HOW MONETARY POLICY IS MADE:
TWO CANADIAN TALES

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Abstract

This paper examines the policy rate recommendations of the Bank of Canada's Governing Council (GC) and the C.D. Howe Institute's (CDHI) Monetary Policy Council (MPC) since 2003. We find, first, that differences in the median recommendations between the MPC and the GC are persistent but small (i.e., 25 bps). The median MPC recommendation is based on a higher steady state real interest rate. However, the response of the MPC and the GC to output and inflation shocks are, for the most part, comparable. Second, we are also able to examine the individual recommendations for the MPC. Estimates of the determinants of consensus inside the MPC or disagreement with the GC yield some useful insights. For example, disagreements are more likely when rates are proposed to rise than at other times. Equally interesting is the finding that the Bank of Canada conditional commitment on the overnight rate in 2009-10 has a relatively larger restricting impact on the MPC's median recommendation than the GC's target rate.

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1. Introduction

Understanding how monetary policy is conducted has become easier, at least until the so-called Global Financial Crisis that began in late 2007 followed by Europe's ongoing sovereign debt crisis. Most central banks gravitated towards reliance on a single instrument of policy, usually a short-term interest rate. This approach was not only more transparent but it was easier for markets and the public to follow. Indeed, central bankers frequently comment about the stance of monetary policy in relation to some monetary policy rule. Moreover, research had seemingly demonstrated that there was a predictable, if not always stable, transmission mechanism between changes in a central bank's policy rate and macroeconomic outcomes. Ever since Taylor (1993) showed how the Federal Reserve (Fed)'s behaviour could be summarized by calibrating a relationship between the Fed funds rate and an indicator of inflationary pressure and slack in economic activity a vast literature has emerged which has estimated, criticized, and evaluated all aspects of what is now universally referred to as Taylor's rule (e.g., see Asso, Kahn, and Leeson 2010).

The simplicity of the approach also generated regular commentary in the press (e.g., see Davies 2011). Not only was the rule simple to implement, it also permitted observers to determine at a glance whether policy was too loose or tight. If the actual policy rate was below that which Taylor's rule recommended, policy was deemed too loose and vice versa when the policy rate was above what the rule recommended. Indeed, it was this kind of analysis which prompted disagreement between the rule's creator and the current Chairman of the Federal Open Market Committee (FOMC), Ben Bernanke, about whether monetary policy was to blame for the U.S. financial crisis of 2007–2009 (see Taylor 2007, Bernanke 2010). More recently, in light of the events since 2008, there has been a shift towards identifying and explaining persistent deviations from the Taylor rule, termed by some the 'Great Deviation' (e.g., Taylor 2013).

Of course, monetary policy cannot be reduced to a simple equation as Poole (2006), among others, reminds us. Monetary policy also contains an element of 'art' in the sense that individual judgments about the future also play an important role in setting the policy rate. After all, current interest rates influence savings-investment decisions over some future horizon

and the central bank wishes to retain some flexibility to deviate from the rule when this is warranted. In addition, central bankers are also at pains to point out that there is considerable uncertainty about the size of any output gap, the variable which, along with inflation and an assumption about what is a 'normal' real interest rate, drives the policy rate predictions of the Taylor rule.

Not surprisingly then, it has become easier to perform one's own evaluation of the stance of monetary policy. Moreover, in Canada, where the government and the Bank of Canada have agreed on inflation targets for over two decades, there is an additional variable that permits outside observers to anchor their expectations of inflation and estimate what the appropriate policy rate ought to be, namely the commitment to maintain an inflation rate of 2%.[1] One complication in evaluating the state of monetary policy is that, because monetary policy is supposed to be forward-looking, forecasts are required to translate the rule into a policy recommendation. As a result, when the stance of monetary policy is set by a committee, there are reasons to expect disagreement or consensus, depending on one's views about the state of the economy. In addition, uncertainty about future economic outcomes likely also comes into play.

Since observing monetary policy has become a popular activity, 'shadow' committees have appeared in a few economies. These provide their own recommendations on what the appropriate policy rate ought to be and Canada is a pioneer.[2] In 2002, the C.D. Howe Institute created the Monetary Policy Council (MPC) to provide "…the Bank of Canada, financial-market participants and economic policy commentators with a regular independent assessment of the appropriate stance of Canadian monetary policy."[3]

This paper examines the record of the MPC, from its origins, and asks not only whether we can identify differences between its recommendations and the ones actually made by the Bank,

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[1] There is no specific time horizon indicated. However, the Bank of Canada has repeatedly stressed that the target is to be met in a flexible manner although the expectation is that 2% over the medium-term (i.e., over a 2 year period) is the aim of monetary policy. See, for example, Carney (2013), and references therein.
[2] As this is written, there are shadow monetary policy committees in the US, the euro area, the U.K., Australia, and New Zealand. See Neuenkirch and Siklos (2013).
[3] http://www.cdhowe.org/monetary-policy-council-2.

but also whether we can evaluate the basis on which MPC committee members reach consensus or disagree amongst each other over time and the role played by outside events (e.g., the financial crisis, forward guidance) in shaping policy rate recommendations.

One of our most interesting findings is that the Bank of Canada's conditional commitment to keep the policy rate low for a period of time had a substantial impact on the MPC. This result suggests that the credibility of the Bank of Canada as well as the power, under certain circumstances, of conditional commitments. Alternatively, financial markets may have reached the same conclusion about the policy rate going forward. While the evidence seems to favor the former explanation the data are, unfortunately, insufficiently informative as to allow us to identify the precise source of the success of the conditional commitment. In part for this reason we also conduct some counterfactuals. One of these finds that, assuming perfect credibility, the shadow council viewed real rates to be lower than actually observed during the period of conditional commitment. Hence, while the MPC is, on the whole less dovish than its counterpart at the Bank of Canada, the latter's communication strategy is deemed credible.

The rest of the paper is organized as follows. In section 2, we describe the work of monetary policy committees in general, the decision-making problems that confront them and how these influence the deliberations and the outcome of meetings. We then outline in section 3 the functioning of the C.D. Howe's MPC and the process adopted to deliver a policy rate recommendation as well as providing a brief explanation of how the Bank of Canada sets the policy rate. Section 4 is devoted to outlining the econometric specifications used to test various hypotheses of interest concerning how the respective policy making or recommending bodies behave. Following a discussion of some stylized facts, the paper describes the empirical results and some counterfactual experiments in section 5. The paper concludes with a summary and suggestions for future research, while some policy implications are also drawn.

2. Monetary Policy Committees

The literature dealing with central banks and monetary policy has, with considerable justification, focused on improvements in monetary policy performance. These include the

adoption of monetary policy strategies such as inflation targeting, and progress made in enhancing the accountability and transparency of central banks, following the worldwide movement towards granting the monetary authorities greater autonomy in setting the short-term stance of monetary policy.

Another important, and more recent, development in monetary policy, what Alan Blinder (2004) refers to as the "Quiet Revolution", has been studied less intently by economists: monetary policy is typically decided by a committee (e.g., see Sibert 2006, Mahadeva and Sterne 2000). Surveys suggest considerable diversity in their size, structure, and influence on monetary policy outcomes (e.g., Maier 2010, Lybek and Morris 2004). Theoretical work offers relatively little guidance about the 'optimal' size of a committee of this kind, although Sibert (2006), who reviews the rich literature in psychology and other relevant fields, concludes that committees with more than 6 members are likely too large. On this score the monetary policy committees of a large number of central banks are, by this metric, too large (e.g., see Mahadeva and Sterne 2000).

The principal advantages of committee-based decisions is that they reduce the likelihood of 'bad' or 'extreme' decisions, and they are able to process a far greater amount of information than any single individual is able to. However, the committee structure is also subject to some important risks. Other than the coordination problems that are created when committees are too large, it is possible that some committee members can engage in 'free riding', thereby negating the comparative advantage in processing vast amounts of information. There is also the risk of 'groupthink' wherein members are more likely to strive for consensus in order to retain their membership in the group, at the expense of their own beliefs and preferences. Similarly, the need to vote on a particular monetary policy recommendation carries with it the risk of 'information cascades' such that the 'costs' of disagreeing, say, with the Chair, rise as opposition to a particular recommendation or proposal declines. As a result, the voting order, and the individual responsible for making a particular motion, can play a decisive role in the voting outcome.

The foregoing developments suggest that policy makers (i.e., governments and their central banks) have concluded that there are net benefits from monetary policy decisions being made

by committees, even when these may not always be legally responsible for the decision. Thus, for example, the Governor of the Bank of Canada is statutorily responsible for monetary policy decisions even if a committee exists (i.e., the Governing Council, GC) which deliberates the appropriate stance of monetary policy (see also below). Nevertheless, unlike the shadow MPC, we only observe the GC's consensus decision, not the scope of any disagreement within the Council. In other countries, such as in Australia, and the U.K., some committee members are outsiders, typically appointed by the political authorities, often in consultation with the senior management of the central bank.

