of the level of output from its potential level consistent with each *Inflation Report*.

Because we use contemporaneous forecasts (ones from the most recent *Inflation Report*), we have a potential endogeneity problem as the individual rate preferences for the MPC meeting in the middle month of each quarter are based upon these forecasts or, are at least in principle, consistent with it. Most studies in this literature have not used the Bank's forecasts. Besley *et al.* (2008) used forecasts from the previous *Inflation Report* and not the contemporaneous forecasts due to concerns about endogeneity. We return to this issue later in the paper.

Finally, we include the dummy variable, $Internal_i$, equal to unity when policymaker i is an internal MPC member, to capture effects associated with member type.

4. Estimation results and robustness checks

---

[13] For a discussion of the Bank of England's history with inflation targeting, see King (2007). For the January 2004 MPC meeting, because we use the inflation forecast from the *Inflation Report* published in November 2003, we subtract off the old target to compute the inflation gap.

[14] The 2-year and 1-year forecast horizons for inflation and output, respectively, are also used in Besley *et al.* (2008) and Harris and Spencer (2008), and are consistent with the Bank of England's views on the monetary transmission mechanism. See "The transmission mechanism of monetary policy," www.bankofengland.co.uk/publications/other/monetary/montrans.pdf .

[15] The real-time historical data and the preliminary estimate of growth are taken from the UK's Office of National Statistics (www.statistics.gov.uk).

Estimation results are presented in table 2. In order to investigate the role played by member type and tenure, we estimate a number of alternative versions of the baseline specification (equation (2)). Column (1) provides estimates from a "conventional" specification, as it exists elsewhere in the literature (see, for example, Besley *et al.,* 2008). We then show, in columns (2) and (3), the effects of truncating the sample for tenure effects (dropping votes cast after tenure year 3) and for the start-up of the MPC (dropped votes cast at meetings 3 through 36), respectively. Column (4) presents our "modified" baseline, which is identical in specification to equation 2, but the data sample has been amended to reflect the two truncations already noted. Beyond that, in column (5), we explore the role of experience by including dummy variables equal to unity for the second and third years of tenure on the MPC ($Exp2_{it}$ and $Exp3_{it}$). In column (6), we augment this specification by including terms that interact experience with the type of membership on the MPC ($Exp2\_int_{it}$ and $Exp3\_int_{it}$).

All of the panel equations were estimated using ordinary least squares. We clustered errors by MPC member when computing standard errors under the assumption that each individual's error is not necessarily independently and identically distributed over time. Standard errors were obtained from heteroskedasticity-consistent covariances using White's procedure.

As shown in table 2, the policy rate is highly persistent in all specifications. In addition, the Bank's own forecasts are highly significant – inflation above target and output above potential are associated with higher policy interest rates. The magnitude of these estimates and their statistical significance is quite similar across the specifications. The results in column (1) indicate that internal members prefer higher interest rates – 4 basis points higher – than external members, as the coefficient on the dummy variable is significant at the 5 percent level. However, after truncating the data sample for tenure beyond year 3 (column 2) and the starting up of the MPC (column 3), we find that the difference in voting behavior between internals and externals disappears, as shown in column 4. Thus, our findings suggest that the differences in the average

voting behavior between internal and external members that is found in other studies owes to the inclusion of observations that should be omitted from the sample.

When we add dummy variables for tenure years 2 and 3, the results – shown in column (5) – provide no empirical support for experience effects (and the dummy variable for member type becomes significant again, at the 10 percent level). However, when we include interaction terms on top of experience effects in column (6), we find evidence of voting dynamics: The dummy for tenure year 3 is negative and significant at the 5 percent level, while the interaction term for tenure year 3 is positive and significant at the 1 percent level.

