Australian National University

Crawford School of Public Policy

CAMA

Centre for Applied Macroeconomic Analysis

Sources of Disagreement in Inflation Forecasts: An International Empirical Investigation

CAMA Working Paper 42/2012
September 2012

Pierre L. Siklos
Wilfrid Laurier University, Canada
Centre for Applied Macroeconomic Analysis

Abstract

Central to the conduct of monetary policy are inflation forecasts. Inflation forecast are not unique. Central banks and professional organizations generate inflation forecasts while households are surveyed about their inflation outlook. This paper estimates inflation forecast disagreement for nine economies over the 1999-2009 period, five of which target inflation. I find that central bank transparency tends to increase forecast disagreement. To the extent this reflects the attention paid to inflation performance the implication is that transparency is beneficial. Moreover, this finding does not appear to be a feature that applies only to central banks that must adhere to an inflation target.

Keywords

Forecast disagreement; Central bank transparency; Inflation; Quantile regression; Panel regression

JEL Classification

E52; E58; C53

Suggested Citation:

Siklos, P. L. (2012). “Sources of Disagreement in Inflation Forecasts: An International Empirical Investigation”, CAMA Working Paper 42/2012.

Address for correspondence:

(E) cama.admin@anu.edu.au

SOURCES OF DISAGREEMENT IN INFLATION FORECASTS: AN INTERNATIONAL EMPIRICAL INVESTIGATION*

Pierre L. Siklos
Department of Economics
Wilfrid Laurier University
Waterloo, ON
CANADA
N2L 3C5

[This draft: JULY 2012]

*This paper was partially written while the author was a Visiting Scholar in 2010 at the Institute for Monetary and Economic Studies, Bank of Japan. Comments by Michael Ehrmann, seminar participants at the Bank of Japan and the University of Athens, Shigenori Shiratsuka, Nao Sudou, and Kozo Ueda, are gratefully acknowledged as are the comments of the Editor, and three anonymous referees. A separate appendix, available on request, contains additional information not included here to conserve space. I am also grateful to the various central banks and Institutes I have visited over the years and to the Bank for International Settlements for their assistance in providing me with some of the data used in this study.

ABSTRACT

Central to the conduct of monetary policy are inflation forecasts. Inflation forecast are not unique. Central banks and professional organizations generate inflation forecasts while households are surveyed about their inflation outlook. This paper estimates inflation forecast disagreement for nine economies over the 1999-2009 period, five of which target inflation. I find that central bank transparency tends to increase forecast disagreement. To the extent this reflects the attention paid to inflation performance the implication is that transparency is beneficial. Moreover, this finding does not appear to be a feature that applies only to central banks that must adhere to an inflation target.

JEL classification: E52, E58, C53

Keywords: forecast disagreement, central bank transparency, inflation, quantile regression, panel regression

1. Introduction

Inflation forecasts lie at the heart of a central bank's monetary policy strategy. A wide variety of forecasts are published and they reflect differences not only in views about the future but are based on different information sets, as well being more or less sensitive to the regular arrival of macroeconomic news. Not surprisingly then, there exists considerable scope for forecasters to disagree. Nevertheless, Leduc, Rudebusch, and Weidner (2009) point out that the concept of forecast disagreement is frequently overlooked by observers who track aggregate economic activity. There are comparatively few attempts to measure, let alone explain, how and why forecasters disagree. Why should we be interested in inflation forecast disagreement? Bernanke (2008, 2007) offers an explanation when he observes that economists have yet to fully grasp the dynamics of inflation expectations. Indeed, he suggests (Bernanke 2007) that expectations can change, "…depending on economic developments and (most importantly) the current and past conduct of monetary policy."

The present study begins with the observation that the sensitivity of various inflation forecasts to incoming economic developments and institutional considerations can differ. Unlike similar studies which examine the range of forecasts from a single source, this paper argues that researchers should analyze a wider array of forecast types. By estimating inflation forecast disagreement based on different sources, such as professional forecasts, central bank, and survey-based forecasts, observers can determine, for example, the roles played by central bank transparency and the choice of the monetary policy strategy. Similarly, it is also useful to ask to what extent inflation forecast disagreement is driven by domestic factors as opposed to global considerations. Both are no doubt reflected in realized inflation and most central banks have come to the conclusion that international influences have played an increasingly important role over the past decade (e.g., see IMF 2006).

This paper estimates a model of inflation forecast disagreement, explores the role of global versus domestic determinants, assesses the influence of central bank transparency, as well as the impact of an inflation targeting policy strategy. The next section provides definitions of forecast disagreement and briefly considers the state of the theoretical debate germane to the

question of what drives forecast disagreement. Section 3 describes the data and outlines the econometric modeling strategy followed. Empirical results are discussed in section 4 prior to concluding remarks in section 5.

Briefly, the paper finds that central bank transparency is associated with an increase in forecast disagreement. Whether this is due to the negative consequences of greater openness (e.g., see van der Cruijsen, Eijffinger, and Hoogduin (2010); Ehrmann and Fratzscher (2009)), as opposed to the benefits of providing markets, and the public, with information which increases the diversity of views, is unclear. However, since the adoption of an inflation targeting (IT) policy strategy alone is found to have little effect on forecast disagreement, and all the central banks in question have become more transparent over time, it is not obvious that the monetary authorities investigated in this study are too transparent. Equally important is the finding that the determinants of forecast disagreement are sensitive to where estimates are clustered in the distribution of forecast disagreement as well as the source of the forecast (e.g., professional versus survey-based forecasts). As a result, quantile regressions provide new insights into the determinants of forecast disagreement as do panel regressions that consider how the source of the forecast influences forecast disagreement.

2. Forecast Disagreement: Measurement and Related Literature

Granger (1996) suggests that much can be learned from examining forecasts from different sources.[1] However, there is no universally agreed upon measure of forecast disagreement. Generally, it is evaluated in one of three ways: the squared deviations among individual forecasts (e.g., Lahiri and Sheng (2008)), the inter-quartile range of forecasts (e.g., Mankiw, Reis, and Wolfers (2003), Capistrán and Timmermann (2008)), or some normalized absolute deviation of forecasts (e.g., Banternghansa and McCracken (2009)). All three measures were evaluated in this study but the results reported below only report the squared deviations

[1] "If an economy goes through a period when it is relatively easy to forecast, resulting in narrow probability intervals, a group of competent forecasters of comparable quality should be in agreement, but if the economy is difficult to forecast you can expect less agreement between forecasters, unless they collaborate." (Granger (1996, p. 455).

measure.[2] Let d_{th}^{j} represent forecast disagreement at time *t*, over a forecast of horizon *h*, for economy *j*. Then,

$$d_{th}^{j} = \frac{1}{N_j - 1} \sum_{i=1}^{N_j} (F_{ith}^{j} - \bar{F}_{\bullet th}^{j})^2 \quad (1)$$

where *F* is the inflation forecast, N_j is the number of forecasts, *i* identifies the forecast, while $\bar{F}^{j}$ represents the mean forecast value across forecasters in economy *j*. Forecast disagreement can be grouped according to the source of the forecast. The types of forecasts include ones prepared by central banks, survey-based forecasts conducted among households and businesses, a set of widely followed or core forecasts (i.e., OECD, IMF, Consensus), as well as a group consisting of all non survey-based forecasts. The mean value of *d* is then calculated for each economy *j* in the dataset. Grouping of forecasts is likely to be useful for a variety of reasons. For example, some of the data used in this study are projections, others are actual forecasts. Moreover, the assumptions and models (whether of the implicit or explicit variety) used to generate inflation forecasts are also likely to differ across the available sources.

Few empirical studies examine sources of forecast disagreement over time. Dovern, Fritsche, and Slacalek (2009) consider Consensus forecasts in the G-7 and find that the dynamics of forecasts for real variables (e.g., real GDP growth) differs substantially from those of nominal forecasts, such as the inflation rate that is the focus of the present study. Banternghansa and McCracken (2009) are interested in disagreement about the outlook for the U.S. economy among members of the U.S. Fed's Federal Open Market Committee. They conclude that forecast accuracy may take a back seat to other considerations, such as ideology. This finding is especially true for the inflation variable (also see Ellison and Sargent (2009)). Relying on the inter-quartile range from the U.S. Survey of Professional Forecasters, Capistrán and Timmermann (2009) report a drop in forecast disagreement since the early 1980s and point to the changing conditional volatility of inflation as one of the sources of dispersion. Their finding of a significant empirical link between the level and conditional inflation forecasts is

[2] This is done both to conserve space, as well we because the main conclusions were unaffected by the chosen forecast disagreement proxy.

dependent on fitting a GARCH-type model to inflation (also see Lahiri and Sheng (2008)) which can be sample sensitive.[3] Ehrmann, Eijffinger, and Fratzscher (2010) also examine the dispersion of inflation forecasts, among other macro variables, for 12 countries, 7 of which belong to the European Union, and find that greater central bank transparency may reduce the dispersion of inflation forecasts. However, their result holds primarily for professional forecasts alone and the results change when their preferred dispersion measure is used.[4]

Widespread belief in the promise of lower inflation, obtained thanks to central bank independence, may well generate less disagreement about future inflation, unless the monetary authority possesses little credibility. The same argument extends to the influence of greater central bank transparency (e.g., van der Cruijsen and Demertzis 2007). Yet, transparency comes in different forms (e.g., see Dincer and Eichengreen 2008). Some forms of transparency, such as policy and political transparency, could also reduce forecast disagreement since the central bank would be expected to keep inflation within fairly narrow bounds. Limits in the ability to process information also come into play in explaining forecast disagreement. For example, van der Cruijsen, Eijffinger, and Hoogduin (2010) argue that there is an optimal level of transparency which is likely equivalent to less than complete transparency. They present empirical evidence suggesting that some central banks may be excessively transparent, and risk confusing markets and the public, but the authors are unable

[3] The period under study is not amenable to such interpretations about the conditional volatility of inflation. I was unable to fit a sensible GARCH(1,1) type model to inflation covering the full sample (1999-2009) for any of the economies considered in this study. Other types of conditional volatility models (e.g., TARCH) were also unsuccessful. I also considered adding a widely used measure of stock market volatility, the VIX, which is often used as a broad based indicator of economic uncertainty. The VIX represents the expected volatility of US stock prices in the near term (e.g., 30 days ahead), based on the S&P 500 index, and is calculated by the Chicago Board Options Exchange. The VIX is based on US data and is replicated only for a few other economies (e.g., the euro stoxx 50 volatility index for the euro area, the VXJ and CSFI-VXJ for Japan). Only some of the US evidence below incorporates this indicator in the estimated specifications as the time series properties of the other two VIX type indexes were similar (not shown). Another alternative might be to consider a financial conditions index, available for all the economies considered in this study. I did not consider such a proxy in part because, typically, these indexes mix a variety of financial indicators, some of which are already incorporated in the specifications considered (e.g., interest rate spread).

