Decade of dissent: explaining the dissent voting behavior of Bank of England MPC members

Harris, Mark and Spencer, Christopher

June 2008

Decade of Dissent: Explaining the Dissent Voting Behavior of Bank of England MPC Members *

Mark Harris
Monash University
mark.harris@buseco.monash.edu.au

Christopher Spencer
University of Surrey
cgspencer@hotmail.co.uk

June 2008

Abstract

We examine the dissent voting record of the Bank of England Monetary Policy Committee (MPC) in its first decade. Probit estimates indicate the impact of career experience on dissent voting is negligible, whereas the impact of forecast inflation is pronounced. In addition to finding a role for dynamics, we also find a role for unobserved heterogeneity in the form of member-specific fixed-effects, suggesting previous literature characterizing voting behavior as largely determined by whether members are appointed from within or outside the ranks of Bank of England staff (internal and external members respectively) is overly simplistic.

JEL Classification: C35, D7, E5.

Keywords: Bank of England, Monetary Policy Committee, career background effects, dissent voting, unobserved heterogeneity.

*This paper is a substantially re-worked version of "The Dissent Voting Behaviour of Bank of England MPC Members", University of Surrey Department of Economics Working Paper No. 03/06. Financial support from the ESRC gratefully acknowledged (ESRC Postgraduate Studentship R42200134224). Spencer would like to thank John Driffill, Stephen Drinkwater, Paul Levine, Joe Pearlman and Neil Rickman for helpful comments and suggestions. The usual disclaimer applies.

1 Introduction

A neglected aspect in the growing literature on Bank of England Monetary Policy Committee voting is the effect of career backgrounds and experience on dissent voting behavior. This is in contrast to the literature on FOMC decision making, where the policy choices of FOMC members, including dissent voting, is not only rigorously modeled as a function of members' career backgrounds, but found to be determined by such factors in econometric estimations (see for example, Havrilesky and Schweitzer 1990, Chappell et al. 1993, 2005, and more recently Adolph 2003). The conjecture that career experience may play a role in determining voting decisions at monthly Bank of England MPC meetings is thus not without empirical foundation, albeit based on evidence from its US counterpart. In setting out to address career experience effects, this paper extends the existing literature on MPC decision making in a number of ways. First, using binary and ordered probit analysis, we directly test the hypothesis that different career backgrounds affect members' decisions to cast dissenting votes: specifically, the impact of career experience on dissent voting is estimated as part of a wider strategy which also seeks to gauge the corresponding impact of the MPC's inflation and output projections, a member's 'type' (i.e., internal versus external member), and different chairmen. Significantly, our analysis draws on the theoretical model of Havrilesky and Schweitzer (1990) - hereafter the H-S model - which predicts that different career backgrounds directly influence a member's propensity to dissent on the side of monetary ease and tightness. In the context of this paper these backgrounds correspond to years spent working in the following areas or organizations: academia; the Bank of England; banking and finance; government; industry; and non-governmental organizations. Second, unobserved heterogeneity in the form of fixed and random effects is introduced into the estimation strategy. This innovation is driven by the observation that not all MPC members act in accordance with a view prevalent in the literature, that compared to MPC members appointed from within the ranks of bank staff, external MPC members choose lower interest rates (Gerlach-Kristen 2003), and are even characterized by loss functions which are more sympathetic to deviations of output from potential (Gerlach-Kristen, 2007). Both of these stylized facts may imply that external (internal) members are more predisposed to dissent on the side of monetary ease (tightness), something which in practice is clearly not observed across all members. The paper progresses as follows. We begin by relating our contribution to previous studies of MPC voting behavior. We then set out the H-S model, and in addition to this, examine why the frequency and nature of dissent voting associated with different MPC members might a priori be expected to differ: other than career background effects, we posit that

differences may be attributable to career concerns and the prospect of reappointment, the appointments procedure, and members' information sets and models of the economy. Evidence on the dissent voting behavior of MPC members from June 1997 – May 2007 is then presented. The H-S model is then taken to voting data, and the associated econometric evidence presented. The paper then concludes.

2 Relationship to the Literature

The voting behaviour of Bank of England MPC members is gaining increasing attention in the academic literature. In Gerlach-Kristen (2003), disagreements between members of the Bank's MPC typically constitute the rule, and not the exception. Internal members are shown to dissent more frequently than external members, and although the author does not appeal to econometric methods to model dissenting votes, a number of reasons are suggested as driving dissent. These include career concerns, media publicity deriving from the decision to dissent, and the information sets of MPC members. Using information on dissents, Gerlach-Kristen (2007) employs simulation methods to show that external members have asymmetric loss functions, and are more likely to respond to deviations below as opposed to above potential output. The same author (Gerlach-Kristen, 2004) also shows that disagreements at monthly meetings can predict interest rate changes. Focus on MPC voting is not confined to dissenting votes. Bhattacharjee and Holly (2005) exploit the heterogeneity in members' votes to shed light on the main determinants of MPC decisions, allowing for the distinction between internal and external members in their estimation approach. Spencer (2006) adopts a similar econometric approach to the current paper using an ordered probit model to estimate the reaction functions of MPC members. Similarly, Brooks *et al.* (2007) explain MPC voting using an *inflated ordered probit* (IOP) model comprising a two-equation system of a "long-run" equation capturing a binary decision to change or not change the interest-rate, and a "short-run" one based on a simple monetary policy rule. Other studies of voting in monetary policy committees have traditionally focused on the FOMC, with a large number falling into what Meade and Sheets (2005) call the 'partisan theory of politics' genre (for example, Belden 1989, Chappell et al. 1993, Havrilesky and Schweitzer 1990 and Krause 1996). Hallmarking many of these studies is a role for political influence through the FOMC appointments procedure and a prominent role for career backgrounds.[1] Chappell et al (1993) find that partisan behavior is partially attributable to the career backgrounds of FOMC members, noting that "experience in government, particularly at the Federal Reserve Board, is associated with significantly stronger preferences for monetary ease" (p.130). Adolph (2005)

uncovers similar findings, and more recently, Meade and Stasavage (2008) have introduced a role for career concerns, suggesting that members of a monetary policy committee are less likely to voice dissent when the transcripts of FOMC meetings are placed in the public domain.[2] As a primary motivation of this paper is to test the model of Havrilesky and Schweitzer (1990), it is to their contribution which attention now briefly turns.

3 Why Dissent? The H-S Model of Dissent Voting

Originally used to describe FOMC dissent voting, the H-S model is here both expounded and applied to the Bank of England MPC. The model is premised on the notion that the government has a time-consistent inflationary bias, a feature which is prevalent in the literature on monetary policy: here, MPC members whose career backgrounds lie closer to central government are more liable to conform to such bias, and the more one conforms to it, the greater the propensity to dissent on the side of monetary ease. Conversely, members whose experiences are relatively further from central government are more prone to dissent on the side of monetary tightness.

Havrilesky and Schweitzer also assume there is a utility and disutility associated with dissenting. Utility arises from a member believing it is *morally right* to dissent - this is why, even in the face of pressure to vote with the majority of MPC members, some individuals may choose to make their differing opinion known through recording a dissenting vote. On the other hand, disutility arises precisely because of the need for committee members to fall into line with each other. There is some anecdotal evidence to suggest this may in practice happen: recent work by Spencer (2006) shows that compared to external members, internals are significantly more prone to vote as a *bloc*. While this may reflect an institutional consensus amongst internal MPC members regarding the appropriate interest rate, it is not implausible to suppose that such members desist from voting against their colleagues specifically because they work for the same organization: the conjecture here is that voting against one's peers too often will be viewed in a dim light. Yet while dissent voting is not actively encouraged, the *individualistic* nature of the MPC[3] may lessen the stigma attached to dissenting: Nakahara (2001), for instance, cites former external MPC member DeAnne Julius as attributing dissent voting to *individually accountability*, without which members would "lose the incentive to make public their position at the voting stage even if they had voiced opposing views during the debate." We propose that while individual accountability may mitigate the stigma attached to dissenting, it does not eliminate in altogether.

3.1 Model

In setting out the formal model, we envisage an MPC composed of g members, each of whom may have amassed career experiences, for different durations, in j different fields. These experiences are referred to by H-S as a member's *career characteristics*.[4]

For member g we denote her j^{th} career characteristic as X_{gj}, such that $\overline{X}_j$ represents the MPC's mean for that characteristic. So-called 'career proximity' to central government is increasing in $X_{gj} - \overline{X}_j$ such that $X_{gj} - \overline{X}_j > 0$ (< 0) promotes dissents on the side of monetary ease (tightness). As $X_{gj} - \overline{X}_j > 0$ (< 0) becomes larger (smaller), so too does the propensity to dissent on the side of ease (tightness). However, given there are j characteristics, the extent to which a given MPC member dissents is ultimately a function of how each characteristic is weighted. We are now in a position to write an expression for member g's *utility*, namely

$$U_g(D_g) = U(D_g \mid X_{gj} - \overline{X}_j, j = 1, 2, ..., N) \tag{1}$$

where $\frac{\partial U}{\partial (D_g - \overline{D}_g)} < 0$ and $\frac{\partial^2 U}{\partial (D_g - \overline{D}_g)^2} > 0$. In (1), the utility achieved by member g is a function of the number of dissenting votes cast, the direction and number of which is conditioned by career proximity parameters, $X_{gj} - \overline{X}_j, j = 1, 2, ..., N$. It is further assumed that (1) is characterized by a unique global maximum, which defines the optimal number of dissenting votes, $\overline{D}_g$. It turns out that the actual number of dissents cast by member g, D_g, will not necessarily equal the number of dissents which maximize utility. This is because members also experience *disutility*, an expression for which is given by

$$V_g(D_g) = V(D_g \mid X_{gj} - \overline{X}_j, j = 1, 2, ..., N) \tag{2}$$

which has a unique global minimum at $D_g = 0$. Here, the assumed properties of $V_g(D_g)$ – $\frac{\partial V}{\partial D_g} > 0$ and $\frac{\partial^2 V}{\partial D_g^2} < 0$ – imply that as the number of dissents moves further away from zero, the disutility felt by member g increases at an increasing rate.