As discussed in Jaccard and Turrisi (2003) and Ozer-Balli and Sørensen (2010), formal testing of an interaction effect is a joint test involving both the underlying term (the tenure year dummy, for example) and the interaction term of the underlying term with another variable. Table 3 provides formal tests of possible hypotheses about member type and experience effects based on the estimates in column (6). The first hypothesis (H1) tests member type in the first 12 months on the MPC. This is a simple test on the member type dummy and indicates that there is no difference in voting between internal and external members in their first 12 months on the MPC. The test of member type in tenure year 2, hypothesis H2, is a joint test of the member type dummy ($Internal_i$) and its interaction term with tenure year 2 ($Exp2\_int_{it}$), and is also insignificant. In addition, the test of hypothesis H4 points to statistical insignificance of experience in tenure year 2. However, both hypotheses H3 and H5, which test whether internals and externals behave similarly in tenure year 3 and whether voting in tenure year 3 does not differ from voting in other years, respectively, reject the null hypothesis at the 1 percent level. Thus, we can conclude that internal and external members behave similarly during their first two years on the MPC, but that their voting behavior diverges during their third year of policymaking. Importantly this is a two-part finding: First, voting differs in tenure year 3 from earlier years and second, internals and externals behave differently from each other in tenure year 3. Our hypothesis tests indicate that externals prefer interest rates that are about 2 basis points lower.

To gain some insight into the robustness of these results, we examined F-tests of these same five hypotheses using forward recursive estimation. We began by estimating equation (6) with an initial sample size of 40 meetings, and extended the end of the estimation window by one meeting for each subsequent regression. We tested the five hypotheses listed in table 3 for each of the forward recursive regressions and plotted the F-statistics in charts 2 and 3. For example, the left-most values in chart 2 provide the F-values from tests of H1, H2, and H3 when equation (6) is estimated using votes from meetings 37 through 76 of the sample, corresponding to June 2000 through August 2003. The right-most values in chart 2 are F-values for the same hypotheses when equation (6) is estimated using votes from meeting 37 through 140 (June 2000 through December 2008) and are identical to the values given in table 3.

For hypotheses H3 and H5, the recursive F-values provide additional support for our findings about dynamics and member type, and are highly significant for all windows sizes. Hypotheses 2 and 4 are rejected for some windows (roughly when the estimation window ends between meetings 120 and 135), suggesting that over some periods, tenure year 2 has been associated with differences in behavior. However, this finding is not consistent and does not hold for the majority of estimation windows.

Robustness checks

We subjected the specification in column (6) to a number of robustness checks. First, since MPC forecasts of future output and inflation may be imperfect proxies of the relevant macroeconomic environment, we added real-time forecasts published by Consensus Economics (denoted with the subscript "CF") as additional explanatory variables. The Consensus forecast variables are intended to capture new economic information not available at the time the MPC forecasts were formulated or in the months when the MPC forecast is not updated. Each month, Consensus Economics surveys a large number of private-sector forecasters to obtain individual predictions of major economic indicators in the UK and other countries. We used their mean forecast for inflation (the relevant index less the inflation target) and real output growth in the

current and the subsequent calendar years.[16] Because MPC meetings are usually convened during the first 10 days of the month, whereas Consensus Economics publishes its UK forecasts toward the middle of each month, we used the Consensus forecasts published in the month prior to the month in which an MPC meeting was held.[17] Re-estimation of equation 6 indicates that only the Consensus Economics projection for current-year output growth provides limited supplementary information. Otherwise, the results are identical to those presented in column (6).

Second, a potential problem already noted is the endogeneity of the policy rate and the MPC forecasts published in the *Inflation Report* the middle month of each quarter. To address this possibility, we examined the correlation between the MPC forecasts and the residuals for all of the estimated specifications and found them to be uncorrelated. Moreover, we replaced the MPC forecasts in specification (6) with the 1-year-ahead Consensus Forecasts. The estimation results were very similar, although the interaction term for tenure year 2 was statistically significant.

Third, another potential issue concerns the appropriate definition of the lagged rate. When a policymaker decides his preferred policy rate at an MPC meeting, does he use as a reference point the policy rate at the previous meeting or his own preferred rate at that meeting? In order to control for the possibility that the lagged individual rate preference is important, we re-estimated the specification in column (6), including an additional dummy variable defined as (+1, 0, -1) if the member preferred a higher, unchanged, or a lower interest rate, respectively, at the previous meeting. The results for member type and tenure effects were again very similar to those reported in table 2.[18] [19]

---

[16] The forecasts are conditioned upon each individual forecaster's expected path for policy interest rates.
[17] The horizon of the MPC and Consensus forecasts are different, which is not reflected in the time subscripts used in equation (2). MPC forecasts are for 1- and 2-years ahead, while the Consensus forecasts are always made on a calendar-year basis (for the current and subsequent calendar years). Thus, the horizon of the Consensus forecast is longest for the forecasts made early in a given year and shortest for forecasts made at the end of a year.
[18] Simply replacing the lagged policy rate by the lagged preferred rate in equation (2) resulted in a weaker tenure effect.
[19] [Still to come: A fifth robustness check using different window sizes.]

