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WHEN IS LIFT-OFF?

EVALUATING FORWARD GUIDANCE FROM THE SHADOW*

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Abstract

We examine the record of the CD Howe's shadow Monetary Policy Council (SMPC) in Canada. We report a considerable diversity of opinion about the recommended future path of interest rates inside the SMPC. During the period of Bank of Canada forward guidance, market determined forward rates diverge considerably from the recommendations implied by the SMPC. Nevertheless, there is little evidence that the Bank of Canada and the SMPC coordinate their future views about the interest rate path. Finally, changes in views about future changes in policy rates for horizons beyond the next two interest rate decisions are difficult to explain. Our findings imply that there remain challenges in understanding the evolution of future interest rate paths over time. We conclude with some policy implications.

Keywords: Bank of Canada, central bank communication, forward guidance, monetary policy committees, shadow councils, Taylor rules.

JEL Classifications: E43, E52, E58, E61, E69.

1. Introduction

Monetary policy is typically delivered after a committee has deliberated economic conditions and a proposal to change, or not, the policy rate has been taken by a vote. There exist, of course, different approaches to vote taking. In the wake of the global financial crisis, and the lowering of policy rates in the industrial world to levels close to or at the zero lower bound (ZLB), attention has turned to other strategies used by central banks to influence expectations. In this environment, some monetary authorities have turned to forward guidance to influence inflation expectations and, by implication, interest rates across the (whole) term structure.

Although forward guidance has existed in a variety of forms since the late 1990s, a more explicit and time-contingent form of forward guidance was pioneered by the Bank of Canada (BoC) in April 2009 when, faced with a policy rate effectively at the ZLB, a conditional commitment was made to maintain extraordinarily low rates for up to a calendar year. Unfortunately, other than publishing some macroeconomic forecasts, the BoC does not release a forward interest rate path. Several other central banks, including most recently the US Federal Reserve (Fed), have become more transparent in this connection. Moreover, given how the Bank is governed, no minutes or votes of its policy-making Governing Council (GC) are published. This limits researchers' ability to examine the record of forward guidance and policy stance setting of the BoC.

However, the decisions of the BoC are 'shadowed' by the Monetary Policy Council (SMPC), a body administered by a non-partisan think tank, the C.D. Howe Institute (CDHI).[1] This committee recommends a policy rate setting for the BoC's target for the overnight rate as well as providing a forward interest rate path, up to a year ahead. Moreover, the independent (and unpaid) members of the SMPC provide individual recommendations about the future path of

[1] At the time of this writing, the CDHI's SMPC is the only shadow council which aims at providing independent advice about the appropriate stance of the BoC's monetary policy. Internationally, there are relatively few such shadow committees. To our knowledge, only the UK has two shadow committees. See also Neuenkirch and Siklos (2013) for empirical evidence for the euro area and the UK.

the BoC's policy rate. These are publicly available and are empirically studied in this paper.[2] Therefore, it is of considerable interest to investigate the record of a shadow monetary policy committee of the kind setup in Canada.

Recently, there has been resurgence in outsiders expressing independent opinions about the appropriate stance of monetary policy, e.g., in the United Kingdom, the euro area, Australia, and New Zealand. Their presence arguably provides the public with some checks and balances that are part and parcel of how democratic societies are expected to function. Shadow monetary policy committees provide an additional voice that informs both the central bank and the public about the suitability of the current stance of monetary policy. Stated differently, these groups can contribute to making monetary policy more accessible to the public. Moreover, the central bank may well respond to potentially dissenting views about its actions by seeking to improve how effectively it communicates to the public. This kind of development is also helpful to central banks who seek to be transparent and accountable. Transparency and accountability also requires central banks to explain their actions and provide sufficient information to enable the public to understand why certain policy decisions are taken (see also Neuenkirch and Siklos 2013, Siklos and Neuenkirch 2014).

We are interested in how much diversity of opinion exists about the appropriate future stance of monetary policy and the extent to which observable institutional and economic factors can explain individual recommendations over time. We also compare the SMPCs recommendations against observed future decisions made by the BoC as well as financial market views about the future of short-term interest rates. Briefly, we find that there exists considerable disagreement within the SMPC over time about the recommended future interest rate path. We also report significant differences of opinion between the SMPC and financial markets about the future direction of interest rates. Moreover, while the BoC, financial markets, and the SMPC recommendations and views about future interest rates generally parallel each other, there appears to be little evidence that these views are coordinated.

[2] The data used in this study will be made available on the Central Bank Communication Network's website (http://www.central-bank-communication.net/).

Whereas a few economic indicators explain how SMPC members change their future interest rate paths, determinants of the diversity of opinions within the SMPC are sensitive according to whether interest rates are rising or falling and the period of explicit forward guidance. SMPC members, in particular, appear to have taken seriously the conditional nature of the BoC's commitment on future policy rates.

Our findings also lead to two policy implications. First, following developments elsewhere, it would be useful for some of the internal debates inside the Bank of Canada's Governing Council to be publicly available. Even the ECB has announced that it would publish summaries of the meetings of its own GC. The BoC should follow suit.[3] Second, since the BoC's GC is not recognized in Statutes, the Bank of Canada Act should be changed to formally acknowledge the rights and responsibilities of the central bank's monetary policy committee.

The rest of the paper is organized as follows. In Section 2, we briefly explain how the BoC and the SMPC make monetary policy decisions. In Section 3, we survey recent work and evidence in relation to the principle of forward guidance around the world and, in particular in Canada. In Section 4, we consider some stylized facts as well as some empirical evidence on the behavior and determinants of future interest rate paths set by the SMPC in relation to subsequent decisions taken by the BoC as well as market determined future interest rates. The paper concludes with some policy implications.

2. The Shadow Council and Observed Monetary Policy

Ever since Canada adopted inflation targeting in the early 1990s, together with the adoption of a fixed schedule for the announcement of the policy rate since 2000,[4] it has become easier to follow monetary policy and assess its stance. In part as a reaction to these developments a non-partisan public policy think tank, the C.D. Howe Institute (www.cdhowe.org), created a shadow monetary policy committee called the Monetary Policy Council. The mandate of this shadow

[3] See, for example, https://www.ecb.europa.eu/press/inter/date/2014/html/sp140804.en.html.

[4] The policy rate is the interest rate target on overnight borrowing by major financial institutions. An operating band is permitted around the target which the Bank can control. See http://www.bankofcanada.ca/monetary-policy-introduction/key-interest-rate/.

committee is not to second guess the policy strategy of the BoC, nor does it attempt to forecast future BoC policy, but its aim is to provide a second opinion, that is, a recommendation about the appropriate stance of future monetary policy.

The government and the central bank operate under a mandate to target inflation in consumer prices in a 1–3% range with the express aim to maintain inflation in the headline Consumer Price Index at 2%, the mid-point of the target range. The agreement with the government is renewed every five years and, since 1998, the inflation objective has remained unchanged.[5] The regular renewal and discussion surrounding the announcement and renewal of targets was part and parcel of a strategy to improve central bank communication about the inflation control strategy.[6] In contrast to the Bank, the SMPC is tasked with providing a recommendation on what the appropriate setting for the policy rate ought to be conditional on the objective of achieving the 2% inflation target.

Whereas the BoC typically makes a policy rate announcement on Wednesdays, the SMPC meets the previous Thursday.[7] There are at least three important substantive differences between the operation of the SMPC and its counterpart at the BoC, called the Governing Council. First, and most relevant for the purposes of the present study, the shadow committee not only recommends a policy rate for the upcoming BoC setting but provides recommendations for the following meeting as well as meetings 6 and 12 months ahead. The last two types of recommendations were introduced in 2007 and 2010, respectively. In contrast, the BoC provides no forward interest rate path. Second, the BoC does provide macroeconomic forecasts though this is a fairly recent innovation. SMPC members do not publish forecasts.[8] Indeed, it is only recently (2010) that the BoC has published a two year

[5] Complete details about the Bank's monetary policy strategy can be found at http://www.bankofcanada.ca/monetary-policy-introduction/framework/inflation-control-target/.

[6] Egert (2010) assesses the effects of central bank communication on the exchange rate in South Africa.

[7] Prior to 2013, the BoC's policy rate announcement was made on Tuesdays. Since then the Bank has been able to release its quarterly Monetary Policy Report (a further four interim updates of which are also published) earlier permitting the simultaneous release. The SMPC discussed the possibility of delaying its own policy rate announcement but chose to retain the Thursday meeting schedule.

[8] Note that the organizations the professional economists on the SMPC represent do publish forecasts which are routinely discussed inside the SMPC.

ahead fan-type chart for inflation. Previously, and then again only since 2005, the Bank has provided an own forecast for inflation and real GDP growth.[9] Third, while individual SMPC member recommendations are published, alongside a consensus press release explaining the median recommendation and the tone of the committee deliberations, the BoC issues only a press release. The GC is not a body recognized in the Bank of Canada Act. It is a creation of a former BoC Governor, Gordon Thiessen, during the 1990s and consists of six members, including the Governor, the Senior Deputy-Governor, and four Deputy-Governors.[10] As a result, the central bank does not publish votes or minutes of its policy making body.