[4] Their conclusions are based on monthly data primarily from Consensus forecasts, covering the period from 1995 to 2008.

to conclude that a particular level of transparency is optimal. Instead, transparency is believed to be country-specific. The real issue, however, is the clarity of information provision and there is no reason, a priori, why this should be positively correlated with the volume of information made public by central banks.[5] Moreover, while more transparency may well translate into less effort by the public to digest the added information, it is also conceivable that more and better information may result in more attention aimed at discerning the future direction of monetary policy and, consequently, produce more disagreement among forecasters. For example, greater transparency may well stem from a central bank's desire to target different interest groups.[6] Matters become still more complicated if transparency has the effect of raising the 'rational' inattention of forecasters by lulling agents into complacency. Forecasters may then become 'lazy'. Under these conditions, the provision to public information can be detrimental (e.g., see Morris and Shin (2002)). Even a successful inflation target is no barrier to generating forecast disagreement (Bomfin and Rudebusch 2000).

A case can be made for an inflation target and greater central bank transparency increasing forecast disagreement. Walsh (2007), who considers inflation targeting central banks, makes it clear that optimal transparency is influenced by a central bank's ability to forecast aggregate demand shocks. However, the results can be overturned when aggregate supply shocks are also taken into account. Hence, there is the real possibility that agents living under such a regime actually become more sensitive to information made public by central banks. Cornand and Heinemann (2008) make the distinction between the precision of central bank announcements and the publicity generated by such announcements. It is conceivable that both are conditions more likely to be met in IT economies whose central banks also tend to be relatively more transparent. Bomfin and Rudebusch (2000) also illustrate how the precision and commitment

[5] Fracasso, Genberg, and Wyplosz (2003) examine the record of Inflation Reports published by 19 inflation targeting central banks. Based on their analysis, which includes results from a survey, they conclude that inflation targeting does contribute to improving, among consumers of this information, the clarity with which central banks communicate their intentions and policies.

[6] The notion that transparency can be excessive is a plausible one, particularly if the manner in which information is released is unclear or confuses. The debate over the consequences of more publicly available information is also germane. See Morris and Shin (2002), and Svensson (2006).

to an explicit inflation objective can enhance credibility and deliver lower and more stable inflation at a lower sacrifice ratio. Moreover, central bank transparency, not formally modeled by the authors, is found to be positively related to credibility. Nevertheless, Blinder et. al. (2008) remind us that existing evidence which shows that inflation targeting reduces inflation, and its variability, remains less compelling.

Ambiguity in theoretical predictions is natural under the circumstances because it is exceedingly difficult to identify rational inattention from complacency. Therefore, empirical evidence can at least contribute to clarifying some of the issues through a better understanding of the determinants of inflation forecast disagreement.

3. Econometric Methodology and Data

3.1 Econometric Methodology

Our interest in this study is the empirical significance of the determinants of forecast disagreement, as defined in equation (1). It is convenient to distinguish between quantitative and qualitative determinants. Hence, we can write

$$ {}_{\tau}\overline{d}_t^{\,j} = g(\mathbf{X}_t^j, \mathbf{Z}_t^j) + \varepsilon_t^j \qquad (2) $$

where *j* denotes the economy in question, **X** and **Z** are country-specific vectors of quantitative and qualitative determinants of forecast disagreement (*d*), at time t, while τ indicates the possibility, discussed previously, that macroeconomic information is likely digested differently across types of forecasts, with possibly different consequences for inflation forecast disagreement, while ε is an error term.

We consider several quantitative determinants of *d*. First, theory suggests that current and past monetary policy performance will influence forecast disagreement. Inflation in consumer prices is a natural proxy for the quality of monetary policy. The present study also considers the possibility that forecasts are influenced by global and domestic factors. Households, for example, may be more sensitive to domestic considerations alone than by the impact of external factors. On the other hand, professional forecasters, and central banks, may be more sensitive to global factors. In any event, the relative importance of these factors in explaining

the dynamics of inflation remains in dispute with IMF (2006), Borio and Filardo (2006), and Bohl, Mayes, and Siklos (2011) finding in favor of the globalization and inflation hypothesis while Ball (2006), and Ihrig et.al. (2007) conclude otherwise. Because the decomposition into global and domestic factors is not directly observed it I rely instead on a factor model. The following specification serves as the starting point:

$$\Upsilon_t A' = \Upsilon_t \phi(L) + \eta_t \tag{3}$$

where Υ_t is the vector of observable endogenous variables, A' are the inputs (i.e., the time series) from which the factors are derived, $\phi(L)$ is a distributed lag function, and η is the residual term. Different types of forecasts enter separately, or jointly, in the vector Υ_t consistent with the preceding discussion about the potential influence of domestic versus international influences on forecast disagreement.[7] As defined, all vectors consist of domestic and foreign forecasts of inflation. Allowance is also made for the possibility that the number of variables used to extract domestic versus global components of inflation forecasts can differ.

The vector of quantitative variables in equation (2) is rounded out by including commodity price inflation, a term spread, the output gap, and an asset prices gap. Commodity prices have long played a role in forecasting models and their inclusion serves to highlight the critical importance of distinguishing between aggregate demand and supply shocks. The term spread too has been a staple of models used to forecast inflation and future economic activity. A similar explanation applies to the inclusion of the output gap, a concept which has generated controversy over measurement issues and reliability. Finally, evaluations about the conduct of monetary policy have for some years debated the role of asset prices. An empirically worthy question to consider then is whether forecasters more generally have incorporated information about asset price developments into their forecasts? Turning to qualitative determinants two

[7] There is nothing to prevent the inclusion of realized macroeconomic time series as variables entering equation (3). However, under the assumption that the vector of forecasts already incorporates this information, these additions appear superfluous. Were these to be incorporated into the factor model specification used here, an additional term would have to be added to equation (3).

variables discussed earlier are considered. They are: whether the economy in question explicitly adopted an IT strategy,[8] and central bank transparency.

For reasons that will become more apparent below, equation (2) is estimated two ways. The distribution of inflation forecast disagreement is often concentrated in the tails of the distribution (results not shown). A conventional mean regression then may not capture the desired relationship as specified in equation (2). Therefore, equation (2) is also estimated via the quantile regression (QR) method (e.g., see Koenker (2005)). The QR approach permits a richer examination of the statistical relationship between covariates. For example, central bank transparency may impact forecast disagreement differently when the latter is high relative to the mean. Similarly, inflation targeting may also influence forecast disagreement differently when we examine the tails of the distribution as opposed to only estimating the conditional responses at the mean. In QR form, equation (2) would be written as

$$Q_{\bar{d}}(\theta|\mathbf{X}_t^j,\mathbf{Z}_t^j) = \beta_0 + \beta_1\mathbf{X}_t^j + \beta_2\mathbf{Z}_t^j + F_\varepsilon^{-1}(\theta) \quad (4)$$

where **X** and **Z** were defined previously, θ are the quantiles, and F_ε denotes the common distribution of the errors. Equation (4) is then estimated for each economy individually. Note that since inflation forecasts are decomposed into domestic and global factors the inclusion of the latter implies that individual specifications do take account of foreign influences on domestic inflation forecast disagreement.

Alternatively, estimates of equation (2) in a panel setting are also provided with proper allowance for the potential endogeneity of some of the right hand side variables. Hence, while past inflation performance will partially determine forecast disagreement, there is also the possibility that the current economic environment may also affect how much disagreement there is over the future course of inflation. GMM estimation seems called for under the

[8] Some of the economies examined here have a numerical inflation objective (e.g., the ECB, and the Swiss National Bank) but they are not considered inflation targeting central banks. Hence, there is a distinction between central banks that have a numerical objective (e.g., this is the variable definition used in Eijffinger, Ehrmann, and Fratzscher 2010), and ones that have adopted an explicit IT monetary policy strategy (the definition adopted in the present study).

circumstances.[9] A challenge with this approach is how to address the weak instruments question. Another potential concern is that dynamic panel GMM estimation can lead to a proliferation of instruments (Roodman (2009)). The number of instruments is kept to a minimum but it is also the case that the instrument set in this study overcomes the weak instruments problem. The F-test based on the first stage regression developed by Staiger and Stock (1997) when one of the regressors, the likely culprit being realized inflation, is endogenous is used to check for weak instruments.[10]

3.2 Data and Practical Considerations

An appendix (not shown) provides details of the data sources and other details about the inflation forecasts used in this study. All data were converted to the quarterly frequency. Nine economies are examined, five of which explicitly target inflation. The inflation targeting (IT) group of countries consists of Australia, Canada, New Zealand, Sweden, and the U.K.[11] The non-IT economies considered are: the euro area, Japan, Switzerland, and the U.S.A. The full sample, before any data transformations are applied, is from 1999Q1 to 2009Q4, inclusive. [12] The

[9] The specifications were also estimated using instrumental variable estimation in a panel setting. Overall, the conclusions are broadly similar to the ones reported in the next section. In this connection an important question is whether to take first differences to account for the time series dimension of the data. While there is evidence that differencing is appropriate, resulting in a dynamic panel model (i.e., requiring the Arellano and Bond (1991) type estimator; also see Arellano and Bover (1995)), tests support the approach whereby orthogonal deviations are preferred to remove individual effects (e.g., see Hayakawa (2009)). Finally, in principle, it is also possible to estimate equation (2) via the QR method in a panel setting. However, the data set in question, and certain technical aspects of the methodology in question (e.g., see n. 30 below), would require addressing issues outside the scope of this paper. This is left for future research.

[10] The first stage regression is separately estimated for each individual economy considered. As far as I am aware there are no tests for weak instruments in dynamic panel models.

[11] IT is not a homogeneous policy across countries. For example, in the case of Australia, the inflation target is defined rather differently than in the other IT countries in the sample. An unpublished appendix provides additional details.