In other instances (e.g., the U.S.), history influences both the size and composition of the monetary policy committee. Hence, the FOMC is not only large (up to 17 voting members), but is partly subject to regional pressures and by the fact that membership changes because of a regular rotation among the regional Federal Reserve Banks. Finally, committees can differ according to the public impression they provide about the nature of their decision-making process. Hence, the European Central Bank's (ECB) Governing Council explicitly decides by consensus while other central bank committees permit, if not encourage, differences of opinion to be aired in public (e.g., the FOMC and the Bank of England's MPC). Hence, to the extent that the background and training of MPC and GC members are comparable, it is of independent interest to consider what drives disagreement or consensus inside the MPC. This evidence may well provide some clues about the GC's behavior.[4]

The decision to allow differences of opinion inside committees to be aired in public is prompted by research in the last few years which suggests that the release of voting records

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[4] In addition to size, structure, and responsibility, monetary policy committees differ according to the amount of information that is released to the public concerning their activities. A few central banks release, usually with a delay, minutes of their meetings as well as the individual committee member's votes. Generally, however, the value of such minutes may well be influenced according to whether these are eventually made public. Minutes may well be carefully crafted accounts of internal discussions with more open deliberations left unrecorded as certain members could choose to carry on such discussions outside of regular meeting times (e.g., Swank, Swank, and Visser 2008, Visser and Swank 2007). More generally, the press release announcing a particular monetary policy decision is more likely to hint at possible differences of opinion inside the committee. Even the ECB, which famously enforced the need to project consensus, has admitted that unanimity is not always possible. At the time of writing the Governing Council of the ECB is contemplating the release of minutes in a manner that has yet to be decided.

does not destabilize financial markets nor does the publication of this type of information negatively impact the extent to which the public's expectations of inflation might become unanchored or the reputation of the central bank negatively affected (e.g., see Siklos 2003). Indeed, the empirical evidence suggests that the voting records of monetary policy committees provide some useful information about future policy actions (inter alia, Gerlach-Kristen 2004, Fujiki 2005, Andersson, Dillen, and Sellin 2006, Horvath, Smidkova, and Zapal 2013, Neuenkirch 2013). Nevertheless, taking a public stand on the appropriate stance of monetary policy is not without consequences. For example, Meade and Stasavage (2008) conclude that the disclosure of voting records negatively affects how many committee members voice dissent. Once again, a look at the MPC, which publishes the individual policy positions of its members, can provide us with evidence that can be contrasted with that of the GC, where individual positions are not made public.

3. The Monetary Policy Council and the Governing Council

3.1. The C.D. Howe's MPC

Since 2002, the C.D. Howe Institute has convened a Monetary Policy Council that includes academics and professional economists. The MPC consists of 12 members named by the C.D. Howe based on the background and expertise of potential candidates to comment and provide recommendations on the appropriate stance of monetary policy.[5] Its aim is to "...discuss the Bank of Canada's policy toward the overnight rate, the short-term interest rate that is the Bank's benchmark interest rate for influencing monetary conditions in Canada, shortly before each of the Bank's interest-rate announcements." In other words, the MPC provides *independent* advice about what the appropriate policy rate ought to be and not a forecast of

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[5] The list of current members, their background and affiliations, can be found at http://www.cdhowe.org/monetary-policy-council-2. Members do not receive any financial support from the institute nor are they asked to adopt a particular ideology in making monetary policy recommendations. Invitations to join the MPC normally come from the President of the C.D. Howe Institute, currently William Robson. He is also the one who first convened the committee when he was the CDHI's Director of Research.

how the Bank is likely to set future policy rates.[6] Moreover, in the last few years, the MPC, unlike its counterpart at the Bank of Canada, has also provided information about the appropriate interest rate path for the following year.[7] Between 2002 and April 2012, the MPC met 70 times.[8]

MPC meetings are usually chaired by the President and C.E.O. of the C.D. Howe or, in his absence, the Vice-President, Research. Meetings are normally held 5 days before the Bank of Canada's announcement of the overnight rate.[9] For members' vote to be recorded they must either be present in person, at the C.D. Howe Institute's offices, or participate via conference call arranged by the Institute.[10] While the Bank of Canada sets the overnight rate on a Tuesday, the usual day for monetary policy announcements in Canada,[11] the MPC meets the previous Thursday. Occasionally, when the Bank announces the policy rate on a Thursday, the MPC will meet the preceding Tuesday. Meetings follow an Agenda which has remained unchanged since the MPC's inception.[12]

Each meeting lasts approximately one hour, begins at 11:30 a.m. and, generally, ends promptly at 12:30 p.m. or very shortly thereafter.[13] The Chair opens the meeting with a roll call, an introduction that may include a brief overview of the outcome of the last meeting, or some other item of interest to the MPC to open the discussion. When a new member joins the

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[6] As opposed to the Reuters Poll of more than 40 Canadian "economists and strategists" who are asked to provide a forecast of the Bank's upcoming policy stance.

[7] A separate paper under preparation investigates the information content of the MPC's forward interest rate path.

[8] Table A1, in the Appendix, lists the dates of the C.D. Howe's MPC meetings together with the dates when the Bank issued its announcements of the target for the overnight rate.

[9] "The overnight rate is the interest rate at which major financial institutions borrow and lend one-day (or "overnight") funds among themselves; the Bank sets a target level for that rate. This target for the overnight rate is often referred to as the Bank's key interest rate or key policy rate." Source: http://www.bankofcanada.ca/monetary-policy-introduction/key-interest-rate/.

[10] We have also recorded the data according to whether the member participated at the meeting in person or via conference call. We return to this distinction below.

[11] In 2013 the regular policy rate announcement was re-scheduled to Wednesday to parallel the release of the quarterly *Monetary Policy Report*.

[12] Figure A1 (Appendix) reproduces a copy of the Agenda of a meeting held in May 2012.

[13] Each meeting should be viewed as the conclusion of a process. In between each MPC meeting, there is an implicit expectation that each member, in their own manner, prepares for the next meeting. Clearly, unlike their counterparts at the Bank of Canada (see below), MPC members likely devote relatively less time thinking about the future course of monetary policy.

Council there is a short introduction of the individual as well as a brief repetition of how the meeting will be conducted. From time to time, the Chair will also point out if a committee member has separately submitted a piece in advance intended to highlight an area of concern or of interest to the MPC. Submissions of this kind happen on an ad hoc basis and fairly infrequently.

Members are assigned a rank according to the first letter of their last name. A die is then thrown and this determines which member is asked, at the outset, to express a 'bias' concerning the direction of the next policy rate setting. This is referred to as the 'straw poll' and it serves to launch the deliberations that follow. At this stage, there has been no discussion of policy issues or any debate about the stance of monetary policy. Put simply, each member provides a numerical value, expressed in fractions of 25 bps, indicating whether their recommendation at the beginning of the meeting leans toward a rise or a fall in the upcoming policy rate setting. Ostensibly, the objective of the exercise is to give all participants an idea of where each member stands, prior to any group influence. The straw poll is not taken as a commitment but rather helps focus the discussion and provides an *ex ante* signal of the likely consensus, or lack thereof, inside the MPC about the stance that monetary policy ought to take in the upcoming policy rate setting period. Hence, exploring whether policy positions change between the time the meeting is called to order and the final recommendations are made may provide us with some useful information about committee's views *ex ante*.

Next, the meeting considers the latest economic forecasts and outlook presented by the professional economists on the Council. These individuals are easy to identify from the MPC members list published on the C.D. Howe's website as they are employed outside of academic institutions and, typically, work in the financial sector. Members of the Council are then encouraged to address questions to the professional economists on the committee about the latter group's outlook and views concerning the Canadian economy.[14] Much of the remainder of the meeting is then devoted to a discussion during which each member expresses their views

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[14] It should be noted that several of the professional economists on the Council also meet and regularly exchange forecasts and other views about the Canadian economy with Bank of Canada officials.

about what issue, domestic and foreign, is likely to influence their position about the current and future direction of the policy rate. The Chair ensures that all members' views are represented as well as encouraging everyone to query the views of others or their interpretation of the current and preferred stance of monetary policy, as well as articulate the principal motivations in support of their recommendations. Generally, the focus of the discussion is on the immediate decision faced by the MPC and, by implication, the Bank of Canada even though, as pointed out previously, MPC members are also asked to take a stand on the policy rate settings up to one year into the future. While it cannot be claimed that the Taylor rule comes up as an item of discussion in every meeting it is clear that, over time, most members do rely on some version of a Taylor rule to organize some of their thinking.[15]

Just before the hour of discussion is up, the Chair calls for each member's recommendation. Once again, the die is thrown and this determines the MPC member who is first to make recommendations about the future course of monetary policy.[16] Each MPC member must recommend the overnight rate setting the Bank of Canada should announce at (i) the following meeting, with separate recommendations are made for the (ii) meeting thereafter as well as (iii) meetings in 6 to 12 months time, keeping in mind the calendar of announcements that the Bank of Canada issues in advance. It is important, therefore, to underscore once again that the MPC is making a recommendation about the appropriate stance of monetary policy and not a forecast of how the Bank of Canada will actually set the future level of the overnight rate.

Each member is also permitted to make a very brief statement to emphasize the reasoning behind their recommendations as well as offer advice that the Bank of Canada ought to consider. Once all the votes are cast, the Chair reviews the recommendations to ensure these were accurately recorded, announces the median recommendations and the meeting is concluded. Members are asked not to speak about any of the recommendations until the votes and the accompanying statement are published on the C.D. Howe's website at 2:00 p.m. (see,

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[15] Indeed, from time to time, a policy rule serves as a device to comment on the current policies of the Bank of Canada. See, for example, Parkin (2011), Melino and Parkin (2010), Siklos and Spence (2010), Siklos (2009), and Parkin (2009). All of the authors are past or present members of the MPC.