5. Conclusion

In this paper, we use a panel reaction function framework to examine the dynamics of votes cast by the Bank of England's monetary policy committee. Our results show that the general finding in the literature that external and internal MPC members behave differently arises only in the third year of tenure; in their first and the second years on the committee, the voting behavior of the two groups is largely similar. This is a more nuanced finding than the well-known result that internals and externals vote differently. The well-known result uses a sample that omits dynamics and is biased by votes from the initial years of the MPC and from a few long-standing internal members. If it is indeed the case that all MPC members initially vote similarly, then background characteristics such as education and prior employment would not be expected to explain differences in their voting behavior. In an earlier study, Harris and Spencer (2008) find no direct support for background characteristics and this finding is consistent with ours.

Our results have an interesting policy implication in that they provide support to a lengthening of the term for externals, since the benefits of outside expertise and thinking for MPC decisionmaking appears to arise only during the last year of external members' statutory term in office. Our results also provide support for staggered appointments to ensure that committee composition always includes some independent-minded members.

References

Bank of England, "The MPC of the Bank of England: Ten years on," www.bankofengland.co.uk/publications/other/treasurycommittee/mpc/ten.

Bank of England, "The transmission mechanism of monetary policy," www.bankofengland.co.uk/publications/other/monetary/montrans.pdf .

Berk, Jan Marc and Beata K. Bierut (2010), "Monetary policy committees: meetings and outcomes," *Contemporary Economic Policy* 28:4, 569–588.

Besley, Timothy, Neil Meads and Paolo Surico (2008), "Insiders versus Outsiders in Monetary Policy-Making," *American Economic Review* 98:2, 218-223.

Bhattacharjee, Arnab and Sean Holly (2006), "Taking Personalities out of Monetary Policy Decision Making: Interactions, Heterogeneity and Committee Decisions in the Bank of England's MPC," CDMA Working Paper 612, University of St. Andrews.

Blinder, Alan S. (1998), *Central Banks in Theory and Practice*, MIT Press.

Blinder, Alan S. (2004), *The Quiet Revolution: Central Banking Goes Modern*, Yale University Press.

Gerlach-Kristen, Petra (2003), "Insiders and Outsiders at the Bank of England," *Central Banking* XIV:1, 96-102.

Gerlach-Kristen, Petra (2009), "Outsiders at the Bank of England's MPC," *Journal of Money, Credit, and Banking* 41:6, 1099-1116.

Goodhart, Charles A.E. (2005), "The Monetary Policy Committee's Reaction Function: An Exercise in Estimation," *Topics in Macroeconomics* 5:1, Article 18.

Groth, Charlotta and Tracy Wheeler (2008), "The behaviour of the MPC: Gradualism, inaction and individual voting patterns," External MPC Unit Discussion Paper 21, Bank of England.

Hansen, Stephen and Michael F. McMahon (2008), "Delayed Doves: MPC Voting Behaviour of Externals," CEP Discussion Paper 862, London School of Economics.

Harris, Mark and Christopher Spencer (2008), "Decade of dissent: explaining the dissent voting behavior of Bank of England MPC members," MPRA Paper 9100, University of Munich.

Havrilesky, Thomas M. and Robert Schweitzer (1990), "A theory of FOMC dissent voting with evidence from the time series," in T. Mayer (ed.), *The Political Economy of American Monetary Policy*, 197-210, Cambridge University Press.

Jaccard, James and Robert Turrisi (2003), *Interaction Effects in Multiple Regression* (2nd ed.), Sage University Papers Series on Quantitative Applications in the Social Sciences, 07-072.

King, Mervyn (2007), "The MPC Ten Years On," Speech to the Society of Business Economists, May 2, http://www.bankofengland.co.uk/publications/news/2007/054.htm.

Ozer-Balli, Hatice and Bent E. Sørensen (2010), "Interaction Effects in Econometrics," Discussion Paper 7929, Centre for Economic Policy Research.