[12] While forecasts are available for a longer time period, at least since the early 1990s, one has to contend with the problem of taking account of the disinflation which characterized that decade in all of the economies in the dataset. Moreover, the countries that explicitly target inflation were in the early stages of implementation of that policy regime. The early years of inflation targeting (roughly 1990-1993) in New Zealand and Canada consisted of inflation reduction targets. Later the regime shifted to inflation control targets. Siklos (2010) finds that some

remaining variables consist of macroeconomic time series that were obtained from *International Financial Statistics* CD-ROM (February 2010 edition), the BIS, and the databases of the individual central banks covered in this study. These series consist of an output gap, obtained by applying an H-P filter to the log of real GDP, three proxies for the term spread,[13] four different measures of commodity price inflation[14] and four asset price indicators. The latter consist of measures based on the real exchange rate, equity returns, nominal asset prices, and a similar index for real estate prices, relying on indexes developed by the BIS.[15] Finally, to capture the possible effects of uncertainty the VIX is added but only for the specifications applied to US data.[16]

Next, I utilize the index of central bank transparency constructed by Dincer and Eichengreen (2008) and updated by Siklos (2011). The overall index of transparency consists of the arithmetic aggregation of five sub-indices, each of which attempt to isolate a specific area of monetary policy.[17] During the sample considered (1999-2009) overall transparency rose in every economy examined. However, only Japan experiences years when transparency falls before rising later in the sample. Moreover, in the case of the US, transparency rose only in

---

estimated relationships using forecast disagreement appear to break down toward the end of the 1990s. A proximate cause is the Asian financial crisis.

[13] Namely the spread between a long-term government bond yield and a short-term money market rate, the spread between a money market rate and the central bank policy rate, and the spread between LIBOR and the central bank policy rates.

[14] Oil prices, non-fuel commodity prices, energy prices, and an overall commodity price indicator. All enter in rates of change in the estimated specifications.

[15] Property prices are now available from http://www.bis.org/statistics/pp.htm. All asset prices enter the estimated specifications in gap form, following detrending via an H-P filter with a smoothing parameter of 1600.

[16] Also, see n. 3. The data were obtained from http://www.cboe.com/micro/vix/historical.aspx.

[17] The sub-groupings consist of economic transparency which refers to the quantity and type of information released by a central bank (e.g., an inflation forecast); procedural transparency signals how much information about the internal workings of the central bank is made public (e.g., voting records); policy transparency provides an indication of how central banks announce their decisions (e.g., explanations of policy rate setting decisions); political transparency refers to the openness of the central bank – government relationship while operational transparency indicates the extent to which the monetary authority opens itself to assessments of its conduct (e.g., policy assessments and reviews).

1999 and did not change thereafter. For the most part, improvements in transparency came primarily from the release of additional information (i.e., economic transparency) in eight of the nine central banks considered. There are few instances of improvements in the transparency of central bank procedures or in the openness of government-central bank relations. As a result, the correlation between the overall index of central bank transparency and its constituents is generally very high (viz., typically over 0.70).

Table 1 provides some details about the number and types of forecasts that are the subject of the econometric investigation described in the next section. A total of 74 forecasts from a variety of sources are used. A majority of them (39) are from professionals or various international institutions such as the IMF (i.e., the World Economic Outlook, or WEO forecasts), or the OECD. Professional forecasts include the mean forecast from Consensus Economics, forecasts collected from *The Economist*, as well as the US and euro area Surveys of Professional Forecasters. Eight of 9 central banks in the data set provide forecasts.[18] Not all forecasts are available since 1999. Therefore, some of the estimates below are based on estimates from unbalanced panels (beginning 2000Q1 or 2001Q1). Given the definition of forecast disagreement (see equation (1)) this implies that the number of forecasts included varies over time. At least one household or business survey is always included among the survey-based forecasts.[19]

The simple correlations between measures of forecast disagreement according to the type of forecast vary considerably. For example, correlations between forecast disagreement based on central bank forecasts and those of professional forecasters (e.g., OECD, Consensus, WEO) are often low, such as for Japan (0.09), to negative, as in the case of New Zealand (-0.12), but can also be high as, for example, for the UK (0.70). In contrast, the correlations between central bank forecasts or professional forecasts and those based on surveys are generally low and

[18] The Reserve Bank of Australia began to publish its forecasts in 2007. There were, therefore, too few observations to include them in our dataset. No distinction is made below between staff or policy committee forecasts.

[19] The names of the sources for all the inflation forecasts available for the econometric analysis to follow are also relegated to an unpublished appendix.

almost always statistically insignificant (results not shown). To conserve space, the results below focus on the aggregate measure of forecast disagreement.

Data limitations also mean that forecast disagreement is evaluated only for the one year ahead horizon. Two year ahead forecasts are available for only a few of the economies considered and still fewer longer term inflation forecasts exist. If the present study dealt with how well expectations are anchored then a one year ahead horizon may well be considered inadequate. However, policy makers ought to be very concerned about the behavior of short-term forecasts as these could well signal the beginning of some underlying shift in the credibility of monetary policy. Blinder et.al. (2008), for example, note that "short-run" communication, such as the release of an inflation forecast, is likely to have a wide variety of effects and this could be revealed in the behavior of forecast disagreement. Moreover, short-term forecasts are precisely those that are likely to be the focus of transparent central banks.

Three other important data related considerations require brief discussion. First, forecasts are either of the fixed event (i.e., a forecast for inflation for a particular calendar year) or fixed horizon (e.g., one quarter or one year ahead) variety. It is common in the literature to convert fixed event data into a fixed horizon using an admittedly *ad hoc* procedure.[20] The present study adopts this convention. Second, forecasts range from the monthly through semi-annual sampling frequencies. Monthly data are converted to the quarterly frequency through simple arithmetic averaging. Data at the semi-annual frequency are converted to quarterly data via quadratic-match averaging.[21] Finally, survey data need to be converted from index form into an inflation rate. Two approaches are generally employed, namely the regression and probability methods. The former is associated with the work of Pesaran (1985, 1987) while the latter is

[20] Consider a monthly forecast of inflation (π) for calendar year *t*, released in month *m*. Denote such a forecast as $\pi^{FE}_{m,t}$ where FE refers to the fixed event nature of the forecast. Hence, a forecast for the fixed event one year ahead would be written $\pi^{FE}_{m,t+1}$. The transformation from FE to FH, where FH represents a fixed horizon forecast, is $\pi^{FH}_{m,t} = [(13-m)/12]\pi^{FE}_{m,t} + [(m-1)/12]\pi^{FE}_{m,t+1}$.

[21] Essentially, this fits a local quadratic polynomial for each observation of the low frequency series. This polynomial is then used to fill in the missing observations at the higher frequency.

best known from the work of Carlson and Parkin (1975). Both techniques are used and the mean of the two resulting series serve as the proxy for inflation expectations or forecasts from the relevant survey-based data.[22]

4. Determinants of Forecast Disagreement: Empirical Evidence

Figure 1 plots the policy rate and CPI inflation for the nine economies in the sample over the 1999Q1-2009Q4 period. Also shown are the inflation target ranges for the five IT central banks. In the case of the ECB, not an IT central bank, its self-declared inflation objective of "… close to but below 2% over the medium-term" (http://www.ecb.int/home/glossary/html/glossp.en.html) but exceeding zero, is also shown.[23] The subdued nature of inflation over the sample is apparent as is the persistent deflation experienced by Japan. All the other economies, save Australia, also reveal a brief bout of deflation toward the end of the sample as a result of the fallout from the global financial crisis. The impact of the events of 2007-2009 is also highlighted by the precipitous drop in policy rates. Note, however, that Australia is the only economy where the policy rate rises near the end of the period shown.

Figure 2 plots the evolution of forecast errors according to their main source, namely the central bank, surveys of households or businesses, and professional forecasters. The data reveal a feature of forecasts previously noted by Granger (1996), namely that forecast errors are often positively correlated across forecasters. This result carries over to all the economies considered. The stacked bars underscore this fact as the sign of the forecast errors is often positive or negative across most forecasts, regardless of their source. This also includes central bank

[22] As might be expected, there are pros and cons to using either technique. Smith and McAleer (1995) provide a comprehensive survey of the relevant literature. In addition, survey-based data are believed to display a bias that is not straightforward to correct as any adjustment may need to be idiosyncratic to the survey itself. For the case of Japanese data see Ueda (2009), and references therein. While no bias corrections are made, some of the estimates presented in the following section strip out the survey-based forecasts to determine the sensitivity of the econometric results.

[23] I refer to CPI as the measure of inflation used for all nine economies in the dataset. For euro area data, it is the rate of change (annual rates) in the Harmonized Index of Consumer Prices (or HICP) that is employed.

forecasts.[24] Note, however, that this does not imply that all forecasts are equally accurate. An indication of the accuracy of each forecast is provided by the height of each bar.[25] Finally, it is also worth noting that, even if the sign of forecast errors is similar across forecasts, there are frequent reversals across all economies considered, but most notably for Australia, Canada, Japan, and Switzerland. Therefore, this result is not exclusive to IT regimes. One is tempted to conclude that it should not be surprising that forecast errors are correlated and not because of any collusion among forecasters. Moreover, it also seems unlikely that the assumptions and models used to generate forecasts are so similar as to produce the outcome shown in Figure 2. Instead, it is plausible, at least until 2008, that the benign macroeconomic environment produced comparable inflation forecasts. Thereafter the sharp, but predominantly global, shock also led forecasts to be revised in a seemingly coordinated fashion. It must be emphasized, however, that the specifications used here are unable to conclusively support any of these explanations. The serial correlation found in inflation forecasts is also a feature of the model and the results of Capistrán and Timmermann (2008).

Next, figure 3 plots various indicators of forecast disagreement defined as in equation (1). In light of Granger's (1996) suggestion about linking the state of forecast disagreement to overall economic performance recession dates are shown on all the graphs to highlight the fact that few economies experienced a recession except at the very end of the sample.[26] It is

[24] An earlier version of the paper provides a version of Figure 2 for each individual forecast in each country. It is now relegated to an Appendix. It was suggested that instead of mean forecasts, the median of forecasts might be preferable. Thus, for example, the median of the forecasts for the majority of the Bank of Japan's policy board are published but not the median of the entire committee. However, in recent years the differences do not appear to be statistically significant. More importantly, since I am interested in the full range of forecasts using a median would exclude 'outliers' and it is not obvious that this is desirable under the circumstances, even if one were able to obtain median estimates for all of the available forecasts.

[25] Pesaran and Timmermann's (1992) turning points test, that is, a test of the skill of forecasters at predicting changes in the direction of inflation was also examined. Relatively few forecasts display a skill at the timing of changes in inflation. Nevertheless, there is some evidence that Consensus forecasts, followed by OECD forecasts, display some ability to do so across the economies surveyed here and there are a few survey-based forecasts that similarly reveal an ability to forecast turning points in inflation.