[16] It is only fairly recently that the identity of the first member to vote has been recorded. Hence, we are unable to control for any 'first mover' type effect in the empirical work reported below.

for example, http://www.cdhowe.org/mpc-recommendations-april-2013/21315). While the statement explaining the outcome of the meeting is prepared by the C.D. Howe staff the text reflects the views of the committee as a whole. Indeed, any differences of opinion are noted in the announcement as well as the general sense of the meeting. Following the statement each member's policy rate recommendation is made public.

3.2. The Bank of Canada's Governing Council

The Bank of Canada's Governing Council (http://www.bankofcanada.ca/about/corporate-governance/governing-council/) makes a recommendation about the overnight rate setting, usually on Tuesdays, at 9:00 a.m. (http://www.bankofcanada.ca/monetary-policy-introduction/key-interest-rate/; also see note 9). The GC consists of the Governor, the Senior Deputy-Governor, and four Deputy-Governors. The Governor and Senior Deputy-Governor are appointed by a Board, subject to government approval (see Bank of Canada Act, http://laws-lois.justice.gc.ca/eng/acts/B-2/page-2.html#h-4). The remaining Deputy-Governors are appointed by the Bank.

A statement accompanies each Governing Council decision that briefly explains the GC's position. Decisions are reached "…through consensus…". This is necessary since the GC is a creation of former Governor, Gordon Thiessen (1994-2001), and has no basis in statute. Accordingly, no votes or minutes are released. It was also under Thiessen's Governorship, in November 2000, that fixed announcement dates for the overnight rate were introduced. It was precisely this innovation in policy making, together with the introduction of inflation targeting, that inspired the creation of the CDHI's MPC.

The Bank of Canada Act stipulates that monetary policy decisions are communicated by the Governor of the Bank who is accountable for these decisions. Figure 1 reproduces the illustration used by Murray (2012) to explain the Bank's decision-making process.

[Figure 1 about here]

The staff's recommendations are made on the Friday prior to the GC's decision which is taken the following Monday. News of the decision is released on Tuesday. Clearly, the Bank may well obtain new information between the time of the C.D. Howe's MPC decision and the issuance of the press release by the Bank of Canada the following Tuesday. It is unclear to what extent this delay has a material impact on the Bank of Canada's decision. While the volume of information received by decision makers at the Bank of Canada is clearly greater than what the C.D. Howe's MPC likely considers it is not obvious – unless (i) there is a major crisis between the MPC and GC meeting dates or (ii) some private information available only to the GC that could have a decisive influence on the outcome – that the gap between MPC and GC meeting days is significant. We control for the timing gap as part of our robustness tests (see Table A2 in the Appendix).

The Bank follows a timeline leading to a decision while the C.D. Howe's MPC does not. Essentially, prior to the GC's decision, there are several briefings and the members of the GC are also informed by Staff Projections (cf., Figure 1). Four times a year the Bank also publishes a *Monetary Policy Report* (http://www.bankofcanada.ca/publications-research/periodicals/mpr/; MPR)[17] and this provides additional background to the GC's decision made two days earlier.[18] In addition, since 2005, the Bank's MPR contains the Staff's projections. Also published at the same time are survey results from the *Business Outlook Survey* (http://www.bankofcanada.ca/publications-research/periodicals/bos/). Of course, the Bank of Canada makes public a considerable amount of related information that informs the public of the work of the Bank. It should be noted that the CDHI's MPC does not receive results from the Survey or the Bank of Canada's forecasts in advance.

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[17] These are published in January, April, July, and October. The document provides an update of the Bank's forecasts for inflation and real economic activity, as well as a more in depth analysis of the current and anticipated economic environment. The MPR is released the day after the policy rate announcement. Beginning in 2013, the MPR and the policy rate announcements are concurrent.

[18] The Bank of Canada's GC meets and sets the target for the overnight interest rate 8 times a year.

4. Policy Rate Setting, Consensus, and Disagreement: Specifications and Econometric Issues

4.1. Monetary Policy Reaction Functions

A useful starting point, as pointed out previously, is the Taylor rule though this rule does have its limitations due to the ultra-low interest rate environment of the past few years (see, however, below). In what follows we consider several variants of the originally specified Taylor rule (TR; Taylor 1993) for reasons that will immediately become apparent. The general specification we consider is written as follows:

$$i_t^\tau = (1 - \rho_0)\big(\alpha r_t + \beta_0 \tilde{\pi}_{t+12|t} + \beta_1 \tilde{y}_{t+12|t}\big) + \rho_0 i_{t-1}^{CB} + \rho_1 i_{t-1}^{Fed} + \theta X_t + \varepsilon_t \quad (1)$$

Equation (1), for the most part, incorporates a standard Taylor rule where the policy rate, i_t, is set either by the central bank or the MPC together with an interest rate smoothing parameter ρ_0. Both committees must set the current period policy rate according to the level set by the central bank in period t-1.[19] Given the potential role the U.S. plays in Canadian economic performance, the impact of the past Fed target rate on today's Canadian rates is also included. Its impact is captured by ρ_1. Following Clarida (2012), the real interest rate, r_t, is time varying and is based on the real return yield on 10 year Canadian Government bonds.[20]

The determinants of the TR include an expected inflation gap, $\tilde{\pi}_{t+12|t}$, defined as the twelve month ahead inflation forecast minus the stated inflation target.[21] The headline Consumer Price index forecast by *The Economist Poll* of Forecasters is used to measure inflation

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[19] If the Bank decides on a policy rate that differs from the MPC's recommended setting the former is the starting point of discussions at the next MPC meeting.

[20] Most estimates of the Taylor rule do not permit a time-varying real interest rate. However, in view of the events (i.e., the end of the Great Moderation, the Global Financial Crisis, the experiment with forward guidance) that took place during the sample considered it would seem sensible not to assume that the 'neutral' real rate is constant throughout.

[21] The Bank of Canada's inflation target is (re-)set every five years. Following a brief period when inflation reduction targets were in place, shortly after the introduction of inflation targeting in 1991, the target has remained unchanged since 2001. It has been set at 2% with a ± 1% tolerance range. See, for example, http://www.bankofcanada.ca/monetary-policy-introduction/framework/inflation-control-target/.

expectations.[22] Furthermore, we have to proxy the unobservable expected output gap, $\tilde{y}_{t+12|t}$. We follow past practice by employing a Hodrick-Prescott (1997) filter with the standard smoothing parameter of 14,400 for the one year ahead output forecast by *The Economist.*[23] We chose not to add an exchange rate variable.[24] Research on estimated as well as optimal TR (e.g., see Clarida 2001, Collins and Siklos 2004) suggests that adding this series does not make much difference to inferences based on the standard TR specification.

We also consider several other determinants of i_t, summarized by the vector **X** in equation (1). These are motivated by events during the global financial crisis and thereafter. First, the VIX volatility index is employed as an indicator measuring financial market stress.[25] Undoubtedly, central banks worldwide monitor the turbulences in financial markets very closely. Thus, it might be insightful to evaluate the influence of financial stress on actual interest rate setting. Second, the period of credit easing and quantitative easing in the U.S. is captured by a dummy variable. Since January 2008, the Fed implements unconventional measures in addition to managing the short-term interest rate and these measures might also affect the preferred interest level in Canada. Third and most significantly, in April 2009, the Bank of Canada made a conditional commitment to keep the policy rate at the effective zero lower bound (i.e., 25 basis points) until the second quarter of 2010 (http://www.bankofcanada.ca/2009/04/press-releases/fad-press-release-2009-04-21/). The commitment was repeated each time the BoC set the overnight rate until it was withdrawn in April 2010, ahead of schedule (http://www.bankofcanada.ca/2010/04/press-releases/fad-press-release-2010-04-20/).[26]

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[22] This seems appropriate since the published forecasts are ones from financial institutions, including the Royal Bank of Canada, whose Chief Economist is a member of the MPC.

[23] We also tried the Bank of Canada's own output gap series (http://www.bankofcanada.ca/rates/indicators/capacity-and-inflation-pressures/product-market-definitions/product-market-historical-data/). However, the specification employing forecasts by *The Economist* yields more plausible results. This may well have to do with the fact that the Bank's forecasts are not updated monthly. The same argument holds for the Bank's quarterly inflation forecasts, available only since 2005.

[24] Inclusion of a U.S. interest rate can be said to indirectly any exchange rate motive in policy rate setting.

[25] The VIX is the Canadian version of the well-known U.S. VIX indicator. The indicator estimates the 30-day volatility of the Toronto Stock Exchange that is implied by the near-term and next-term options. See https://www.m-x.ca/indicesmx_vixc_en.php.

[26] Evaluations of this episode suggest that the Bank was effective in communicating the conditionality of the commitment (e.g., see He 2010, Siklos 2010).

Equation (1) relies on data publically available at the time of the MPC proposal and the GC decision. As a consequence, the specification is estimated via least squares.