It is easily shown that when the marginal utility of increasing dissent equals the marginal disutility of increasing dissent, member g's net utility will satisfy an unconstrained maximum where:

$$\frac{\partial U}{\partial D_g} = \frac{\partial V}{\partial D_g}. \tag{3}$$

Put another way, marginal net utility must be zero. To glean the normative implications of the model, H-S consider the conditions required to ensure a monotonic transformation from the weighted career characteristic differences, $X_{gj} - \overline{X}_j$, to the actual number of dissents, D_g. Due to the nature of the first order conditions for *utility* and *disutility* in (1)

and (2), the actual number of dissents is not guaranteed to map monotonically onto career characteristic differences. Ensuring such a transformation requires the restriction that the marginal net utility of the j^{th} member increasing dissent towards her global optimum is strictly less than that pertaining to the $(j + k^{th})$ member: as Havrilesky and Schweitzer state, this holds the implication that "a member with marginally stronger moral convictions in favor of dissenting cannot be marginally more easily cowed by group...disapproval".

3.2 Beyond Career Characteristics

In addition to the effect of career characteristics, a number of additional factors may inform the decision to dissent: these include the appointments procedure, tenure lengths, prospects for reappointment and career concerns, members' views about underlying structure of the economy, and members' information sets.

The UK government does not play a role in all MPC appointments. The Governor and the two Deputy Governors who sit on the MPC as *internal members* are all Crown appointments, and although statutes prescribe that the two remaining internal members (who are Executive Directors with responsibilities for different areas of banking operations) are appointed to their positions by the Governor only *after* the Chancellor of the Exchequer has been consulted, in practice, the Chancellor has little say in the matter.[5] All external members are chosen directly by the Chancellor. Drawing on the central bank independence literature (Grilli *et al.* 1991, Cukierman *et al.* 1992), it might be argued that from an appointments perspective, the Executive Directors enjoy most independence from the government, which is likely to promote dissents on the side on monetary tightness.[6]

The central bank independence literature also suggests that longer term lengths increase a central bank's so called *political independence* from the government (Grilli *et al.* 1991). This is of interest insofar as both the Governor and two aforementioned Deputy Governors are appointed for five year renewable terms, whereas all other MPC members serve shorter three year renewable terms. In enjoying longer term lengths, the Governor and the two Deputy Governors may be less susceptible to governmental pressure to reduce interest rates. On this analysis, external (internal) members emerge as the least (most) independent of all MPC members, making them more (less) likely to dissent on the side of monetary ease.[7] *Further, what emerges from the preceding discussion of both tenure length and appointments is that external members emerge as being the least independent of MPC members, which suggests closest proximity to government.* From an econometric perspective, this characteristic can be thought of as being implicitly embodied, for example, in a dummy variable which captures the internal-external distinction.

There may also be a role for career concerns, particularly if some MPC members

perceive a link between voting behavior and *reappointment*. This prospect has been recognized by members of the UK political establishment - Howard (2000) suggests that if one is seeking reappointment, then voting for lower, as opposed to higher interest rates may secure a second term. Yet there is little evidence to support this conjecture: first, results from our econometric estimations do not support this hypothesis; second, Mervyn King, who was reappointed to succeed Eddie George as Governor of the Bank and thus Chairman of the MPC cast *more* dissenting votes on the side of monetary tightness than any other MPC member up to the time of his reappointment.

Finally, different MPC members will invariably hold different views about the underlying structure of the economy, and be exposed and receptive to different sources of economic information. As Blinder (2007) notes, even when faced with the same information (for example, as presented at the Bank's monthly 'pre-MPC' meeting), different MPC members may have contrasting views as to the appropriate policy stance. As all of these factors represent potential sources of disagreement regarding interest rate policy, this may lead to dissent voting.[8]

4 Dissenting Votes

All voting data is obtained from the *Minutes of MPC Meetings*, which identifies who the dissenting voters are at each meeting, and whether they dissented on the side of ease or tightness. We define two types of dissent voting: *dissent for tighter policy* and *dissent for looser policy*. There are important caveats to these definitions, which are expounded as follows:

(*i*) **Dissent for tighter policy**: Defined as where a member votes for a higher short-term interest-rate than the rate chosen by the winning majority of MPC members. A member may vote for no change or a decrease in the interest-rate but still be classed as dissenting for tighter policy if the rate chosen by the MPC is lower than their chosen rate.
(*ii*) **Dissent for looser policy**: Defined as where a member votes for a lower short-term interest-rate than the rate chosen by the winning majority of MPC members. A member may vote for no change or an increase in the interest-rate but still be classed as dissenting for looser policy if the rate chosen by the MPC is higher than their chosen rate.

Finally, we also find it useful to define as *assenting* vote as one which is cast in agreement with the the winning majority of MPC members at each meeting.

Table 1: Number of Dissenting Votes Cast by the MPC, June 1997-May 2007[a]

	Ease Dissents	Tightness Dissents	All Dissents
All Members	83(7.9)[b]	70(6.6)	153(14.5)
Internal Members	10(1.0)	41(3.9)	51(4.8)
External Members	73(6.9)	29(2.7)	102(9.7)

[a]Results based on data from 121 meetings.
[b]Figures in round brackets $(\cdot)$ express number of dissenting votes cast as a percentage of all 1057 votes cast.

4.1 The MPC's Dissent Voting Record

The paper now turns to the empirics. We show that while internal and external members exhibit different voting patterns in the aggregate - as is evidenced in the literature (see for example Gerlach-Kristen 2003) - such stylized facts mask considerable voter heterogeneity within groups.

Table 1 documents the dissent voting behavior associated with the MPC. Columns (a) and (b) show the number of dissenting votes cast on the side of ease and tightness respectively. Column (c) shows the total number of dissenting votes, irrespective of direction.[9] Figures in round brackets (.) express the number of dissenting votes cast as a percentage of all votes cast.

When all votes are considered (irrespective of a member's internal or external status), dissenting votes cast for monetary ease and tightness are split relatively evenly (83 vs. 70 votes). This similarity is, however, deceptive: at a more disaggregated level, the pattern of dissenting votes appears very different for internal and external members. External members dissented exactly twice as often as internal members (102 vs. 51 votes), despite casting fewer votes than internal members (591 vs. 466 votes). On average, just over one in every five votes cast by external members was dissenting. This figure is just under one in ten for internal members. Further, both groups cast dissenting votes at a rate of *less* than one per meeting: external (internal) members on average cast four (two) dissenting votes every five meetings.[10] A two sample test of proportions (against a null of no difference) accepts the hypothesis that external members dissent more often than internal members ($z = 6.083$, $p = 0$). Turning to the *composition* of dissents, whereas internal members are prone to dissenting on the side of tightness, external members do so on the side of monetary ease. Approximately 75 percent of all dissenting votes cast by external members are for looser policy, as opposed to around thirteen percent for internal members.

Yet as suggested previously, focusing on the disparity between internal and external members may be too simplistic a device to characterize MPC voting. This is reflected in Table 2, which shows the dissent voting behavior of MPC members at an individual level. Out of the fourteen external members in the sample, six members (Buiter, Goodhart,

Table 2: Number of Dissenting Votes Cast by Individual MPC Members, June 1997-May 2007

Internal Members	Votes[a]	Ease Dissents	Tightness Dissents	All Dissents
Eddie George	74	0	0	0
Howard Davies	2	0	0	0
Mervyn King	121	0	13	13
Ian Plenderleith	61	2	3	5
David Clementi	61	1	3	4
John Vickers	28	0	5	5
Charles Bean	81	4	0	4
Paul Tucker	60	1	6	7
Andrew Large	40	0	9	9
Rachel Lomax	47	2	2	4
John Gieve	16	0	0	0
Total		10	41	51
External Members				
Willem Buiter	36	8	9	17
Charles Goodhart	36	0	3	3
DeAnne Julius	45	14	0	14
Sir Alan Budd	18	0	4	4
Sushil Wadhwani	37	13	0	13
Stephen Nickell	73	13	4	17
Christopher Allsopp	37	11	0	11
Kate Barker	61	4	1	5
Marian Bell	36	5	0	5
Richard Lambert	34	0	0	0
David Walton	12	1	2	3
David Blanchflower	12	4	0	4
Tim Besley	9	0	3	3
Andrew Sentance	8	0	3	3
Total		73	29	102