[26] As shown in Figure 3, other than the US, only Switzerland and Japan experienced brief recessions at the beginning of the 2000s. Australia recorded no recessions throughout the sample considered. US business cycle dates are from the National Bureau of Economic Research (NBER; www.nber.org/cycles.html). Business cycle dates

conceivable, however, that U.S. economic conditions had global effects, at least based on the stylized gleaned from Figure 3. The role of the global financial crisis and its attendant effects on forecast disagreement is, perhaps unsurprisingly, particularly striking in the case of the U.S., the U.K., and the euro area. Nevertheless, several of the other economies such as Sweden, Switzerland and Canada, also experience a sharp rise in inflation forecast disagreement at the same time. Attention should also be drawn to the fact that some forms of disagreement (e.g., survey-based forecasts) appear more sensitive to the influence of 'bad' times than other types of forecasts (e.g., forecasts from 'common sources', namely the OECD, the IMF's WEO, and Consensus). Mankiw, Reis, and Wolfers (2003), Lahiri and Sheng (2008), and Capistrán and Timmermann (2008) are other examples of studies that report substantial changes in forecast disagreement over time in response to changing macroeconomic conditions.

I now turn to the econometric results. These are displayed in Tables 2 and 3. Table 2 shows the quantile and mean regressions estimated for each economy individually while Table 3 provides some evidence based on a panel regression estimated via GMM. Examination of the forecast disagreement data suggests that the distribution is typically skewed to the right (not shown). Hence, as previously noted, a mean regression may not be the most appropriate way to consider the role of the various hypothesized determinants of forecast disagreement. Quantile regression results are shown for the first and third quartiles, as well as for the median. To conserve space, only global and domestic components of inflation forecasts generated from a factor model applied to all available forecasts are shown in Table 2.

Transparency is found to increase forecast disagreement in all economies with the notable exceptions of the euro area and the US, where transparency has no statistically significant impact. In Japan, transparency reduces forecast disagreement though the impact is economically small and is only significant when disagreement is at or above the median of the

for the euro area and the remaining economies in the sample were obtained from the Centre for Economic Policy Research and the Economic Cycle Research Institute (www.cepr.org/data/dating and www.businesscycle.com/home/).

distribution.[27] The result for the US is not surprising given that the transparency index has not changed since 1999. As far as the euro area is concerned, it is possible that forecasters were not swayed by the European Central Bank's effort to manage expectations via the release of additional information. After all, a mere ten years after its formation, the economies of the euro area remain diverse while the transparency measure focuses on information that is pertinent to the euro area as a whole only. Japan is the only economy in the sample that experienced both a fall and a rise in the transparency index and this may explain why the link between transparency and disagreement differs from all the other economies considered.

It is also found that transparency and disagreement are weakly related to, or are unrelated with, forecast disagreement in the three largest economies in the sample (i.e., the US, Japan, and the euro area) but not the remaining economies considered. In particular, transparency raises forecast disagreement at all quantiles for Canada, Sweden, Switzerland, and the U.K., and at the mean, median or the lower quartile for Australia. In the case of New Zealand when disagreement is relatively high greater transparency raises forecast disagreement although the mean effect is also positive and statistically significant.

Therefore, the results here are in contrast with some of the results presented in Ehrmann, Eijffinger and Fratzscher (2010) who associate lower forecast disagreement with more central bank transparency. One possible reason for the discrepancy is that they focus on Consensus forecasts alone while the evidence presented here considers a wider array of forecasts. Another potential source of difference is that their dataset consists of several countries in the eurozone (5 of the 12 economies in their sample) and omit two important inflation targeting central banks, namely Australia and New Zealand. The same authors' conclusion that there are limits to the impact that central bank transparency has on forecast disagreement is, however, reflected in the quantile regression results. Nevertheless, the bottom line is that there is no obvious

[27] In order to include a measure of transparency for the U.S. factor model estimates must be omitted since, as noted earlier, the only change in transparency occurs in 1999. For estimates that include factor model estimates, see Siklos (2010a). The results obtained for the euro area, the US, and Japan, extend to all estimated quantiles based on quantile process estimates (results not shown).

distinction between forecast disagreement and whether the central bank in question possesses a numerical target for inflation.

There is less evidence that the distinction between global and domestic determinants of inflation forecasts influences forecast disagreement while current and past monetary performance, proxied by the realized level of inflation, is seen to be inversely related to forecast disagreement in two of the nine economies considered (Australia, and the UK). Higher inflation raises forecast disagreement in Canada, Japan, and the US.[28] Note, however, that a deterioration in monetary policy performance appears to reduce forecast disagreement more often than not when disagreement is evaluated at the median or the right tail of the distribution. When a positive coefficient is reported the results are more country-specific. For example, higher inflation induces more disagreement in the lower tail of forecast disagreement for Canada but in the right tail for the US. These results would not be apparent from the estimation of a conventional regression on the mean alone. The finding that macroeconomic information, say in the form of inflation performance, is a determinant of forecast disagreement is compatible with results reported in other studies such as Dovern, Fritsche and Slacalek (2009), Capistrán and Timmermann (2008), and Mankiw, Wolfers and Reis (2003).

The statistical significance of individual variables is sensitive according to whether mean or QR regressions are considered. For example, when the coefficient in question is statistically significant (i.e., for Australia, Canada and the UK) commodity price inflation does not affect forecast disagreement in the highest quartile but is seen to be statistically significant for the lowest quartile shown. Moreover, commodity price inflation has an economically small, to insignificant, impact on forecast disagreement in the large economies considered (i.e., the euro area, Japan, and the US). Similarly, asset prices that deviate from an H-P filtered trend tend to influence the median or mean forecast disagreement but less so in the tails of the distribution in the case of Australia, Switzerland and the UK. It is worth remarking that asset price gaps are relatively large and persistent especially for Australia and the UK (results not shown).

[28] Canada is one of the only exceptions with forecast disagreement sensitive to both global and domestic factors in inflation forecasts.

Finally, consider the impact of the VIX on US forecast disagreement. When disagreement is high relative to the mean higher stock market volatility raises inflation forecast disagreement. Hence, what drives inflation forecasts, and disagreement across forecasters, changes according to whether disagreement is relatively high or low to begin with. Finally, estimates according to the source of the forecast (e.g., survey-based or professional forecasts; results not shown) reveal that the positive link between transparency and forecast disagreement tends to disappears when survey-based inflation forecasts are considered while the source of the significant link between transparency and forecast disagreement appears to originate from the professional forecasters in the sample. To the extent that the source of the forecast matters because forecasters' outlook is partially driven by ideology (e.g., central bankers versus survey forecasts) the results here further highlight the limits of transparency (see also Banternghansa and McCracken 2009, Ehrmann, Eijffinger and Fratzscher 2010).

A difficulty with the quantile and mean regressions considered so far is that the results may be sensitive to the presence of serially correlated errors.[29] Additionally, it is possible that cross-correlations in forecast disagreement are not entirely accounted for by the inclusion of the factor model for inflation forecasts. If any of the variables are thought to be endogenous, this may create further inference problems though with the relatively small sample size used here the correction may not be straightforward.[30] Most importantly, the individual regressions do not provide any information about the role of the monetary policy strategy.

Therefore, in Table 3, I turn to panel regression estimates. Five different models were estimated to determine the sensitivity of the results to alternative factor models estimated from inflation forecasts. The factor models that consider US only variables or survey based

[29] A separate Table, available in the appendix, provides the details for the case shown in Table 2. A version of the model with a lagged dependent variable, and a specification in first differences was also considered. Interestingly, the mean regression shows far fewer signs of serial correlation than some of the quantile regressions. In any event, serial correlation coefficients (given in parenthesis) are significant only for Japan (0.73), Switzerland (0.50), the UK (0.73), and the US (0.65).

[30] Chernozhukov and Hansen (2008) consider the estimation of quantile regressions such as the ones presented here using instrumental variables estimation. Their procedure was not implemented here.

forecasts alone sever the link between transparency and forecast disagreement. Instead, disagreement appears more sensitive to professional forecasters' views about the inflation outlook than those extracted from survey-based estimates alone. These results suggest that the impact of central bank transparency is a non-US phenomenon as well as one that has had little impact on survey-based inflation forecasts.[31] The inflation target dummy is statistically significant in two of the five models considered. Transparency continues to raise forecast disagreement in three of five models shown but the results are once again sensitive to the inclusion of survey-based inflation forecasts.

Next, we consider the impact of the interaction of transparency and the monetary policy regime. The interaction of inflation targeting and central bank transparency indicates that the joint occurrence of a numerical inflation objective and greater transparency generally does not raise forecast disagreement, at least in three of the five estimated models. It is, however, interesting to note that the interaction term that combines inflation targeting with the transparency index offsets, or even reduces, forecast disagreement when the estimated factor model entering the specification considers all available forecast information or information that excludes US-based forecasts.[32] This suggests that US forecasts play a negligible role in determining forecast disagreement in the group of economies considered here. Once again it appears that survey-based forecasts and policy regimes do not interact in the same manner as the other forecast types.

The results may also be seen as supporting the notion that there is no such thing as a broadly common view of one year ahead inflation rates and this ought to provide the monetary authorities with sufficient latitude to influence inflationary expectations. Indeed, since neither inflation targeting nor central bank transparency influence forecast disagreement when only survey-based data are used to construct global and domestic factors it is conceivable that these

[31] Readers are reminded that the transparency index in the US only changes in the first year of the sample (1999) while the link between transparency and forecast disagreement was similarly found to be sensitive according to whether equation (1) is constructed from survey-based forecast alone as opposed to all forecast types considered.

[32] This conclusion is based on Wald tests that the sum of the coefficients for transparency and the transparency-inflation targeting interaction term are statistically different from zero.

institutional factors have yet to significantly impact household and business sector inflation expectations. A possible explanation is that households are inattentive to the impact of central bank transparency perhaps because the presence of a credible numerical objective, or lengthy experience with fairly stable inflation, is sufficient to reduce disagreement over the inflation outlook. Indeed, the results based on survey data alone confirm the view that central bank transparency plays no role in explaining forecast disagreement.