4.2. Consensus within the MPC and Disagreement with the GC

While estimates of TR can provide useful benchmarks the principal concern in this paper revolves around the information content of policy rate recommendations of the MPC as well as disagreements, and their sources, between the MPC and the GC. Individual behaviour within the MPC effectively amounts to asking about the sources of consensus, if any, inside the MPC, and whether one can detect any evidence of the concerns sometimes raised about how committee members interact with each other. Similarly, disagreements between the MPC and the GC raise a host of questions about the extent to which the two groups see eye to eye and whether the respective composition, size, timing of decisions, and possibly differences in information sets, can account for different policy recommendations. Clearly, some of the potential determinants of consensus and disagreement are unobservable. Hence, any specification considered is only able to partially deal with the complexities of committee and policy rate setting behaviour.

$$Consensus_t = \delta_0 + \delta_1 Consensus_{t-1} + \delta_2 \boldsymbol{Y}_t + \delta_3 Disagreement_{t-1} + \mu_t \quad (2)$$

$$Agreement_t^* = \Pr[i_t^{SC} - i_t^{CB} = 0|Z_t] = \kappa_0 + \kappa_1 \boldsymbol{Y}_t + \kappa_1 Consensus_t + \eta_t \quad (3)$$

$$\boldsymbol{Y}_t = \{Pros_t, In\text{-}Person_t, Cond.Commit._t, Cut_t, Rise_t, VIX_t, Infl.Volatility_t\} \quad (4)$$

Equation (2) considers the sources of consensus in committee decisions. Since it is not clear, *a priori*, how to measure consensus among committee members, we rely on two metrics. Perhaps the most straightforward assessment of consensus is the fraction of MPC members who vote in favor of the committee's proposal (*Cons. Share*). As an alternative, we examine the size of disagreements within the MPC by relying on the simple standard deviation of proposals relative to the mean since this gives a measure of the range of proposed policy rate recommendations (*SD (Ind. Prop.)*).

As explanatory variables, we, first, employ the lagged consensus variable to test for persistence in the degree of consensus within the MPC. Second, we consider the representation of professionals on the committee (i.e., 100% less the fraction of academics on the MPC) and the share of members attending the meeting in person as variables affecting the degree of consensus. Third, we control for the conditional commitment period as, during this period, interest rate changes were potentially put on hold, subject to the inflation outlook of the Bank of Canada. Fourth, the specification considers whether consensus is asymmetrically determined between a rate rise or fall. Fifth, we proxy macroeconomic uncertainty by the VIX volatility index. Alternatively, we also consider the conditional volatility of inflation obtained by using a simple GARCH(1,1) model. Finally, we test if past disagreements in policy recommendations between the MPC and the GC influences consensus within the MPC over time. Equation (2) is estimated via OLS.[27]

Finally, equation (3) transforms non-zero differences between the actual and recommended policy rates into a binary variable (0 = disagreement, 1 = agreement) to obtain, via probit estimation, estimates of the probability of agreement between the shadow and formal monetary policy committees, conditional on the same set of observables used in equation (4) and the current degree of consensus within the MPC.

5. Stylized Facts and Empirical Results

5.1. Stylized Facts

Table 1 provides a brief comparison of the essential elements of decision-making at the C.D. Howe and the Bank of Canada. The principal differences concern the information that is publicly communicated. Hence, while the GC decides on the current setting for the policy rate, statutory responsibility for monetary policy decisions rests entirely with the Governor. In contrast,

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[27] We also estimate a version of (2) where consensus is a function of MPC members' views as reflected in the straw poll. Put differently, adding this variable could be construed as reflecting the 'distance' between an initial and a final position. Note, however, that the straw poll in no way is meant as a commitment regarding a member's final policy recommendation.

individual recommendations from the C.D. Howe are published on its website. Second, while the Bank of Canada publishes macroeconomic forecasts four times a year the MPC does not. Instead, the MPC publishes a projection path for the policy rate for a one year ahead horizon.

[Table 1 about here]

Figure 2 plots the policy rate of the Bank of Canada and the MPC's median recommendation as well as the Fed funds rate. Since U.S. influences may loom large in the MPC's decisions, and likely the same is true inside the GC, it is interesting to contrast the domestic setting with the policy rate set in the U.S. Figure 2 reveals quite clearly that there have been persistent differences between U.S. and Canadian policy rates. Until early 2005 the BoC's overnight rate was usually higher than its U.S. counterpart. A reversal takes place until the so-called global financial crisis hits the U.S. economy in late 2007. Since then the Fed funds rate remains below the BoC's policy rate. Figure 2 also suggests that while the MPC and the GC are not too far apart in their views about the appropriate setting for the policy rate differences that do emerge can remain persistent for some time.

[Figure 2 about here]

Figure 3 highlights the differences between the GC policy rate and the MPC proposal. Indeed, as Figure 3 makes clear, in case of disagreement between the committees, the MPC has tended to almost always recommend a policy rate that is higher than the one actually set by the GC. The only exception is on September 2008. Back then a large number of announcements from the U.S. aimed at stemming the impact of the worsening financial crisis. This may have prompted the MPC to recommend a 25 basis point lower recommendation than the BoC.[28]

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[28] The Fed held firm on the Fed funds rate, at least until later that year when the policy rate dropped in large increments. For a sample of the events surrounding the financial crisis, see the St. Louis Fed's crisis timeline: http://timeline.stlouisfed.org/index.cfm?p=timeline#2008-9.

[Figure 3 about here]

As noted previously, each MPC meeting begins with a straw poll that is intended to reveal the opening bias of MPC members concerning the upcoming policy rate recommendation. As shown in Figure 4 there are persistent differences between the preliminary and actual recommendations for the policy rate. Moreover, there is also a substantial and persistent gap in the range of policy rate proposals both at the beginning and at the conclusion of the MPC meeting.

[Figure 4 about here]

5.2. Monetary Policy Reaction Functions

To set the stage for investigating the workings of the MPC, and the question what drives consensus inside the committee as well as disagreement vis-à-vis the GC, we begin with a comparison of the two committees through the TR as summarized by equation (1). Table 2 presents TR estimates for the MPC (top portion) and the GC (bottom portion) for several different versions of equation (1) to account for some of the extraneous factors or variables that may also have influenced the median policy rate recommendations (i.e., the **X** vector in the TR specification). These include a widely used proxy for uncertainty, namely the Canadian edition of the VIX volatility index, a dummy variable that conditions the recommendations on the period when the Fed engaged in credit and/or quantitative easing policies and, finally, a dummy variable for the Bank of Canada's conditional commitment on the policy rate in 2009-2010.

[Table 2 about here]

Focusing on the steady state parameter estimates for the real interest rate, the inflation gap, and the output gap, we find that the median real interest rate of the MPC is consistently higher than the one implicit in the BoC's TR.[29] Nevertheless, and with only one exception (column (2) for the MPC), the long-run interest rate is consistently lower than the 2%[30] often used in similar studies, a reflection perhaps that the period under investigation is influenced by the events since late 2007. Next, it appears that the MPC and GC are equally dovish in response to inflation surprises[31] as the steady state estimate of the inflation parameter is well below the 1.5 recommended by Taylor as reflecting best practice in maintaining inflation on 'target'.[32]

Indeed, if the specifications are conditioned on periods when 'unconventional' policies are in place, these clearly replace inflation as the primary driver of lower policy rate recommendations. In fact, the BoC's conditional commitment has a significantly larger impact on reducing the median MPC policy rate recommendation than on the policy rate set by the GC. Finally, and equally interesting, is the finding that the median MPC member is considerably more responsive to the output gap than his/her counterpart inside the GC.[33]

Since individual recommendations of the MPC are published, we can provide some additional insights about members' recommendations as shown in Table 3.

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[29] Note that this conclusion is based on the comparison of point estimates. See below for a more formal comparison.

[30] Wald tests confirm that the long-run real interest rate is statically different from two percent for specification (1) in case of the MPC (at the ten percent significance level) and specifications (1), (3), and (4) in case of the GC (at the one percent significance level).

[31] Statistical testing confirms that there are no significant differences in the MPC's and GC's reaction to inflation.

[32] The 1.5 value is based on a constant inflation target. Wald tests confirm that the inflation coefficient is statically different from 1.5 for specification (4) in case of the MPC (at the one percent significance level) and specifications (3) and (4) in case of the GC (at the five and one percent significance level, respectively).

[33] Both conjectures are based on point estimates as we do not detect statistically significant differences between the MPC's and GC's reaction to output and the conditional commitment period. Not shown are other variants of equation (1), where we consider other determinants of the median policy rate recommendation such as (i) changes in the TED spread (i.e., the change in the difference between the yield on three-month Canadian prime corporate papers and Treasury bills of the same maturity), (ii) interaction terms wherein the proportion of professionals in the shadow committee affects the reaction to inflation and output forecasts, and (iii) the bias of the MPC based on future policy rate recommendations. The latter two variations appear to play no statistically significant role in explaining the median policy rate recommendations. A rise in the TED spread has a significantly positive effect on the median recommendation. These results are relegated to Table A2 in the Appendix.