[a]Denotes total number of votes cast by each member

Budd, Walton, Besley and Sentance) cast more dissenting votes on the side of tightness than ease. Moreover, the reputation for externals to cast dissenting votes on the side of monetary ease seems to be driven by just four individuals: Julius, Wadhwani, Nickell and Allsopp. Excluding Buiter, whose numerous tightness dissents are balanced by a significant number of ease dissents, and Lambert, who did not dissent, the remaining members cast only a modest amount of ease dissents. In short, externals are seen to exhibit considerable heterogeneity in their dissent voting behavior. Turning to internal members, two individuals - Mervyn King and Andrew Large - might be viewed as driving tightness dissents. Moreover, once King is omitted from the sample, the total number of tightness dissents cast by internals fall to a figure below that of externals (28 vs. 29 votes). Further, while internals are less prone to cast dissenting votes *per se* (put another way, they are far more likely to be on the winning side of a decision), four members (excluding Davies who cast only two votes) buck the trend that internals are more likely to dissent on the side of tightness – Bean, Lomax, Gieve and George. The reason for George casting no dissents may be precisely down to his role MPC Chairman between June 1997 - May 2003: he was never on the losing side of a decision due to his power to make the policy proposal at each meeting.[11]

5 Career Background Data

Prior to estimation, we first define our variables. To capture career background effects, a series of covariates proxying members' career characteristics are constructed. Career backgrounds are categorized according to years spent working in six broadly defined categories:[12]

(i) Academia - refers to years working at a university in an academic capacity.
(ii) Bank - denotes the number of years employed at the Bank of England.
(iii) Finance - refers to positions held in banking and finance.
(iv) Government - denotes years spent working in the civil service or for the UK Government.
(v) Industry - refers to years spent an economist in industry.
(vi) NGO - refers to non-governmental organizations. This covers both national and international independent research organizations such the Organization for Economic Cooperation and Development (OECD), and transnational institutions such as the International Monetary Fund (IMF), World Trade Organization (WTO) and Bank for International Settlements (BIS).

Our classification system covers only full time positions and secondments held by MPC members up to but not including time working on the MPC; excluded from the criteria are all part-time positions, special advisory roles and academic consulting. Consequently, all time served on the MPC - which technically constitutes a full-time position working for the Bank of England - is purposely neglected.

We assume that backgrounds in academia, finance, at the Bank of England and NGOs promote tightness dissents: in the case of academia, this reflects the large impact of the literature on time-consistent monetary policy, and the view that experience in academia promotes independent thinking hence lowering members' susceptibility to yield to short-run political pressures. Experience at the Bank of England is assumed to engender an acute aware of the inflationary consequences of activist monetary policy, thus promoting tightness dissents. For 'career' central bankers, dissenting on the side of monetary tightness may also be used to signal their credentials as being 'conservative' or 'inflation-averse'. Finally, the inclusion of finance and NGOs reflects a view that such careers are removed from governmental power and influence. We also propose that time spent in industry and government will promote ease dissents. In the case of industry, while rising prices may imply higher wage claims and thus rising costs for the firm (prompting calls for the monetary authorities to bring inflation under control through tightening interest rates), ease dissents are more likely to be promoted as higher interest rates hit the ability of firms to invest and borrow, reduce consumer expenditure, and reduce the international competitiveness of products for export through exchange rate effects.

For the purposes of econometric estimation, and in line with H-S, these variables are subsequently manipulated: for each MPC member, experience within each career category is expressed as the difference between the number of years spent working in that category and the committee mean for that category. From Table 3, it can be thus be inferred that the Committee means for career experience, and thus career experience variables - which we label Acad_D, Bank_D, Fin_D, Govt_D, Ind_D and NGO_D, where D denotes 'deviation from the committee mean' - will vary over time due to members' overlapping terms. Indeed, the nature of overlapping terms is shown in Table 3. On average, the composition of the MPC changed approximately every six months, raising the prospect that over the sample period, as different personalities both entered and left the group, the decision making dynamics of the committee underwent considerable change.

Table 3: The Changing Composition of the MPC, June 1997-May 2007[a]

Period	Number of Meetings	MPC Size	Change in Membership	Members	
				Internal Members	External Members
Jun 1997-Jul 1997:	2	6	0	George, Davies, King, Plenderleith	Buiter, Goodhart
Aug 1997:	1	5	-1	George, King, Buiter, Goodhart, Plenderleith	Buiter, Goodhart
Sep 1997-Nov 1997:	3	7	$+1$	George, King, Plenderleith, Clementi	Buiter, Goodhart, Julius
Dec 1997-May 1998:	6	8	$+1$	George, King, Plenderleith, Clementi	Buiter, Goodhart, Julius, Budd
Jun 1998-May 1999:	12	9	$+1$	George, King, Plenderleith, Clementi, Vickers	Buiter, Goodhart, Julius, Budd
Jun 1999-May 2000:	12	9	$-1, +1$	George, King, Plenderleith, Clementi, Vickers	Buiter, Goodhart, Julius, Wadhwani
Jun 2000-Sep 2000:	4	9	$-2, +2$	George, King, Plenderleith, Clementi, Vickers	Julius, Wadhwani, Allsopp, Nickell
Oct 2000-May 2001:	9	9	$-1, +1$	George, King, Plenderleith, Clementi, Bean	Julius, Wadhwani, Allsopp, Nickell
Jun 2001-May 2002[†]	12	9	$-1, +1$	George, King, Plenderleith, Clementi, Bean	Wadhwani, Allsopp, Nickell, Barker
Jun 2002:	1	8	$-2, +1$	George, King, Clementi, Bean, Tucker	Allsopp, Nickell, Barker
Jul 2002-Aug 2002:	2	9	$+1$	George, King, Clementi, Bean,Tucker	Allsopp, Nickell, Barker, Bell
Sep 2002:	1	8	-1	George, King, Bean, Tucker	Allsopp, Nickell, Barker, Bell
Oct 2002-May 2003:	8	9	$+1$	George, King, Bean,Tucker, Large	Allsopp, Nickell, Barker, Bell
Jun 2003:	1	9	$-1, +1$	George, King, Bean,Tucker, Large	Nickell, Barker, Bell, Lambert
Jul 2003-Jun 2005:	24	9	$-1, +1$	King, Bean, Tucker, Large, Lomax	Nickell, Barker, Bell, Lambert
Jul 2005-Jan 2006:	7	9	$-1, +1$	King, Bean, Tucker, Large, Lomax	Nickell, Barker, Lambert, Walton
Feb 2006-Mar 2006:	2	9	$-1, +1$	King, Bean, Tucker,Lomax, Gieve	Nickell, Barker, Lambert, Walton
Apr 2006-May 2006:	2	8	-1	King, Bean,Tucker, Lomax, Gieve	Nickell, Barker, Walton
Jun 2006:	1	8	$-1, +1$	King, Bean, Tucker, Lomax, Gieve	Barker, Walton, Blanchflower
Jul-Aug 2006:	2	7	-1	King, Bean,Tucker, Lomax, Gieve,	Barker, Blanchflower
Sep 2006:	1	8	$+1$	King, Bean, Tucker, Lomax, Gieve	Barker, Blanchflower, Besley
Oct 2006 - May 2007	8	9	$+1$	King, Bean, Tucker, Lomax, Gieve,	Barker, Blanchflower, Besley, Sentance

[a]Includes the emergency MPC meeting of 18^{th} September 2001.

Table 4: MPC Members' ease and tightness dissenting votes explained by differences between their career characteristics and Committee means for those characteristics[a]

Constant	Acad_D	Bank_D	Fin_D	Gov_D	Ind_D	NGO_D
−0.186	0.021	0.1162	0.0056	0.0529	0.3433	−0.889
(0.162)	(0.019)	(0.029)***	(0.030)	(0.023)**	(0.063)***	(0.135)***

Summary Statistics	
AIC	BIC
150.989	172.209

[a]Robust standard errors in round (·) brackets. No of obs = 153.
***/**/*Denotes two-tailed significance at the 1%/5%/10% level.

5.1 Estimation

5.1.1 Binary Probit (BP) Estimates

The first set of regressions is based on a truncated dataset comprising only the dissenting votes cast by MPC members ($n = 153$), and is analogous to the estimation in Havrilesky and Schweitzer (1990). Specifically, we estimate a binary probit (BP) regression of the form

$$\begin{aligned} Z_{gt} &= \beta_0 + \beta_1 \mathsf{Acad}_D + \beta_2\, \mathsf{Bank}_D + \beta_3 \mathsf{Fin}_D \\ &\quad + \beta_4\, \mathsf{Gov}_D + \beta_5 \mathsf{Ind}_D + \beta_6 \mathsf{NGO}_D + u_j \end{aligned} \tag{4}$$

where $Z_{gt} = 1$ (0) denotes a dissenting vote on the side of monetary tightness (ease). Results are presented in Table 4, and suggest that while career experience in academia and finance do not contribute to a member's propensity to dissent in either direction, years spent at the Bank of England, and in Government and Industry, promote tightness dissents, whereas NGO experience promotes dissents on the side of monetary ease. Clearly, many of these results run contrary to our predictions: other than time spent at the Bank of England, career effects in every statistically significant category have the *opposite* effect than expected.

