

The Announcement of Future Policy Intentions*

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Abstract

The usefulness of announcing future policy intentions is among the most hotly debated issues in the recent discussions on the optimal level of transparency. On one side, it has been argued that the release of information about policy inclinations allows a more precise control of market expectations and, in turn, a more effective achievement of the ultimate goals. On the other, it has been observed that, when the overall level of transparency of a central bank is already very high, this type of communication might be useless and also that it might even turn out to be harmful, when the public does not realize its conditional nature. Our empirical analysis suggests that the announcement of future policy intentions, either quantitative or qualitative, improves the ability of market operators to predict monetary policy decisions. Moreover the experience of New Zealand indicate that the public is able to understand its conditional nature and that, in normal circumstances, private expectations adjust coherently with the information included in this type of communication. The latter evidence does not hold in those periods characterized by a change in the direction of official interest rates when market expectations tend to move in a direction which is opposite to the one suggested by the monetary news.

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1 Introduction

In the last two decades there has been a substantial change in the attitude of most central banks toward transparency. The old view that central bankers should speak in an opaque and convoluted language has been replaced by a new one which regards transparency as mandatory.¹ Two elements contributed to this change. Institutional reforms directed at improving central bank independence needed to be counterbalanced by the introduction of instruments aimed at enforcing central bank accountability. In this respect, a transparent policy process improves accountability by clarifying how a central bank expects to attain its policy objectives and by ensuring that policy is conducted in a manner that can be seen to be consistent with achieving those objectives (Bernanke, 2007).

The second factor was the advent of the New-keynesian literature in the eighties which provided strong theoretical underpinnings to the idea that the central bank's stabilization goals could have been most effectively achieved to the extent that the central bank not only acted appropriately, but also in a predictable way. This was not the case in the previous decades when the dominant economic paradigm was the New-classical approach (Phelps, 1970; Lucas 1972, 1975; Sargent and Wallace, 1975; Kydland and Prescott, 1977; Lucas and Sargent, 1978) which was grounded on three central ideas, with non-univocal implications in terms of transparency: (i) economic theory may help predict agents decisions "only if policies are the choice of stable rules of the game, well understood by economic agents" (Lucas and Sargent, 1978), (ii) as economic fluctuations arise from agents reaction to unanticipated changes in variables which impinge on their decisions, in order to be effective policies must themselves be unforeseeable by private agents (Lucas and Sargent, 1978, 1981) and, finally, (iii) as rational agents anticipate central bank and government's behavior, the deliberate provision of misinformation cannot be used in a systematic way to improve the economic environment (Kydland and Prescott, 1977; Lucas and Sargent, 1978; Barro-Gordon, 1983). Until the beginning of the nineties the second idea had the greatest impact on central bank's practice and central bank attempt to be unpredictable in its decisions was a standard.

In the eighties, the so called New-keynesian literature integrated the dynamic stochastic general equilibrium elements of the New-classical literature with Keynesian elements, as imperfect competition and nominal rigidities. The result was

¹The old view is perfectly summarized in one of the most famous sentences of Alan Greenspan: "If I seem unduly clear to you, you must have misunderstood what I said."

the surge of models centered on the role played by forward-looking expectations in the adjustment of prices and wages: the fact that prices may remain unchanged for some time naturally implies that firms must be forward-looking, assessing not just the current economic environment but the outlook for the future as well. At the same time, the presence of nominal rigidities was the source of monetary non-neutralities: it is because forward-looking expectations matter that the systematic behavior of the central bank plays a critical role in determining the real effects of monetary policy, as only the systematic part of policy will affect future expectations (Walsh, 2006). To this end, by reducing uncertainty, "central bank transparency helps anchor the public's longer-term expectations of inflation and, as experience has shown, this helps stabilize inflation and promote maximum sustainable economic growth" (Bernanke, 2007).

This change has paved the way for the development of a rich theoretical and empirical literature on the role of transparency in monetary policy. While theoretical studies find that transparency is not always beneficial, the empirical ones suggest that it is often associated with lower and more stable inflation, higher predictability of the policy decisions and lower volatility of financial markets. This evidence is likely to have increased the consensus on the fact that transparency is beneficial not only because it facilitates central bank's accountability but also because, by fostering the control on markets' expectations, it improves the effectiveness and the efficiency of the monetary authority in reaching its final goals. In particular, the ability to steer expectations through transparency allows the central bank to obtain the same effect on long term interest rates with smaller changes in the policy instrument.

In order to influence market expectations and longer-term interest rates central banks may directly release information about its assessment of the future course of the policy rate (Kahan, 2007). This possibility is at present one of the most controversial and debated aspects of policy transparency. According to some economists the risk that markets do not understand the conditionality of the announcement may make this aspect of transparency counterproductive. Two other often cited reasons against the direct revelation of information on the future course of the policy rate are the fact that if the central bank is already very transparent in many other aspects of its monetary policy strategy then the publication of the path would not have any effect on market expectations and the fact that it might turn out to be very difficult for a large committee to find an agreement on a path.

Both theoretical and empirical analysis on this particular aspect of transparency are very scant. With this work we aim at providing a contribution toward the

reversal of this situation. In particular, our evidence based on data on the euro area, New Zealand, Norway and the U.S. suggests that the announcement of future policy intentions, either quantitative or qualitative, improves the ability of market operators to predict monetary policy decisions. Moreover, restricting our analysis to the case of the Reserve Bank of New Zealand (RBNZ), which publishes since the late nineties a quantitative measure of its expected interest rate path, we find that market expectations on short term interest rates over short term horizons respond in a significant and consistent way to the monetary surprise unleashed by the release of the path. This result may be interpreted as a signal of high credibility of the RBNZ and, once combined with the observation that the RBNZ is one of the most transparent central banks, it also indicates that the concern related with the ineffectiveness of this practice in a very transparent environment is likely to be of limited practical relevance. We also find that the change in market interest rates in the period between two publications of the interest rate path is similar to the revision of the published path. We interpret this result as evidence of the fact that the conditional nature of the central bank's announcement is well understood by the public. Finally our analysis suggests that in presence of changes in the direction of official interest rates the reaction of financial markets to the monetary news unleashed by the publication of the path is somehow anomalous, as it goes in the opposite direction of that implied by the monetary news.

The paper is organized as follows. Section 2 is introductory and provides a definition of transparency and a survey of the main theoretical and empirical results on its different aspects. In section 3 we focus on one of these aspects: the central bank's announcement of future policy intentions. The following section provides new evidence on its effects. Section 5 concludes.

2 Central bank's transparency: definition, measurement and literature insights

The goal of this section is not to present an exhaustive review of the literature (which can instead be found in Geraats, 2002; Hahn, 2002; Carpenter, 2004; van der Cruijssen and Eijffinger, 2007), but to provide a bird-eye view on this field of research which, in turn, will allow a more general understanding of the analysis of the costs and benefits of the announcement of future policy intentions.

In the literature, transparency is defined as the central bank propensity to share

information on the monetary policy framework with the public.² As transparency is an intrinsically multi-faceted concept, its measurement has to rely on some judgmental criteria. Geerats (2002) considers five aspects, each related to a different stage of the policy making process: political transparency, economic transparency, procedural transparency, policy transparency and operational transparency.

Political transparency is related to the communication of the objectives of a central bank and of their relative importance, of its institutional framework and of its degree of independence. *Economic transparency* is related to the sharing of economic information that is used in the decisional process. It includes the available data and the statistical and economic models that are used to produce forecasts. *Procedural transparency* concerns the decision process and it refers to the publication of the minutes and the results of the voting that has led to the policy deliberation. *Policy transparency* refers to the announcement and the explanation of the policy decisions and to the release of information about the inclination with respect to the future stance. *Operational transparency* refers to the communication about disturbances that hit the economy after a policy decision has been taken and that can affect the setting of the operating instrument (control errors) or the transmission mechanism (transmission disturbances).

While, on one side, there is a wide consensus on the fact that some level of transparency and of accountability is necessary to counterbalance the increased independence of central banks, on the other, the agreement on which should be the optimal level of transparency is far from being complete. Views change according to the specific aspect of the central bank communication which is considered and with the assumptions concerning the economic environment under investigation.³ In particular, according to Geerats (2002), the absence of an univocal view on the optimal degree of transparency also reflects the fact that there are two ways in which central bank's communication exerts its effects on the economy. On one side transparency reduces *uncertainty*, on the other it modifies the *incentives* of the central bank to manipulate private sector beliefs. These two effects often influence welfare in opposite direction and with a relative strength that depends on the particular

²Even if in general a central bank that releases more information is also more transparent, the concepts of communication and transparency do not necessarily coincide. For example, in an economic environment where the central bank can credibly commit to a rule and where agents form their expectations rationally, even a minimal level of communication is sufficient to obtain the maximum level of transparency (Woodford, 2005; de Haan, Eijffinger and Rybinski, 2006).