Turning to the other variables in the estimated models it is found that a rise in the spread, ordinarily an indicator of improved future economic activity, reduces forecast disagreement but the effect is larger among the non survey-based forecasts. A similar result is obtained for the effect of headline inflation on forecast disagreement. Hence, as before, a rise in inflation reduces forecast disagreement. Whether this has anything to do with the publicity attached to monetary policy decisions is unclear. Nevertheless, Cornand and Heinemann's (2008) hypothesis linking optimal transparency according to whether agents receive signals from policy makers is germane. Also notable is the consistently positive relationship between asset prices and forecast disagreement. First, because this suggests that, at least over the period considered, forecasters of all types factored in asset prices. Second, the finding implies that the behavior of asset prices leads to greater disagreement about the short-term course of inflation perhaps because such a development creates a greater diversity of views about the spillovers from asset markets to goods markets.[33]

The panel setting also reveals that both global and domestic factors in forecasts of inflation are significant determinants of forecast disagreement. Forecast disagreement falls as the domestic component of an inflation forecast rises while the opposite is true for the global component. However, when survey-based forecasts are excluded, a rise in the domestic component of inflation forecasts raise disagreement. It is conceivable that the global influence suggests that external factors influencing inflation forecasts are generally viewed as having the

[33] Differences in views, for example, about the consequences for inflation of attempts by several of the central banks in the sample to inject large amounts of liquidity into the financial system may emerge in the form of greater forecast disagreement. For a brief review of the issues, see Berrospide (2011).

same effect on domestic inflation, or in their implicit or explicit model of inflation (e.g., external effects are treated as exogenously given), which translates into less forecast disagreement. In contrast, a rise in the domestic component is interpreted differently across forecasters since the presumed domestic transmission mechanism from domestic factors to inflation is likely to be different across forecasters. Of course, without additional information about the objective function and precise models used by the various forecasters, this interpretation must remain tentative.

Finally, the output gap plays a negligible role in influencing forecast disagreement while a rise in commodity price inflation reduces disagreement. This result parallels the one found for several of the individual economies reported in Table 2 and is also consistent with the results in Makiw, Reis, and Wolfers (2003). Apparently, forecasters appear to share common views about the implications of commodity price movements for the inflation outlook.

5. Conclusions

This study has considered the determinants of forecast disagreement in nine economies, five of which have an explicit inflation target. Instead of examining a single forecast source the paper considers a much wider array of inflation forecasts, including survey-based forecasts. Three main conclusions emerge.

First, some of the prevailing ambiguity in theories linking transparency and, by implication, forecast disagreement, while controlling for other factors, seems replicated in the data. Nevertheless, on balance, transparency contributes to raising inflation forecast disagreement. There is, however, an exception to this conclusion with potential implications for the conduct of monetary policy. Based on panel GMM results, survey-based forecast disagreement, typically conducted among households, is unaffected either by the presence of a numerical inflation objective the monetary authority has to meet or the degree to which a central bank is transparent. Since numerical inflation objectives have hardly changed where they exist in the economies considered here the former result may not be surprising. The statistically insignificant inflation target – central bank transparency interaction term suggests there may be limits, perhaps even diminishing returns in attempts by central banks to provide more

information. In this sense our results are in line with those of Ehrmann, Eijffinger, and Fratzscher (2010) who also find that transparency effects dissipate once central bank transparency reaches a particular, but unobserved, threshold. On the other hand, greater central bank transparency does raise forecast disagreement among the bulk of other forecasters examined (e.g., professional forecasters). Central bank communication may well be affecting these groups and less so households.

Second, the distinction between inflation forecasts that are generated by professionals, central banks, or are survey-based, matters greatly. Third, forecast disagreement can be significantly influenced by the global component of inflation forecasts which appears to impact forecast disagreement in the same manner across forecast types.

To be sure, there are ways of improving the present study as well as considerable scope for more work in this area. For example, central bank transparency changes more slowly than does forecast disagreement and this may have some bearing on our findings. Another difficulty is that, having classified economies as belonging to one of two types of monetary policy strategies, namely inflation versus non-inflation targeting central banks, there remain subtle but important differences in how monetary policy is practiced by each monetary authority that are not easily captured by the specifications considered here. For example, all of the non-IT economies considered in this study would consider themselves just as committed to low and stable inflation as their counterparts in IT central banks. To the extent that asymmetries might plague the relationships of interest these were omitted from the various specifications tested. Perhaps forecast disagreement changes more when inflation is rising than during a disinflationary episode. Next, it would be useful, data permitting, to extend the analysis to consider inflation expectations at longer horizons. Also problematic is that the data used to construct some of the quantitative determinants of forecast are not measured in real time but are quasi-final estimates of the series in question.

It is also possible that uncertainty plays a role in the evolution of forecast disagreement in a manner that differs from the attempts made here or these may well have more important effects if a longer sample had been employed. Finally, there is the matter of the sharp changes

in forecast disagreement toward the end of the sample, a reflection of the impact of the global financial crisis. I estimated the models in Tables 2 and 3 adding a crisis dummy relying on the crisis dates relying on the dates found in Dominguez, Hashimoto, and Ito (2011) but the coefficients were statistically insignificant. It is conceivable that there are interaction effects not considered that may also be relevant. However, as the sample ends in 2009Q4, there are relatively few 'crisis' observations. More data in future will permit an evaluation of whether the relationships estimated here will hold if the post 2007 financial crisis period represents a structural break of sorts. Indeed, if the positive association between transparency and disagreement persists this may reflect an increased desire of forecasters to process publicly available information because the financial crisis increases the public's attention to the implications of economic shocks.

The main implications of the present study are clear. It is important for policy makers, and those interested in understanding what drives inflation forecasts, to move away from an over-reliance on point estimates, let alone forecasts from a single source, and examine instead the distribution of point forecasts when making judgments about public reaction to changes in the future direction of monetary policy. Moreover, groups of forecasters appear to respond differently to the availability of information. As a result, central bank transparency has its limits and its influence is more likely to be felt when there are sharp changes in observed inflation. Moreover, the connection between real economic variables (e.g., output gaps, recessions versus recoveries) remains as unclear as the existing literature has reported so far. Finally, changing macroeconomic conditions result in considerable variability in inflation forecast disagreement.

REFERENCES

Acemoglu, D., V. Chernozhukov, and M. Yildiz (2007), "Learning and Disagreement in an Uncertain World", working paper, MIT, July.

Arellano, M., and S. Bond (1991), "Some Tests of Specifications for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *Review of Economic Studies* (58): 277-97.

Arellano, M., and O. Bover (1995), "Another Look at Instrumental Variables Estimation of Error Components Models", *Journal of Econometrics* (68): 29-51.

Ball, L. (2006), "Has Globalization Changed Inflation?", NBER working paper 12687.

Banternghansa, C., and M. McCracken (2009), "Forecast Disagreement Among FOMC Members", Federal Reserve Bank of St. Louis working paper 2009-059A, December.

Borio, C., and A. Filardo (2007), "Globalization and Inflation: New Cross –Country Evidence on the Global Determinants of Inflation", BIS working paper 227.

Bernanke, B. (2004), "The Great Moderation", remarks at the meetings of the Eastern Economics Association, Washington, D.C., February 20.

Bernanke, B. (2007), "Inflation Expectations and Inflation Forecasting", speech given at the Monetary Economics Workshop Summer Institute of the National Bureau of Economic Research, Cambridge, July 10.

Bernanke, B. (2008), "Outstanding Issues in the Analysis of Inflation", speech given at the Federal Reserve Bank of Atlanta's 53rd Annual Conference, Chatham, 9 June.

Berrospide, J. (2011), "Liquidity Hoarding and the Financial Crisis: An Empirical Evaluation", unpublished, Federal Reserve Bank of New York, December.

Blinder, A.S., M. Ehrmann, M. Fratzcher, J. De Haan, and D.-J. Jansen (2008), "Central Bank Communiation and Monetary Policy: A Survey of Theory and Evidence", *Journal of Economic Literature* 46(4): 910-45.

Bohl, M., D. Mayes, and P. Siklos (2011), "The Quality of Monetary Policy and Inflation Performance: Globalization and Its Aftermath", *Manchester School* 79 (June): 617-45.

Capistrán, C. and A. Timmermann (2008), "Disagreement and Biases in Inflation Expectations", *Journal of Money, Credit and Banking* 41 (March-April): 365-396.

Carlson, J. and M. Parkin (1975), "Inflation Expectations", *Economica* 42: 123-138.

Cornand, C. and F. Heinemann (2008), "Optimal Degree of Public Information Dissemination", *Economic Journal* 118 (April): 718-42.

Chernozhukov, V. and C. Hansen (2008), "Instrumental Variable Quantile Regression: A Robust Inference Approach", *Journal of Econometrics* 142: 379-398.

Dincer, N., and B. Eichengreen (2008), "Central Bank Transparency: Where, Why, and with What Effects?, in J.P. Touffut (Ed.), *Central Banks as Economic Institutions* (Cheltenham, U.K., and Northampton, Mass.: Edward Elgar), pp. 105-41.

Dominguez, K., Y. Hashimoto, and T. Ito (2011), "International Reserves and the Global Financial Crisis", NBER working paper 17362, August.

Dovern, J., U. Fritsche, and J. Slacalek (2009), "Disagreement Among Forecasters in G7 Countries", ECB working paper, August.

Ehrmann, M., S. Eijffinger, and M. Fratzscher (2010), "The Role of Central Bank Transparency for Guiding Private Sector Forecasts", European Central Bank working paper 1146, January.

Ellison, M., and T. Sargent (2009), "A Defense of the FOMC", presented at the 10th EABCN workshop on Uncertainty over the Business Cycle, European Central Bank, Frankfurt, March 30.

Fracasso, A., H. Genberg, and C. Wyplosz (2003), "How Do Central Bankers Write? An Evaluation of Inflation Targeting Central Banks", *Geneva Reports on the World Economy Special Report 2*, available from http://www.norges-bank.no/upload/import/konferanser/2003-05-05/data/fracasso.pdf.

Granger, C. (1996), "Can We Improve on the Perceived Quality of Economic Forecasts?", *Journal of Applied Econometrics* 11 (September-October): 455-73.

Gurkaynak, R., B. Sack, and E. Swanson (2005), "The Excess Sensitivity of Long-Term Interest Rates: Evidence and Implications for Macroeconomic Models", *American Economic Review* (March).

Hayakawa, K. (2009), "First Difference or Forward Orthogonal Deviation – Which Transformation Should Be Used in Dynamic Panel Models? A Simulation Study", *Economic Bulletin* 29 (3: 2008-2017.

Ihrig, J., S. Kamin, D. Lindner, and J. Marquez (2007), "Some Simple Tests of the Globalization and Inflation Hypothesis", International Finance Discussion Paper 2007-891, April.

International Monetary Fund (2006), *World Economic Outlook*: *Globalization and Inflation*, April.

Koenker, R. (2005), *Quantile Regression* (Cambridge: Cambridge University Press).

Lahiri, K., and X. Sheng (2008), "Evolution of Forecast Disagreement in a Bayesian Learning Model", *Journal of Econometrics* 144: 325-340.

Leduc, S., G. Rudebusch, and J. Wiedner (2009), "Disagreement About the Inflation Outlook", Federal Reserve Bank of San Francisco *Economic Letter* 2009-31, October 5.