The SMPC consists of 12 individuals, half of whom are academics while the remaining members are professional economists broadly representing the financial sector.[11] Both academic and business economists who have served on the Council are described as eminent in their fields as well as holding diverse views about how monetary policy should be conducted.[12] Therefore, the SMPC's recommendations should be recognized as a serious attempt to provide a second opinion on the appropriateness of monetary policy in Canada. The SMPC's press release is made public at 2:00PM on the day the SMPC meets, committee member votes are easily accessible, and regularly reported in the National Canadian Press.[13]

Details about the governance structure and decision-making by the GC as well as details about how the SMPC conducts its meetings and the preparation of the press release can also be found in Siklos and Neuenkirch (2014). Members vote individually on recommendations for the

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[9] For a recent analysis of inflation reports and their clarity, see Bulir et al. (2013).

[10] It is conceivable that the Governing Council was created by former Governor Gordon Thiessen in reaction to the so-called Manley Report (see Manley and Dorin 1992) which essentially concluded that, when it comes to BoC governance, "if it ain't broke, don't fix it". Also, see Laidler (1991). For a recent study of the determinants and consequences of transparency in monetary policy committees, see Hayo and Mazhar (2013).

[11] The current and past membership of the SMPC can be found at http://www.cdhowe.org/monetary-policy-council-2 while the Bank's current GC membership is available at http://www.bankofcanada.ca/about/corporate-governance/governing-council/.

[12] Bill Robson, President of the C.D. Howe, who created and Chairs the SMPC, also wrote to us that "…reputation in the relevant field of analysis was a key criterion." He also goes on to add, in private correspondence with us: " …it has always seemed more congenial to have our academic members be from different institutions and our business members be from different companies." Finally, he adds: "...former senior BoC [Bank of Canada] employees, though extensively consulted over the SMPC's mandate and operations, have never been invited to join it."

[13] Notably, the Globe and Mail (http://www.theglobeandmail.com/) and the National Post (http://www.nationalpost.com/index.html).

upcoming BoC overnight rate setting, the one after that, as well as recommendations 6 and 12 months ahead. There are no pre-meetings or other organized consultations between SMPC members prior to any decisions. The setup of the SMPC encourages individual voting and taking individual responsibility for monetary policy decisions.

3. Forward Guidance

3.1. Varieties of Forward Guidance around the World

Forward guidance as a principle for providing fewer surprises about the likely future stance of monetary policy is a development of the early 1990s, possibly pioneered by the Fed when it sought to provide additional information in the directive the Federal Open Market Committee (FOMC) publishes about the likely future stance of monetary policy. The Bank of Japan also introduced a form of forward guidance in 1999 when it committed to keep its policy rate at the ZLB until deflation expectations dissipated. Historically, however, the Fed's usage of forward guidance has been applied in fits and starts. Until the late 1990s, it was in the form of asymmetric guidance, that is, whether the future might bring tightening or loosening of monetary policy (e.g., see Thornton and Wheelock 2000). Thereafter, the Fed introduced the concept of the 'balance of risks'. When deflation became a cause of concern for US policy makers in the early 2000s, the notion of keeping policy rates at a certain level for an 'extended period of time' entered the lexicon of central banking. In any event these episodes later came to be called narrative or 'open-ended' forms of forward guidance.

The concept of forward guidance, as it is now understood, is practiced differently across central banks that have deployed this strategy in recent years. Nevertheless, all forms of forward guidance have in common the notion that the central bank provides some information about the future path of interest rates (e.g., Coeuré 2013). Some central banks (e.g., Norway's Norges Bank, Sweden's Riksbank, the Czech National Bank, and the Fed) provide numerical estimates of expected future policy rates while others (e.g., the BoC, the European Central Bank

(ECB)) are less explicit.[14] Reliance on this kind of strategy for communicating the stance of monetary policy has taken on a greater urgency since the Global Financial Crisis when the room to manoeuvre on the policy rate effectively vanished as several central banks approached or reached the ZLB. The Fed has since been at the forefront in experimenting with different types of forward guidance (e.g., see Williams 2013).

Since then, time forward guidance has come to be viewed as another policy tool which, under certain circumstances, can be used to stimulate the economy, reduce policy making uncertainty, uncertainty about the inflation-output trade-off, and provide breathing room for the transmission mechanism of monetary policy to return to normal. It is in large part for this reason that forward guidance as an instrument evolved into time-contingent and, more recently, state-contingent, forms (e.g., Carney 2013b). Indeed, the BoC can be said to have pioneered the time-contingent version of the strategy when it announced, in April 2009, its commitment to keep the policy rate at the effective ZLB for up to a year. The conditions were seen, *ex post*, to have been met when the BoC invoked the need to raise the policy rate in April 2010, one meeting prior to the expiry of the promise to hold the rate at the ZLB.[15]

More recently, as advanced economies struggle to return to more 'normal' economic growth, forward guidance has become state-contingent in at least two cases. First, in 2012, and more recently in 2013, the Fed and the Bank of England (BoE) committed to the ZLB so long as the unemployment rate remains above a certain threshold (6.5% for the US, 7% for the UK). Both central banks have been explicit about the importance of not interpreting the thresholds as triggers for tighter policy (e.g., see Bank of England 2013). Indeed, this and unexpected improvements in economic activity beginning in 2014 eventually led both central banks to downplay at first and then, effectively, abandon the state-contingent form of forward guidance

[14] Another distinction is whether the path is purely model-driven or represents the views of the policy making committee members. Several authors (e.g., Kool and Thornton 2012, Karagedikli and Siklos 2013, and references therein) examine the impact of forward interest rate paths on yields and the exchange rate. The evidence of forward guidance on financial market returns is decidedly mixed.

[15] He (2010) found that the policy did move yields in the desired direction, as did Siklos and Spence (2010), while Siklos and Neuenkirch (2014) examined the effect of the BoC's conditional commitment on the CDHI's SMPC current policy rate recommendation. They conclude that the conditional commitment has a significantly larger negative effect on the SMPC's recommendation than on the policy rate set by the GC itself.

(e.g., see Filardo and Hofmann 2014). Conditionality also remains at the forefront as the same central banks underscore the need to remain faithful to their remit, a medium-term inflation target for the Fed and a 2% inflation target for the BoE.[16] Interestingly, as pointed out by Weale (2013), a member of the BoE's Monetary Policy Committee, forward guidance has "raised the bar" about whether a tightening of the stance of monetary policy is in order when expectations of inflation begin to rise. This view is also consistent with the theoretical position outlined by Woodford (2012) who proposed that keeping policy rates low for longer than would be expected, under a rule that policy ought to be tightened when expectations of inflation rise, provides the economic stimulation necessary to achieve 'escape velocity' from sluggish economic growth (also see Carney 2013a). Of course, as even those who are skeptical about the impact of forward guidance will stress, central bank credibility is essential for the strategy to be successful.

3.2. Forward Guidance in Canada

The BoC does not publish a forward interest rate path nor does it publish minutes of the meetings of the policy making committee or the votes of its members. In contrast, the CDHI's SMPC does publish a forward rate path and the individual votes of its committee members. Figures 1a–1c display the forward rates for the median, most dovish, and most hawkish members of the SMPC at eight different meetings over the period 2007 through mid-2013.[17] Perhaps the most striking result from a visual inspection of the figure is that, with very few exceptions, SMPC members of all stripes advocated 'lift-off' of the policy rate throughout the sample, even during the implementation of forward guidance between April 2009 and April 2010. The median voter recommends lowering the policy rate during the height of the Global Financial Crisis (December 2008) while the dove and hawk recommend an unchanged policy rate over the one year horizon (but at different levels). Otherwise the main difference between

[16] The Fed has the advantage in this context of being able to rely on its dual mandate to maintain price stability while striving to support an economy that operates at capacity.

[17] The dove is defined as the SMPC member who recommends the lowest policy rate for the BoC for the upcoming overnight rate setting by the Bank. Obviously, the most hawkish member recommends the highest policy rate. There can be more than one dove or hawk at the conclusion of an SMPC meeting. Also, the individual labelled as dove or hawk can, and does of course, change over time.

median, dovish, and hawkish recommendations is not the *sign* of the suggested future change in the policy rate but, rather, the *speed* with which future rates should rise. Clearly, the recommended future rise is faster among hawks than for doves. Nevertheless, as we shall see in the following section, there remain substantial differences of opinion between the members of the SMPC about the appropriate policy rate.

Notice also that, for each of the meetings shown in Figures 1a–1c, all members must reset their most immediate policy rate proposal to the rate actually set by the BoC at its previous meeting. Clearly, over the roughly seven years of rate setting shown, all members of the SMPC have effectively been more hawkish than the BoC turned out to be, at least *ex post*. Since we do not observe GC members' views about when 'lift-off' of the policy rate might take place, unlike their counterparts at the FOMC, we cannot say whether the SMPC has been more hawkish about the future than their counterparts at the BoC.[18] Since it is reasonable to expect disagreements about the future course of monetary policy inside the BoC's GC, the central bank displays insufficient transparency, especially compared to some of its counterparts elsewhere among advanced economies.