³Cukierman (2002) shows that the effects of greater transparency on social welfare are different depending to the fact that the underlying economy is characterized by a Lucas-type or a New-keynesian transmission mechanism.

characteristics of the economy under analysis.⁴

In the following we present a brief summary of the main conclusions of the theoretical literature. For expositional purposes results are collected according to the categorization of transparency suggested by Geerats (2002).

2.1 Theoretical results on transparency

Results related to *political transparency* do not univocally suggest that a high level of transparency is always beneficial. On one side, most works show that the publication of an inflation target (Walsh, 1999) as well as the release of information pointed at a clarification of the incentives of a central bank (Rogoff, 1985; Svensson, 1997; Blinder, 1997; Walsh, 1995) are beneficial, as they lower the level and variability of inflation. On the contrary it has also been shown that a slight modification of the assumptions about the economic environment might render optimal some form of opacity (Schaling and Nolan, 1998; Eijffinger, Hoeberichts and Schaling, 2000; Sorensen, 1991; Gruner, 2002).

Also the results related to *economic transparency* are mixed. In general the desirability of economic transparency relies on the incentive channel, as uncertainty about the state of the economy, by reducing the responsiveness of the public to the policy signals, affects the incentive for the central bank to construct reputation (Geraats, 2005). Mixed results appear when the uncertainty channel is involved. On one side Geraats (2000), Geraats (2002) and Walsh (2006) show that the release of central bank information on economic data, by reducing economic uncertainty, increases predictability of monetary policy moves and reduces output volatility (Geraats, 2002). On the other side, in models characterized by Lucas-type transmission mechanisms, Cukierman (2001) and Gersbach (2003) show that less uncertainty on economic data exerts a detrimental effect on the ability of the central bank to stabilize output and induces a larger volatility in inflation (Cukierman, 2001; Gersbach, 2003).

As far as *procedural transparency* is regarded, most of the analysis focus on the incentive channel. It has been argued that, by guaranteeing a greater accountability (Buiter, 1999; Geraats, 2002), procedural transparency induces members of the policy committee to ponder their decision more carefully and it allows to avoid (or

⁴For example, in strategic monetary games à la Kydland and Prescott (1977) it is often found that transparency has a beneficial uncertainty effects because it eliminates uncertainty about output and inflation but, at the same time, it has a detrimental incentive effect because it removes reputation considerations and increases the inflation bias (Geerats, 2002).

unmask) political pressures. However, the fact that the members know that their positions and argumentations within the Council will be made public could give rise to a behavior which would not be in line with the policy objective (Cukierman, 2005). Finally, it has also been emphasized that the publication of the minutes could give the impression to the non specialized public that the policymaking process is more uncertain and controversial than it is. These observations may explain why in actual practice procedural transparency is limited.⁵

Most analysis on *policy transparency* focuses on the uncertainty channel in order to evaluate its desirability. It has been shown that, when the central bank's target changes over time, is not known by the public and cannot be inferred by observing the interbank rate, then opacity might be preferable, even though it increases the private sector forecast error (Dotsey, 1987). This result depends on the fact that opacity decreases the volatility of the actual interbank rate, as the latter becomes less sensitive to disturbances to the target. An opposite conclusion can be reached when the money target is fixed (Tabellini, 1987). In this case opacity increases the volatility of the interbank rate, as it increases its reaction to money market disturbances. Even though the literature on the importance of a timely communication of policy decision and on the effects of the release of policy explanations is very scant, in practice almost all central bank announce immediately the result of the policy meeting, most of them discuss their policy decision and some of them even provide a policy inclination.⁶

Finally, *operational transparency* refers to the communication of the disturbances that affect the implementation of the policy decision. The general approach of this strand of the literature is to consider an economy that is hit by multiple shocks, one of which affecting the setting of the monetary policy operating instrument. Private agents cannot distinguish the source of these disturbances and use past data to estimate parameters of the objective function of the policy maker. In this context operational transparency can be both beneficial or detrimental depending on the relative strength of the incentive and uncertainty mechanisms. On one side, through the incentive channel, transparency reduces the inflation bias by increasing the sensitivity of private expectations to past data. On the other, through the uncertainty channel, it gives to the central bank less flexibility to stimulate output (Cukierman

⁵The only central banks which publish the minutes and the individual decisions of the members of the Council are those of Japan, Sweden, United Kingdom and the United States.

⁶Some monetary authorities, as for example the Bank of Japan in the most recent period, provide a discussion of their policy decisions only when they modify official rates but not when they are kept unchanged.

and Meltzer, 1986; Jensen, 2001; Faust and Svensson, 2001). It should be noticed that in practice central banks have an almost perfect control over the setting of the operating instrument, while there is large evidence that the transmission mechanism is affected by significant disturbances, but the literature on this last aspect is very scant.

There are theoretical papers that cannot be ordered on the basis of the above classification, as they focus on different aspects of transparency at the same time. This is the case of the strand of literature that studies the effects of transparency in the context of coordination games. When private agents have public and private information, an excessive level of transparency may induce them to put excessive weight on the public signal than what would be justified by the relative level of its precision. This reduces social welfare (Morris and Shin, 2002; Walsh, 2006) and the information content of market prices (Morris and Shin, 2005). However it has recently been shown that this result holds only if the precision of the public signal is significantly lower than the precision of the private signal and that, for empirically plausible values of these parameters, transparency is generally beneficial (Svensson, 2006; Woodford, 2005).

2.2 Empirical evidence on transparency

The lack of agreement in the theoretical literature about the optimal degree of information sharing has increased the interest in the results provided by the empirical analysis (Svensson, 2006). In describing the empirical effects of transparency a first preliminary question is whether in practice the monetary authority is endowed with superior private information. This is obviously the case as far as policy objectives or procedural strategies are concerned, but it may not be true for other aspects involved in the central bank's communication. Empirical works show that the Federal Reserve Bank has an information advantage with respect to the specialized public about inflation and employment (Romer and Romer, 2000; Peek, Rosengreen and Tootell, 1999). Evidence for other central banks and other issues involved in the communication is very scant.

Empirical studies may focus on *summary measures* of transparency, or concentrate on the evaluation of a *particular aspect* of it. The second approach has the advantage of not using judgmental criteria, even though it may generate results that are flawed by the inability of capturing all the aspects of central bank's transparency. On the other hand the first approach has the advantage of being based on a quanti-

tative indicator that summarizes the various aspects of the transparency of a central bank but, being constructed on judgmental criteria, it may provide contradictory results.⁷ Both the *summary* and the *particular* approaches have been used to analyze the effects of transparency (a) on financial markets, (b) on the predictability of monetary policy moves and (c) on the ability of a central bank to reach its ultimate goals, that is, the control of inflation and macroeconomic stability.

As far as *the impact of communication on financial markets* is regarded, it appears that an increase in the overall level of transparency, by enhancing credibility, reputation and flexibility of the central bank, reduces the level of short and long term nominal interest rates (Geraats, Eijffinger and van der Cruysen, 2006). As far as more specific aspects of transparency are concerned it emerges that communication has a strong impact on financial markets. In the U.S. short term interest rates and equity prices react to statements both about the monetary policy inclination and about the economic outlook. Moreover they seem to react more to statements by the Chairman than to the speeches of other FOMC members (Ehrmann and Fratzscher, 2005b; Khon and Sack, 2003; Gürkaynak, Sack and Swanson, 2005). In the euro area the introductory statement of the press conference hold by the ECB after the meeting of the Governing Council has a significant impact on the level and volatility of short term interest rates (Rosa and Verga 2007; Musard-Gies 2006; Sebestyen and Sicilia, 2006). Differently from the U.S., in the euro area and in the U.K. financial markets respond mostly to communication about monetary policy and only moderately to communication about the economic outlook (Ehrmann and Fratzscher, 2005b). Moreover in the U.K. the price of the futures on short term interest rates mainly reacts to the collective forms of communication - the Minutes and Inflation Report - while the reaction to more individual forms of communication, such as speeches and parliamentary testimony, seems to be more limited (Reeves and Sawicki, 2005).