Mankiw, N.G., and R. Reis (2002), “Sticky Information: A Moel of Noneutrality and Structural Slumps”, NBER working paper 8614, December.

Mankiw, N.G., and R. Reis (2006), “Pervasive Stickiness”, NBER working paper 12024, February.

Mankiw, N.G., R. Reis, and J. Wolfers (2003), “Disagreement About Inflation Expectations”, NBER working paper 9796, June.

Morris, S., and H. Shin (2002), “Social Value of Public Information”, *American Economic Review* 52 (5): 1521-1534.

Morris, S., and H. Shin (2005), “Central Bank Transparency and the Signal Value of Prices”, *Brookings Papers on Economic Activity* (2): 1-66.

Pesaran, H. (1984), “Formation of Inflation Expectations in British Manufacturing Industries” *Economic Journal* 95: 948-975.

Pesaran, H. (1987), *The Limits to Rational Expectations* (Basil Blackwell: Oxford).

Pesaran, H., and A. Timmermann (1992), “A Simple Nonparametric Test of Predictive Performance”, *Journal of Business and Economic Statistics* 10: 461-465.

Roodman, D. (2009), “A Note of the Theme of Too many Intsruments”, *Oxford Bulletin of Economics and Statistics* 71(1): 135-158.

Shiratsuka, S. (2009), “Size and Composition of Central Bank Balance Sheet: Revisiting Japan’s Experience of the Quantitative Easing Policy”, IMES working paper 2009-E-25, November.

Siklos, P.L. (2011), “Central Bank Transparency: Another Look”, *Applied Economics Letters* 18 (July): 929-33.

Siklos, P. (2010), “Relative Price Shocks, Inflation Expectations, and the Role of Monetary Policy”, in R. Fry, C. Jones and C. Kent (Eds.), *Inflation in a Era of Relative Price Shocks* (Sydney: Reserve Bank of Australia), pp. 259-297.

Siklos, P. (2010a), “Sources of Disagreement in Inflation Forecasts: A Cross-Country Empirical Investigation”, IMES Discussion paper 2010 E-26, Bank of Japan.

Sims, C. (2006), “Rational Inattention: Beyond the Linear Quadratic Case”, *American Economic Review* 96(2): 158-63.

Smith, J., and M. McAleer (1995), “Alternative Procedures for Converting Qualitative Data Response Data to Quantitative Expectations: An Application to Australian Manufacturing”, *Journal of Applied Econometrics* 10 (Apr.-Jun.): 165-85.

Staiger, D., and J. Stock (1997), “Instrumental Variables Regression with Weak Instruments”, *Econometrica* (65): 557-86.

Stock, J., and M. Watson (2007), “Why Has U.S. Inflation Become Harder to Forecast?”, *Journal of Money, Credit and Banking* 39 (S1): 3-33.

Svensson, L. (2006), “Social Value of Public Information: Comment – Morris and Shin is Actually Pro-Transparency, Not Con”, *American Economic Review* 96(1): 448-452.

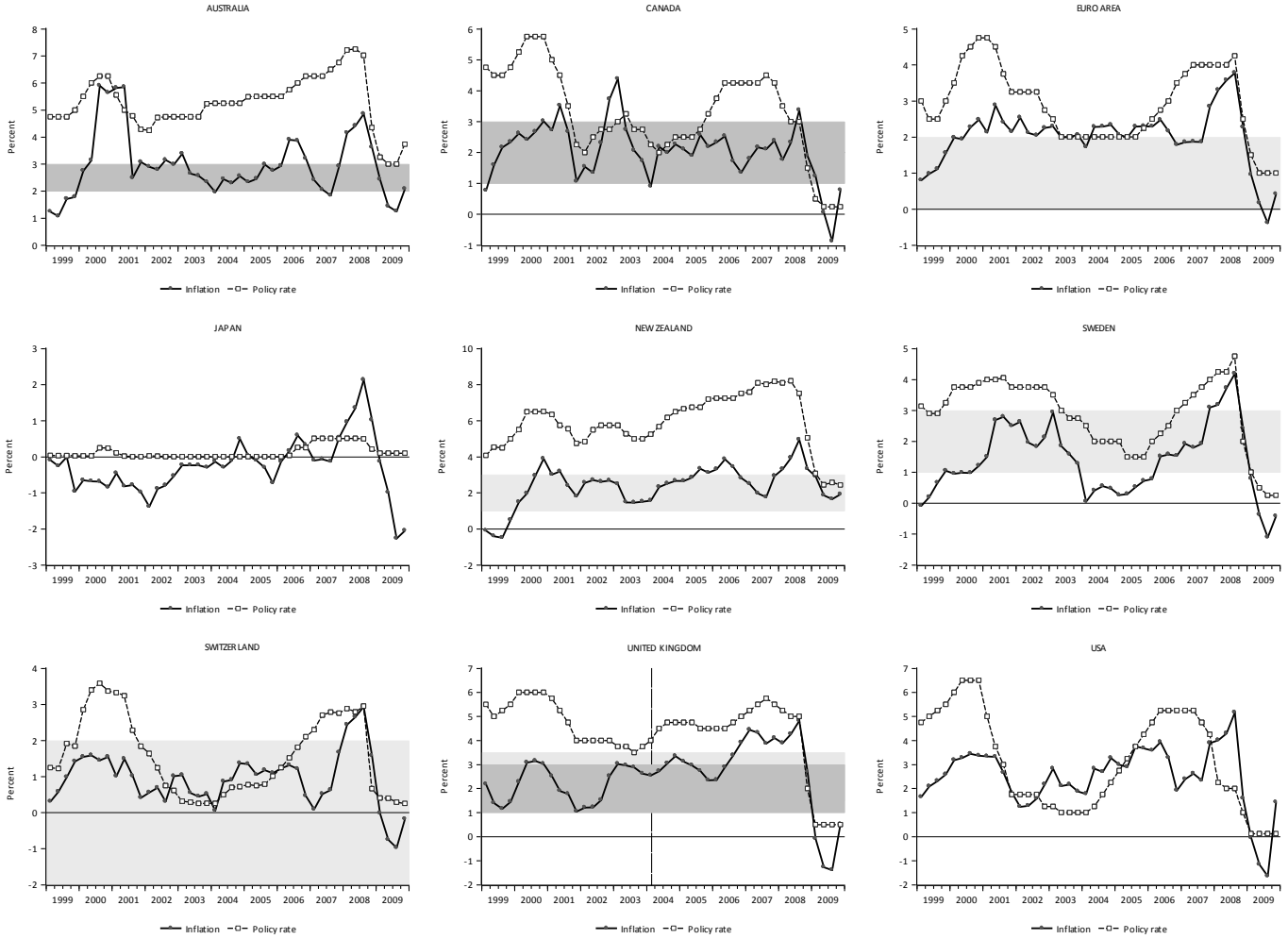
van der Cruijsen, Carin & Eijffinger, S. & Hoogduin, L.,(2010),. "Optimal Central Bank Transparency," Journal of International Money and Finance, Elsevier, vol. 29(8), pages 1482-1507, December.

van der Cruijsen, C., and M. Demertzis (2007), “The Impact of Central Bank Transparency on Inflation Expectations”, *European Journal of Political Economy* 23 (March): 51-66.

Ueda, K. (2009), “Determinants of Households’ Inflation Expectations”, IMES working paper 2009-E-8.

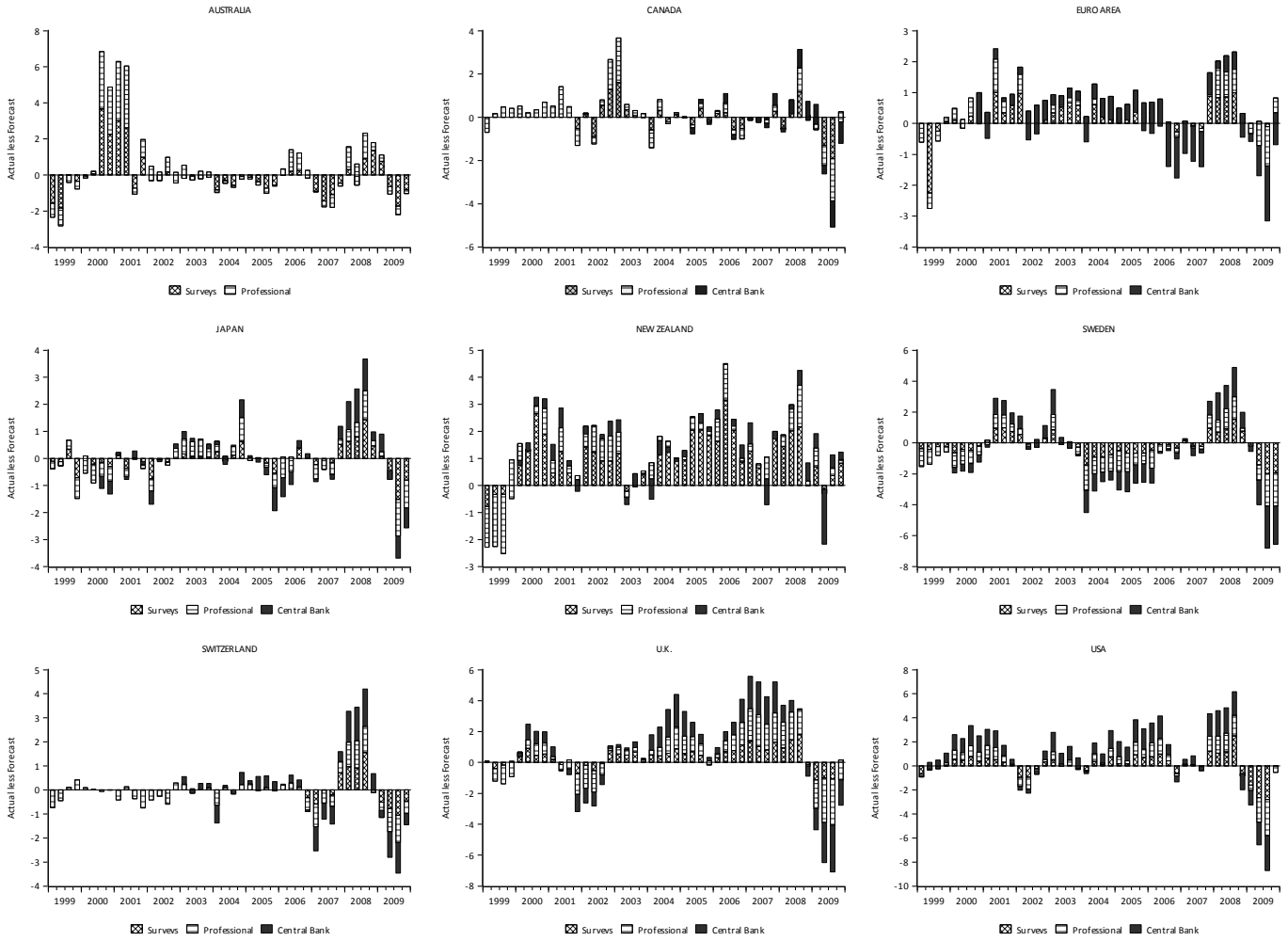
Walsh, C. (2007), “Optimal Economic Transparency”, *International Journal of Central Banking* (March): 5-36.