[Table 3 about here]

The first column reproduces the baseline TR estimate found in Table 2. Next, we examine the recommendations of two MPC members who, based on the historical experience, have consistently been either dovish or hawkish. In other words, we estimate TR for two members who regularly recommend a policy rate below the median ('dove') or above the median recommendation ('hawk'). As seen from Table 3 the MPC's dove pays less attention to the BoC's previous setting while the opposite is true of the hawk on the committee. Further, the dove seems, on average, unresponsive to inflation while the hawk not only responds positively to inflation shocks but by a magnitude that, at least based on the steady state estimate, exceeds by a wide margin the Taylor recommendation for good practice in monetary policy (i.e., 1.5). In contrast, the MPC's dove responds strongly to output while the hawk is unresponsive to real shocks emanating from GDP forecasts. Finally, the dove is clearly distinguished from the hawk by the estimated steady state real interest rate with the former's estimate being a third lower than the hawk's estimate which also exceeds the value typically encountered in the voluminous empirical TR literature. One interpretation of these results is that hawks and doves, in the context of the TR, effectively behave in the manner observers typically believe such monikers describe their attitude towards inflation and output gap shocks In other words, the hawk and the dove act exactly as one would have predicted based on the TR construct.

On the other hand, the professional/academic distinction appears to matter less than the difference between hawks versus doves when viewed through the lens of the TR (see, however, below). However, a note of caution is that there are relatively few members on the MPC for which we have enough observations to reliably classify them as definite hawks or doves. Furthermore, committee members have also been known to switch over time from one to the other type of recommendation relative to the median.

5.3. Consensus within the MPC and Disagreement with the GC

Tables 4 displays estimates of various specifications for equation (2). The results apply only to the MPC since the Bank of Canada does not release information about the individual positions taken by GC members. In view of the earlier discussion about group influences on committee decisions we estimate the relevant relationships for both the actual poll (left panel of Table 4), which is the one made public, and the straw poll that is taken at the beginning of the meeting (right panel of Table 4).

[Table 4 about here]

Table 4 reveals some interesting characteristics about what drive differences of opinion within the MPC in the actual poll. First, consensus or the lack thereof, is generally persistent as the first lag is statistically significant for both indicators, (i) the share of votes in favour of the MPC proposal and (ii) the standard deviation of individual proposals. Second, policy rate cuts and hikes produce less consensus.[34] Third, disagreement between the BoC and the MPC also significantly lowers consensus in the MPC's current meeting. One interpretation is that when overall economic signals are uncertain and leading to disagreement between both committees, this is also reflected is a larger variety of views within the MPC. Note that when we add the straw poll as a determinant (middle columns) the VIX is no longer statistically significant while the share of professionals on the MPC raises consensus. It is conceivable that, under some circumstances, the share of professionals on the MPC acts as a proxy of sorts for the volatility or uncertainty that influences policy recommendations. Fourth, and also in line with the previous interpretation, higher stock market volatility leads to less consensus in the MPC. Finally, and perhaps most interestingly in terms of whether certain forms of central bank communication can help fix expectations, the Bank of Canada's conditional commitment in 2010-11 had a statistically significant impact on the MPC. This conditional commitment raises

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[34] Note that a positive sign indicates higher consensus in case of the indicator based on the share of votes in favour of the proposal, whereas, in case of the standard deviation indicator, a negative sign implies more consensus, i.e., a decrease in the standard deviation.

the share of members who support the median recommendation and reduces the variability of policy rate proposals.

Many of the foregoing results do not carry over when Consensus is measured via the straw poll. Only proposed interest rate cuts and the VIX index significantly influence consensus inside the MPC. Indeed, whereas the estimated specifications based on the actual poll do a reasonably good job at explaining the variability of two dependent variables, the explanatory power of the specifications based on the straw poll is generally lower. Whether this difference reflects the impact of group think or conveys the effect that committee discussions have on the outcome of individual decision-makers is unclear.[35] Nevertheless, the outcome does suggest that there may be interesting information content in the differences between the actual published poll relative to the straw poll taken.[36]

Next, we turn our attention to investigating the determinants of the differences between the MPC and GC recommendations. The results are shown in Tables 5 where agreement is evaluated as a binary variable. This produces a dependent variable that is set to 1 when the two committees agree and is 0 otherwise.[37]

[Table 5 about here]

Table 5 reveals that several interesting findings. First, when consensus in the MPC is higher (i.e., Cons. Share rises) this decreases the gap between the MPC and the GC's policy rate recommendations. Similarly, when the diversity of views inside the MPC increases (i.e., SD (Ind.

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[35] An interesting result with respect to group behavior is that, in case of the straw poll, a higher in-person voting share is found to increase consensus.

[36] Note that MPC members are required to submit a 25 bps interval recommendation rather than suggesting an actual point value. To generate measures of consensus, we have to decide if we calculate these using (i) the midpoint, (ii) the bottom or (iii) the top of individual recommendation intervals. However, the results are very similar for all three choices and, consequently, we present only the ones using the midpoint. Nevertheless, the need to supply an interval rather than a single point recommendation could be one of the reasons for the observed differences between the straw poll and the actual poll.

[37] Note that over the sample considered, policy rate recommendations did not deviate by more than 25 basis points (also, see Figure 3).

Prop. rises) differences in the median policy recommendations between the two committees increase. Similar to the results for consensus within the MPC, the share of professional economists has effectively no statistically measurable influence on the amount of disagreement between the two policy rate setting committees. More important, perhaps, is the finding that the period of the conditional commitment has an economically large and statistically important impact on the policy rate setting behaviour of the two committees. That period contributed to raising the agreement between the MPC and the GC. Hence, differences between the respective stances taken by the GC and the MPC dissipated during the one year period (i.e., April 2010-2011) when the conditional commitment was in place. This may well reflect the Bank of Canada's credibility among MPC members.

Allowing for asymmetry between rate hikes and declines matters as can be seen from the econometric results. While proposed rate hikes significantly increase differences of opinion between the MPC and the GC across both specifications, rate cuts have no significant impact on disagreement. This may as well reflect the relatively higher degree of hawkishness of the MPC compared to the GC.

5.4. Counterfactual Analysis

Finally, we consider a couple of counterfactual experiments. Given the uncertainty around the response and effectiveness of monetary policy during and in the aftermath of the crisis we first ask what the TR response coefficients would have been if both the MPC and the GC had perfect foresight? In the perfect foresight case (results not shown; see Table A3 in the Appendix) we find that both the GC and the MPC would have significantly reduced their steady state response to inflation and increase the reaction to the output gap. Other coefficients in the TR shown in Table 2 would have remained largely unchanged.

A second counterfactual focuses on the reaction to the Bank of Canada's conditional commitment in 2009. Since financial markets around the world were in the grips of the ongoing financial crisis we ask: suppose that the conditional commitment essentially represented the

GC's attempt to temporarily set the neutral real rate to zero[38] what inflation path for the average MPC member would have been consistent with such an outcome?[39] Figure 5 shows the results. Restricting the neutral real rate to 0% during the April 2009-2010 period effectively translates into a temporary deflation of almost 2% at by October 2009 thereafter rising to around the Bank of Canada's 2% inflation target by April 2010 when the commitment was rescinded by the Bank. Figure 5 suggests then not only that the Bank's conditional commitment had the desired impact and that the MPC effectively treated the episode as leading back to the 2% inflation target by the time the commitment ended. This reinforces the importance of forward guidance in monetary policy.[40] Whether forward guidance is, in fact, a successful device is not immediately clear, however. After all, the timing of the conditional commitment, arguably introduced at the height of the crisis, may also reflect a response by members of the MPC, and the Bank of Canada, to the unfolding of events in financial markets as well as the ongoing stressful economic environment.

6. Conclusions and Policy Implications

Ever since rules have been used to describe the essence of how monetary policy decisions are taken, economists and interested observers have expressed a keen interest in whether monetary policy is too loose or tight at times. Equally interesting, given that monetary policy decisions are often taken in a committee setting, are whether the dynamics of group behaviour inside committees gives rise to consensus or disagreement and, more importantly, what drives decision-making inside policy making bodies.

In Canada there exists yet another avenue through which monetary policy decisions can be evaluated. The C.D. Howe Institute convenes a Monetary Policy Council which makes an

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[38] Presumably, as a device to communicate, as clearly as possible, a determined attempt to ease policy.
[39] Inflation is estimated in a simple autoregressive distributed lag model which includes lags of inflation, the output gap, the target rate, and the real interest rate. Lag length is determined based on a joint significance test of each additional lag.
[40] Standard error bands (not shown) confirm that the counterfactual inflation path was statistically significantly lower throughout the December 2009-April 2010 period. Hence, it took some time for the MPC to adjust its view of the likely inflation path.

independent recommendation of the setting of the overnight rate a few days before the Bank of Canada's Governing Council pronounces on the policy rate setting. This paper investigates the interest rate recommendations of both committees in the context of a Taylor rule. In addition, we posit a specification to examine what determines the likelihood of consensus inside the MPC only since the individual recommendations of the GC are not made public. Finally, we examine several factors explaining disagreement between the GC and the MPC.

The following are the principal findings of this study. First, while the MPC and the GC are not too far apart in their views about the appropriate setting for the policy rate, differences that do emerge can remain persistent for some time. In case of disagreement between the committees, the MPC has tended to almost always recommend a policy rate that is higher than the one actually set by the GC. Second, these differences are particularly driven by the fact that the MPC assumes a higher steady state real interest rate than its GC counterpart. Finally, there are few differences in both committees' responses to inflation and output shocks. Hence, the MPC and the GC are not, strictly speaking, two peas in a pod.