There is a widespread evidence that transparency improves the *predictability of monetary policy decisions*. Studies that consider the impact of the overall level of

⁷Among the most common indicators of transparency are those of Fry, Julius, Mahadeva, Roger and Sterne (2000), computed for 93 central banks in the period 1998-1999 and based on the evaluation of the communication about the analysis of the policy decisions, of the economic context and the central banks' forecasts. Another widely used index is the one of Bini-Smaghi and Gross (2001). This index is available for 6 of the most important central banks and focuses on the communication about the monetary policy objective, the monetary policy framework, the published data and forecasts. Finally the index of Eijffinger and Geraats (2006) is computed for 9 central banks from 1998 to 2002 and is based on information on the 5 aspects of transparency identified by Geraats (2002).

transparency are based on the hypothesis that if transparency increases the ability of market operators to correctly anticipate current and future policy actions, then a smaller reaction of short and long term interest rates should be observed in days in which policy decisions are taken. This evidence has been found for the U.S. (Haldane and Read, 2000; Poole and Rasche, 2003; Lange, Sack and Whitesell, 2003), for the euro area (Bernoth and von Hagen 2004), for the U.K. (Haldane and Read, 2000) and Canada (Muller and Zelmer, 1999). One important drawback of this approach is that, in general, it does not allow to distinguish to which extent the reduction in volatility observed in recent years is determined by the increased degree of monetary policy transparency or by other factors like, for example, the reduction of macroeconomic volatility. Interestingly Swanson (2006) provides support to the hypothesis that the recent improvement in the predictability of short term interest rates is likely to be associated with greater transparency, as in the same period the ability of the public to forecast other macroeconomic variables has remained unchanged. Other analysis are focused on specific aspects of central bank's transparency. For example some of them provide a direct measure of the impact of communication on predictability by looking at the predictive power of Taylor rules augmented with indicators of the verbal communication or at the effects of the publication of voting records. According to this evidence the communication of the ECB improves the predictability of monetary policy decisions (Rosa and Verga, 2005 and Heinmann and Ullrich, 2005). However it is also observed that the information released by this central bank is complementary and not a substitute for forecasting techniques based on economic data (Jansen and de Haan, 2006). In the U.S., the increase in monetary policy transparency since 2000 has improved the predictability of monetary policy. Markets anticipate the next monetary policy decision earlier under the new regime and, in turn, interest rates move by a smaller magnitude over the whole inter-meeting period (Ehrmann and Fratzscher, 2005a). In the U.K., the publication of the voting record of the Bank of England has enhanced the predictability of policy decisions (Gerlach-Kristen, 2003).

Finally there is a large body of the empirical literature that analyzes the *macroeconomic consequences* of transparency. Studies based on summary measures of transparency find that a more clear communication lowers average inflation and inflation persistence (Chortareas, Stasavage and Sterne, 2002a and Cecchetti and Krause, 2002), weakens the link between realized and expected inflation (Van der Crujisen and Demertzis, 2006) and reduces the sacrifice ratio (Chortareas, Stasavage and Sterne 2002b). Analysis focused on specific aspects of transparency find that adopt-

ing an inflation target reduces the inflation rate and its volatility (Fatas, Mihov and Rose, 2006 and Vega and Winkelried, 2005), anchors long-run inflation expectations and reduces inflation persistence (Johnson, 2002, Levin, Natalucci and Piger, 2003 and Gurkayanak, Levin and Swanson, 2006), promotes convergence of forecast errors on inflation and, even if it does not affect the average forecast error, it is particularly beneficial for forecasters with poor private information (Crowe, 2007). In particular, there is evidence that in the U.S. the changes in the communication strategy of the Federal Reserve in 1994 have synchronized, even if not improved, private expectations on the future evolution of the main macroeconomic variables (Bauer, Eisenbeis, Waggoner and Zha, 2006). In the euro area the degree of "hawkishness" of the ECB communication has a positive effect on short term inflation expectations of financial markets experts (Ullrich, 2006).

The actual practice of the most advanced central banks seems to reflect more the pro-transparency evidence that emerge from the empirical literature than the mixed results obtained by theoretical works. Current practices concerning the degree of transparency with respect to the final objectives, the information and instruments used in the decisional process are largely aligned.⁸ Moreover, there is a wide convergence of opinions on the usefulness of declaring and explaining policy decisions. On the contrary substantial disagreement persists on other aspects like the publication of minutes and voting of the policy committee members and the degree of clearness to be used in the forward guidance on future policy intentions.

3 The announcement of future policy intentions

Due to the presence of frictions in the transmission channel, monetary policy decisions affect the economy with some lags. In such an environment central banks might enhance the overall efficacy and effectiveness of monetary policy by adopting communication strategies that allow a direct control of private expectations (Woodford, 2005). One of these strategies is to provide information on the likely future evolution of the official interest rate. This can be done either through qualitative

⁸Even though all the main central banks state their own policy objectives, the Bank of Japan and the Federal Reserve distinguish themselves for the lack of a numerical target for inflation and of a clear rank among their objectives. All the main central banks publish information on the structural macroeconomic model used for forecasting purposes (with the exception of the Bank of Japan and the Riksbank; see Eiiiffinger and Geraats, 2006) and release short and medium term forecasts for inflation and output. In some countries, like New Zealand, Sweden, Great Britain and Norway, the baseline forecast is sometimes accompanied by the description of alternative scenarios.

announcements or by releasing a quantitative measure that reflects central bank's expectations about the future interest rate path. If the monetary authority is credible and if it is able to transmit clearly its policy inclinations an active use of this communication strategy should effectively allow a significant control over public expectations. In the recent debate, however, also emerged some drawbacks of this aspect of the communication.

The announcement of future policy intentions is useful because (i) it affects market expectations about the future evolution of monetary policy and, in turn, it allows the market to price more efficiently financial assets (Archer, 2005; Kahn, 2007; Svensson, 2004), (ii) it helps to enforce the optimal policy under commitment (Woodford, 2005; Archer, 2005; Khan, 2007; Mishkin, 2004; Svensson, 2004), (iii) it increases the accountability of the central bank and the incentives for producing good forecasts (Mishkin, 2004; Archer, 2005). Finally, (iv) it also fosters the discussion within the monetary policy committee on policy objectives and on the appropriate models to be used in assessing the evolution of the economy (Archer, 2005). On the contrary, on top of the general observation presented in section 2 that the provision of public information is not necessarily beneficial (Morris and Shin, 2002), it has been argued that an explicit announcement of future policy intentions might be (i) useless if the central bank is already very transparent in many other dimensions, since in this case the impact on private expectations could be minimal (Khan, 2007), or even (ii) harmful if the public does not understand its conditional nature, given that it could undermine the credibility of the central bank (Woodford, 2005; Mishkin, 2004).⁹ Finally, it has been argued that it may result very difficult to reach an agreement on the future evolution of the interest rates within the monetary policy committee (Goodhart, 2005; Mishkin, 2004).¹⁰

So far the theoretical literature has not provided results that can be used to assess the costs and the benefits of this type of communication. An exception is Rudebusch and Williams (2006). They show that, in general, the publication of interest rate projections favors the alignment of public's and the central bank's expectations on future policy actions and, therefore, reduces the magnitude of fluctuations in output

⁹It should however be noticed that central banks can make a large use of "technical devices" (e.g. fan charts or the publication of different paths for different scenarios) that can facilitate the understanding of the conditional nature of the published path (Woodford, 2005).

¹⁰According to some observers finding an agreement on an interest rate path shouldn't imply more problems than finding an agreement on an inflation projection, something that is routinely done by many central banks. In particular Svensson (2003) suggests that an agreement on a projected path could arise from a majority vote selecting the median value of the rates proposed by the members of the committee at each horizon.

and inflation gaps.¹¹ However they also observe that this result is not independent of the assumptions of the model and that there are environments where the uncertainty related to the transmission mechanism may distort the public's expectations about future policy decisions and, in turn, increase aggregate variability. The two authors also analyze the relevance of one concern often raised against the usefulness of the publication of the interest rate path, the public misconception on the actual precision of the central bank communication. In their framework publishing interest rate projections can be counterproductive if private agents do not know the accuracy of central bank signals. This result shows that the alignment of central bank and public expectations is not necessarily welfare improving and highlights the importance of a communication strategy in which the announcement of future policy intentions is always accompanied by statements that stress its conditional and uncertain nature.

Also the empirical results on the effects of the announcement of future policy intentions is scant. To our knowledge, the only available evidence is Archer (2005) who finds a very limited effect of unexpected changes in the interest rate path announced by the Reserve Bank of New Zealand on the slope of the term structure of interest rates and uses this evidence to support the idea that, in New Zealand, financial markets have well understood the conditional nature of the projections.

The absence of theoretical and empirical results is one of the reasons that can explain why the approaches adopted by central banks for communicating their future policy intentions are so heterogeneous. In particular many central banks still do not reveal any information on the likely future evolution of short term interest rates. At the same time important differences exist even among those central banks that have decided to signal their future policy intentions. For example the Bank of Norway, the Reserve Bank of New Zealand and the Bank of Sweden publish quantitative projections of the short-term interest rates, while some other central banks, like the Federal Reserve and the ECB, rely instead on a discontinuous use of qualitative announcements.

In the remaining part of the paper we provide new evidence on the effects of the announcement of future policy intentions. In the next section we use data on Norway, New Zealand, the U.S. and the euro area, to verify if this type of communication improves the predictability of policy decisions. In the following section we restrict

¹¹In their model the central bank communicates to the market a noisy signal of its one-step ahead expected interest rate and the variance of the information transmission error is an (inverse) measure of the degree of transparency.

our attention to New Zealand to assess the practical relevance of two of the most cited concerns related to the announcement of policy inclinations. In particular (i) we evaluate the possibility that this communication strategy might turn out to be useless if the central bank is already very transparent in many other dimensions and (ii) we verify if the public has understood the conditional nature of the projections.