Figure 1 – Inflation and Policy Rates, 1999-2009



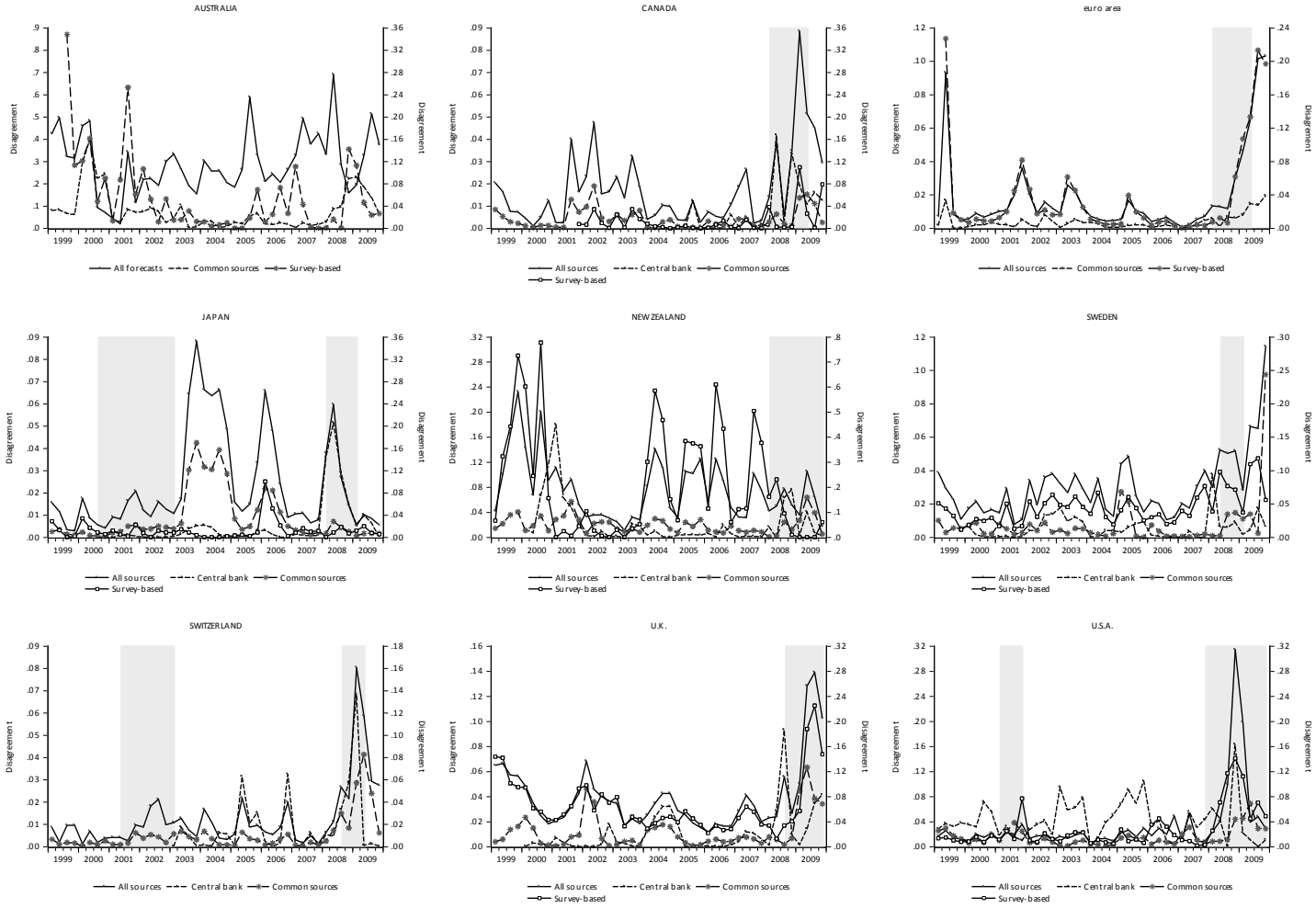
Note: The vertical line for the U.K. indicates when the remit of the Bank of England was changed to the 1-3% inflation range. For Australia, the jump in inflation in 2000-2001 reflects the introduction of the G.S.T. No special adjustments were made for this event. Inflation is the annual rate of change in the headline CPI (the retail price index for the UK, and the harmonized price index for the euro area).

Figure 2 – Forecast Errors, 1999-2009



Note: The forecast errors is $\pi_{t+1}^{FH} - \pi_t$, where the first term is the one year ahead fixed horizon (FH) forecast and the second term is realized inflation. Also see Figure 1. The errors are 'stacked' one on top of the others. An unpublished appendix contains details about the individual forecasts included in each category.

Figure 3 – Forecast Disagreement, 1999-2009



Note: Calculated as in equation (1), on a quarterly basis. Common sources consist of forecasts from the OECD, Consensus Economics, and IMF (i.e., WEO) only. The left hand scale is the aggregate measure of inflation forecast disagreement; the remaining measures are plotted against the right hand scale. The shaded areas represent recessions. Sources for recession dates are NBER, CEPR, and Economic Cycle Research Institute (see text for further details).

Table 1 – Numbers of Forecasts and Forecast Types

Economy	Total	Survey type	Central Bank	Disagreement
AUSTRALIA	7	2	0	6
CANADA	7	1	1*	7
Euro area	8	3	1	9
JAPAN	9	4	2**	9
NEW ZEALAND	6	1	1	6
SWEDEN	10	5	1	10
SWITZERLAND	6	1	1	5
U.K.	11	5	2$	10
U.S.A.	10	3	1@	10

NOTES: * Bank of Canada's baseline forecast; ** Two versions of BoJ monetary policy committee forecast; $ BoE unconditional and conditional forecasts; @ Greenbook and FOMC forecasts are spliced together to form a 'hybrid' forecast. The 'Disagreement' column refers to the number of forecasts from each economy included in the econometric testing. More details are relegated to an unpublished appendix.

Table 2 – Quantile and Mean Regressions of the Determinants of Forecast Disagreement, 1999-2009

Dependent Variable: Forecast disagreement (equation (1))												
Economy	Quantile = 0.25				Quantile= 0.5				Quantile = 0.75				Mean			
AUSTRALIA	*Variable*	*Coefft*	*t-Stat*	*Prob.*	*Variable*	*Coeff*	*t-Stat*	*Prob.*	*Variable*	*Coeff*	*t-Stat*	*Prob.*	*Variable*	*Coeff*	*t-Stat*	*Prob.*
	constant	-2.73	-0.83	0.41	constant	-4.33	-1.30	0.20	constant	-1.59	-0.48	0.63	**Constant**	**-6.49**	**-2.27**	**0.03**
	Inflation	**-0.24**	**-2.31**	**0.03**	**Inflation**	**-0.21**	**-1.76**	**0.09**	Inflation	-0.14	-0.94	0.35	Inflation	-0.08	-0.80	0.43
	Domestic	-0.12	-0.86	0.39	Domestic	-0.05	-0.31	0.76	Domestic	-0.07	-0.31	0.76	Domestic	-0.20	-1.31	0.20
	Global	0.33	0.37	0.71	**Global**	**1.26**	**1.67**	**0.10**	Global	-0.12	-0.13	0.90	Global	0.75	1.29	0.21
	Commodity prices	**-0.01**	**-2.77**	**0.01**	**Commodity prices**	**-0.01**	**-1.96**	**0.06**	Commodity prices	-0.00	-0.35	0.73	**Commodity prices**	**-0.01**	**-2.98**	**0.01**
	Output gap	0.20	0.85	0.41	Output gap	-0.18	-0.72	0.48	Output gap	-0.20	-0.78	0.44	Output gap	-0.07	-0.47	0.64
	Asset price gap	0.01	0.42	0.68	**Asset price gap**	**0.05**	**1.81**	**0.08**	Asset price gap	0.04	1.53	0.13	**Asset price gap**	**0.05**	**2.29**	**0.03**
	SPREAD	**-0.39**	**-3.01**	**0.01**	**SPREAD**	**-0.41**	**-2.56**	**0.02**	SPREAD	**-0.39**	**-1.65**	**0.10**	**SPREAD**	**-0.34**	**-2.49**	**0.02**
	Transparency	**0.63**	**2.10**	**0.04**	**Transparency**	**0.78**	**2.61**	**0.01**	Transparency	**0.53**	**1.63**	**0.10**	**Transparency**	**0.96**	**3.79**	**0.00**
	Ps. R-squared			0.60	Ps. R squared			0.55	Ps. R-squared			0.47	R-squared			0.727866
	Adj R- squared			0.48	Adj R-squared			0.42	Adj R-squared			0.35	Adjusted R-squared			0.650113
	S.E. of regression			0.49	S.E. of regression			0.38	S.E. of regression			0.55	S.E. of regression			0.357053
	Observations		37		Observations		37		Observations		37		Sum squared resid			3.569632
													Log likelihood			-9.239300
													F-statistic		9.361305	
													Prob(F-statistic)		0.000003	
													Observations		37	