The decision-making activities inside the MPC provide interesting results. First, views inside the MPC change between the time the straw poll is taken at the beginning of the meeting and the eventual recommendations at the end of the meeting. Second, there is relatively less consensus inside the MPC when rates are rising or falling than when they remain unchanged. Third, differences between the MPC and the GC's recommendations are least notable when there is consensus inside the committee. In that case, the committee's views tend to be closer to the GC than when such a condition is not present. The period of the Bank of Canada's conditional commitment, when the policy rate was promised to remain unchanged for up to a year, conditional on the economic outlook, had a relatively larger impact on the MPC than in the GC as the MPC's recommendations were biased downward during this period. This result is also confirmed by a counterfactual experiment. Finally, hawks and doves behave exactly as theory and the TR specification would suggest, that is, the former places a relatively higher weight on inflation than on the output gap.

There appears to be something to be learned from a comparison of a shadow committee and the legally constituted and responsible counterpart, at least in Canada's case.[41] Recently, there has been resurgence in outsiders expressing independent opinions about the appropriate stance of monetary policy. This kind of development is helpful to central banks who seek to be transparent and accountable but the creation and communication by shadow committees has also been facilitated by the widespread reliance on the Taylor rule as a guide to policy making. Whether the events of the last few years will make this more difficult and, hence, complicate the task of credibly communicating policy remains to be seen. This will no doubt be influenced by how informative the policy rate remains in discussions about what the correct stance of monetary policy ought to be.

Our findings also suggest some policy implications. In spite of the variety of views and backgrounds of the members of the MPC and the GC it is likely that similarity in training and experience contribute to narrowing the differences between the two monetary policy committees. However, there is also the overarching constraint imposed by inflation targeting and the transparency associated with such a regime. If the policy regime was different there may well be more disagreement about the appropriate policy stance (e.g., see Neuenkirch and Siklos 2013 for the case of the ECB).

Conditional commitments, or forward guidance, of the kind the Bank of Canada introduced in 2009 not only influences the views of those who shadow monetary policy but, by implication, may impact expectations. Nevertheless, it remains to be seen whether calendar-driven forms of forward guidance are superior to threshold-based attempts, such as the one recently introduced by the Fed, to manage expectations. Also, it may be argued that while such devices can work, they ought to be used sparingly. Otherwise, there is a risk that the central bank will lose credibility if it resorts to such forms of guidance too often.

Finally, diversity within the MPC does not appear to pose any particular difficulties in setting the appropriate stance of monetary policy nor do differences in views appear so large so as to

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[41] While the GC is aware head of time of the MPC recommendations, the CDHI has no way of measuring any influence it might have on Bank of Canada. It is reasonable, however, to assume that the GC independently sets the course of monetary policy.

threaten the ability of diverse opinions to provide useful informed opinion about monetary policy actions. Inflation targeting, together with adequate transparency and accountability provide the necessary constraint to ensure that there is some value in presenting differences in opinion. Consequently, consideration should be given to formally recognize and define the responsibilities of the Governing Council. Explicit recognition of the committee structure as a means of delivering monetary policy has spread around the world and there is no reason why this approach should not be applied to Canada.

Table 1: Bank of Canada's Governing Council versus C.D. Howe's Monetary Policy Council

	Bank of Canada	**C.D. Howe**
Statement	yes	yes
Voting Record	Governor's decision	yes
Minutes	no	no
Macroeconomic Forecasts	quarterly	no
Interest Rate Projections	no	yes

Table 2: Taylor Rule Estimates for the C.D. Howe's MPC and the Bank of Canada's GC

C.D. Howe	(1)	(2)	(3)	(4)
Lag BoC Target Rate	0.837***	0.877***	0.833***	0.790***
Lag Fed Target Rate	0.091***	0.052**	0.070**	0.115***
Real Bond Yield	1.438***	2.366***	1.581***	1.479***
Inflation Forecast Gap	1.177*	1.070*	0.800	− 0.392
GDP Forecast Gap	1.192**	0.515	0.804**	0.508
VIX-20 Index		−0.008***		
Credit Easing/Quantitative Easing			−0.146**	
Cond. Commitment				−0.286**
S.E. of regression	0.180	0.158	0.169	0.174
Observations	105	105	105	105
R^2	0.985	0.988	0.987	0.986

BoC	(1)	(2)	(3)	(4)
Lag BoC Target Rate	0.808***	0.836***	0.805***	0.787***
Lag Fed Target Rate	0.122***	0.095***	0.103***	0.133***
Real Bond Yield	1.097***	1.773***	1.321***	1.163***
Inflation Forecast Gap	1.131*	1.053*	0.777	0.304
GDP Forecast Gap	0.836**	0.339	0.549**	0.520
VIX-20 Index		−0.006***		
Credit Easing/Quantitative Easing			−0.135***	
Cond. Commitment				−0.128*
S.E. of regression	0.149	0.135	0.137	0.148
Observations	105	105	105	105
R^2	0.989	0.991	0.991	0.990

Note: Estimates are for equation (1). OLS is used. ***/**/* indicates significance at the 1%/5%/10% level. Newey-West (1987) standard errors are used if autocorrelation was detected. Table reports estimates for the steady state coefficients for α (real bond yield), β_0 (inflation gap), and β_1 (output gap). The inflation and output forecast gaps are based on one year ahead forecasts of inflation and real GDP growth from *The Economist*. An H-P filter is used to estimate the gap with the standard monthly smoothing filter.

Table 3: Taylor Rule for MPC Dove and Hawk

	(1)	Dove	Hawk
Lag BoC Target Rate	0.837***	0.718***	0.918***
Lag Fed Target Rate	0.091***	0.169**	0.035
Real Bond Yield	1.438***	0.993**	3.024***
Inflation Forecast Gap	1.177*	−0.255	3.586**
GDP Forecast Gap	1.192**	1.517*	0.833
Average Diff to Median Proposal		−0.091	0.152
S.E. of regression	0.180	0.334	0.196
Observations	105	69	46
R^2	0.985	0.949	0.983

Note: Estimates are for equation (1). OLS is used. ***/**/* indicates significance at the 1%/5%/10% level. Newey-West (1987) standard errors are used if autocorrelation was detected. Table reports estimates for the steady state coefficients for α (real bond yield), β_0 (inflation gap), and β_1 (output gap). The dove (hawk) is a time series of the recommendations of one member who consistently votes for a policy rate below (above) the median recommendation on the MPC. The inflation and output forecast gaps are based on one year ahead forecasts of inflation and real GDP growth from *The Economist*. An H-P filter is used to estimate the gap with the standard monthly smoothing filter.

Table 4: Consensus within the C.D. Howe's MPC – Actual Poll versus Straw Poll

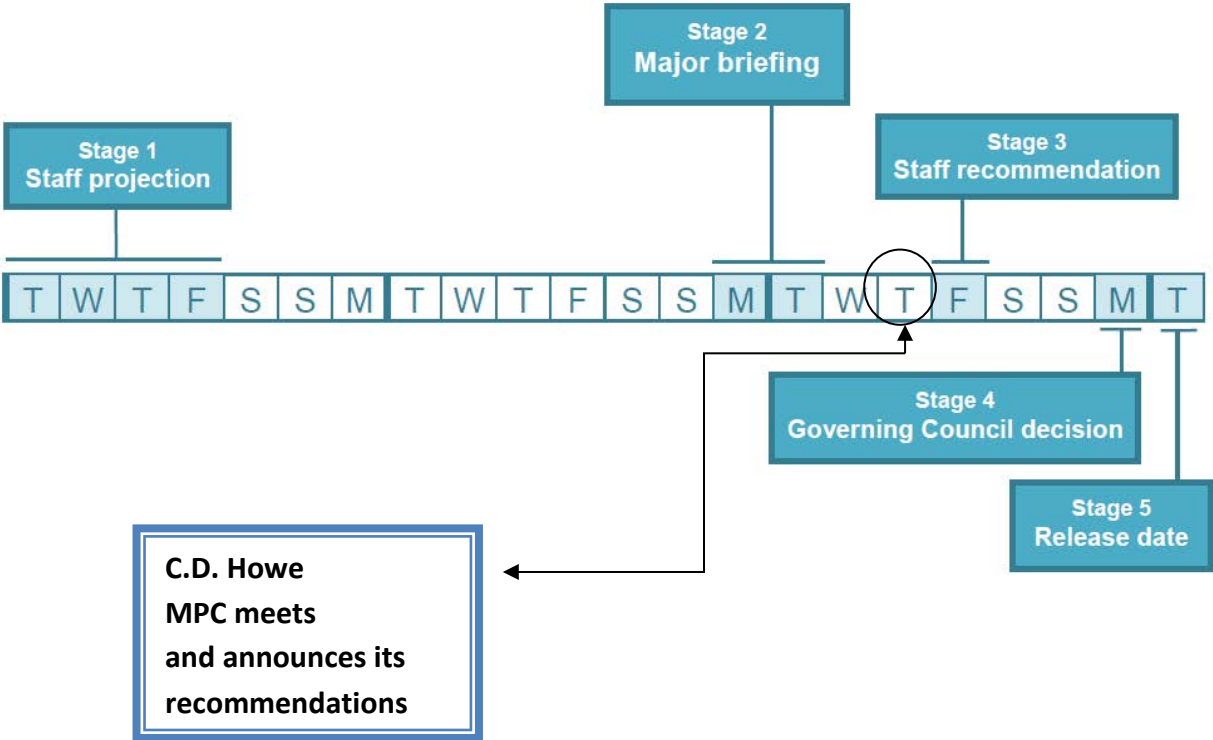| Dependent Variable	Actual Poll (1)				Actual Poll (2)				Straw Poll			
	Cons. Share		SD (Ind. Prop.)		Cons. Share		SD (Ind. Prop.)		Cons. Share		SD (Ind. Prop.)	
Consensus Straw Poll	---		---		0.071		0.344	*	---		---	
Constant	0.516	***	0.066	**	0.450	**	0.048		0.825	**	0.104	***
Lagged Dependent Variable	0.311	*	0.283	**	0.280		0.206		-0.161		0.027	
Professional Share	0.282		-0.056		0.383	**	-0.093		0.153		0.049	
In-Person Voting Share	-0.124		-0.043		-0.120		-0.017		0.127		-0.103	**
Cond. Commitment	0.142	**	-0.086	***	0.117	*	-0.072	***	-0.019		-0.024	
Lag (Diff (C.D. Howe - BOC))	-0.232		0.141	*	-0.215		0.142	*	-0.303		0.018	
Proposal: Cut	-0.152	**	0.049	**	-0.149	**	0.040	*	-0.281	***	0.051	**
Proposal: Hike	-0.094	*	0.012		-0.107	**	0.018		-0.090		0.005	
VIX Index	-0.001		0.002	**	-0.001		0.001		0.001		0.003	***
Cond. Infl. Volatility	0.002		-0.001		-0.013		0.009		-0.139		-0.034	
Observations	68		68		61		61		61		61	
σ	0.145		0.049		0.146		0.048		0.232		0.047	
R^2	0.547		0.649		0.520		0.650		0.195		0.488	