4 The announcement of future policy intentions and the predictability of policy decisions

any evaluation of the impact of the announcement of future policy intentions on the predictability of monetary policy decision crucially depends on the criteria adopted to select periods that are characterized by the use of this communication strategy. While, on one side, the presence of a quantitative announcement can be verified uncontroversially, on the other, some degree of judgment is unavoidable in identifying periods that are characterized by the use of qualitative announcements.

Our selection is, in most of the cases, based on the presence in official communications of sentences (or quantitative data) that literally refer to the future path of the policy interest rates. At the same time we have also taken into account that in some particular situations the same information can be transmitted by the central bank to the public through coded sentences which are not explicitly related to future policy intentions. Short summaries of our reading of the communication strategies adopted since the beginning of 1999 by the Norges Bank, the Reserve Bank of New Zealand, the Federal Reserve of the U.S. and the European Central Bank to provide information on the likely future evolution of policy rates are reported below.

Norges Bank - The Norges Bank started to provide qualitative information on its short term future policy intentions in May 2000. Until mid-2001 this type of information was released at each of the (around) 9 meetings that were held during the year using sentences like *"... in the light of recent trends in the economy and the current balance of risks, the probability that the next change in interest rates will be an increase is greater than (equal to - smaller than) the probability of a reduction."* Starting from mid-2001, when the Norges Bank became an inflation targeter, the same type of information was communicated in an equivalent way focusing on the likely evolution of inflation in a two-years horizon in case interest rates were kept unchanged (e.g. *"... according to Norges Bank's assessment, with an unchanged interest rate ahead, the probability that inflation two years ahead will be higher than*

2.5 per cent is the same as (greater than - smaller than) the probability that it will be lower.”).

From mid-2004 the Norges Bank has sharpened its announcement of future policy intentions in three ways. First it has moved back to a communication directly focused on official interest rates. Second the announcement has provided information on the likely level of the official interest rate in a precise point in time, normally three-four months ahead.¹² Finally, the likely level of the interest rate over the planned horizon has been identified with a quantitative interval of around 1 percentage point (e.g. *”...the analysis indicates that a sight deposit rate in the interval 1.5-2.5 per cent in mid-March 2005 will, given the outlook for inflation and output, provide a reasonable balance between the objective of reaching the inflation target and the objective of stability in the real economy.”*).

From the end of 2005 to date the Norges Bank has complemented the communication strategy adopted since mid-2004 with the publication of an interest rate projection which is released 3 times a year in the Inflation report. The published path is constituted by quarterly means surrounded by confidence intervals (fan chart) and covers a 4 years horizon. The publication of quarterly means, as opposed to the level of the interest rate in a three-four months horizon as it was the case under the previous regime, provides more detailed information on the likely timing of policy moves. The future path of the rates is established by the Board, in a process which takes into account several inputs,¹³ and must satisfy some specific criteria in order to be considered appropriate (Qvigstad, 2005; Berge, 2006).¹⁴ Finally, a great attention is paid to the conditional nature of the rate forecasts and to the clarification of the factors which could, subsequently, determine a deviation from these forecasts. In particular, the Inflation Report underlines that *”a deviation of actual interest rate developments from the forecast must be expected to be the rule rather than the exception”*.

¹²However in this period policy intentions were released only 3 times a year (in the section “Monetary policy assessment” of the Inflation Report) and no other systematic information was provided during the other meetings included between two publications of the Inflation Report.

¹³Among the others factors it reflects the estimates arising from a set of economic models, the information relating to the current situation and the interviews carried out in the institutions and firms in each region relative to the expected development of the economy in their sector

¹⁴On the basis of such criteria, the appropriate path of the rates must: 1) anchor the inflation expectations, 2) favor a good balancing between inflation and output gap, 3) keep (in a certain degree) such balancing also in different scenarios, 4) imply moderate (not sharp) variations of the interest rates over time, 5) favor the stability in the financial markets, 6) be coherent with the path foreseen by simple rules of monetary policy and in the opposite case an explanation must be given.

Reserve Bank of New Zealand - The Reserve Bank of New Zealand has been releasing quantitative information on its policy inclinations since 1997. In more recent years the announcement of the interest rate path has coincided with the revisions dates of the official cash rate of March, June, September and December. In New Zealand the official cash rate is revised eight times per year. After the intervening revision dates of January, April, July and October the Reserve Bank of New Zealand only releases a general evaluation on how the outlook for growth and inflation has changed since the last meeting. The interest rate projection is included in the Monetary Policy Statement which provides point estimates for the likely future evolution of a large set of key macroeconomic variables. The Reserve Bank of New Zealand releases its expected path for the yield on 90 days bank bills for each quarter of the following two years. The interest rate projection is produced using a combination of the bank's core macroeconomic model and policy-maker's judgment.

Federal Reserve - From May 1999 to the beginning of 2000 the U.S. Federal Open Market Committee (FOMC) has explicitly announced its expected future policy stance ("policy bias") in the post-meeting statements. An "asymmetric bias" meant that the FOMC judged that a policy move in one direction was more likely than in the other, while a "symmetric bias" meant that the direction of the next policy move was equally likely to be up or down (Rudebusch and Williams, 2006). This type of explicit announcement was interrupted at the beginning of 2000 until mid-2003. In August 2003, in order to convince the market that policy interest rates were going to be kept low for some time, the FOMC reintroduced in the post-meeting statement a direct, though not unambiguous, indication about its future policy inclinations ("The Committee believes that policy accommodation can be maintained for a considerable period"). A reference to future policy intentions was maintained also in the following period of official rate increases ("policy accommodation can be removed at a pace that is likely to be measured") and was discontinued in June 2006.

European Central Bank - The use of particular keywords (e.g. "vigilance", "monitor closely") in the Editorial Statement released each month after the monetary policy meeting by the European Central Bank has been recently interpreted by market operators as a signal of its short term monetary policy orientation.¹⁵ These key-

¹⁵Indexes based on these keywords, like the hawkometer of the Deutsche Bank, are commonly used by the academia and by market operators as synthetic indicators of future monetary policy inclination of the ECB. Also Bini-Smaghi(2006) observes that in the recent tightening cycle the ECB has provided a guidance over the short term evolution of the official interest rate.

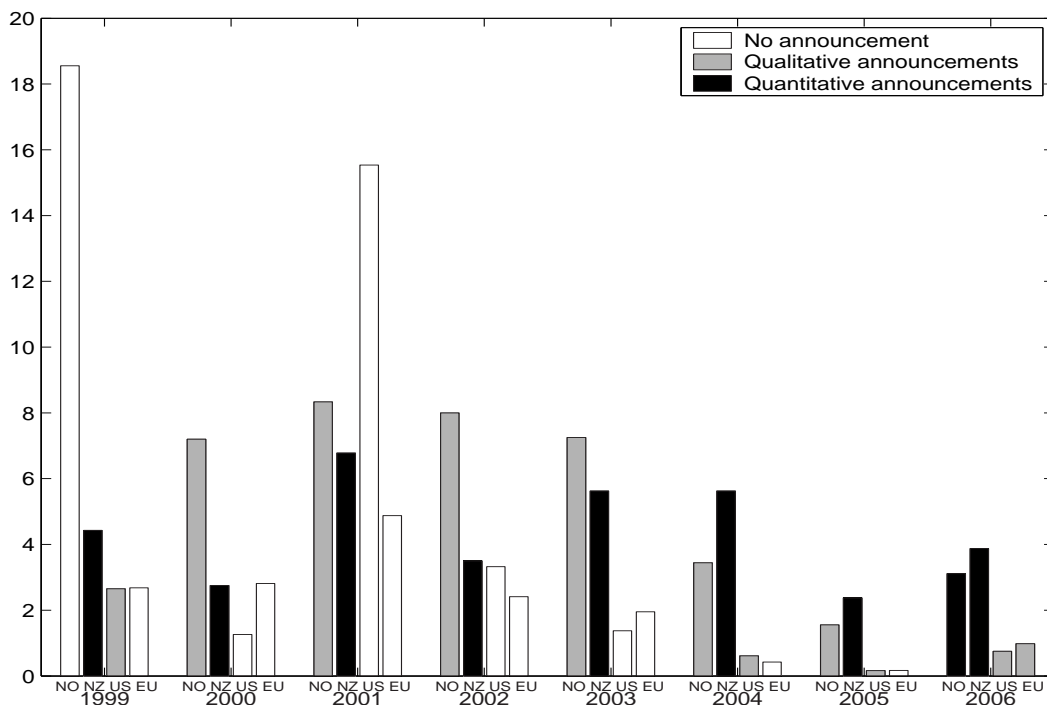
words have been systematically used since September 2005 and sometimes have been reinforced by more explicit announcements (*"if our scenario is confirmed, and until now it has been confirmed, further withdrawal of monetary accommodation would be warranted"*, Q&A June 2006). At the same time the use of sentences like *"we do not take ex ante positions"* or *"we never pre-commit to any rate increases"* is intended to emphasize the conditional nature of policy inclinations. The ECB has never announced medium term policy inclinations.