Riboni, Alessandro and Francisco J. Ruge-Murcia (2008), "Preference Heterogeneity in Monetary Policy Committees," *International Journal of Central Banking* 4:1, 213-233.

Sibert, Anne (2006), "Central Banking by Committee," *International Finance* 9:2, 145-168.

Spencer, Chistopher (2006), "Reaction Functions of Bank of England MPC Members: Insiders versus Outsiders," Discussion Paper 15/05, University of Surrey.

Svensson, Lars E.O. (1997), "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets," *European Economic Review* 41:6, 1111-1146.

Taylor, John B. (1993), "Discretion Versus Policy Rules in Practice," *Carnegie Rochester Conference Series on Public Policy* 39, 194-214.

Woodford, Michael (2003), *Interest and Prices*, Princeton University Press.

Table 1. MPC voting by member type and tenure year, June 1997 – December 2008
(140 meetings, 26 officials)

	Internal				External[1]			
	Voters (#)	Total votes	Dissents (%)	Policy rate less mean vote (basis points)[3]	Voters (#)	Total votes	Dissents (%)	Policy rate less mean vote (basis points)[2]
1st tenure year (1-12 months)	12	127	5.5	-1.0*	14	168	22.6	-1.8*
2nd tenure year (13-24 months)	10	120	10.0	-1.3*	13	150	23.3	4.3***
3rd tenure year (25-36 months)	10	111	13.5	-2.9***	12	120	25.8	5.0***
4th tenure year (37-48 months)	8	88	10.2	-0.9	5	35	10.2	4.3**
5th tenure year (49-60 months)	7	84	9.5	0.0	2	24	4.2	1.0
6th tenure year (61-72 months)	6	51	3.9	-1.0	2	24	25.0	6.3**
7th tenure year (73-84 months)	4	33	6.1	1.5	2	13	7.7	1.9
8th tenure year (85-96 months)	2	24	0.0	0.0	1	8	0.0	0.0
9th tenure year (97-108 months)	2	16	6.3	-1.6				
10th tenure year (109-120 months)	1	12	0.0	0.0				
11th tenure year (121-132 months)	1	12	8.3	-2.1				
12th tenure year (133-144 months)	1	8	0.0	0.0				

[1] The horizontal underscoring indicates the term of appointment for external members (3 years).
[2] A ***/**/* indicates that the difference between the policy rate and the mean of policymakers' votes (i.e., their preferred rates) was significant at the 1/5/10 percent level, respectively.

Chart 1. Share of votes cast by internal and external members, by tenure year on the MPC