5.1.2 Potential Shortcomings

The estimation strategy outlined above using (4) suffers from a number of shortcomings. First, it ignores all votes cast in *agreement* with the policy proposal (assenting votes) and as such, we may be wasting information contained in the voting record. Second, our estimations do not control for the presence of other factors which determine the decision to dissent (consequently, for example, omitted variable bias may be present). Third, and building on the first point, through ignoring *assenting* votes, the small sample size precludes us from pursuing estimation strategies which condition on unobserved heterogeneity

or address dynamics. We return to the issue of dynamics in Section 5.2.

To address the first shortcoming we extend the econometric framework such that when voting on the policy proposal, MPC members are viewed as being faced with three mutually exclusive choices: to dissent on the side of ease, to assent, or to dissent on the side of monetary tightness. A natural candidate for modeling such behavior is the ordered probit (OP) model,

$$\mathsf{Z}^*_{gt} = \mathbf{x}^{'}_{gt}\beta + \varepsilon_{gt} \tag{5}$$

$$\mathsf{Z}_{gt} = -1 \text{ if } \mathsf{Z}^*_{gt} \leq \gamma_1$$

$$\mathsf{Z}_{gt} = 0 \text{ if } \gamma_1 < \mathsf{Z}^*_{gt} \leq \gamma_2 \tag{6}$$

$$\mathsf{Z}_{gt} = 1 \text{ if } \mathsf{Z}^*_{gt} > \gamma_2$$

where Z^*_{gt} is a stacked $m \times 1$ vector of $-1s$, $0s$ and $1s$ corresponding to members' votes to dissent for looser policy, assent, or dissent for tighter policy. x_i is a $m \times h$ matrix containing h independent variables, and β is a $1 \times h$ vector of parameter estimates.

To address the second shortcoming, the $\mathbf{x_{gt}}$ matrix contains the covariates listed in (4) plus the following: Type is a binary variable where a one (zero) is assigned if a member is an internal (external) member. Based on the discussions presented in Sections 2 and 4.1 a positive sign is expected, reflecting the more general finding in Gerlach-Kristen (2003) that whereas internal (external) members are more likely to dissent on the side of monetary tightness (ease). To control for economic conditions, we construct Taylor-rule type covariates based on the MPC's in-house inflation and output growth forecasts as published in the Bank's quarterly *Inflation Report*. Forecast horizons in line with views expressed by the MPC (Bank of England, 1999) that interest-rate changes take two years to maximally impact inflation, and approximately one year for output are chosen. The published modal projections are then 'adjusted' following Goodhart (2005),[13] and are expressed in deviation form: specifically, output growth minus potential (assumed to be 2.4 percent p.a.) and the deviation of inflation from target: we denote these forecasts π_G and GDP_G.[14] To account for the possibility that internal and external members may not respond equally to changes in macroeconomic conditions (based on the discussion of members' information sets and economic models in Section 3.2), two interaction terms are introduced, ($\mathsf{Type} \times \mathsf{GDP}_G$) and ($\mathsf{Type} \times \pi_G$). Lastly, to capture the impact under different MPC chairmen (Governors George and King), we include the binary variable Chair, which assumes a value of one (zero) if King (George). We note here that two additional variables - a dummy to capture the impact of gender, and a reappointment dummy to proxy for the role of career concerns - were introduced, but subsequently dropped from estimations

as they proved to be consistently insignificant.

We now address the third shortcoming. As there are repeated observations for individual MPC members, it is possible to condition on unobserved individual heterogeneity by augmenting equation (5) to include an *unobserved effect*, α_g:

$$\mathsf{Z}^*_{gt} = \mathbf{x}'_{gt}\beta + \alpha_g + \varepsilon_{gt}. \tag{7}$$

This begs the question of how to treat the α_g. Whilst non-linear panel data estimation has traditionally focussed on treating unobserved heterogeneity as random due to the 'incidental parameters' problem (Neyman and Scott, 1948), recent developments suggest that nature of our sample permits a fixed-effects estimation strategy. Specifically, we are in a position contrary to that typically observed in the panel data literature, with small cross-sectional component relative to the sample (i.e., large T and small N). The overwhelming majority of the 25 MPC members in the sample are observed over a relatively large time period ($t = 1, \ldots, T_i$): other than Davies ($T_i = 2$) - who was removed from the sample due to an insufficient number of observations - the number of time periods ranged from $T_i = 8$ (Besley) to $T_i = 121$ (King). Heckman (1981) suggests that a temporal sample size of $T = 8$ is sufficient for any significant fixed T bias to have essentially disappeared. Greene (2004) provides further evidence, citing a significant reduction in biases from $T = 3$ onwards. In light of these arguments, we include fixed-effects dummies for all MPC members bar Davies. This amounts to relaxing the commonly maintained assumption of

$$E\left(\mathbf{x}'_{gt}\alpha_g\right) = 0, \ \forall g, t. \tag{8}$$

The baseline equation on which estimation is based hence becomes

$$\mathsf{Z}^*_{gt} = \mathbf{x}'_{gt}\beta + \alpha_g D_g + \varepsilon_{gt}, \tag{9}$$

where D_g represents a dummy variable for member g.

5.1.3 Ordered Probit (OP) Estimates

Estimates for the ordered probit model are shown in Table 5. Huber-White (robust) standard errors are given in round (.) brackets, with corresponding levels of significance, where ***,**,* denote 1, 5 and 10 percent levels respectively. AIC and BIC denote the Akaike and Bayesian information criteria, where a smaller value suggests a better specification. Model 1 is the OP analogue of equation (4), and can be viewed as a 'baseline' specification: indeed, the results are qualitatively the same as in Table 4, albeit the magnitude of the

parameters fall substantially for each covariate. Whereas Model 2 controls for economic conditions and Chairman effects, in Model 3 this is augmented to control for the impact of a member's internal or external status through introducing the Type dummy and interaction terms. Clearly, career background parameters are very robust to specification change, and the inclusion of additional variables in Models 2-3 does not drastically affect their values significantly. Such a move is also desirable based on AIC and BIC grounds. Further, in Models 1 to 3, the joint hypothesis of career backgrounds having *no* significant effect in driving dissent was rejected outright. Yet as is the case for BP estimation, many of the career effect results run contrary to our predictions, and where career variables are highly significant, the impact on dissent voting is negligible (this assertion is also based on calculating *marginal effects*, which are not reported here).

The fixed-effects specification (Model 4) excludes career characteristics for two reasons: first, inclusion of career covariates generated fixed-effects estimates which were nonsensical.[15] A possible explanation for this finding outcome is that career covariates are highly correlated with member dummies, and although they vary across time for each member, they may lack sufficient variation to avoid collinearity. Second, because career experience is by *definition* specific to each member, it represents an individual characteristic, which in addition to factors such as a member's information set and model of the economy, is already captured by a member's fixed-effects dummy. Crucially, most member dummies exhibited significance at the five percent level or less, and a test of the hypothesis that fixed-effects dummies are jointly insignificant was rejected outright, ($\chi^2_{22} = 153.16$, $p = 0.000$), as was a test for the joint equality of coefficients ($\chi^2_{22} = 164.24$, $p = 0.000$). Most member dummies are also negatively signed. This reflects the fact that King (the omitted dummy) cast a substantial number of tightness dissents relative to other members. Coupled with the tests of equality and joint significance, the number of statistically significant dummies is indicative of considerable voter heterogeneity.

Some commentary on the additional covariates in Models 2-4 is also appropriate: while π_G and GDP_G are highly significant across all specifications, GDP_G is negatively (and thus not correctly) signed. This result was not anticipated, and is not easy explained. Saying this, the magnitude of the π_G parameter is substantially greater than that corresponding to GDP_G, implying deviations from target inflation play a much larger role in driving dissent than comparable deviations of GDP growth from its assumed trend. Finally, the significance of the Type dummy and both interaction terms in Model 3, provides support for the notion that internal and external members respond differently to changes in macroeconomic conditions. The significance of the inflation interaction term in model 3 and is of some interest: it suggests that as forecast inflation moves further from its target

rate, some members react differently to others, favoring different interest rates. In turn this leads to disagreements, thus giving rise to dissenting votes. This finding is consistent with the earlier conjecture that not all members have the 'same model' of the economy in their heads. It is also reinforced by the significance of members' fixed effects dummies, which we assume embody such differences of opinion, in models 4. Finally, the effect under different the chairman is ambiguous – parameter estimates for Models 2 to 4 range from negative and marginally significant (Model 2), insignificant (Model 3) to positive and significant (Model 4).

In terms of model selection, the information criteria do not select any model unanimously: according to BIC, Model 3 performs best, while Model 4 is preferred by AIC. In some respects, this result is unsurprising: due to its asymptotic consistency and its heavy penalty on complexity, BIC typically selects more parsimonious specifications. Conversely, AIC often chooses less parsimonious specifications as complexity is not so heavily penalized, especially for small or moderate sample sizes. However, it is notable that alternative goodness of fit measures not reported here (McFadden's R^2 and Adjusted R^2, Cox-Snell Maximum Likelihood R^2, Cragg-Uhler R^2 and McKelvey and Zavoina's R^2) all identify Model 4 as having the best explanatory power.[16]

5.2 Dynamics

As a final innovation, we introduce dynamics in the form of lagging the dependent variable by a single period. This is a potentially attractive innovation: from a behavioral perspective, it addresses the possibility that the period t decision to dissent may be partially determined by the $t-1$ decision to dissent. Put another way, a consequence of dissenting in period $t-1$ is that the choice to dissent next period may be different than if the individual had assented. Further, the inclusion of dynamics allows us to examine the extent to which past dissents play a role in predicting future dissents.