Figures 2a and 2b provide a different perspective on the recommendations of SMPC members. We follow the approach adopted by the Fed in its Monetary Policy Reports (http://www.federalreserve.gov/monetarypolicy/mpr_default.htm) and show the 'appropriate pace of policy firming'. Each bullet represents the 6 month and 12 month ahead recommendation of individual members. At both horizons, the bulk of the SMPC believed that the overnight rate should rise though the dispersion is rather high in case of the one year ahead recommendation. Nevertheless, during the second half of 2011, that is, when the euro area crisis seemed to reach a peak, there is both a sharp drop in the forward rate recommendations and, more tellingly, a noticeable reduction in the dispersion of proposals for the appropriate future BoC policy rate. No doubt another factor that contributes to the patterns shown in

[18] Siklos and Neuenkirch (2014) find, in case of the proposal for the upcoming meeting, that differences between the SMPC and GC are partly driven by the fact that the former assumes a higher steady state real interest rate than the latter. In contrast, there are few differences in both committees' responses to inflation and output shocks.

Figures 2a and 2b is the delayed 'exit' from the ZLB at the Fed. Overall, we see that disagreement inside the committee is a moving target, occasionally high but, at other times, very low. Clearly, one possibility is that certain central bank announcements (e.g., the ECB's Outright Monetary Transactions, or Fed announcements about the likely date of exit from ultra-low interest rates) have a measurable effect on the SMPC's recommendations. Alternatively, 'experts' inside and outside the central bank do, at times but not always, see eye to eye.

It is well known that since monetary policy decisions are made by committees a variety of risks arise thereof (e.g., see Sibert 2006, Maier 2010). There is the free rider problem when a committee member simply agrees with others who voted ahead of him. A variant of this problem is the possibility of information cascades. Here the focus is on committee members who might choose to ignore independent signals in arriving at their voting decisions. Committees are also prone to being cautious, or perhaps conservative, in an attempt to paper over differences or to emphasize the desirability of achieving decisions by consensus. Finally, committees may become polarized leading to more extreme decisions than might otherwise be the case. This phenomenon may be revealed either by excessive caution or by excessive risk-taking.

Given the organizational structure of the CDHI's SMPC, some of the problems associated with conventional policy committees do not apply. Members do not know, *a priori*, who will vote first nor does the Chair make a recommendation that may be rejected in favor of an alternative. The committee members individually provide a *recommendation* to the BoC. In addition, there is no commitment to maintain the recommendation in future since the SMPC must take as given the stance that the Bank actually took once a decision has been published. Hence, the behavior of the SMPC can be viewed as a laboratory of sorts for how monetary policy committees behave in the absence, at least most of the time, of an interest rate path provided by the BoC even when some kind of forward guidance is provided. Finally, unlike markets and the public, which may be inattentive to the nuances that accompany central bank

policy rate decisions, the CDHI's SMPC is well aware not only of the decision take by the BoC but also the words that accompany these announcements and the reasoning behind them.[19]

4. The Record of Forward Guidance: Data, Stylized Facts, and Empirical Evidence

4.1. Data and Stylized Facts

The empirical evidence below relies on monthly data since March 2007, when the CDHI's SMPC introduced a proposal on the interest rate in 6-months' time. As previously mentioned the SMPC makes several recommendations at each meeting. It recommends a policy rate for the BoC's next meeting (4 or 5 days later), a policy rate recommendation for the meeting after that (approximately 6 weeks after that), a recommendation for the policy rate in 6 months' time, and a recommendation for the policy rate in 12 months' time.[20]

Figures 3 and 4 show a variety of policy rates and policy rate expectations or recommendations. Figure 3 demonstrates that substantial differences of opinion about the 6 months ahead policy rate recommendation persist within the SMPC. The gap often ranges between 100 to 150 basis points among the hawks and doves on the committee. Notice also that the highest and lowest policy recommendations are more volatile than the median policy rate recommendation.

Figure 4 compares the CDHI's SMPC 6 months' ahead median policy rate recommendation against the BoC's actual stance 6 months later as well as a market indicator of future interest rates, namely the 3 month forward BA rate.[21] The latter represents the yield on bankers' acceptances, a highly liquid and widely used indicator of short-term interest rates in Canada.[22] Once again it is evident from the three lines that there exists a diversity of opinions about future policy rates not only between the SMPC and financial markets but also between both of

[19] Undoubtedly, the BoC garners relatively more public attention than the SMPC. Whether this affects the empirical results in this paper or not remains unclear. Nevertheless, as previously mentioned, the SMPC's recommendations are regularly discussed in the Canadian media.

[20] 12-month ahead recommendations are published since January 2010. The resulting small sample (28 observations) makes it unattractive to utilize these data.

[21] Unfortunately, we are unable to obtain a long enough sample for a 6 months ahead BA yield.

[22] Bankers' acceptances are short-term obligations that are accepted by banks such that there is a guarantee of repayment of principal and interest. For additional details, see http://www.m-x.ca/f_publications_en/BA_en.pdf.

these indicators and the BoC's actual policy rate setting. Interestingly, while the correlation between the forward BA yield and the SMPC recommendation is high until early 2009 the two indicators diverge persistently thereafter. Between 2010 and 2012, the SMPC's recommendation for the BoC's policy rate 6 months ahead is consistently above the actual policy rate. Essentially, the reverse is true of the 3 months ahead BA over approximately the same period. Of course, one has to take into account the BoC's conditional commitment from April 2009 to April 2010, as discussed previously.

Figure 5 provides a slightly different perspective on the discrepancies between the BoC's views and those of the CDHI's SMPC median voter. With two minor exceptions, the SMPC revised its forward interest rate proposal by more than the observed change in the BoC's actual policy rate during the 6 months period. Interestingly, the SMPC "forward spread" falls considerably faster than the Bank's "forward spread", even after the introduction of the conditional commitment policy in April 2009. From the spring of 2012 onwards, the SMPC did not propose a change in the target rate over the next 6 months and the GC also left the target rate unchanged.

As discussed above, there are relatively fewer pressures on the SMPC to fall victim to information cascades or group polarization, a problem that can emerge in several committee settings. As a result, if information is processed or interpreted differently, there is scope for considerably greater disagreement about the future course monetary policy in Canada ought to follow. This is illustrated in Figure 6 which plots the standard deviation of individual SMPC committee member recommendations for future policy rates. It can be clearly seen that the correlation between the standard deviation for the upcoming and meeting after that is very high. In contrast, recommendations for the policy rate in 6 month time reveal a much higher standard deviation which is also more variable than the other two recommendations. Indeed, if the standard deviation proxies the level of disagreement within the committee then there is comparatively much less disagreement about the near term stance that monetary policy should take while disagreement is much higher most of the time at the 6 months horizon. While not entirely surprising, it is interesting that disagreement about the course that the BoC should take

over the near term up to a 6 months horizon is similar in early-2009 and in early-2013. The period in early-2009 anticipates, of course, the time-contingent commitment pioneered by the BoC in April 2009. In early-2013, there was growing consensus globally that central bank policy rates would not be rising for the foreseeable future.

4.2. Econometric Evidence

We now turn to some econometric evidence. Given the stylized facts previously discussed, it is of considerable interest to answer a series of questions. First, are highlighted differences between the GC's, the SMPC's, and the financial markets' view on forward interest rates statistically significant? Second, we assess the wisdom of the SMPC's 6 months ahead forward interest rate recommendations *ex post.* Specifically, we determine how changes in the domestic and international macroeconomic and financial environment affect the SMPC's median, most dovish, and most hawkish proposal. Third, we also ask whether observable institutional and macroeconomic determinants can explain within committee differences in views about the appropriate stance of monetary policy going forward. For that purpose, we estimate the following three specifications.

$$i^{k}_{t+6} = \alpha_0 + \alpha_1 i^{j}_{t+6} + \varepsilon_t \tag{1}$$

$$\Delta i^{MPC}_{t+6} = \beta_0 + \boldsymbol{\beta}_1 \mathbf{Z}^{f}_{t} + \upsilon_t \tag{2}$$

$$DIS^{MPC}_{t+m} = \lambda_0 + \boldsymbol{\lambda}_1 \Phi_t + \boldsymbol{\lambda}_2 \Omega_{t-1} + \xi_t \tag{3}$$

Equation (1) explores the predictive power of the SMPC's version of forward guidance for the BoC policy rate setting 6 months ahead. Alternatively, we also ask whether financial markets views about the future course of short-term interest rates (i.e., the 3 months forward BA yield) successfully forecast the BoC's rate in 6 months. In Tables 1a and 1b *k* refers to the BoC and *j* to the SMPC or BA. A second set of estimations (shown in Tables 2a–2c) aims at predicting the SMPC's 6 months ahead recommendations which now serves as the left-hand side variable labelled *k* with the 3 month BA returns representing the variable *j.*

Equation (2) considers the determinants of changes in the SMPC's views about the policy rate 6 months ahead. The specification examines the extent to which the shadow committee's view about future interest rates is explained by forward-looking variables. It is standard practice to argue that monetary policy ought to be forward-looking, especially when the central bank is required to meet an inflation target. Motivated by the Taylor (1993) rule, two obvious proxies for how forward-looking the SMPC is are changes in Canadian inflation and real GDP growth forecasts. Given the openness of the Canadian economy and the worldwide tendency to keep interest rates close to or at the ZLB, we also include changes in the corresponding US and euro area (EA) forecasts. Finally, changes in the VIX index are included to proxy volatility in financial markets.