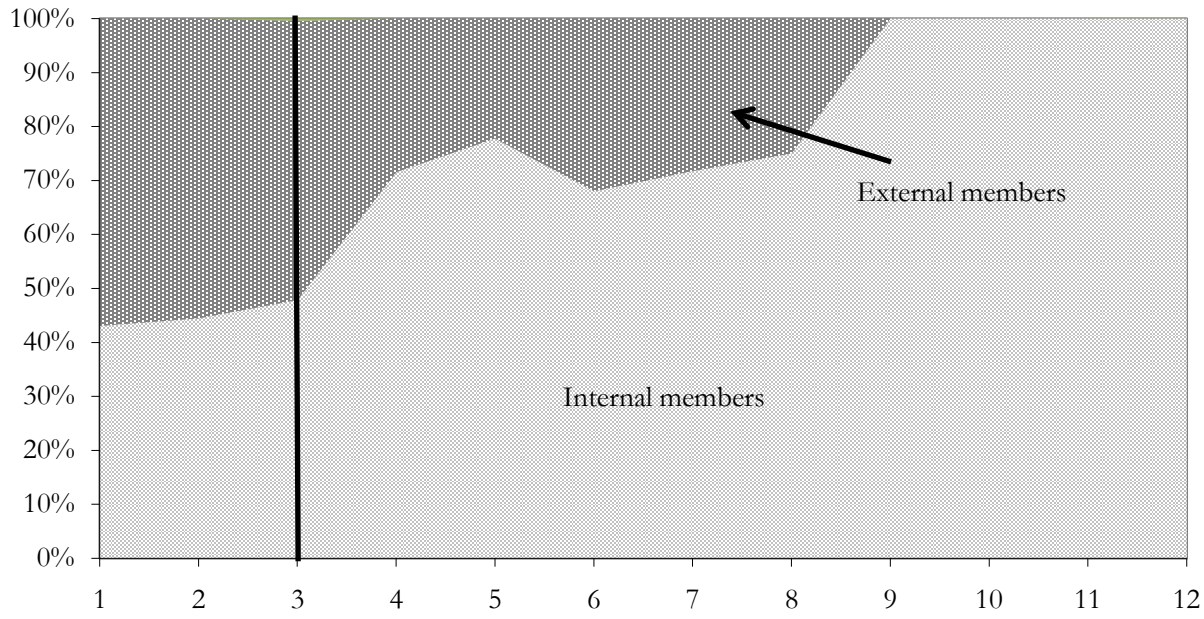


Table 2. Estimation results for panel regressions*

Equation:	(1)	(2)	(3)	(4)	(5)	(6)
	Conventional baseline	Drop after tenure year 3	Drop meetings 3-36	Modified baseline	Add experience effects	Add interaction effects
$Repo_{t-1}$	1.02 (0.01)***	1.02 (0.01)***	0.99 (0.01)***	0.99 (0.02)***	0.99 (0.02)***	0.98 (0.02)***
$E_t(\pi_{BOE,\, t+2} - \pi^*)$	0.60 (0.05)***	0.59 (0.06)***	0.71 (0.04)***	0.76 (0.05)***	0.76 (0.06)***	0.76 (0.06)***
$E_t(y_{BOE,\, t+1} - y^*)$	0.27 (0.03)***	0.31 (0.04)***	0.20 (0.02)**	0.19 (0.03)***	0.17 (0.03)**	0.16 (0.03)***
$E_t(\pi_{CF,\, t} - \pi^*)$						
$E_t(\pi_{CF,\, t+1} - \pi^*)$						
$E_t(y_{CF,\, t})$						
$E_t(y_{CF,\, t+1})$						
Internal	0.04 (0.02)*	0.04 (0.02)**	0.04 (0.02)*	0.04 (0.02)	0.04 (0.02)	-0.02 (0.03)
Exp2					0.00 (0.02)	-0.02 (0.02)
Exp3					-0.04 (0.02)	-0.10 (0.04)**
Exp2_int						0.04 (0.03)
Exp3_int						0.14 (0.04)***
R-squared	0.9767	0.9786	0.9647	0.9637	0.9642	0.9654
Observations	1216	784	926	494	494	494

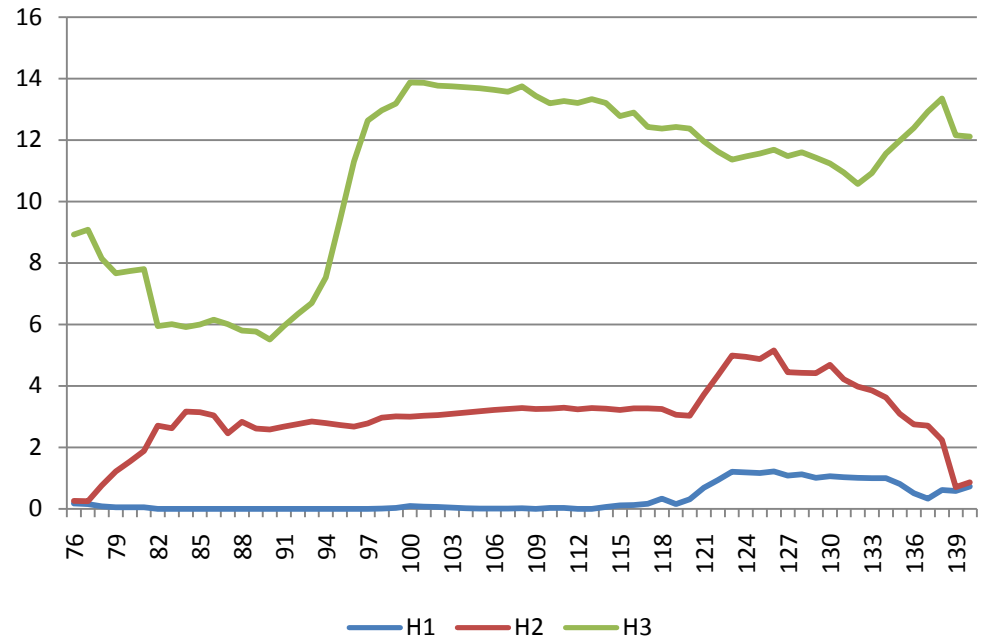
* Dependent variable in all equations (R_{it}) is the preferred policy rate of individual i at meeting t.
Estimation sample for equation (1) is August 1997 through December 2008, meetings 3 to 140 (meetings 1 and 2 are excluded due to data limitations).
All equations estimated by OLS with robust errors (in parentheses) clustered by individual; constant terms included but not reported.
***/**/* represents significance at the 1/5/10 percent levels, respectively.