Given estimation strategies for dynamic panels are typically designed to address bias arising for small T and large N - a situation we are in a contrary position to – we assume any potential bias arising in our estimations disappears, or is negligible in size (the vast majority of individuals in the sample have $T > 30$, with an average number of 43 observations per member).[17] Also, the fact that lags may be correlated with the fixed effects is of less concern than under random effects, where the assumption of zero correlation between the random effects and all explanatory variables (see equation (8)) would be violated. We therefore augment the OP specifications in Table 5 with two indicator variables for the

lagged dependent variable $\mathsf{Z}^*_{g,t-1}$:

$$\mathsf{Z}^*_{gt} = \varphi_0 \mathbb{Z}^{\mathsf{ease}}_{g,t-1} + \varphi_2 \mathbb{Z}^{\mathsf{tightness}}_{g,t-1} + \mathbf{x}'_{gt}\beta + \alpha_g D_g + \varepsilon_{gt}, \tag{10}$$

where φ_0 and φ_2 are parameters to be estimated and $\mathbb{Z}^{\mathsf{ease}}_{g,t-1}$ ($\mathbb{Z}^{\mathsf{tightness}}_{g,t-1}$) is an indicator variable constructed from $\mathsf{Z}^*_{g,t-1}$, such that a value of one denotes a dissenting vote on the side of ease (tightness) and a zero denotes otherwise. Table 6 shows the results. To make the impact of adding lags more readily comparable with the static specifications in Table 5, their dynamic counterparts are labelled Model 1_L, Model 2_L, Model 3_L and Model 4_L, where the last specification in Table 6 excludes career characteristics for reasons noted previously.[18]

According to AIC and BIC measures, each dynamic specification outperforms its static counterpart. Significantly, results bear a strong resemblance to those in Table 5: the qualitiative findings are virtually identical, and are clearly robust to the inclusion of the extra lag variables. This is also true for joint tests of insignificance and coefficient equality for the fixed-effects dummies in Model 4_L, which were again overwhelmingly rejected. We thus restrict our focus to the predictive impact of the lag variables.

The effect of adding lags is illustrated in Table 7, where predictions of Model 3_L are generated by holding career variables at their means and setting $\mathsf{GDP}_G{=}\pi_G{=}0$. For simplicity we focus on the internal-external distinction (through setting Type to one or zero), and compare the predicted probabilities associated with each group of: (i) dissenting on the side of ease in period t under $\mathbb{Z}^{\mathsf{ease}}_{g,t-1} = 0$ and $\mathbb{Z}^{\mathsf{ease}}_{g,t-1} = 1$; and (ii) dissenting on the side of tightness in period t under $\mathbb{Z}^{\mathsf{tightness}}_{g,t-1} = 0$ and $\mathbb{Z}^{\mathsf{tightness}}_{g,t-1} = 1$. In (i) we also base our calculations on the condition that when $\mathbb{Z}^{\mathsf{ease}}_{g,t-1} = 0$, $\mathbb{Z}^{\mathsf{tightness}}_{g,t-1} = 0$. Equivalent conditions are imposed under (ii).[19] Results show that for internal and external members alike, a dissent in $t-1$ substantially raises the probability of casting the same type of dissenting vote in the following period: the increases in probability lie between 0.26 and 0.39 (as shown in the rows labeled 'Difference'). This finding suggests past dissenting behavior influences current dissenting behavior.

6 Conclusion

At the outset of this paper, we set out to explain the type and frequency of dissenting votes cast by MPC members, with emphasis on career background effects. To motivate the issue of dissent voting, we re-visited the contribution of Havrilesky and Schweitzer (1990), and applied it to the Bank of England's MPC. In addition to this, we rationalized why discrepancies between internal and external members might arise, and proposed the

internal-external distinction was too simplistic: voting patterns exhibit considerable heterogeneity across *all* members. The econometric evidence presents something of a 'career background puzzle' – unlike the FOMC literature, career experience plays a *very* weak role in determining a member's decision to dissent: moreover, where career backgrounds are significant, they are often counter-intuitively signed. Other evidence was mixed. While the role of different chairmen is ambiguous, the deviation of the MPC's inflation forecast from target is consistently significant, correctly signed, and relative to other parameters exerts the largest impact on a member's decision to dissent. This is, arguably, not unexpected for an institution such as the Bank of England, whose primary objective is to target inflation. Finally, we identified a significant role for dynamics, where a dissent for monetary ease or tightness increases the likelihood of it being followed by a dissent in the same direction.

Future work in this area might compare the determinants of dissent voting in different monetary institutions such as the US Federal Reserve, Swedish Riksbank and Bank of Japan. Moreover, as more central banks delegate monetary policy to committees, and place the voting record in the public domain, investigation of this issue can only heighten our understanding of monetary policy, and of the individuals and institutions that shape it.

Notes

[1]However, it is worth noting here that FOMC studies are geared towards the institutional nuances of the US Federal Reserve and political system. As our entire sample period falls within the incumbency of the British Labour Party, appealing to political partisanship to explain dissent voting is rendered less plausible than for FOMC studies where the monetary policy preferences of individual members are modeled as a function of the political affiliation of the individuals who appointed them. Such studies typically cover periods encompassing different political administrations, Republican and Democrat. For example, Chappell et al (1993) find that the power of appointment provides 'an important channel of systematic partisan influence' (p.209).

[2]Under sequential voting (the practice currently enjoyed by MPC members) the presence of career concerns may also have consequences for voting outcomes, a view espoused in the herding literature. If committee members simply echo the choice of the first member to declare her view, not only might a "false consensus will be achieved" and members' information wasted (Scharfstein and Stein, 1990, pp.477-478), but internal members may simply 'follow the leader', falling in line with the Governor who frames the policy question on which MPC members vote. For this reason, the UK government has aired views to the effect that it would prefer MPC members to vote simultaneously. We do not model this scenario in this paper. (*Response of the Government to the Report of the House of Lords Select Committee on the Monetary Policy Committee of the Bank of England*, HL Paper 34, Session 2000-01.)

[3]See for example Blinder and Wyplosz (2004) and Blinder (2007).

[4]The practical analogue of these j characteristics would be experiences in different sectors or areas of the economy, such as private industry and finance. These measures are developed in Section 5.

[5]We thank Charles Goodhart for clarifying this matter.

[6]Other aspects of the appointments procedure have received noteworthy attention. Cobham (2000) argues that the appointments procedure is opaque and open to political opportunism. The opaque nature of the appointments procedure is additionally captured in a Treasury select committee hearing where Richard Lambert (who joined the MPC in May 2003) was asked whether 'a couple of calls to Japan was all there was to becoming a member of the MPC.' (Oral evidence of Mr. Richard Lambert, taken before the Treasury Committee on Monday 16 June 2003).

[7]The above discussion suggests the original H-S model in Section 3.1 may be conditioned by additional factors, where the expressions for utility and disutility in equations (1) and (2) are augmented to give

$$U_g(D_g) = U(D_g \mid X_{gj} - \overline{X}_j, \mathbb{I}_g - \overline{\mathbb{I}}, j = 1, 2, ..., N)$$

$$V_g(D_g) = V(D_g \mid X_{gj} - \overline{X}_j, \mathbb{I}_g - \overline{\mathbb{I}}, j = 1, 2, ..., N)$$

where $\mathbb{I}_g$ denotes member g's measure of independence from the government, such that $\overline{\mathbb{I}}_j$ represents the MPC's mean for that measure. Here, the $\mathbb{I}_g - \overline{\mathbb{I}}$ term measures a member's 'independence proximity' to central government and is increasing in $\mathbb{I}_g - \overline{\mathbb{I}}$ such that $\mathbb{I}_g - \overline{\mathbb{I}} > 0$ (< 0) promotes dissents on the side of monetary ease (tightness). Provided the same assumptions with respect to first and second order conditions corresponding to (1) and (2) apply, the implications stemming from the theory outlined in 3.1 remain intact.

[8]In May 2002, Sushil Wadhwani, an external member who served on the MPC between June 1999-May 2002 claimed that monetary policy was 'held too tight because of a biased forecast' (Wadhwani (2002), p.1.): the main inflation projection in the May 2002 *Inflation Report* assumed a 'higher pass-through into prices' than was probable (p.3) and the level of potential output was deemed 'too pessimistic' (p.10).

This is perhaps unsurprising: as Charles Goodhart notes, the introduction of external MPC members into a Committee forecasting process such as the one underlying the Bank's quarterly *Inflation Report* projections, is 'inevitably likely to generate some tension and disagreements' (Goodhart (2001), p.62). Also see Blanchflower (2006).

[9]In the first decade of the Bank of England MPC almost fifteen percent of votes cast by its members were dissents. This figure is markedly higher than the portion of dissenting votes associated with monetary policy committees at comparable institutions such as the US Federal Reserve, the Bank of Japan and the Swedish Riksbank.