Equation (3) asks about the sources of disagreement (*DIS*) within the SMPC over the future path for the BoC's policy rate. If we define disagreement as the standard deviation of individual proposals about future monetary policy settings then we can ask to what extent these disagreements are driven by institutional, financial, or macroeconomic factors. Determinants include the fraction of voting members who are professional economists as opposed to academic economists, the share of voting members who were physically present at the SMPC meeting, as opposed to participating via conference call, the period of the conditional commitment (i.e., April 2009–April 2010), lagged disagreement between the GC and the SMPC over the appropriate target for the overnight rate, the VIX, and the conditional standard deviation of observed inflation. Additionally, we consider the possibility that disagreement about future interest rate paths differs between meetings when interest rates are proposed to rise versus meetings when the median voter is in favor of falling rates.[23]

Regression results are shown in Tables 1 to 4. OLS is used throughout. Newey and West (1987) standard errors are used if we detect autocorrelation in the residuals. White (1980) standard errors are used if we detect heteroskedasticity in the residuals. Tables 1a and 1b provide estimates of Equation (1). Tables 1a and 1b presents two sets of results also allowing for the possibility that future interest rate paths behaved differently during the pre-conditional

[23] To conserve space, detailed variable definitions are relegated to an unpublished appendix available on request.

commitment period.[24] It is immediately clear that there is a less than one to one relationship between changes in both the shadow committee's and financial markets' views about the future path of policy rates and the actual overnight rate 6 months ahead. Nevertheless, the CDHI's SMPC views come closest to ones eventually taken by the BoC based on the explanatory power of the different regressions. In contrast, changes in the forward BA can only explain approximately two-thirds of the eventual BoC policy rate. Finally, we observe only small differences according to whether the median, hawks, or doves on the SMPC are considered.

Turning to the interest rate path before April 2009, Table 1b essentially reveals that, prior to the period of the conditional commitment, a 100 basis point change in either the SMPC minimum recommendation for future overnight rates or the forward BA rate results in a 100 basis point change in the BoC's policy rate 6 months into the future. Whether this reflects the 'follow the market' principle discussed in Blinder (2004) wherein central banks deliver the monetary policy that 'markets' or, in this case, 'experts' also recommend, is unclear. Nevertheless, tests shown in both parts of the Table suggest that both the SMPC and the forward BA are not unbiased estimates of future BoC policy rates.[25] Clearly then, there is more to BoC policy rate moves than simply following markets. Of course, the table does not indicate the source of the bias.[26] Subsequent results discussed below may help in providing possible explanations for this finding.

Tables 2a through 2c provide further estimates of Equation (1). These results are meant to investigate differences between the SMPC and financial markets views about future interest rate paths. On average, both the SMPC and the BA markets see eye to eye concerning the future path of short term interest rates although the BA is usually not an unbiased forecast of the CDHI's committee views. Nevertheless, when the sample is broken down into pre and post

[24] Note that forecasting the BoC in the post-conditional commitment period is not feasible since there is no variation in the policy rate.

[25] The sole exception is the interest rate paths recommended by SMPC doves when considering the full sample period.

[26] One obvious difference between the BoC and the Fed studied by Blinder (2004) is that the former follows a numerical inflation target while the latter central bank did not at the time. Differences in outlook (both inflation and real GDP growth, among other variables) could also be a factor resulting in biased forecasts.

conditional commitment samples, there is a striking divergence between market and expert views. Ever since the BoC provided forward guidance there is a complete absence of predictive power from BA forward indicator to SMPC views about future interest rate paths. Figure 3, discussed earlier, suggests that we should not be surprised at such a result. Additional data going forward may reveal a narrowing of the differences between the two sources of future views about short-term interest rates.

We now turn to asking whether there are observables that can be used to explain how the SMPC revises its future interest rate path over time. The results are displayed in Table 3. To determine the sensitivity of the results according to the type of voter in the SMPC separate estimates are shown for the median, most dovish, and most hawkish voter on the committee. The type of voter impacts the explanatory power of the regression with observables almost twice as capable of explaining changes in the SMPC's future interest rate path for the median versus the dovish voter on the committee. Nevertheless, the regressions find that few forward-looking variables are statistically significant. Whereas a rise in the VIX, interpreted as a rise in uncertainty or volatility, results in a reduction in future interest rate recommendations, changes in forecasts of inflation are irrelevant. If such forecasts are believed to primarily drive how the BoC sets the policy rate there is little indication that forecasts serve as a coordinating mechanism in setting the future stance of monetary policy. In contrast, there is some evidence that Canadian (and euro area) economic growth forecasts influence the hawks and doves on the committee. In both cases better economic prospects serve to raise the future interest rate path. Notice, however, that hawks are more than twice as sensitive to better forecasts of economic growth as their more dovish counterparts on the committee. Of course, it needs to be stressed that the period under investigation is dominated by the events since the financial crisis erupted in the summer of 2007. Hence, it is perhaps not surprising that inflation forecasts

took a back seat to real GDP growth forecasts in influencing the views of SMPC committee members.[27]

The previous results make it clear that there is disagreement about future interest rate paths within the SMPC. To further explore disagreement and its sources, we estimate Equation (3) for three distinct decision points along the future path, namely the extent of disagreement over the recommended policy rate in the upcoming BoC announcement, the meeting after that as well as the 6 month ahead horizon. The results are displayed in Table 4. Once again, paralleling somewhat the results of Table 3, it is difficult to find observable macroeconomic, financial, or institutional determinants of disagreement over the path of interest rates 6 months ahead. Nevertheless, there is considerable persistence in the level of disagreement at this horizon. Turning to the other SMPC settings, the conditional commitment period clearly reduced disagreement within the SMPC. Whether this reflects BoC credibility or a widely held form of agreement about the prospects for, say, future inflation and the need to commit to unchanged policy rates during this period is unclear. However, since the impact of this episode dissipates after the upcoming setting this represents a little bit of evidence that the conditionality was taken seriously by the SMPC. In addition, lagged disagreement vis-à-vis the BoC's policy rate setting raises SMPC disagreement over future interest rates. Similarly, it is worth highlighting that recommended cuts in the policy rate generate twice as much disagreement as do recommended hikes.[28]

5. Conclusions

Monetary policy decisions are typically obtained after a committee has deliberated and voted on a proposal. In Canada, while a Governing Council is the forum where such deliberations take place the Governor remains statutorily responsible for setting the stance of monetary policy. As a result, neither minutes nor votes of the GC are published. While a committee structure is

[27] As part of our robustness tests, we include the contemporaneous inflation gap in Equation (2). However, this variable is insignificant in all three specifications. This can be seen as evidence that SMPC members react rather to changes in forward-looking variables than to the contemporaneous inflation gap.

[28] As part of our robustness tests, we include the contemporaneous absolute inflation gap in Equation (3). However, this variable is insignificant in all three specifications. Consequently, current deviations from target do not significantly increase the diversity of opinions within the SMPC.

ordinarily believed to deliver better decisions there are also risks associated with this form of decision-making, particularly around the manner in which information is transmitted and the impact this can have on voting.

Against this background, we examine the decisions of the CD Howe shadow Monetary Policy Council which provides a separate recommendation about the appropriate policy the Bank of Canada should conduct. The SMPC does not face the same information cascades and group polarization risks faced by actual decision-makers in central bank monetary policy committees. More importantly in an era that has come to be increasingly dominated by forward guidance and where central bank policy rates no longer represent a sufficient indicator of the stance of monetary policy, the CDHI's SMPC also provides a forward interest rate path. The BoC, in contrast, does not publish such a path. This paper investigates the determinants of the SMPC's recommendations, the diversity of opinions within the SMPC, and the relationship, if any, between the SMPC's published views and market determined forward rates as well as actual future decisions taken by the BoC.

The empirical evidence presented in this paper reveals that there is considerable diversity of opinion about the recommended future path of interest rates inside the SMPC. Virtually all SMPC members recommended that the BoC should implement a 'lift-off' of policy rates except during the height of the global financial crisis. It is only by the middle of 2013, when it became clear, based on the forward guidance of other major central banks (i.e., the Fed, the ECB, and the BoE), that SMPC members delayed the timing of a 'lift-off' of the overnight rate in Canada. Estimates also suggest that, beginning with the explicit forward guidance provided by the BoC between April 2009 and April 2010, market determined forward rates, as represented by the 3 months forward bankers' acceptance yields, diverge considerably from the recommendations implied by the SMPC. Additionally, there is little evidence that the Bank and the SMPC coordinate their future views about the interest rate path. Nevertheless, it is difficult to explain the basis on which voters in the SMPC change their views about future interest rates.