Table 3. Hypothesis testing, specification (6)

Null Hypothesis	Coefficient test	F-statistic
H1: Member type is insignificant in tenure year 1.	Internal = 0	0.73
H2: Member type is insignificant in tenure year 2.	Internal = Exp2_int = 0	0.87
H3: Member type is insignificant in tenure year 3.	Internal = Exp3_int = 0	12.11***
H4: The second year of tenure is insignificant.	Exp2 = Exp2_int = 0	0.86
H5: The third year of tenure is insignificant.	Exp3 = Exp3_int = 0	10.47***

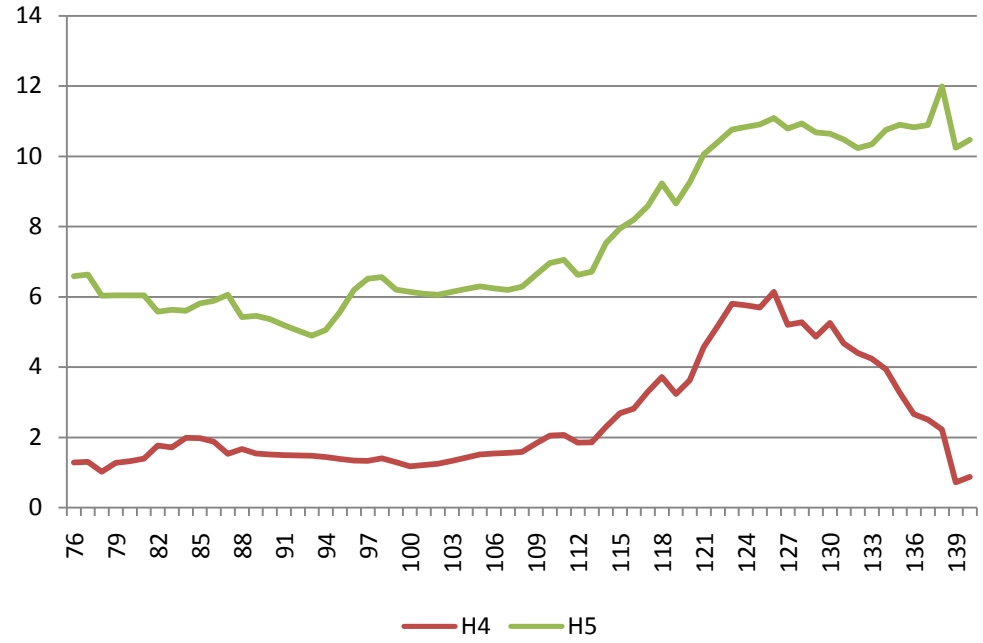
//* represents rejection of the null hypothesis (H0) at the 1/5/10 percent level, respectively.

Chart 2. Recursive F-values for Hypotheses 1-3, specification (6)*



* The y-axis measures the value of the F-statistic from recursive regressions. The first recursive regression is estimated for meeting 37 through meeting 76 (a 40-meeting window); the window size is increased by one for each subsequent regression. The value of the F-statistic is plotted at the last meeting of the estimation window.

Chart 3. Recursive F-values for Hypotheses 4-5, specification (6)*



* The y-axis measures the value of the F-statistic from recursive regressions. The first recursive regression is estimated for meeting 37 through meeting 76 (a 40-meeting window); the window size is increased by one for each subsequent regression. The value of the F-statistic is plotted at the last meeting of the estimation window.