[10]Exact permutation tests were also used extensively to test for differences in the dissent voting behavior associated with internal and external members at each MPC meeting. For each individual meeting nine hypotheses were examined, and in all 121 sets of test statistics were generated: specifically, for each type of dissenting vote defined in Section 4 (dissent irrespective of direction, dissent for tighter policy, dissent for looser policy), we tested for whether (1) internal members cast such votes more often than external members (one-tailed test), (2) external members cast such votes more often than internal members (one-tailed test), and (3) whether there was any general difference between groups (two-tailed test). Each hypothesis was tested against a null of no difference in voting behavior. When judged against conventional levels of significance, members do *not* differ in their dissent voting behavior. However, the very small sample size (MPC membership ranged from six to nine individuals) raised problems of statistical power, and specifically, the prospect of failing to reject the null hypothesis when it is false (i.e., a type II error). Moreover, it was found that for a test to have any statistical power at conventional levels (power = 0.8), all internal members would have to dissent while all external members assented.

[11]Significantly, it is possible for the Chairman to lose a vote. This happened for the first time during the 100^{th} meeting of the MPC in August 2005, when Governor King was on the losing side of a 5-4 split. Having ascertained the policy stances of all committee members, King tabled a policy proposal which he then proceeded to vote against.

[12]During the process of constructing these variables, it was found that the average level of academic experience enjoyed by MPC members at successive MPC meetings has not dropped substantially over the first decade of the MPC. However, experience at the Bank of England has dropped markedly, whilst industry experience has risen. This is true for internal and external members alike.

[13]Goodhart argues that the ex-post nature of the Bank's published forecasts diminishes their importance in explaining the MPC's policy decisions: this is because in practice MPC members react to ex-ante forecasts (i.e., conditioned on the interest-rate set by the MPC in the previous month). We use the ex-post forecasts to construct proxy ex-ante forecasts. These forecasts are potentially much closer to those on which individual voting decisions are based.

[14]Estimations were also performed using Taylor-rule type variables constructed from real-time consensus forecasts of GDP growth and inflation, obtained from HM Treasury's *Forecasts for the UK Economy*. Published monthly, this is a compendium of forecasts produced by city and independent forecasters. We note that whilst decisions on UK interest rates are in part a function of the Bank's central inflation and GDP projections, their quarterly nature makes their incorporation into our econometric framework difficult - this is because the MPC make interest rate decisions on a monthly basis. For this reason, and to take into account new forecast information available to MPC members at each monthly meeting, we ran also regressions using these new variables. Results consistently placed a smaller parameter on the inflation term, although the output term was still negative and often insignificant. All other parameters were robust to the inclusion of these alternative forecasts. However, we opted for the results based on the MPC's Bank

forecasts due to their purported importance in informing the MPC's decisions. Full consensus estimation results are available from the authors on request.

[15]Results available from the authors on request.

[16]For completeness, we also performed estimations treating the α_g in equation (7) as random. Wooldridge (2002), for instance, states that 'it almost always make sense to treat the unobserved effects as random'. The presence of AR(1) errors is also modeled. This latter strategy allows for the fact that 'just as observed covariates can change over time, so too can unobserved influences and determinants of the outcomes' (Heiss, 2007). The random effects model (7) thus becomes

$$\mathsf{Z}^*_{gt} = \mathbf{x}'_{gt}\beta + \alpha_{gt} + \varepsilon_{gt} \qquad\qquad \varepsilon_{gt} \sim iid(0, \sigma^2_\varepsilon) \tag{11}$$

where

$$\alpha_{gt} = \rho\alpha_{g,t-1} + v_{it}. \qquad\qquad v_{it} \sim iid(0, (1-\rho^2)\sigma^2) \tag{12}$$

Here, α_{gt} is an *i.i.d.* random variable with zero mean and variance σ^2, only now the unobserved heterogeneity obeys a stationary AR(1) process over time with correlation parameter ρ. It is noteworthy that if $\alpha_{gt} = \alpha_g \; \forall \; t$, equation (11) reduces to the standard random effects model (see Heiss 2007 for full details). Results are shown in Table 8, where we note that for Models 6 and 7 (random effects) ρ is interpreted as the proportion of variance explained by the panel-level variance, and for Models 7 and 8, ρ represents the correlation parameter in equation (12). We restrict our attention to career background covariates, the estimated parameters of which are highly similar to those in Models 1, 2 and 3: experience in academia and finance is not statistically significant, while industry and NGO experience exert the greatest impact (while still having incorrect signs). Interestingly, AIC and BIC identify the AR(1) model, which confirms the presence of high degree first order serial correlation, as superior to the RE specifications.

[17]The bias of including a limited dependent variable declines with T under both the random and fixed effects approach. We do, however, note the nature of our sample renders certain estimation strategies impractical due to degrees of freedom issues, such as Wooldridge (2005), which would require the inclusion of $T = 121$ time dummies.

[18]A *linear probability least squares dummy variable* (LPM-LSDV) approach was also used. We also estimated two specifications:

$$\mathbb{Z}^{\mathsf{ease}}_{gt} = \mathbb{Z}^{\mathsf{ease}}_{g,t-1} - \mathbf{x}'_{gt}\beta + \alpha_g D_g + \varepsilon_{gt},$$

$$\mathbb{Z}^{\mathsf{tightness}}_{gt} = \mathbb{Z}^{\mathsf{tightness}}_{g,t-1} - \mathbf{x}'_{gt}\beta + \alpha_g D_g + \varepsilon_{gt},$$

where $\mathbb{Z}^{\mathsf{ease}}_{gt}$ ($\mathbb{Z}^{\mathsf{tightness}}_{gt}$) is a binary variable where a value of one denotes a dissenting vote on the side of ease (tightness) and a zero denotes otherwise. We further note that while augmenting the LSDV model with a lagged dependent variable potentially downward biases parameter estimates for small T, Monte Carlo analysis suggests any bias created maximally affects the lagged dependent variable (i.e., Judson and Owen, 1999). Yet while a bias corrected LSDV estimator (e.g., Kiviet, 1995) may be recommended, the vast majority of individuals in the sample have large T. It thus seems reasonable to assume that, as is the case with the dynamic OP estimates, any bias will be small. However, unlike the OP model, this estimation strategy does not utilize all of the information contained in the voting data, specifically with respect to the observations assigned zeros. Estimations are available from the authors on request.

[19]Relative to casting an assenting vote in period $t-1$, dissenting for monetary ease (or tightness) in period $t-1$ significantly reduces the period t probability of dissenting in the opposite direction. This is true for all specifications in Table 6.

References

[1] Adolph, Christopher (2005). *Three Simple Tests of Career Influences on Monetary Policy*, Paper presented at the annual meeting of the American Political Science Association, Marriott Wardman Park, Omni Shoreham, Washington Hilton, Washington, DC, Sep 01, 2005.

[2] Alesina, Alberto and Lawrence Summers (1993): "Central Bank Independence and Macroeconomic Performance," *Journal of Money, Credit and Banking*, 25(2), pp.157-162.

[3] Belden, Susan (1989): "Policy Preferences of FOMC Members as Revealed by Dissenting Votes," *Journal of Money, Credit and Banking*, Vol.21, No.4, pp.432-441.

[4] Bhattacharjee, Arnab and Sean Holly (2004): Inflation Targeting, Committee Decision Making and Uncertainty: The case of the Bank of England's MPC, Cambridge Working Papers in Economics, University of Cambridge.

[5] Blanchflower, David. (2006): *Reflections on my first four votes on the MPC*, speech given at the Bank of England's Agency for Wales, Wednesday 27th September 2006.

[6] Blinder, Alan. (2007): "Monetary Policy by Committee: Why and How?" *European Journal of Political Economy*, Vol.23, pp.106-123.

[7] Blinder, Alan. and Charles Wyplosz (2004): *Central Bank Talk: Committee Structure and Communication Policy*, prepared for the session on "Central Bank Communication" at the ASSA meetings, Philadelphia, January 9th, 2005

[8] Brooks, Robert., Mark Harris and Christopher Spencer (2007): *An Inflated Ordered Model of Monetary Policy*, mimeo.

[9] Buiter, Willem. and Anne Sibert. (2001): "Designing a Monetary Authority," in *Challenges for Central Banking* (ed. Anthony M. Santomero, Staffan Viotti and Andres Vredin), Kluwer Academic Publishers, Boston/Dordrecht/London, 2001, pp. 173-185.

[10] Chappell, Henry. W. Jr., Thomas Havrilesky and Rob Roy McGregor (1993): "Partisan monetary policies: Presidential influence through the power of appointment," *Quarterly Journal of Economics*, Vol 108, No.1, pp185-218.

[11] Chappell, Henry. W. Jr., Rob Roy McGregor and Todd Vermilyea (2005): *Committee Decisions on Monetary Policy*, MIT Press.

[12] Clarida, Richard., Jordi Gali, and Mark Gertler. (2000). "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory." *Quarterly Journal of Economics*, No.115, pp.147-180.

[13] Cobham, David (2000): "Restoring trust at the Treasury," *Financial Times*, 10th August 2000.

[14] Cukierman, Alex., Steven B. Webb and Bilin Neyapti (1992): 'Measuring the Independence of Central Banks and its Effect on Policy Outcomes,' *World Bank Economic Review*, Vol. 6(3), pp.353-98, September.