Consequently, there remain challenges to understand the evolution of future interest rate paths over time. This remains the subject of future research.[29]

Finally, our results also lead to two policy implications. The manner in which policy decisions by the Bank of Canada's Governing Council are announced is inconsistent with best international practices. The situation can only be remedied by a revision to the Bank of Canada Act. The Act should formally recognize and define the role of the GC. It is left for future research to discuss whether GC members should be individually or collectively accountable, among other arrangements that need to be examined, including term length, overlapping terms, and so on. Once the GC's role and responsibilities are defined there is scope for more detailed information about deliberations and dissention inside the committee to be published. Currently, there is limited transparency, only consensus, about the decisions of the GC. Best international practice, including soon to be released internal discussions by the GC of the ECB, suggests that the BoC is increasingly behind international developments concerning monetary policy deliberations.

[29] For instance, Bhattacharjee and Holly (2010) analyze committee behaviour within the BoE's Monetary Policy Committee. Such a more detailed analysis of committee decision-making in the context of forward guidance would be an interesting point for future research.

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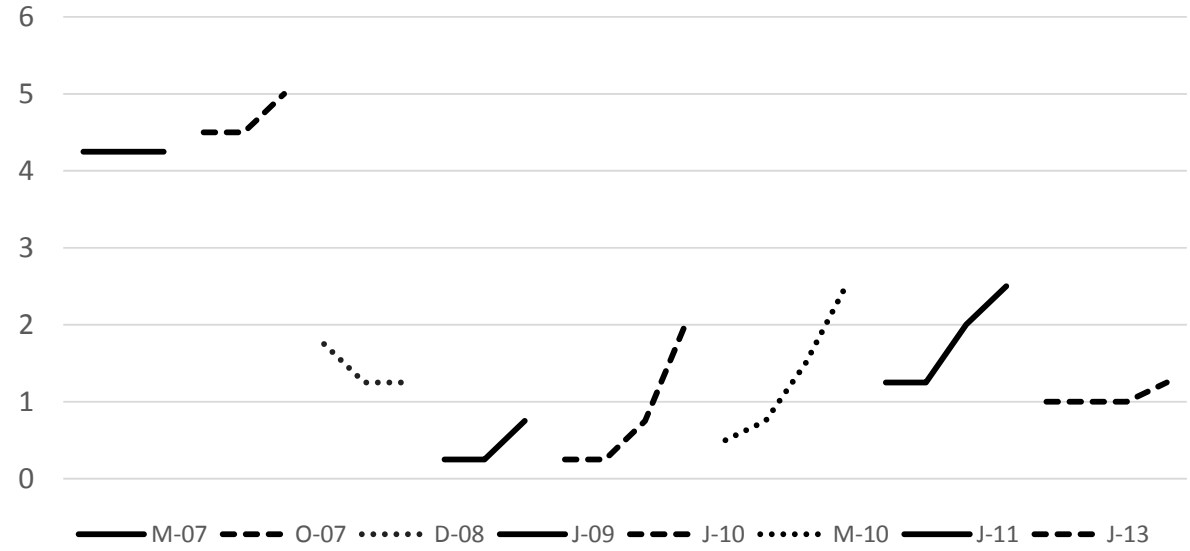
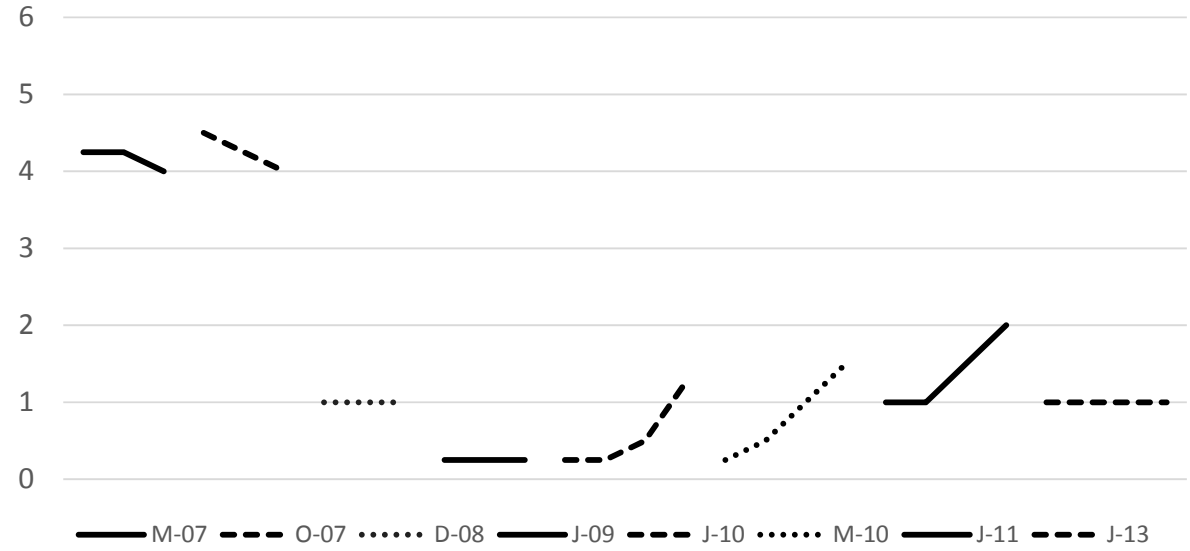
Figures

Figure 1a: Forward Rates from the Median Voter



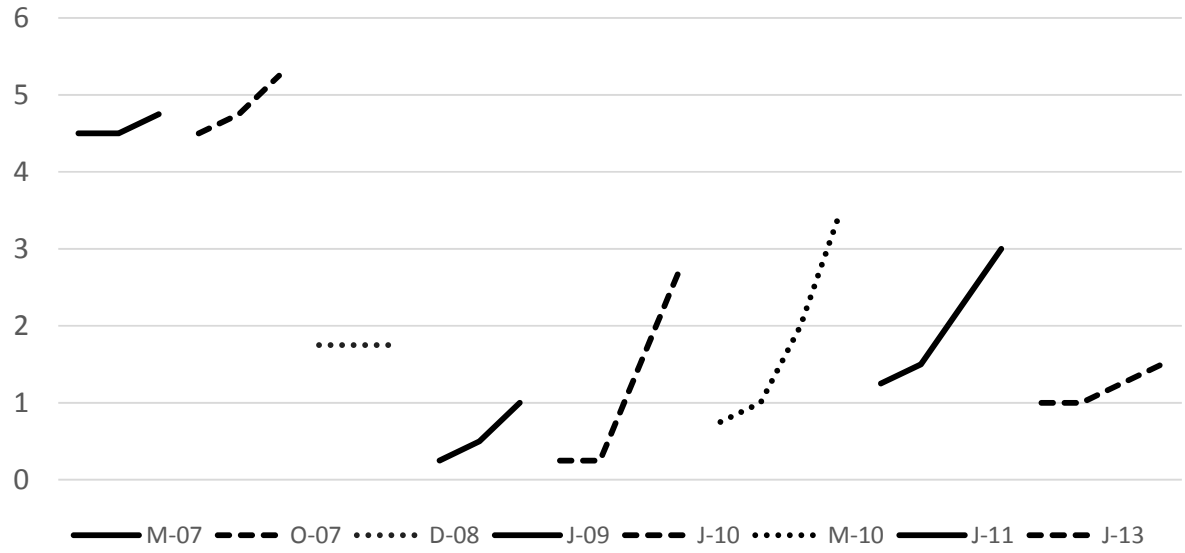
Notes: Figure plots CDHI median proposal for upcoming BoC meeting, the meeting afterwards, the meeting in 6 months, and, since January 2010, also for the meeting in 12 months. The selected observations are: March 2007, October 2007, December 2008, June 2009, January 2010, May 2010, January 2011, and January 2013.