In summary the descriptions reported above suggests that the Norges Bank has provided qualitative announcements about its future policy intentions from May 2000 to June 2004 and that it has moved to quantitative announcements starting from July 2004. The Reserve Bank of New Zealand has released quantitative information over the full sample 1999-2006. The Federal Reserve has make use of qualitative announcements in the second part of 1999 and from August 2003 to June 2006 and, finally, the ECB has released qualitative announcements starting from September 2005. A first evidence on the relationship between the predictability of policy decisions and the release of information about future policy inclinations is provided in Figure 1 where we report, for each of the countries under analysis, the average annual absolute variation of 1 month interest rates in those days in which the official interest rates are revised. This variability can be interpreted as an inverse measure of the predictability of policy decisions (see section 2.2). In the same picture white bars denote years that have been characterized by the absence of an explicit announcement of future policy inclinations, while gray and black bars denote years characterized by the release of, respectively, qualitative and quantitative information on the future evolution of official interest rates.¹⁶

The preliminary evidence presented in Figure 1 provides mixed evidence about the hypothesis that a qualitative or a quantitative announcement of future policy intention improves the predictability of policy decisions. On one side, the idea that this type of announcement does not necessarily improve the predictability of policy decision would be supported by the fact that during the period 1999-2005 the volatility of the 1 month interest rate in meeting days has been systematically higher in New Zealand than in the euro area even if, in that period, the Reserve Bank of New Zealand was providing quantitative information on its future policy intentions while the ECB was not releasing any direct information about its policy inclinations.

¹⁶In the figure a year is selected to be either of the type no announcement or qualitative or quantitative announcement depending on which of the three regimes has been in place for most of the time.

Figure 1: Announcement of policy inclinations and the predictability of policy decisions (average absolute variation of 1 month interest rates; basis points).



Note: NO= Norway, NZ=New Zealand, US=United States, EU=Euro area.

On the contrary when the analysis is focused on Norway the comparison between the volatility of short term interest rates in 1999 and in 2000 seems to suggest that the release of qualitative information has significantly improved the predictability of official rate changes. More in general from Figure 1 also emerges that there has been a widespread increase in the predictability of policy moves after 2003 and that this improvement has coincided with the diffusion of communication strategies based on the revelation of information about future policy inclinations. However this evidence alone does not exclude the possibility that the recent improvements in predictability may be related to factors not necessarily related to transparency.

One of these factors could be a change in the variability of the official interest rates. This possibility has been recently suggested by Swanson (2006) who finds that official rate variability has been the most important cause of the increased volatility of interest rates observed in the U.S. in 2001. Other forces that could affect the volatility of short term interest rates are the variability of the macroeconomic fundamentals or the specific characteristics of the money market.¹⁷ To control for

¹⁷Note that the variability of macroeconomic fundamentals should be already captured by the

the impact of these factors on the predictability of the monetary policy decisions and to have a more clear assessment of the effects of quantitative and qualitative announcements of future policy intentions, we regress the absolute change of the 1 month interest rate during meeting days in Norway, New Zealand, U.S. and in the euro area over the period 1999-2006 on the absolute change in official interest rates and on a series of dummies that are intended to capture the impact of qualitative or quantitative announcements¹⁸ and on a series of annual and country dummies which are intended to control for differences in the business cycle conditions and for the impact of country specific factors like the structure of the money market.¹⁹ The results of the regressions, are presented in Table 1 where we also verify the robustness of our results to the exclusion of the observations related to unscheduled meetings.²⁰

In column 1 of Table 1 we present the baseline specification that only controls for the variability of official rates and for country specific effects. According to this specification the variability of the official interest rate has a positive impact on the variability of the 1 month interest rate during meeting days (i.e. a negative impact on the predictability of policy moves). The estimated coefficients on country dummies also suggests that, controlling for the impact of all the other factors, the central banks of Norway and New Zealand are less predictable than the Federal Reserve and the ECB and that the predictability of these last two central banks is not statistically different. More importantly to our purposes the coefficients on the quantitative and qualitative dummies suggest that the announcement of the future policy intentions enhances the predictability of policy decisions. The estimates presented in Column 2 signal that these results are, both qualitatively and quantitatively, robust to the inclusion of annual dummies. In column 3 we present one more robustness exercise which is based on the inclusion of dummies for each of the unscheduled meetings observed since 1999. Also this specification confirms that the announcement of future policy intentions has a positive impact on the predictability of the official interest rates.

¹⁸These dummies are constructed using the dating described in the first part of this section.

¹⁹To control for the possibility that the business cycle is not aligned across countries and also for the possibility that changes in variability of the 1 month interest rates during meeting days can be due to a more general volatility related to the structure of the interbank market we have also tried a specification which includes the average daily volatility of the 1 month interest rate over the previous six months. This variable was never significant and has therefore been excluded from the set of regressors.

²⁰In the euro area and in New Zealand there has been one unscheduled meeting in September 2001, in the U.S. there have been three unscheduled meetings in 2001 and in Norway four unscheduled meetings at the beginning of 1999 and one in 2001.

Table 1: Announcement of policy intentions and predictability of policy decisions.

	Sample period				
	1999-2006	1999-2006	1999-2006	1999-2002	2003-2006
	$ \Delta_{t,meet}^{1m} $	$ \Delta_{t,meet}^{1m} $	$ \Delta_{t,meet}^{1m} $	$ \Delta_{t,meet}^{1m} $	$ \Delta_{t,meet}^{1m} $
$ \Delta_{t,meet}^{.off} $	0.198** (0.051)	0.191** (0.049)	0.114** (0.024)	0.159** (0.018)	0.069** (0.012)
D-quantitative	-7.680** (2.021)	-7.647** (2.380)	-3.350** (1.030)	-1.282** (0.386)	-1.729** (0.253)
D-qualitative	-4.740** (1.514)	-4.078** (1.317)	-1.126 (0.613)	1.008 (1.049)	-1.020** (0.309)
D-U.S.	0.567 (1.064)	0.567 (1.056)	-0.927 (0.679)	-1.988 (1.047)	-0.347 (0.232)
D-Norway	6.261** (1.521)	6.225** (1.600)	3.564** (0.737)	2.847 (1.214)	2.875** (0.304)
D-New Zealand	7.575** (1.634)	7.916** (2.053)	4.242** (1.204)	...	4.622** (0.657)
Constant	1.838** (0.411)	2.805** (0.557)	2.302** (0.144)	2.349** (0.281)	1.772** (0.318)
Time dummies	No	Yes	Yes	Yes	Yes
Unscheduled meeting dummies	No	No	Yes	Yes	Yes
R ²	0.265	0.300	0.706	0.781	0.265
Sample size	334	334	334	187	147

Note: OLS estimation. Point estimates and standard errors (small case). A star denote significance at 10% level, a double star significance at 5% level.

ity of policy decisions.²¹ Point estimates suggest that quantitative and qualitative announcements reduce the variability of 1 month interest rates during meeting days respectively of 3 and 1 basis points. This result is also quantitatively important since the average variability of 1 month interest rates in meeting days from 1999 to 2006 has ranged from 2 basis points in the euro area and in the U.S. to 5.5 basis points in Norway.

Finally in the last column of Table 1 we show that the evidence in favor of a significant impact of qualitative and quantitative announcements on the predictability of policy decisions holds also if we restrict our sample to the most recent years. Evidence related to 1999-2002 is presented for completeness but has to be evaluated with some care. First, over that period it is not possible to disentangle the effect of a quantitative announcement from the fixed effect of New Zealand. Second the evidence of an insignificant dummy for the qualitative announcements has to be interpreted taking into account that the first experiment with qualitative announce-

²¹Note that the qualitative dummy has a p-value of 0.109 and is therefore borderline to be significant.

ments implemented by the Federal Reserve in 1999 was not completely successful (Rudebusch and Williams, 2006). This last observation suggests that, in general, it is not enough to provide information of the likely evolution of future interest rates but it is crucial that this information, and in particular its conditional nature, is well understood by the markets.

5 The announcement of future policy intentions: evidence from New Zealand

In this section we restrict our attention to New Zealand to assess the practical relevance of two of the most cited concerns related to the announcement of policy inclinations. In particular (i) we evaluate the possibility that this communication strategy might turn out to be useless if the central bank is already very transparent in many other dimensions and (ii) we provide some evidence that suggests that market operators have understood the conditional nature of the projections.

In evaluating these concerns we focus on the Reserve Bank of New Zealand for two reasons. First, it is the only case where future policy intentions have been announced for a period of time that is sufficiently long to guarantee a reliable analysis. Second, since it is among the most transparent central banks in the world and since it provides the markets with very precise information on the future evolution of official interest rates, the Reserve Bank of New Zealand is the most suited case study that can be used to assess the relevance of the two concerns emphasized above.