[15] Edmonds, Timothy. (1999): *The Monetary Policy Committee: Theory and Performance*, House of Commons Research Paper, 99/17 (February)

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

[17] Gerlach-Kristen, Petra (2004): "Is the MPC's voting record informative about future UK monetary policy?" *Scandinavian Journal of Economics*, No. 106 (2), pp.299-313.

[18] Gerlach-Kristen, Petra (2007): *Outsiders at the Bank of England's MPC*, unpublished paper, Swiss National Bank and University of Basel.

[19] Gerling, Kerstin., Hans Peter Gruner., Alexandra Kiel. and Elisabeth Schulte (2003)*: Information Acquisition and Decision Making in Committees: A Survey*, Working Paper No.256 (September), European Central Bank.

[20] Goodhart, Charles A.E. (2001): "The inflation forecast," *National Institute Economic Review*, No. 175 (January), pp.59-66.

[21] Goodhart, Charles A.E. (2005) 'The Monetary Policy Committee's Reaction Function: An Exercise in Estimation', *Topics in Macroeconomics*: Vol. 5: No. 1, Article 18.

[22] Greene, William (2004): 'The Behaviour of the Maximum Likelihood Estimator of Limited Dependent Variable Models in the Presence of Fixed Effects', *Econometrics Journal*, Vol. 7, No.1, pp.98-119.

[23] Grilli, Vittorio., Donato Masciandaro. and Guido Tabellini. (1991): "Political and Monetary Institutions and Public Financial Policies in the Industrial Countries," *Economic Policy*, Vol.6 (October), pp.341-392.

[24] Havrilesky, Thomas. M. and John Gildea. (1991): "The Policy Preferences of FOMC Members as Revealed by Dissenting Votes: A Comment," *Journal of Money, Credit and Banking*, Vol.23, No.1, pp.130-138

[25] 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*, pp.197-210 (Ch.13), Cambridge University Press.

[26] Heckman, J. (1981): "Statistical Models for Discrete Panel Data," in Structural Analysis of Discrete Data with Econometric Applications, ed. by C. Manski, and D. McFadden. Cambridge: MIT Press.

[27] Heiss, Florian (2007): *Limited Dependent Panel Data Models with AR(1) error components in Stata*, mimeo, University of Munich, Department of Economics (December).

[28] Howard, Michael (2002): Speech to the Institute for Public Policy Research, Monday March 11, 2002.

[29] Judson R.A. and Owen A.L. (1999). 'Estimating dynamic panel data models: a guide for macroeconomists', *Economics Letters*, Volume 65, Number 1, October 1999 , pp. 9-15(7).

[30] Kiviet, Jan F. (1995). 'On bias, inconsistency, and efficiency of various estimators in dynamic panel data models,' *Journal of Econometrics*, Vol. 68(1), pp. 53-78, July.

[31] Krause, George. A. (1996): 'Agent Heterogeneity and Consensual Decision Making on the Federal Open Market Committee,' *Public Choice*, Vol. 88(1-2), pp.83-101, July.

[32] Long, J. Scott and Jeremy Freese (2000): "sg145: Scalar measures of fit for regression models," *Stata Technical Bulletin*. Vol.56, pp.34–40. Reprinted in *Stata Technical Bulletin Reprints*, Vol.10, pp.197-205.

[33] McCloskey, Diedre., and Stephen Ziliak (1996): "The Standard Error of Regressions," *Journal of Economic Literature* 4 (March), pp.97-114.

[34] Meade, E. Ellen. and Nathan Sheets. (2005): "Regional Influences on FOMC Voting Patterns," *Journal of Money, Credit and Banking*, Vol.37, No.4, pp.661-677.

[35] Meade, Ellen. E. and David Stasavage (2008): "Publicity of Debate and the Incentive to Dissent: Evidence from the US Federal Reserve." *Economic Journal*, Vol.118, No.525 (April), pp.695-717.

[36] Nakahara, Nobuyuki (2001): Speech given by Nobuyuki Nakahara, member of the Policy Board of the Bank of Japan, at the Capital Markets Research Institute in Tokyo on December 11, 2001.

[37] Neyman, J. and E. Scott (1948): "Consistent Estimates Based on Partially Consistent Observations," *Econometrica*, Vol. 39, pp.359382.

[38] Nickell, Stephen (2006): "Monetary Policy, Demand and Inflation," *Bank of England Quarterly Bulletin*, Spring, 46(1), pp.95-104.

[39] Rogoff, Kenneth (1985): "The Optimal Degree of Commitment to an Intermediate Monetary Target," *Quarterly Journal of Economics*, 100, pp.1169-1190.

[40] Scharfstein, David. S. and Jeremy. C. Stein. (1990):"Herd Behavior and Investment," *American Economic Review*, Vol. 80, No. 3 (June), pp.465-479.

[41] Sibert, Anne. (2003): "Monetary Policy Committees: Individual and Collective Reputations," *Review of Economic Studies*, Vol.70, pp.649-665.

[42] Spencer, Christopher (2006): *Reaction Functions of Bank of England MPC Members*: *Insiders versus Outsiders*, Discussion Paper 15/05, Department of Economics, University of Surrey.

[43] Taylor, John B.(1993): "Discretion Versus Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy*, Vol. 39, pp.195-214.

[44] Wadhwani, Sushil. B. (2002): *The MPC: Some further challenges*, speech delivered at the National Institute of Economic and Social Research Governors' Seminar, in London on Thursday, 16th May 2002.

[45] Wallis, Kenneth. F. (2002): *Chi-squared tests of interval and density forecasts, and the Bank of England's fan charts*, mimeo, University of Warwick (March).

[46] Wooldridge, Jeffrey (2002). *Econometric Analysis of Cross Section and Panel Data*, MIT Press (Cambridge, Massachusetts, U.S.A.).

[47] Wooldridge, Jeffrey. (2005): "Simple solutions to the initial conditions problem in dynamic, nonlinear panel data models with unobserved heterogeneity," *Journal of Applied Econometrics*, Vol. 20(1), pages 39-54.

Table 5: Determinants of Dissent: Ordered Probit Estimates

	Model 1	Model 2	Model 3	Model 4[a]
γ_1	$-1.51(0.62)^{***}$	$-1.680\ (0.098)^{***}$	$-1.39\ (0.120)^{***}$	$-2.085\ (0.161)^{***}$
γ_2	$-1.60(0.65)^{***}$	$1.602\ (0.102)^{***}$	$1.993\ (0.142)^{***}$	$1.508\ (0.155)^{***}$
π_G	–	$2.889\ (0.452)^{***}$	$4.926\ (0.705)^{***}$	$3.078\ (0.525)^{***}$
GDP_G	–	$-0.393\ (0.098)^{***}$	$-0.578\ (0.158)^{***}$	$-0.292\ (0.117)^{**}$
Type	–	–	$0.574\ (0.110)^{***}$	–
Type $\times\ \pi_G$	–	–	$-3.75\ (0.859)^{***}$	–
Type $\times\ \mathsf{GDP}_G$	–	–	$0.377\ (0.176)^{**}$	–
Chair	–	$-0.187\ (0.112)^{*}$	$-0.137\ (0.114)$	$0.361\ (0.164)^{**}$
Acad_D	$0.010(0.08)$	$0.009\ (0.008)$	$0.018\ (0.008)^{**}$	–
Bank_D	$0.052(0.08)^{***}$	$0.054\ (0.009)^{***}$	$0.045\ (0.009)^{***}$	–
Fin_D	$0.014(0.09)$	$0.015\ (0.008)^{*}$	$0.019\ (0.008)^{**}$	–
Gov_D	$0.026(0.08)^{***}$	$0.027\ (0.008)^{***}$	$0.021\ (0.009)^{**}$	–
Ind_D	$0.115(0.019)^{***}$	$0.121\ (0.029)^{***}$	$0.128\ (0.019)^{***}$	–
NGO_D	$-0.236(0.032)^{***}$	$-0.254\ (0.029)^{***}$	$-0.223\ (0.031)^{***}$	–
George$^{\diamond}$	–	–	–	$-0.669\ (0.145)^{***}$
Plenderleith$^{\diamond}$	–	–	–	$-0.564\ (0.281)^{**}$
Clementi$^{\diamond}$	–	–	–	$-0.519\ (0.231)^{**}$
Vickers$^{\diamond}$	–	–	–	$-0.001\ (0.287)$
Bean$^{\diamond}$	–	–	–	$-0.723\ (0.179)^{***}$
Tucker$^{\diamond}$	–	–	–	$0.047\ (0.244)$
Large$^{\diamond}$	–	–	–	$0.663\ (0.247)^{***}$
Lomax$^{\diamond}$	–	–	–	$-0.375\ (0.301)$
Gieve$^{\diamond}$	–	–	–	$-0.417\ (0.145)^{***}$
Buiter$^{\diamond\diamond}$	–	–	–	$-0.741\ (0.445)^{*}$
Goodhart$^{\diamond\diamond}$	–	–	–	$-0.363\ (0.245)$
Julius$^{\diamond\diamond}$	–	–	–	$-2.134\ (0.264)^{***}$
Budd$^{\diamond\diamond}$	–	–	–	$0.211\ (0.323)$
Wadhwani$^{\diamond\diamond}$	–	–	–	$-2.027\ (0.266)^{***}$
Nickell$^{\diamond\diamond}$	–	–	–	$-1.025\ (0.258)^{***}$
Allsopp$^{\diamond\diamond}$	–	–	–	$-1.753\ (0.262)^{***}$
Barker$^{\diamond\diamond}$	–	–	–	$-0.630\ (0.221)^{***}$
Bell$^{\diamond\diamond}$	–	–	–	$-1.438\ (0.288)^{***}$
Lambert$^{\diamond\diamond}$	–	–	–	$-0.355\ (0.140)^{*}$
Walton$^{\diamond\diamond}$	–	–	–	$0.161\ (0.643)$
Blanchflower$^{\diamond\diamond}$	–	–	–	$-1.868\ (0.401)^{***}$
Besley$^{\diamond\diamond}$	–	–	–	$0.872\ (0.050)^{**}$
Sentance$^{\diamond\diamond}$	–	–	–	$1.005\ (0.460)^{**}$
Summary Statistics				
AIC	1020.07	978.7319	949.6397	921.816
BIC	1059.687	1033.201	1018.964	1060.466