Figure 1b: Forward Rates from the Most Dovish Voter



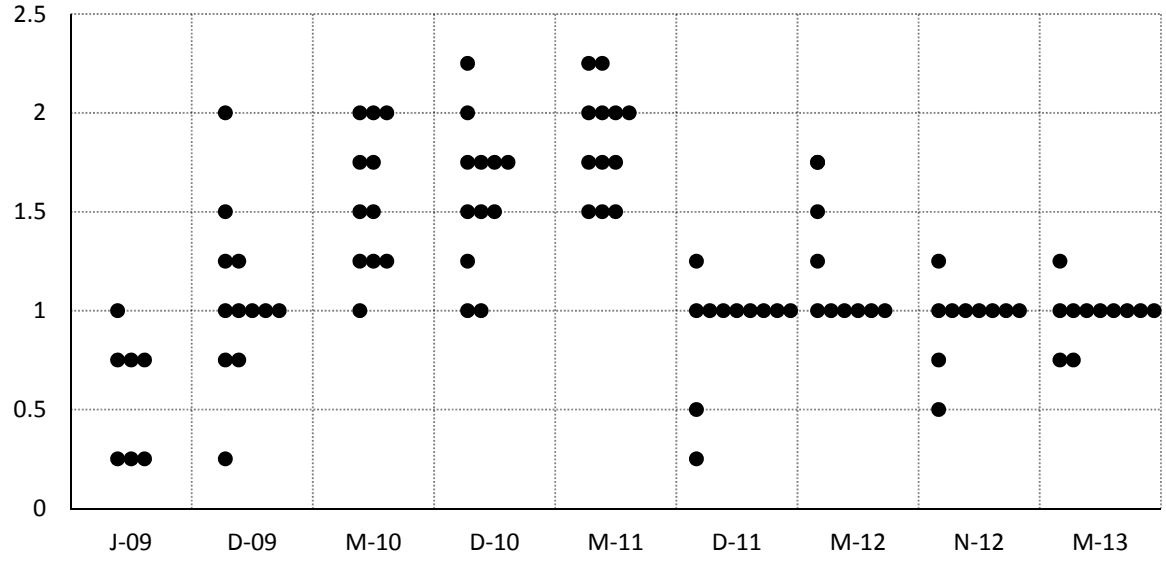
Notes: Figure plots CDHI minimum proposal for upcoming BoC meeting, the meeting afterwards, the meeting in 6 months, and, since January 2010, also for the meeting in 12 months. The selected observations are: March 2007, October 2007, December 2008, June 2009, January 2010, May 2010, January 2011, and January 2013.

Figure 1c: Forward Rates from the Most Hawkish Voter



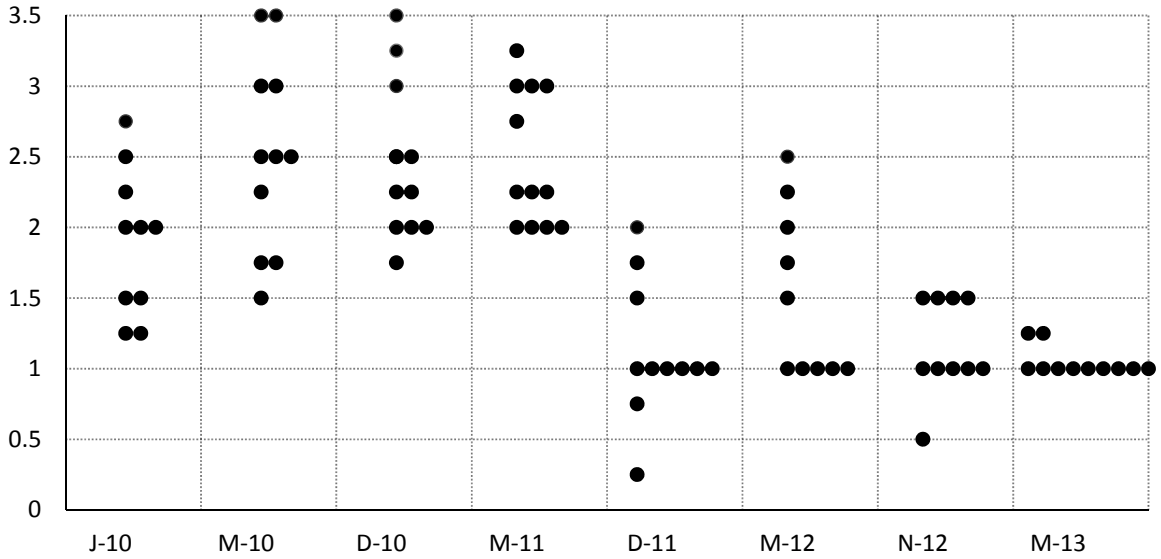
Notes: Figure plots CDHI maximum proposal for upcoming BoC meeting, the meeting afterwards, the meeting in 6 months, and, since January 2010, also for the meeting in 12 months. The selected observations are: March 2007, October 2007, December 2008, June 2009, January 2010, May 2010, January 2011, and January 2013.

Figure 2a: Dispersion of Individual 6 Month Ahead Proposals



Notes: Figure plots individual 6 month ahead proposals at selected meetings: June 2009, December 2009, May 2010, December 2010, May 2011, December 2011, May 2012, November 2012, and May 2013.

Figure 2b: Dispersion of Individual 12 Month Ahead Proposals



Notes: Figure plots individual 12 month ahead proposals at selected meetings: January 2010, May 2010, December 2010, May 2011, December 2011, May 2012, November 2012, and May 2013.

Figure 3: 6 month Ahead SMPC Proposal: Minimum, Median, and Maximum

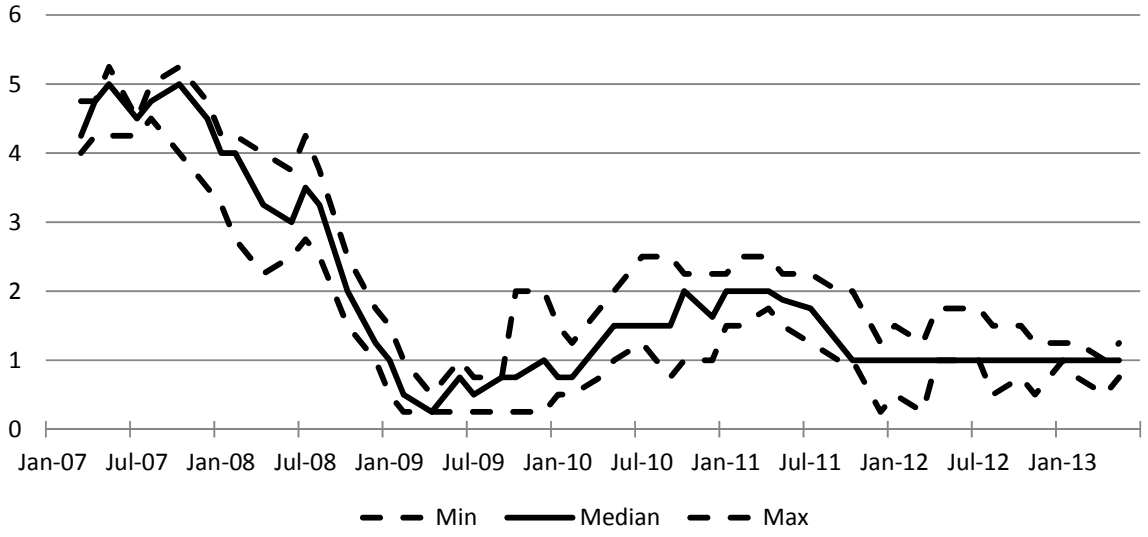


Figure 4: 6 Month Ahead SMPC Median Proposal, BA 3 Months, and Actual BoC Policy Rate Setting in 6 Months

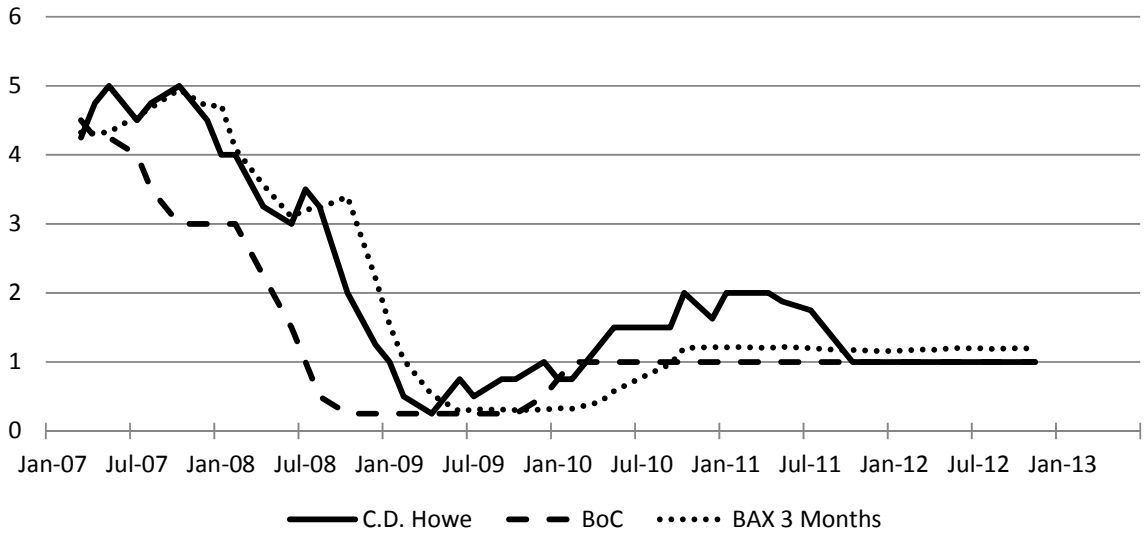


Figure 5: Difference between Upcoming SMPC Proposal and Lagged 6 Months Ahead SMPC Proposal versus Change in the Bank of Canada's Policy Rate during this Period