We start by evaluating to which extent the publication of the interest rate path allows the Reserve Bank of New Zealand to steer market expectations. To the best of our knowledge the only available evidence on this issue is Archer (2005) who provides an assessment of the reaction of the slope of term structure²² to the monetary news included in the publication of the interest rate path and concludes that the control of the central bank on market expectations is, if any, weak.

In the first part of this section we aim at providing results that are complementary to Archer (2005). In particular we want to verify if the evidence of a limited response of market expectations to the monetary news included in the announcement of future policy intentions holds also when the analysis is focused on specific maturities instead of on the term structure. To this end we first compare the av-

²²In particular he analyzes the slope of the segments of the term structure included between 3 and 12 months and between 1 and 3 years.

erage absolute variability of the prices of a set of future contracts on short term interest rates in those days in which the official cash rate is revised (OCR-revision days) and an interest rate projection is released with the variability observed in those OCR-revision days in which there is no such a release. Figure 2 suggests that in the period 1999-2006 the volatility of the price of future contracts on the 90 days bank bill with expiration from 3 to 12 months ahead was on average higher in the OCR-revision dates in which there was a release of interest rate projection than in the remaining OCR-revision days. On the contrary, this does not seem to be the case for spot interest rate on bank bills regardless of their maturity. This latter evidence is not particularly surprising since the publication of the interest rate path should principally affect expected interest rates while short term spot rates should mainly reflect unexpected changes in the official interest rate.

To verify if the differences that emerge from Figure 2 are statistically significant and, at the same time, to control for changes in the variability of the official interest rates²³ we regress daily absolute changes in the return implicit in the price of future contracts on 90 days bank bills with expiration from 3 to 12 months ahead (respectively $|\Delta fut3m_t|$, $|\Delta fut6m_t|$, $|\Delta fut9m_t|$ and $|\Delta fut12m_t|$) on a constant term, an OCR-revision dummy (D-OCRrev: equal to 1 on OCR-revision days and 0 otherwise), a dummy that signals the release of an interest rate projection (D-intproj: equal to 1 in OCR-revision days in which an interest rate projection is released and 0 otherwise) and, as a control, the absolute change in the OCR ($|\Delta OCR_t|$). The estimated equation is therefore:

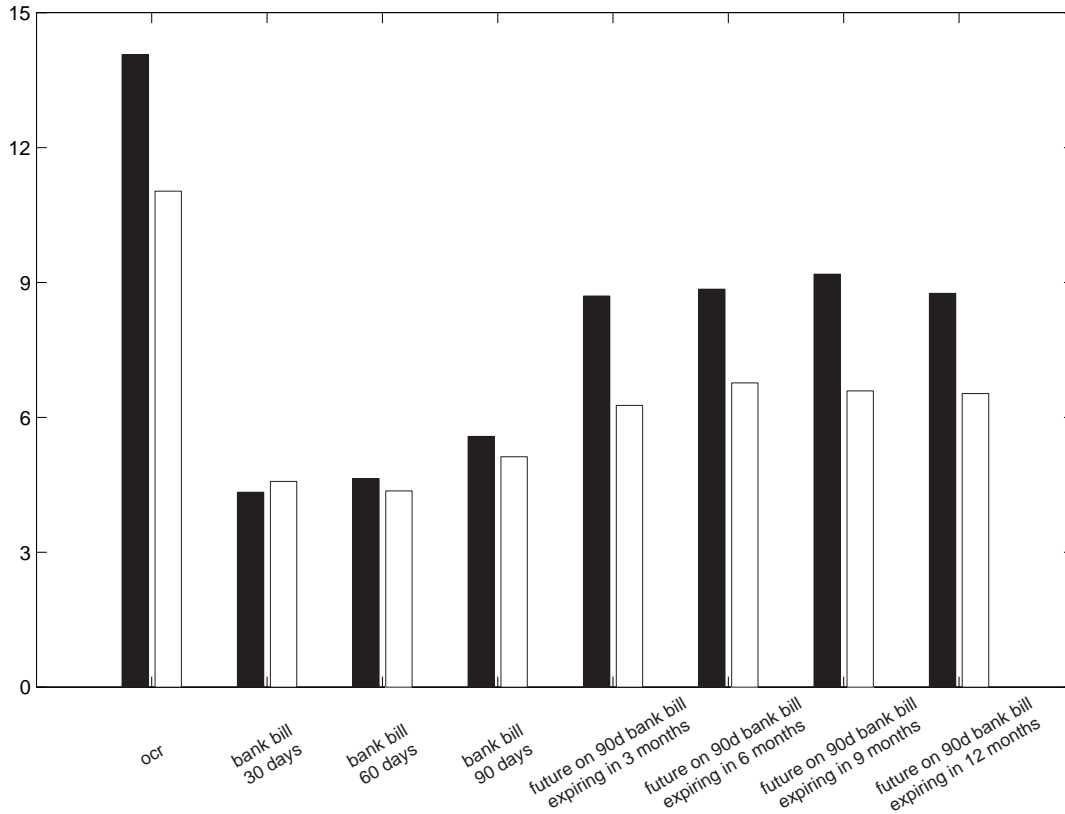
$$|\Delta X_t| = \alpha + \beta_1 |\Delta OCR_t| + \beta_2 \text{D-OCRrev}_t + \beta_3 \text{D-intproj}_t + \epsilon_t \quad (1)$$

where $|\Delta X_t|$ is alternatively equal to $|\Delta fut3m_t|$, $|\Delta fut6m_t|$, $|\Delta fut9m_t|$ and $|\Delta fut12m_t|$. The evidence presented in Table 2 suggests that, even controlling for the impact of the change in the official cash rate, average volatility of the return on future contracts is higher on days in which interest rate projections are released than in the remaining OCR-revision days. Although this effect is not quantitatively large (around 2 basis point) it must be noted that in these days interest rate volatility is 40 per cent higher than in OCR-revision days without a release of interest rate projections and 200 per cent higher than in the remaining days of the year.

In order to assess whether this relationship effectively reflects a response of mar-

²³According to Figure 2 the variability of the official interest rate is higher during OCR-revision days that coincide with the release of the interest rate path.

Figure 2: Average absolute variations of interest rates on OCR-revision day with (black bars) and without (white bars) a release of interest rate projections (sample: 1999-2006, basis points)



Note: Spot yields on bank bills are from Reserve Bank of New Zealand. Prices of future contracts on 90 days bank bills (mid-price, end of regular trading session) are from Bloomberg. For each day of the year we define as its matching “3 months ahead future contract” the first traded contract with expiration date at least 45 days head and as 6, 9 and 12 months ahead futures the next three contracts with the closest expiration dates.

ket interest rates to the forward guidance of the central bank, we construct a measure of the monetary policy surprise unleashed by the publication of the interest path. Define $I_t^{CB,Xm}$ as the central bank’s projection at t for the yield on 90 days bank bill that will be observed in X -months (e.g. $I_t^{CB,3m}$ is the RBNZ’s expectation at t for the spot yield on 90 days bank bill that will be observed in 3 months, $t + 3m$). Assuming, for the sake of simplicity, that between two consecutive releases of interest rate projections there are exactly 90 days²⁴ and that the last release was at $t - 90$, then the change in RBNZ’s projected return on the 90 days bank bill X -months ahead is denoted by:

²⁴We recall the reader that, in New Zealand, interest rate projections are released in March, June, September and December.

Table 2: The effect of the publication of the expected path of interest rates.

Sample period: Mar/1999 - Mar/2007				
	$ \Delta fut3m_t $	$ \Delta fut6m_t $	$ \Delta fut9m_t $	$ \Delta fut12m_t $
$ \Delta OCR_t $	0.109** (0.029)	0.073** (0.029)	0.035 (0.030)	0.037 (0.030)
D-OCRrev _t	2.738** (0.705)	3.151** (0.714)	3.126** (0.735)	2.885** (0.753)
D-intproj _t	1.936** (0.902)	2.045** (0.915)	2.523** (0.942)	2.015** (0.964)
Constant	2.326** (0.081)	2.808** (0.082)	3.072** (0.084)	3.237** (0.086)
R ²	0.063	0.059	0.050	0.039
Sample size	2118	2118	2118	2118

Note: OLS estimation. Point estimates and standard errors (small case). A star denotes significance at 10% level, a double star significance at 5% level.

$$\Delta I_{t,t-90}^{CB,Xm} = \left(I_t^{CB,Xm} - I_{t-90}^{CB,Xm} \right) \quad (2)$$

Similarly define $I_t^{MKT,Xm}$ the market expectation at t for the spot yield on 90 days bank bill that will be observed in X-months. Adding a time varying risk premia we can link this expectation with the return implicit in the market price of futures contracts on the 90 days bank bill, $F_t^{MKT,Xm} = I_t^{MKT,Xm} + RP_t^{Xm}$ and compute the change in market's expectations X-months ahead:

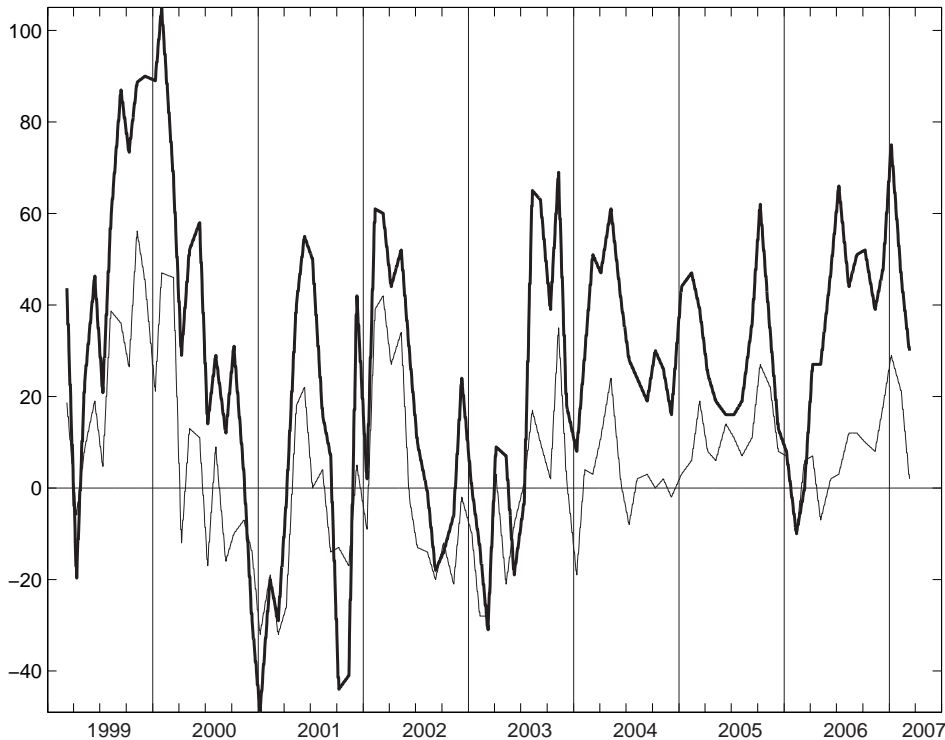
$$\Delta I_{t,t-90}^{MKT,Xm} = \Delta F_{t,t-90}^{MKT,Xm} - \Delta RP_{t,t-90}^{MKT,Xm} \quad (3)$$

we compute the risk premia taking the difference between the interest rate implicit in future contracts and the expectations on the future evolution of the interest rate on 90 days bank's bill released monthly by Consensus Economics (see Figure 3).²⁵

Finally, we define PPS_t^{Xm} the policy path surprise unleashed at t and relative to the horizon Xm as the difference between the revisions in the expectations described in (2) and in (3).

²⁵ Every month Consensus Forecasts provides information on market expectations about the yield on 90 days bank bills that will be observed in 3 and 12 months. A measure of the risk premia on futures contracts expiring 3 and 12 months ahead has been constructed taking the difference between the return implicit in these contracts on the same day of the release of Consensus and the forecast therein reported. A daily series of the risk premia is obtained with a linear interpolation of the monthly data.

Figure 3: Risk premia on future contracts on 90 days bank bills expiring in 3 months (thin line) and in 12 months (sample: 1999-2006, basis points).



Source: Consensus Economics, Bloomberg. See note 25.

$$PPS_t^{Xm} = \Delta I_{t,t-90}^{CB,Xm} - \Delta I_{t-1,t-90}^{MKT,Xm} \quad (4)$$

A measure of the central bank's ability to influence market expectations at different horizons is finally obtained regressing the change in the price of future contracts observed after the release of an interest rate path, $\Delta I_{t,t-1}^{MKT,Xm}$, on the monetary policy surprise, PPS_t^{Xm} :

$$\Delta I_{t,t-1}^{MKT,Xm} = \alpha + \beta_1 PPS_t^{Xm} + \epsilon_t \quad (5)$$

where $Xm = 3m, 12m$. The results are presented in Table 3. They show that at 3 months horizon the impact of the monetary surprise implicit in the publication of the interest rate path on market interest rates is not significant, while it is significant at the 12 months horizon. This evidence is somehow surprising because it suggests that the ability of the RBNZ to influence the slope of the segment of the term structure included between 3 and 12 months (Archer, 2005) is mainly due to its

ability to affect the long end of this part of the curve.

Table 3: The impact of the RBNZ’s announcement of the path on market expectations.

	Sample period: Mar/1999 - Mar/2007	
	$\Delta I_{t,t-1}^{MKT,3m}$	$\Delta I_{t,t-1}^{MKT,12m}$
PPS_t^{Xm}	0.114 (0.107)	0.166** (0.057)
Constant	0.008 (0.018)	0.007 (0.016)
R ²	0.049	0.222
Sample size	32	32

Note: OLS estimation. Point estimates and standard errors (small case). A star denote significance at 10% level, a double star significance at 5% level.

The fact that at the 3 months horizon market operators do not react to the release of the policy path could in principle provide support to the concern that, in a very transparent environment, the usefulness of the release of this type of information might be limited. However it has recently been argued that the impact of monetary news on market expectations might be different in those periods characterized by a change in the direction of the official interest rates. Demiralp and Jorda (2004) and Flemming and Piazzesi (2005) provide evidence in favor of this hypothesis for the U.S. In order to verify if this evidence holds also in New Zealand we have augmented our baseline specification presented in equation (5) to allow for the possibility that the impact of the publication of the interest rate path on market expectations might be different in those periods characterized by a change in the direction of official interest rates:

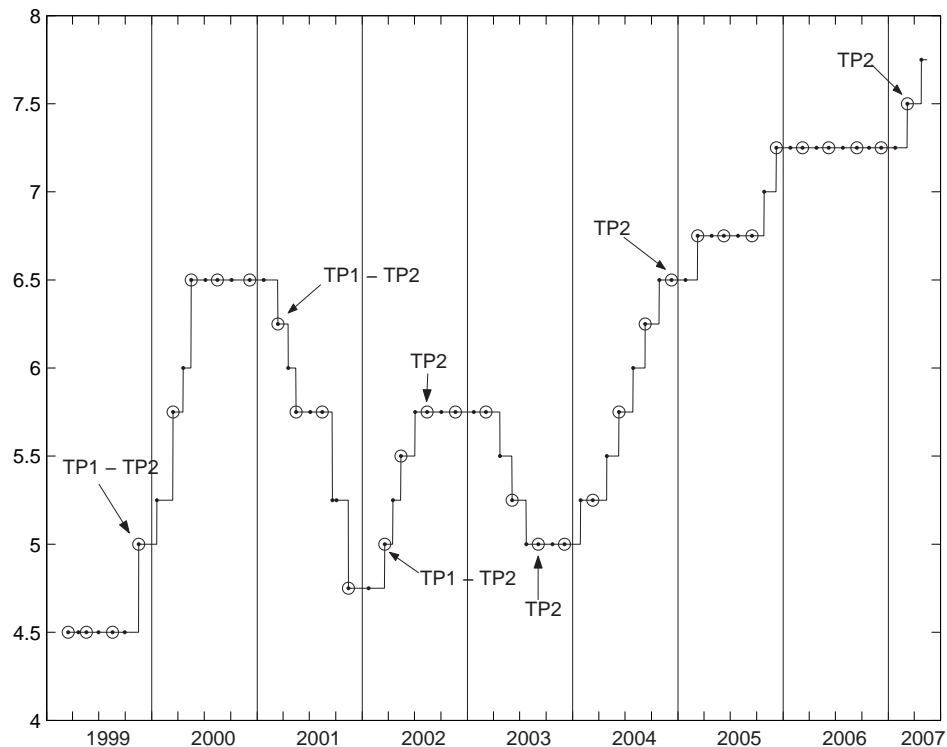
$$\Delta I_{t,t-1}^{MKT,Xm} = \alpha + \beta_1 \text{D-TP} + \beta_2 PPS_t^{Xm} + \beta_3 \text{D-TP} \cdot PPS_t^{Xm} + \epsilon_t \quad (6)$$

where D-TP is a dummy equal to 1 in a OCR-revision day characterized by a change in the direction of the official interest rate and zero otherwise.

In Table 4 we present, for each forecasting horizon, two alternative regressions each based on a different definition of turning point. According to the first one (D-TP1) a turning point is identified by an increase (decrease) of the official cash rate if the previous change, independently from when it was decided, it was a decrease (increase). The second definition (D-TP2) assumes that a well defined direction of the official interest rate (a monetary regime) emerges only when the Reserve Bank

of New Zealand takes three consecutive decisions of the same type (that can be either increases, decreases or decisions to keep the key interest rates unchanged) and identifies a turning point with an official decision (that again can be either an increase, a decrease or the decision to keep the key interest rates unchanged) that either satisfies D-TP1 or breaks a monetary regime. The first definition identifies 5 revision days (out of 67) as being characterized by a change in the direction of official rates. Among these 5 dates only 3 are relevant for our analysis as they coincide with a revision day in which also interest rate projections are released. The second definition identifies 12 turning points of which only 7 coincide with a release of the interest rate path (see Figure 4).