[a]King is the omitted variable; Davies dropped due to insufficient observations.
Standard errors in round $(\cdot)$ brackets;$^{\diamond/\diamond\diamond}$Denotes internal/external member.
$^{***/**/*}$Denotes two-tailed significance at the 1%/5%/10% level. No of obs = 1045.

Table 6: Determinants of Dissent: Dynamic Ordered Probit Estimates

	Model 1_L	Model 2_L	Model 3_L	Model 4_L^a
γ_1	-1.689 $(0.071)^{***}$	-1.823 $(0.108)^{***}$	-1.572 $(0.134)^{***}$	-2.228 $(0.172)^{***}$
γ_2	1.701 $(0.074)^{***}$	1.671 $(0.107)^{***}$	1.987 $(0.149)^{***}$	1.556 $(0.166)^{***}$
$\mathbb{Z}_{g,t-1}^{\mathsf{ease}}$	-1.315 $(0.165)^{***}$	-1.238 $(0.167)^{***}$	-1.105 $(0.174)^{***}$	-0.968 $(0.190)^{***}$
$\mathbb{Z}_{g,t-1}^{\mathsf{tightness}}$	1.044 $(0.195)^{***}$	0.916 $(0.194)^{***}$	0.884 $(0.197)^{***}$	0.723 $(0.205)^{***}$
π_G	–	2.272 $(0.463)^{***}$	3.650 $(0.710)^{***}$	2.549 $(0.544)^{***}$
GDP_G	–	-0.343 $(0.098)^{***}$	-0.484 $(0.156)^{***}$	-0.256 $(0.121)^{**}$
Type	–	–	0.460 $(0.120)^{***}$	–
Type $\times$ π_G	–	–	-2.499 $(0.882)^{***}$	–
Type $\times$ GDP_G	–	–	0.284 (0.179)	–
Chair	–	-0.164 $(0.116)^{*}$	-0.126 (0.118)	0.271 (0.172)
Acad_D	0.005 (0.009)	0.006 (0.009)	0.013 (0.009)	–
Bank_D	0.037 $(0.009)^{***}$	0.041 $(0.009)^{***}$	0.034 $(0.009)^{***}$	–
Fin_D	0.010 (0.008)	0.011 (0.008)	0.014 $(0.008)^{*}$	–
Gov_D	0.015 $(0.009)^{*}$	0.016 $(0.009)^{*}$	0.011 (0.008)	–
Ind_D	0.084 $(0.020)^{***}$	0.090 $(0.021)^{***}$	0.097 $(0.021)^{***}$	–
NGO_D	-0.184 $(0.032)^{***}$	-0.199 $(0.033)^{***}$	-0.176 $(0.034)^{***}$	–
George$^{\diamond}$	–	–	–	-0.622 $(0.158)^{***}$
Plenderleith$^{\diamond}$	–	–	–	-0.497 (0.313)
Clementi$^{\diamond}$	–	–	–	-0.472 $(0.256)^{*}$
Vickers$^{\diamond}$	–	–	–	0.075 (0.311)
Bean$^{\diamond}$	–	–	–	-0.709 $(0.198)^{***}$
Tucker$^{\diamond}$	–	–	–	0.023 (0.264)
Large$^{\diamond}$	–	–	–	0.569 $(0.266)^{**}$
Lomax$^{\diamond}$	–	–	–	-0.554 $(0.302)^{*}$
Gieve$^{\diamond}$	–	–	–	-0.451 $(0.153)^{***}$
Buiter$^{\diamond\diamond}$	–	–	–	-0.601 $(0.426)^{*}$
Goodhart$^{\diamond\diamond}$	–	–	–	-0.327 (0.267)
Julius$^{\diamond\diamond}$	–	–	–	-1.837 $(0.303)^{***}$
Budd$^{\diamond\diamond}$	–	–	–	0.193 (0.328)
Wadhwani$^{\diamond\diamond}$	–	–	–	-1.708 $(0.305)^{***}$
Nickell$^{\diamond\diamond}$	–	–	–	-0.960 $(0.255)^{***}$
Allsopp$^{\diamond\diamond}$	–	–	–	-1.532 $(0.295)^{***}$
Barker$^{\diamond\diamond}$	–	–	–	-0.617 $(0.241)^{**}$
Bell$^{\diamond\diamond}$	–	–	–	-1.289 $(0.303)^{***}$
Lambert$^{\diamond\diamond}$	–	–	–	-0.382 $(0.151)^{**}$
Walton$^{\diamond\diamond}$	–	–	–	0.666 $(0.401)^{*}$
Blanchflower$^{\diamond\diamond}$	–	–	–	-1.699 $(0.493)^{***}$
Besley$^{\diamond\diamond}$	–	–	–	0.829 (0.529)
Sentance$^{\diamond\diamond}$	–	–	–	0.577 (0.588)
Summary Statistics				
AIC	891.1816	870.8825	859.8905	840.7838
BIC	940.4669	934.9535	938.7471	988.64

[a] King is the omitted variable; Davies dropped due to insufficient observations.
Standard errors in round $(\cdot)$ brackets;$^{\diamond/\diamond\diamond}$Denotes internal/external member.
$^{***/**/*}$Denotes two-tailed significance at the 1%/5%/10% level. No of obs = 1021.

Table 7: The effect of lagging the dependent variable on the decision to dissent

	Predicted probabilities of dissenting[a]	
Ease	Internal	External
$\mathbb{Z}^{\mathsf{ease}}_{g,t-1} = 0$	0.08	0.17
$\mathbb{Z}^{\mathsf{ease}}_{g,t-1} = 1$	0.39	0.57
Difference	**0.30**	**0.39**
Tightness		
$\mathbb{Z}^{\mathsf{tightness}}_{g,t-1} = 0$	0.24	0.12
$\mathbb{Z}^{\mathsf{tightness}}_{g,t-1} = 1$	0.57	0.38
Difference	**0.33**	**0.26**

[a]Results based on Model 3_L holding career variables at their means and GDP_G=π_G=0.

Table 8: Ordered Probit Estimates: Random Effects and AR(1) Errors

	Random Effects		AR1 Errors	
	Model 5	Model 6	Model 7	Model 8
γ_1	$-1.711\ (0.147)^{***}$	$-1.815\ (0.124)^{***}$	$-3.22\ (0.530)^{***}$	$-3.311\ (0.551)^{***}$
γ_2	$1.794\ (0.148)^{***}$	$1.796\ (0.119)^{***}$	$0.240\ (0.039)^{***}$	$2.586\ (0.399)^{***}$
π_G	$3.072\ (0.501)^{***}$	$3.040\ (0.485)^{***}$	$4.317\ (1.063)^{***}$	$4.469\ (1.047)^{***}$
GDP_G	$-0.329\ (0.118)^{***}$	$-0.305\ (0.107)^{***}$	$-0.905\ (0.307)^{***}$	$-0.918\ (0.298)^{***}$
Chair	$0.298\ (0.162)^{*}$	$-0.089\ (0.130)$	$-0.696\ (0.402)^{*}$	$-0.650\ (0.356)^{*}$
Acad_D	–	$-0.001\ (0.011)$	–	$0.014\ (0.028)$
Bank_D	–	$0.046\ (0.010)^{***}$	–	$0.096\ (0.032)^{***}$
Fin_D	–	$-0.007\ (0.011)$	–	$0.024\ (0.026)$
Gov_D	–	$0.056\ (0.010)^{***}$	–	$0.049\ (0.031)$
Ind_D	–	$0.105\ (0.023)^{***}$	–	$0.213\ (0.068)^{***}$
NGO_D	–	$-0.299\ (0.404)^{***}$	–	$-0.464\ (0.115)^{***}$
ρ	$0.351\ (0.056)^{***}$	$0.461\ (0.068)^{***}$	$0.869\ (0.036)^{***}$	$0.814\ (0.044)^{***}$
Summary Statistics				
AIC	956.3496	939.6596	865.9159	857.2228
BIC	986.0603	999.0809	900.5783	921.5959

Standard errors in round $(\cdot)$ brackets. No of obs = 1045.
$^{***}/^{**}/^{*}$Denotes two-tailed significance at the 1%/5%/10% level.