Notes: Estimates are for equation (2). OLS is used. ***/**/* indicates significance at the 1%/5%/10% level. White (1980) standard errors are used.

Table 5: Determinants of Agreement between the MPC and the GC

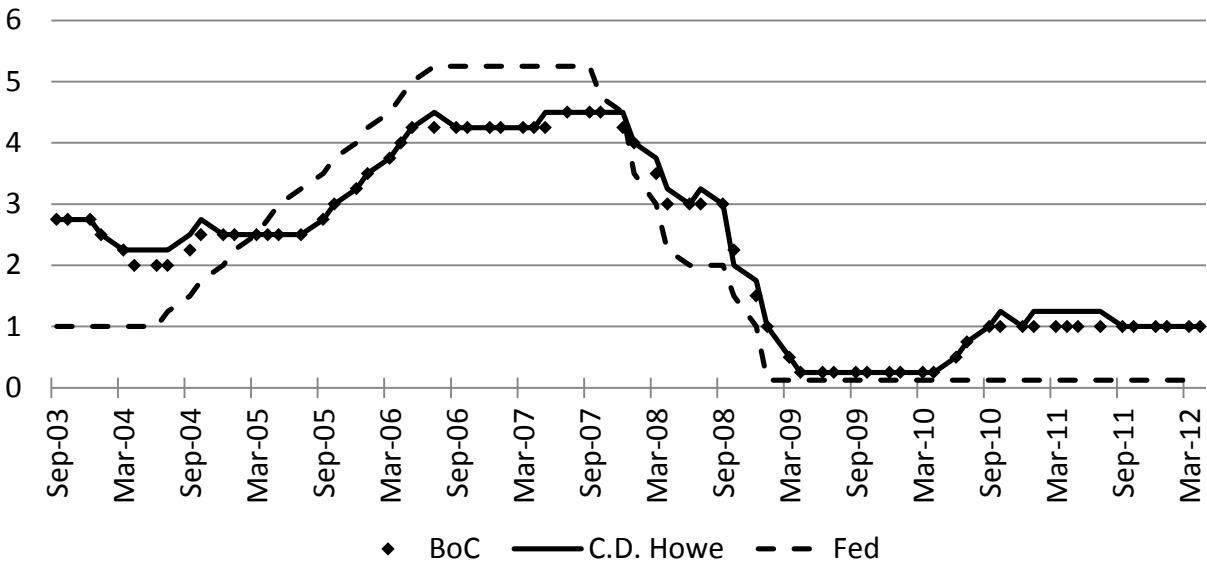| Dep. Variable: MPC Following C.D. Howe Proposal (1 = Yes, 0 = No)				
Consensus Indicator	1.162	***	−1.833	**
Professional Share	−0.256		0.041	
In-Person Voting Share	−0.120		−0.443	*
Cond. Commitment	0.730	***	1.109	***
Proposal: Cut	−0.088		−0.125	
Proposal: Hike	−0.264	***	−0.371	***
VIX-20 Index	−0.001		0.001	
Cond. Infl. Volatility	−0.140		−0.281	*
Consensus Indicator	Cons. Share		SD (Ind. Prop.)	
Observations	69		69	
LR Statistic	321.02	***	315.07	***
Pseudo Log-Likelihood	−19.128		−25.248	
Pseudo R^2	0.529		0.378	

Notes: Table shows average marginal effects for probit estimations of equation (3). ***/**/* indicates significance at the 1%/5%/10% level. Huber (1967)/White (1980) robust standard errors are used.

Figure 1: The Five Stages of the Bank of Canada's Decision-Making Process
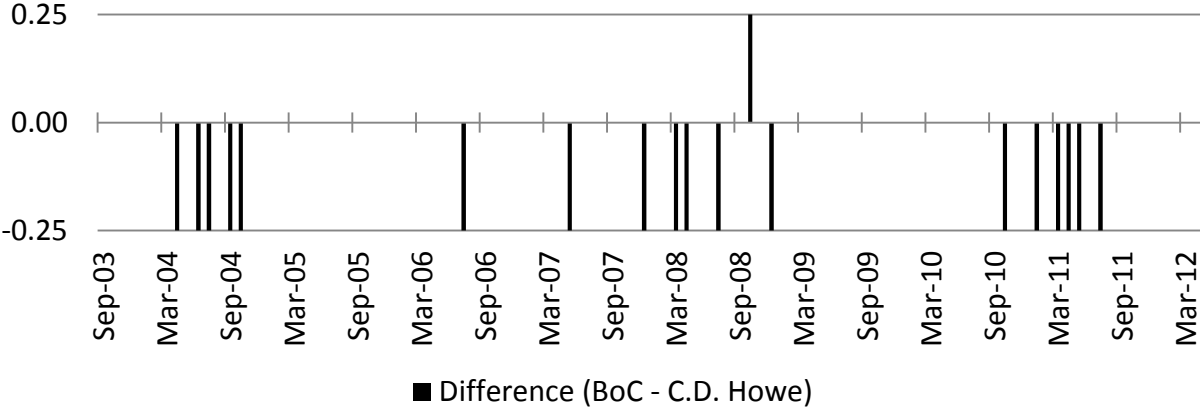

Source: Murray (2012) and authors.

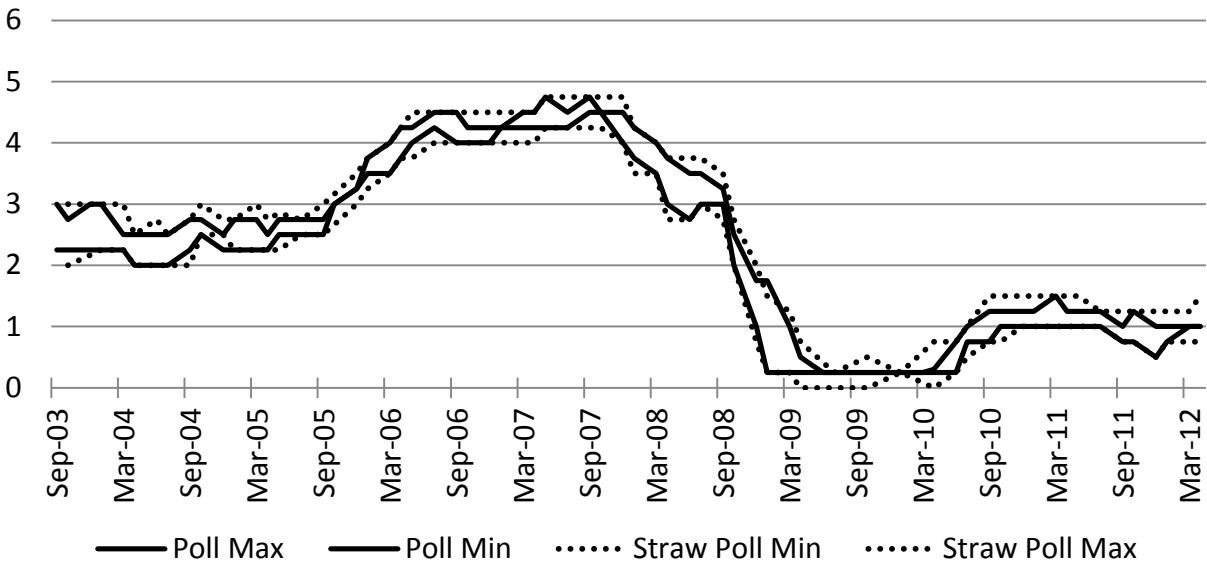Figure 2: MPC Recommendation, GC Target Rate, and Fed Target Rate

Sources: for MPC, C.D. Howe Institute; for the BoC, the Bank of Canada; for the Fed, FRED II (Federal Reserve Bank of St. Louis). The vertical axis is in percent.