Figure 4: Official cash rate and release of projections



Note: The solid line denotes the evolution of the official cash rate. On the same line, dots indicate a OCR-revision dates and circles dates of release of the interest rate projections. Source: RBNZ.

The regressions presented in Table 4 show that in those revision days in which the direction of the official interest rate does not change, when market operators realize that the variation in central bank expectations about the future evolution of short term rates has been different from their own revision they instantaneously adjust their forecasts to close the gap ($\beta_2 > 0$) both at 3 and 12 months horizons. Moreover,

as one would expect, according to these new estimates the reaction of market interest rate decreases with the horizon. On the contrary, in those days characterized by a change in the direction of the official cash rate, market expectations over short horizons move in the opposite direction of that indicated by the monetary news, enlarging the gap with central bank's projections. This can be observed by noting that, in these particular days, the reaction of market interest rates to the monetary surprise is given by the sum of the coefficients on the *PPS* variable and of the coefficient on the interaction between *PPS* and the relevant turning point dummy and that this sum is be negative for the 3-month horizon. On the contrary turning points does not seem to have any effect on expectations related to the 12 month horizon.

Table 4: Turning points and the impact of the RBNZ's announcement of the path on market expectations.

	Sample period: Mar/1999 - Mar/2007			
	$\Delta I_{t,t-1}^{MKT,3m}$		$\Delta I_{t,t-1}^{MKT,12m}$	
PPS_t^{Xm}	0.225** (0.074)	0.253** (0.084)	0.179** (0.073)	0.159** (0.087)
D-TP1 · PPS_t^{Xm}	-0.848** (0.080)		0.083 (0.107)	
D-TP1	0.002 (0.020)		-0.090** (0.039)	
D-TP2 · PPS_t^{Xm}		-0.564** (0.199)		0.022 (0.096)
D-TP2		-0.034 (0.040)		-0.027 (0.029)
Constant	0.006 (0.017)	0.010 (0.018)	0.012 (0.017)	0.013 (0.019)
R ²	0.353	0.279	0.252	0.233
Sample size	32	32	32	32

Note: OLS estimation. Point estimates and robust standard errors (small case). A star denotes significance at 10% level, a double star significance at 5% level.

The development of a theoretical explanation for this evidence will be the object of future research. At the moment our best guess for the unusual response of market expectations over shorter horizons in presence of a change in the direction of official rates is the possibility that in an economic environment where agents face a problem of limited information and use some learning mechanism to form their expectations, any large shock (as a change in the direction of official rates could be) might have

large and unpredictable effects on the way economic agents update their information and thus be one of the potential explanations for their apparently irrational behavior.

In the last part of this section we provide some preliminary result that suggests that in New Zealand market operators understand the conditionality of the interest rate projections released by the RBNZ. This evidence points to a limited practical relevance also of the second concern related with the publication of the interest rate path, that is of the possibility that this type of policy announcement might be harmful when the public does not understand its conditional nature because, in this situation, the credibility of the central bank might be undermined. Our claim is based on two complementary results. First of all we have showed that the reaction of market expectations to the monetary news included in the announcement of future interest rates is only partial ($\beta_2 < 1$). This is consistent with an economic environment characterized by market operators that do not accept monetary news in an unconditional manner but with agents that perfectly realize the conditionality of the information released by the central bank and that filter it according to their personal beliefs on the actual state and on the future evolution of the macroeconomic outlook. Second under the hypothesis that markets do not understand the conditional nature of the projections (or, to put it in a different way, that they interpret the projections as an unconditional commitment of the central bank to deliver a given sequence of interest rate variations) we would expect that future prices (depurated by the risk premia) change only marginally in the period included between two releases of projections. On the contrary in an environment where market operators understand the conditional nature of the announcement we would expect changes in the price of future contracts on short term interest rates that are in line with those of the central bank's projections (i.e. we would expect the estimated coefficient that links $\left(\Delta I_{t,t-90}^{CB,Xm}\right)$ with $\left(\Delta I_{t-1,t-90}^{MKT,Xm}\right)$ to be equal to one).²⁶

A test of the empirical validity of these two hypothesis can be obtained by comparing changes in consecutive interest rate projections released by the RBNZ $\left(\Delta I_{t,t-90}^{CB,Xm}\right)$ with changes in market expected interest rates between the release of last projections and one-day before the release of the new one $\left(\Delta I_{t-1,t-90}^{MKT,Xm}\right)$. Taking into account the evidence presented in the first part of the section also in this case

²⁶This conclusion is based on the implicit hypothesis that the central bank and market operators share the same information set and that they are both able to map it into an optimal interest rate path. In practice actual changes might not be exactly the same because the central banks is endowed with superior information on the state of the economy or because the central bank and market operators map macro news into an expected evolution of official interest rate in a different way.

we adopt a specification that controls for the potential effect of OCR-revision days in which the direction of official interest rates has been changed and for the effect of changing risk premia. The specification of the estimated equation is in (7):

$$\Delta I_{t-1,t-90}^{MKT,Xm} = \alpha + \beta_1 \text{D-TP} + \beta_2 \Delta I_{t,t-90}^{CB,Xm} + \beta_3 \text{D-TP} \cdot \Delta I_{t,t-90}^{CB,Xm} + \epsilon_t \quad (7)$$

Table 5: Markets' understanding of the conditionality of the projections of the RBNZ.

	Sample period: Mar/1999 - Mar/2007					
		$\Delta I_{t-1,t-90}^{MKT,3m}$			$\Delta I_{t-1,t-90}^{MKT,12m}$	
$\Delta I_{t,t-90}^{CB,Xm}$	1.038** (0.101)	1.009** (0.110)	1.029** (0.109)	0.686** (0.085)	0.711** (0.099)	0.753** (0.110)
D-TP1 · $\Delta I_{t,t-90}^{CB,Xm}$		0.206 (0.225)			0.002 (0.115)	
D-TP1		-0.001 (0.120)			-0.279** (0.070)	
D-TP2 · $\Delta I_{t,t-90}^{CB,Xm}$			0.086 (0.254)			-0.153 (0.165)
D-TP2			0.060 (0.085)			-0.028 (0.110)
Constant	-0.015 (0.031)	-0.014 (0.032)	-0.028 (0.032)	-0.015 (0.044)	0.008 (0.045)	-0.014 (0.049)
R ²	0.786	0.789	0.790	0.661	0.696	0.671
Sample size	32	32	32	32	32	32

Note: OLS estimation. Point estimates and robust standard errors (small case). A star denotes significance at 10% level, a double star significance at 5% level.

A first result that emerge from the Table 5 is the fact that, in general, turning point dummies and interactions are not significantly different from zero thus suggesting that the relationship between changes in RBNZ's and in market's expectations is not subject to shifts. More interestingly to our purposes, the coefficient that links the change in the projections of the central bank and the change in market expectations about the future evolution of short term interest rates over the same period is very close to one. This is a second piece of evidence that support the idea that, in New Zealand, market operators understand the conditionality of the information included in the release of the interest rate path. The coefficient on the 12-month horizon is somehow smaller. However, given the evidence on the 3-months horizon,

this is likely to be due to reasons different from the misunderstanding of the conditionality of the projection (i.e. if markets understand that the central bank has not committed to deliver a certain interest rate in three months it is very unlikely that they believe that it might be committed on longer horizon).

6 Conclusions

In the first part of this paper we provide a summary of the main theoretical and empirical issues concerning monetary policy transparency. The impression that one can get from this analysis is that while the theoretical literature has still not reached a definite conclusion on the economic effects of enhancing transparency, the available empirical evidence suggests that transparency enhances the predictability of future policy moves, reduces inflation expectations and its persistence, and, finally, promotes macroeconomic stability.

We then focus our analysis on one of the most debated aspect of transparency, the announcement of future policy intentions. Theoretical and empirical studies on this particular communication strategy have emerged only recently and are still not conclusive. The lack of a definite conclusion on the relative empirical relevance of the advantages and of the disadvantages of this type of communication is probably one of the most important reasons in explaining why central banks' current practices are so heterogeneous in this respect.

In the last part of the paper we provide a contribution in this direction. First, we find evidence that the communication of future policy intentions, either quantitative or qualitative, improves the ability of market operators to predict monetary policy decisions. Then we analyze the case of Reserve Bank of New Zealand, which releases a quantitative assessment of its future policy intentions since 1997 and we show that even for a very transparent central bank, the publication of the expected interest rate path has a significant impact on market expectations. We also find evidence that the change in market interest rates in the period included between two publications of the interest rate path is similar to the revision of the published path, thus suggesting that market operators have well understood the conditionality of the central bank's projections. Finally, our analysis suggest that in presence of changes in the direction of official interest rates, the reaction of financial markets to the monetary news included in the publication of the path is somehow anomalous: the change in market expected interest rate goes in the opposite direction of that implied by the monetary news.

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