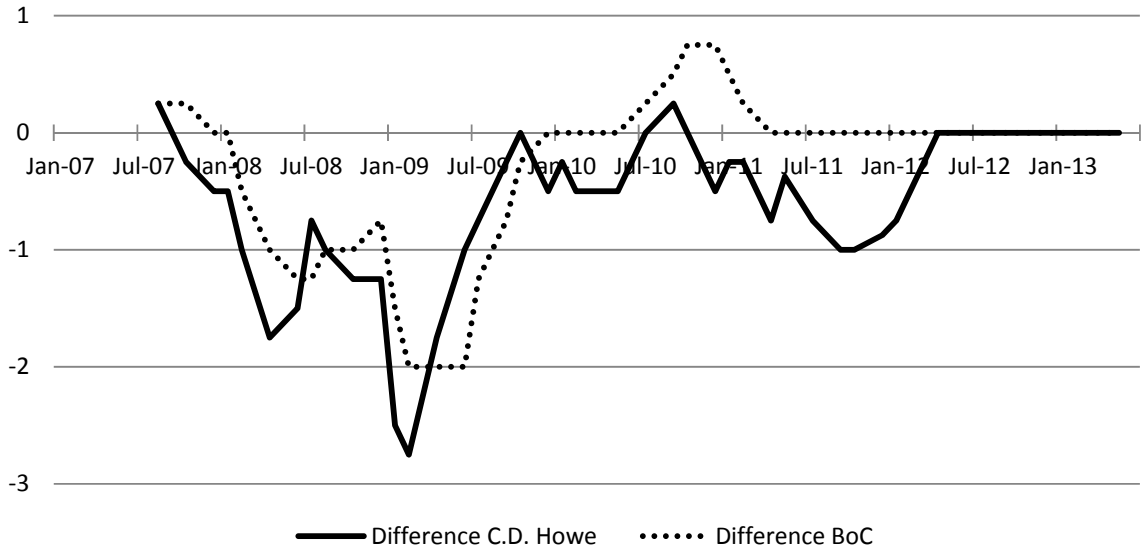
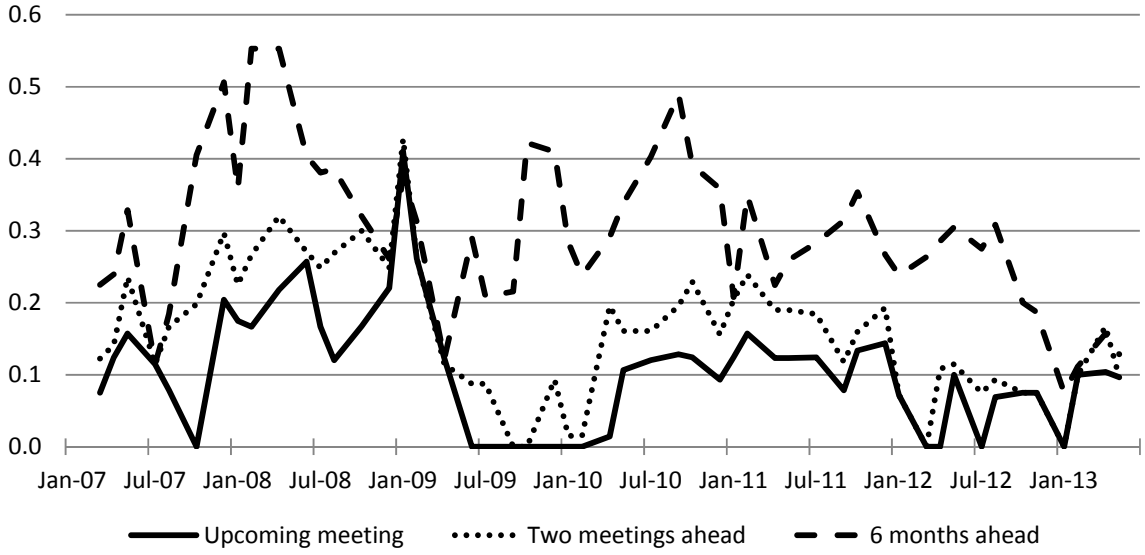


Figure 6: Standard Deviation of Individual SMPC Proposals for Three Different Horizons



Tables

Table 1a: "Forecasting" the BoC's 6 Months Ahead Interest Rate

	CD Howe Min.	CD Howe Med.	CD Howe Max.	3M BA
Constant	0.14	–0.10	–0.50 **	0.15
Explanatory Variable	0.81 ***	0.73 ***	0.75 ***	0.65 ***
Observations	47	47	47	47
R-Squared	0.81	0.78	0.73	0.68
S.E. of Regression	0.53	0.57	0.63	0.68
Unbiasedness	**4.29**	22.07 ***	83.57 ***	9.76 ***

Notes: OLS estimates of Equation (1) with Newey and West (1987) standard errors. The respective explanatory variable is indicated in the top line. Last line shows test statistic for forecasts unbiasedness.

Table 1b: "Forecasting" the BoC's 6 Months Ahead Interest Rate: the pre-Conditional Commitment Period

	CD Howe Min.	CD Howe Med.	CD Howe Max.	3M BA
Constant	–0.54	–0.75	–1.11 *	–1.28 *
Explanatory Variable	1.01 ***	0.89 ***	0.90 ***	0.99 ***
Observations	18	18	18	18
R-Squared	0.82	0.77	0.70	0.67
S.E. of Regression	0.72	0.81	0.92	0.96
Unbiasedness	4.74 *	16.50 ***	21.96 ***	15.37 ***

Notes: OLS estimates of Equation (1) with Newey and West (1987) standard errors. The respective explanatory variable is indicated in the top line. Last line shows test statistic for forecasts unbiasedness.

Table 2a: "Forecasting" the 6 Months Ahead SMPC Recommendation with 3 Months BAs

	CD Howe Min.	CD Howe Med.	CD Howe Max.
Constant	–0.01	0.33 *	0.95 ***
3M BA	0.81 ***	0.89 ***	0.82 ***
Observations	47	47	47
R-Squared	0.87	0.89	0.85
S.E. of Regression	0.48	0.48	0.54
Unbiasedness	12.12 ***	**4.54**	25.42 ***

Notes: OLS estimates of Equation (1) with Newey and West (1987) standard errors. Last line shows test statistic for forecasts unbiasedness. ***/**/* indicates significance at the 1%/5%/10% level.

Table 2b: "Forecasting" the 6 Months Ahead SMPC Recommendation with 3 Months BAs: the pre-Conditional Commitment Period

	CD Howe Min.	CD Howe Med.	CD Howe Max.
Constant	–0.82 **	–0.68 **	–0.06
3M BA	1.01 ***	1.14 ***	1.07 ***
Observations	18	18	18
R-Squared	0.86	0.92	0.90
S.E. of Regression	0.56	0.47	0.49
Unbiasedness	25.93 ***	5.89 *	**3.08**

Notes: OLS estimates of Equation (1) with Newey and West (1987) standard errors in case of the minimum proposal and regular standard errors in case of the median proposal and maximum proposal. Last line shows test statistic for forecasts unbiasedness.***/**/* indicates significance at the 1%/5%/10% level.

Table 2c: "Forecasting" the 6 Months Ahead Proposal with 3 Months BAs: Results for the post-Conditional Commitment Period

	CD Howe Min.	CD Howe Med.	CD Howe Max.
Constant	0.96 **	1.49 ***	2.59 ***
3M BA	0.00	–0.10	–0.58
Observations	21	21	21
R-Squared	0.00	0.00	0.05
S.E. of Regression	0.42	0.43	0.44
Unbiasedness	7.86 **	81.61 ***	92.75 ***

Notes: OLS estimates of Equation (1) with Newey and West (1987) standard errors. Last line shows test statistic for forecasts unbiasedness. ***/**/* indicates significance at the 1%/5%/10% level.

Table 3: Explaining Changes in 6 Months Ahead Proposals: Allowing for International Influence

	Δ(CD Howe Min.)	Δ(CD Howe Med.)	Δ(CD Howe Max.)
Constant	–0.051	–0.063	–0.053
Δ(Infl. Exp.)	–0.076	0.447	–0.001
Δ(GDP Exp.)	0.211 *	0.206	0.443 ***
Δ(VIX)	–0.004	–0.023 **	–0.007
Δ(US Infl. Exp.)	–0.296	–0.051	–0.342
Δ(US GDP Exp.)	–0.044	0.038	–0.212
Δ(EA Infl. Exp.)	0.433	–0.108	0.266
Δ(EA GDP Exp.)	0.383	0.112	0.498 **
Observations	50	50	50
R-Squared	0.193	0.346	0.240
S.E. of Regression	0.335	0.308	0.401
Standard Errors	White	White	N/W

Notes: OLS estimates of Equation (2) with standard errors as indicated in the last line. ***/**/* indicates significance at the 1%/5%/10% level.