Figure 3: Differences between GC Target Rate and the MPC Recommendation

■ Difference (BoC - C.D. Howe)

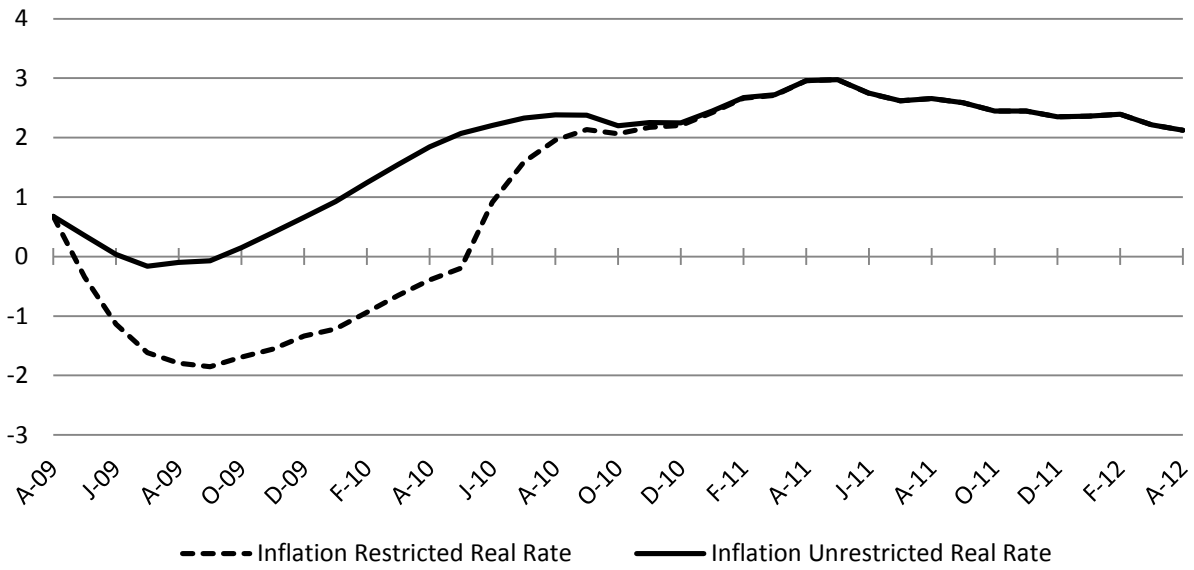Source: Authors' calculations. The vertical axis is in fractions of 1%.

Figure 4: Minimum and Maximum Proposals for Actual Poll and Straw Poll

Source: C.D. Howe and authors' calculations. The vertical axis is in percent.

Figure 5: Counterfactual Experiment:

Inflation Paths With or Without Restrictions on the Neutral Real Interest Rate

Note: The vertical axis is in percent. The solid line is the inflation path of the average MPC member with no restriction on the hypothesized neutral real interest rate. The dashed line is the inflation path assuming that the neutral real interest rate is set to zero during the period of the conditional commitment (April 2009-April 2010).

References

Andersson, M., H. Dillen, and P. Sellin, (2006), "Monetary Policy Signaling and Movements in the Term Structure of Interest Rates", *Journal of Monetary Economics* 53: 1815-55.

Asso, P., C. Khan, and R. Leeson (2010), "The Taylor Rule and the Practice of Central Banking", *Federal Reserve Bank of Kansas City Working Paper* 10-05.

Bernanke, B. (2010), "Monetary Policy and the Housing Bubble", remarks delivered at the *Annual Meeting of the American Economic Association*, Atlanta, GA, January 3, http://www.federalreserve.gov/newsevents/speech/bernanke20100103a.htm.

Blinder, A. (2004), *Quiet Revolution: Central Banking Goes Modern*, New Haven (Conn.): Yale University Press.

Carney, M. (2013), "Monetary Policy After the Fall", *Eric J. Hanson Memorial Lecture*, University of Alberta, 1 May, http://www.bankofcanada.ca/2013/05/speeches/monetary-policy-after-the-fall/.

Clarida, R. (2001), "The Empirics of Monetary Policy Rules in Open Economies", *International Journal of Finance and Economics* 6: 215-23.

Clarida, R. (2012), "*What Has—and Has Not—Been Learned about Monetary Policy in a Low Inflation Environment? A Review of the 2000s*", *Journal of Money, Credit and Banking* 44 (Supplement): *23-40.*

Collins, S. and P. Siklos (2004), "Optimal Monetary Policies and Inflation Targets: Are Australia, Canada and New Zealand Different from the US?" *Open Economies Review* 15: 347-62.

Davies, G. (2011), "The Timing of the Fed's Exit", *Financial Times*, 15 March, http://blogs.ft.com/gavyndavies/2011/03/15/the-timing-of-the-feds-exit/#axzz25tXCNoKD.

Fujiki, H. (2005), "The Monetary Policy Committee and the Incentive Problem: A Selective Survey", *Monetary and Economic Studies* 23: 37-82.

Gerlach-Kristen, P. (2004), "Is the MPC's Voting Record Informative About Future UK Monetary Policy?" *Scandinavian Journal of Economics* 106: 299-313.

He, Z. (2010), "Evaluating the Effect of the Bank of Canada's Conditional Commitment Policy", *Bank of Canada Discussion Paper* 2010-11.

Hodrick, R. and E. Prescott (1997), "Postwar U.S. Business Cycles: An Empirical Investigation", *Journal of Money, Credit, and Banking* 29: 1-16.

Horvath, R., K. Smidkova, and J. Zapal (2013), "Voting Record and Macroeconomic Predictability: Theory and Evidence for Six Central Banks", in P. Siklos and J.-E. Sturm (Eds.), *Central Bank Communication, Decision-Making and Governance: The Issues, the Challenges, and Case Studies*, Cambridge (Mass.): The MIT Press.

Mahadeva, L., and G. Sterne (2000), *Monetary Policy Frameworks in a Global Context*, London: Routledge.

Maier, P. (2010), "How Central Banks Tae Decisions: An Analysis of Monetary Policy Meetings", in P. Siklos, M. Bohl, and M. Wohar (Eds.), *Challenges in Central Banking*: Cambridge University Press, 320-56.

Meade, E., and D. Stasavage (2008), "Publicity of Debate and Incentive to Dissent: Evidence from the U.S. Federal Reserve", *Economic Journal* 118: 695-717.

Melino, A., and M. Parkin (2010), "Greater Transparency Needed", *C.D. Howe E-Brief* No. 102.

Morris, J.A., and T. Lybek (2004), "Central Bank Governance: A Survey of Boards and Management", *IMF Working Paper* 04/226.

Murray, J. (2012), "Monetary Policy Decision-Making at the Bank of Canada", remarks delivered to the mortgage brokers association of B.C, 7 May, http://www.bankofcanada.ca/2012/05/speeches/monetary-policy-decision-making/.

Newey, W. and K. West (1987), "A Simple, Positive Semi-definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix", Econometrica 55: 703-8.

Neuenkirch, M. (2013), "Predicting Bank of England's Asset Purchase Decisions with MPC Voting Records", *MAGKS Discussion Paper* No. 22-2013.

Neuenkirch, M. and P. Siklos (2011), "What's In a Second Opinion? Shadowing the ECB and the Bank of England", *MAGKS Discussion Paper* No 31-2011.

Parkin, M. (2011), "Overnight Moves: The Bank of Canada Should Start to Raise Interest Rates Now", *C.D. Howe Backgrounder* No. 139.

Parkin, M. (2009), "What is the Ideal Monetary Policy Regime? Improving the Bank of Canada's Inflation-Targeting Program", *C.D. Howe Commentary* No. 279.

Poole, W. (2006), "The Fed's Monetary Policy Rule", *Review of the Federal Reserve Bank of St. Louis* 88: 1-11.

Sibert, A. (2006), "Central Banking By Committee", *International Finance* 9: 145-68.

Siklos, P. and A. Spence (2010), "Face-Off: Should the Bank of Canada Release its Projections of the Interest Rate Path", *C.D. Howe Backgrounder* No. 139.

Siklos, P. (2003), "Assessing the Changes in Transparency and Accountability at the Bank of Canada" *Canadian Public Policy* 29: 279-99.

Siklos, P. (2009), "As Good As Gets? The International Dimension to Canada's Monetary Policy Strategy Choices", *C.D. Howe Commentary* No. 279.

Swank, J., O. Swank, and B. Visser (2008), "How Committees of Experts Interact with the Outside World: Some Theory, and Evidence from the FOMC", *Journal of the European Economic Association* 6: 478-86.

Taylor, J. (1993), "Discretion versus Policy Rules in Practice", *Carnegie-Rochester Conference Series on Public Policy* 39: 195-214.

Taylor, J. (2007), "Housing and Monetary Policy", *NBER Working Paper* 13682.

Visser, B., and O. Swank (2007), "On Committees of Experts", *Quarterly Journal of Economics* 122: 337-72.

White, H. (1980), "A Heteroskedasticity-consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity", *Econometrica* 48: 817-38.