Table 4: Explaining the Standard Deviation of Individual Proposals

	Upcoming	Two Meet. Ahead	6 Months Ahead
Constant	0.091 **	0.173 ***	0.118
Lagged Dependent Variable	0.157	0.246 *	0.549 ***
Share of Professionals	–0.037	–0.091	–0.010
Share of In-Person Votes	–0.078	–0.024	0.020
Conditional Commitment	–0.057 ***	–0.014	0.095
Lag Disagreement with BoC	0.045 **	0.032	0.012
Cut	0.082 ***	0.099 ***	–0.042
Hike	0.041 **	0.039 **	0.020
VIX	0.001	0.000	0.002
Cond. Volatility of Inflation	–0.010	–0.037	–0.057
Observations	50	50	50
R-Squared	0.714	0.632	0.410
S.E. of Regression	0.050	0.064	0.094
Standard Errors	White	N/W	Normal

Notes: OLS estimates of Equation (3) with standard errors as indicated in the last line. ***/**/* indicates significance at the 1%/5%/10% level.

Appendix

Table A1: Dates of SMPC and GC Meetings

	SMPC Meeting	SMPC	GC Meeting	GC Decision
1	August 28, 2003	2.75	September 3, 2003	2.75
2	October 9, 2003	2.75	October 15, 2003	2.75
3	November 27, 2003	2.75	December 2, 2003	2.75
4	January 15, 2004	2.5	January 20, 2004	2.5
5	February 26, 2004	2.25	March 2, 2004	2.25
6	April 8, 2004	2.25	April 13, 2004	2
7	June 3, 2004	2.25	June 8, 2004	2
8	July 15, 2004	2.25	July 20, 2004	2
9	September 2, 2004	2.5	September 8, 2004	2.25
10	October 14, 2004	2.75	October 19, 2004	2.5
11	December 2, 2004	2.5	December 7, 2004	2.5
12	January 20, 2005	2.5	January 25, 2005	2.5
13	February 24, 2005	2.5	March 1, 2005	2.5
14	April 7, 2005	2.5	April 12, 2005	2.5
15	May 19, 2005	2.5	May 25, 2005	2.5
16	July 7, 2005	2.5	July 12, 2005	2.5
17	September 1, 2005	2.75	September 7, 2005	2.75
18	October 13, 2005	3	October 18, 2005	3
19	December 1, 2005	3.25	December 6, 2005	3.25
20	January 19, 2006	3.5	January 24, 2006	3.5
21	March 2, 2006	3.75	March 7, 2006	3.75
22	April 20, 2006	4	April 25, 2006	4
23	May 18, 2006	4.25	May 24, 2006	4.25
24	July 6, 2006	4.5	July 11, 2006	4.25
25	August 31, 2006	4.25	September 6, 2006	4.25
26	October 12, 2006	4.25	October 17, 2006	4.25
27	November 30, 2006	4.25	December 5, 2006	4.25
28	January 11, 2007	4.25	January 16, 2007	4.25
29[1]	**March 1, 2007**	**4.25**	**March 6, 2007**	**4.25**
30	April 19, 2007	4.25	April 24, 2007	4.25
31	May 24, 2007	4.5	May 29, 2007	4.25
32	July 5, 2007	4.5	July 10, 2007	4.5
33	August 30, 2007	4.5	September 5, 2007	4.5
34	October 11, 2007	4.5	October 16, 2007	4.5
35	December 4, 2007	4.5	December 4, 2007	4.25
36	January 17, 2008	4	January 22, 2008	4
37	February 28, 2008	3.75	March 4, 2008	3.5
38	April 17, 2008	3.25	April 22, 2008	3
39	June 5, 2008	3	June 10, 2008	3
40	July 10, 2008	3.25	July 15, 2008	3
41	August 28, 2008	3	September 3, 2008	3

42	October 16, 2008	2	October 21, 2008	2.25
43	December 4, 2008	1.75	December 9, 2008	1.5
44	January 15, 2009	1	January 20, 2009	1
45	February 26, 2009	0.5	March 3, 2009	0.5
46	April 16, 2009	0.25	April 21, 2009	0.25
47	June 2, 2009	0.25	June 4, 2009	0.25
48	July 16, 2009	0.25	July 21, 2009	0.25
49	September 8, 2009	0.25	September 10, 2009	0.25
50	October 15, 2009	0.25	October 20, 2009	0.25
51	December 3, 2009	0.25	December 8, 2009	0.25
52[2]	***January 14, 2010***	***0.25***	***January 19, 2010***	***0.25***
53	February 25, 2010	0.25	March 2, 2010	0.25
54	April 15, 2010	0.25	April 20, 2010	0.25
55	May 27, 2010	0.5	June 1, 2010	0.5
56	July 15, 2010	0.75	July 20, 2010	0.75
57	September 2, 2010	1	September 8, 2010	1
58	October 14, 2010	1.25	October 19, 2010	1
59	December 2, 2010	1	December 7, 2010	1
60	January 18, 2011	1.25	January 18, 2011	1
61	February 24, 2011	1.25	March 1, 2011	1
62	April 7, 2011	1.25	April 12, 2011	1
63	May 26, 2011	1.25	May 31, 2011	1
64	July 14, 2011	1.25	July 19, 2011	1
65	September 1, 2011	1	September 7, 2011	1
66	October 20, 2011	1	October 25, 2011	1
67	December 1, 2011	1	December 6, 2011	1
68	January 12, 2012	1	January 17, 2012	1
69	March 6, 2012	1	March 8, 2012	1
70	April 12, 2012	1	April 17, 2012	1
71	May 31, 2012	1	June 5, 2012	1
72	July 12, 2012	1	July 17, 2012	1
73	August 30, 2012	1	September 5, 2012	1
74	October 18, 2012	1	October 23, 2012	1
75	November29, 2012	1	December 4, 2012	1
76	January 17, 2013	1	January 23, 2013	1
77	February 28,2013	1	March 6, 2013	1
78	April 11, 2013	1	April 17, 2013	1
79	May 23, 2013	1	May 29, 2013	1

Notes: (1) 6 months ahead recommendation introduced; (2) 1 year ahead recommendation introduced. Two policy rate settings ahead recommendation exists since the inception of the SMPC.

Table A2: Illustration of Forward Guidance provided by the CDHI's Monetary Policy Council: November 28, 2013

MPC Members	Dec. 4	Jan. 22	6 months	12 months
Craig Alexander TD Bank Group	1.00%	1.00%	1.00%	1.00%
Steve Ambler Université du Québec à Montréal (UQAM)	1.00%	1.00%	1.00%	1.25%
Paul Beaudry University of British Columbia	1.00%	1.00%	1.00%	1.00%
Edward A. Carmichael Ted Carmichael Global Macro	1.00%	0.75%	0.75%	0.75%
Stéfane Marion National Bank	1.00%	1.00%	1.00%	1.00%
Angelo Melino University of Toronto	1.00%	1.00%	1.00%	1.00%
Doug Porter BMO Capital Markets	1.00%	1.00%	1.00%	1.00%
Christopher Ragan McGill University and David Dodge Chair in Monetary Policy, C.D. Howe Institute	1.00%	1.00%	1.25%	1.25%
Nicholas Rowe Carleton University	0.75%	0.75%	1.00%	1.00%
Pierre Siklos Wilfrid Laurier University	1.00%	1.00%	1.00%	1.00%
Median Vote	1.00%	1.00%	1.00%	1.00%

The views and opinions expressed by the participants are their own and do not necessarily reflect the views of the organizations with which they are affiliated, or those of the C.D. Howe Institute.

Table A3: Variable Description and Data Sources

Δ(Infl. Exp.), Δ(US Infl. Exp.), Δ(EA Infl. Exp.): Change in the 12 months ahead inflation expectations for Canada/the United States/the euro area since the last SMPC meeting.
Source: The Economist.

Δ(GDP Exp.), Δ(US GDP Exp.), Δ(EA GDP Exp.): Change in the 12 months ahead real GDP growth expectations for Canada/the United States/the euro area since the last SMPC meeting.
Source: The Economist.

Δ(VIX): Change in the VIX volatility index since the last SMPC meeting.
Source: Toronto Stock Exchange.

Share of Professionals: Share of economists working in the private sector (as opposed to economists working in academia) voting at the respective SMPC meeting.
Source: CD Howe.

Share of In-Person Votes: Share of SMPC members voting in-person (as opposed to voting via conference call) at the respective SMPC meeting.
Source: CD Howe.

Conditional Commitment: Dummy variable that takes the value 1 when the conditional commitment was expected to be in place over the SMPC's proposal horizon and 0 otherwise.
Source: Bank of Canada.

Lag Disagreement with BoC: Dummy variable that takes the value 1 when the GC and the SMPC disagreed over the appropriate target for the overnight rate at their last meeting and 0 otherwise.
Source: Bank of Canada and CD Howe.

Cut, Hike: Dummy variable that takes the value 1 when the SMPC proposes an immediate interest cut/hike (in case of the upcoming BoC meeting) or interest rate cuts/hikes over the proposal horizon and zero otherwise.
Source: CD Howe.

Cond. Volatility of Inflation: Conditional standard deviation of inflation derived from a standard GARCH(1,1) model over the period January 1999–June 2013.
Source: Bank of Canada.