CANADA	**constant**	**-3.21**	**-3.00**	**0.01**	constant	**-2.47**	**-2.47**	**0.02**	**constant**	**-2.75**	**-2.33**	**0.03**	**Constant**	**-2.39**	**-3.19**	**0.00**
	Inflation	**0.06**	**1.91**	**0.07**	Inflation	0.06	1.59	0.12	Inflation	-0.01	-0.37	0.71	Inflation	0.01	0.60	0.55
	Domestic	**0.10**	**2.30**	**0.03**	**Domestic**	**0.08**	**1.83**	**0.08**	Domestic	**0.15**	**3.53**	**0.00**	**Domestic**	**0.10**	**3.63**	**0.00**
	Global	**0.27**	**1.92**	**0.07**	Global	0.18	1.07	0.29	Global	0.05	0.19	0.85	**Global**	**0.21**	**1.72**	**0.10**
	Commodity prices	**-0.00**	**-4.49**	**0.00**	**Commodity prices**	**-0.001**	**-3.60**	**0.00**	Commodity prices	-0.00	-1.45	0.16	**Commodity prices**	**-0.001**	**-4.11**	**0.00**
	Output gap	0.02	0.65	0.52	Output gap	0.03	0.78	0.44	Output gap	0.01	0.23	0.82	Output gap	0.01	0.44	0.66
	Asset price gap	0.00	0.97	0.34	Asset price gap	0.00	0.51	0.61	Asset price gap	-0.00	-0.02	0.98	**Asset price gap**	0.00	1.09	0.28
	SPREAD	0.03	1.31	0.20	SPREAD	0.01	0.59	0.56	SPREAD	-0.02	-0.85	0.40	**SPREAD**	0.01	0.38	0.71
	Transparency	**0.30**	**3.09**	**0.00**	**Transparency**	**0.23**	**2.60**	**0.01**	**Transparency**	**0.28**	**2.63**	**0.01**	**Transparency**	**0.23**	**3.54**	**0.00**
	Ps. R-squared			0.43	Ps. R-squared			0.43	Ps. R squared			0.53	R-squared			0.63
	Adj R-squared			0.26	Adj R-squared			0.27	Adj R-squared			0.39	Adjusted R-squared			0.53
	S.E. of regression			0.09	S.E. of regression			0.09	S.E. ofregression			0.10	S.E. of regression			0.07
	Observations		43		Observations		43		Observations		43		Sum squared resid			0.13
													Log likelihood			51.66
													F-statistic		6.01	
													Prob(F-statistic)		0.00	
													Observations		43	
Euro Area	constant	0.15	0.19	0.85	constant	0.04	0.09	0.93	constant	-0.39	-0.81	0.43	Constant	-0.16	-0.40	0.69
	Inflation	0.02	0.12	0.90	**Inflation**	0.00	0.01	0.99	Inflation	-0.04	-0.27	0.79	Inflation	-0.04	-0.70	0.49
	Domestic	-0.01	-0.15	0.88	Domestic	-0.01	-0.26	0.79	Domestic	-0.02	-0.18	0.86	Domestic	-0.02	-0.32	0.75
	Global	0.02	0.06	0.95	Global	0.02	0.06	0.95	Global	-0.19	-0.23	0.82	Global	-0.14	-0.50	0.62
	Commodity prices	-0.00	-0.44	0.67	Commodity prices	-0.00	-0.66	0.51	Commodity prices	-0.00	-1.18	0.25	**Commodity prices**	**-0.001**	**-1.75**	**0.09**
	Output gap	0.04	0.37	0.71	**Output gap**	**0.06**	**1.82**	**0.08**	Output gap	**0.17**	**2.07**	**0.05**	**Output gap**	**0.09**	**2.28**	**0.03**
	Asset price gap	-0.01	-0.80	0.43	Asset price gap	**-0.01**	**-2.07**	**0.05**	Asset price gap	-0.00	-0.30	0.76	**Asset price gap**	**-0.01**	**-1.64**	**0.10**
	SPREAD	0.00	0.06	0.95	SPREAD	-0.01	-0.14	0.89	SPREAD	0.18	0.72	0.48	SPREAD	0.05	0.70	0.49
	Transparency	-0.01	-0.19	0.85	Transparency	0.01	0.29	0.77	Transparency	0.05	0.81	0.42	Transparency	0.03	0.96	0.35
	Ps. R-squared			0.30	Ps. R-squared			0.30	Ps. R-squared			0.39	R-squared			0.43
	Adj. R-squared			0.10	Adj R-squared			0.10	Adj R-squared			0.21	Adjusted R-squared			0.27
	S.E. of regression			0.15	S.E. of regression			0.16	S.E. of regression			0.15	S.E. of regression			0.11
	Observations		43		Observations		43		Observations		43		Sum squared resid			0.33
													Log likelihood			35.05
													F-statistic		2.66	
													Prob(F-statistic)		0.03	
													Observations		43	
JAPAN	constant	0.05	0.10	0.92	**constant**	**1.08**	**2.69**	**0.01**	**constant**	**1.14**	**3.11**	**0.00**	**Constant**	**0.57**	**2.70**	**0.01**
	Inflation	0.04	0.45	0.66	**Inflation**	**0.10**	**1.70**	**0.10**	Inflation	0.06	1.04	0.31	**Inflation**	**0.07**	**1.66**	**0.10**
	Domestic	0.04	0.72	0.48	Domestic	0.00	0.03	0.98	Domestic	-0.01	-0.25	0.81	Domestic	0.04	1.30	0.21
	Global	-0.15	-0.58	0.57	**Global**	**-0.31**	**-1.79**	**0.08**	Global	-0.20	-1.15	0.26	Global	-0.21	-1.60	0.12
	Commodity prices	-0.00	-0.05	0.96	Commodity prices	-0.00	-0.54	0.59	**Commodity prices**	-0.00	-0.53	0.60	Commodity prices	0.00	0.46	0.65
	Output gap	0.00	0.02	0.98	Output gap	0.00	0.19	0.85	Output gap	0.01	0.55	0.59	Output gap	-0.02	-1.37	0.18
	Asset price gap	0.00	0.36	0.73	Asset price gap	0.00	1.10	0.28	Asset price gap	0.00	0.75	0.46				

	SPREAD	-0.06	-0.47	0.65	**SPREAD**	-0.10	-1.31	0.20	SPREAD	-0.07	-0.88	0.39	**Asset price gap**	0.00	1.22	0.23
	Transparency	0.02	0.53	0.60	**Transparency**	**-0.07**	**-1.80**	**0.08**	**Transparency**	**-0.08**	**-2.19**	**0.04**	**SPREAD**	**-0.11**	**-2.00**	**0.06**
	Ps. R-squared			0.32	Ps. R-squared			0.26	Ps. R-squared			0.48	Transparency	-0.02	-0.93	0.36
	Adj R-squared			0.12	Adj R-squared			0.04	Adj R-squared			0.33	R-squared			0.46
	S.E. of regression			0.11	S.E. of regression			0.08	S.E. of regression			0.11	Adjusted R-squared			0.31
	Observations		37		Observations		37		Observations		37		S.E. of regression			0.07
													Sum squared resid			0.14
													Log likelihood			50.21
													F-statistic		3.03	
													Prob(F-statistic)		0.01	
													Observations		37	
NEW ZEALAND	constant	-9.72	-1.13	0.27	constant	-12.43	-1.38	0.18	**constant**	**-9.78**	**-2.21**	**0.04**	**Constant**	**-9.35**	**-3.22**	**0.00**
	Inflation	-0.03	-0.14	0.89	Inflation	-0.16	-1.03	0.31	Inflation	-0.11	-0.67	0.51	Inflation	-0.12	-1.14	0.27
	Domestic	-0.24	-1.19	0.25	**Domestic**	**-0.45**	**-2.21**	**0.04**	Domestic	-0.17	-0.76	0.45	**Domestic**	**-0.28**	**-2.48**	**0.02**
	Global	-1.35	-1.43	0.16	Global	-0.75	-1.16	0.26	Global	-0.55	-0.87	0.39	**Global**	**-0.98**	**-2.14**	**0.04**
	Commodity prices	0.00	0.31	0.76	Commodity prices	0.00	0.09	0.93	Commodity prices	0.00	1.03	0.31	**Commodity prices**	0.00	1.07	0.29
	Output gap	0.05	0.36	0.72	Output gap	0.15	1.32	0.20	Output gap	0.14	1.27	0.22	Output gap	0.08	1.10	0.28
	Asset price gap	0.00	0.29	0.77	Asset price gap	-0.00	-0.09	0.93	Asset price gap	-0.00	-0.28	0.78	Asset price gap	0.00	0.48	0.64
	SPREAD	**-0.31**	**-2.17**	**0.04**	SPREAD	-0.19	-1.49	0.15	SPREAD	-0.05	-0.26	0.79	**SPREAD**	**-0.21**	**-2.26**	**0.03**
	Transparency	0.85	1.39	0.18	**Transparency**	**1.08**	**1.67**	**0.10**	**Transparency**	**0.90**	**2.93**	**0.01**	**Transparency**	**0.85**	**4.16**	**0.00**
	Ps. R-squared			0.60	Ps. R-squared			0.48	Ps. R-squared			0.48	R-squared			0.74
	Adj R-squared			0.48	Adj R-squared			0.34	Adj R-squared			0.34	Adjusted R-squared			0.66
	S.E. of regression			0.37	S.E. of regression			0.33	S.E. of regression			0.44	S.E. of regression			0.29
	Observations		37		Observations		37		Observations		37		Sum squared resid			2.40
													Log likelihood			-1.89
													F-statistic		9.92	
													Prob(F-statistic)		0.00	
													Observations		37	

SWEDEN	constant	-0.10	-0.46	0.65	constant	-0.13	-0.58	0.57	constant	0.06	0.21	0.84	Constant	-0.10	-0.50	0.62
	Inflation	0.00	0.10	0.92	Inflation	0.01	0.21	0.84	Inflation	-0.03	-0.47	0.64	Inflation	0.01	0.54	0.59
	Domestic	0.02	0.28	0.78	Domestic	-0.02	-0.23	0.82	Domestic	0.01	0.09	0.93	Domestic	-0.01	-0.41	0.69
	Global	0.01	0.02	0.98	Global	-0.20	-0.71	0.48	Global	-0.12	-0.57	0.57	Global	-0.22	-1.59	0.12
	Commodity prices	-0.00	-0.90	0.38	Commodity prices	-0.00	-1.13	0.27	Commodity prices	-0.00	-1.39	0.17	**Commodity prices**	**-0.001**	**-2.47**	**0.02**
	Output gap	-0.02	-0.57	0.57	Output gap	0.00	0.02	0.98	Output gap	0.02	0.80	0.43	Output gap	0.01	0.74	0.46
	Asset price gap	0.00	0.72	0.48	Asset price gap	0.00	0.26	0.80	Asset price gap	-0.00	-0.72	0.48	Asset price gap	-0.00	-0.32	0.75
	SPREAD	-0.06	-1.53	0.14	**SPREAD**	**-0.06**	**-1.65**	**0.10**	**SPREAD**	**-0.10**	**-2.24**	**0.03**	**SPREAD**	**-0.07**	**-2.77**	**0.01**
	Transparency	**0.03**	**2.00**	**0.06**	**Transparency**	**0.03**	**2.40**	**0.02**	**Transparency**	**0.03**	**1.95**	**0.06**	**Transparency**	**0.03**	**2.69**	**0.01**
	Ps. R-squared			0.46	Ps. R-squared			0.45	Pseudo R-squared			0.55	R-squared			0.69
	Adj R-squared			0.31	Adj R-squared			0.30	Adjusted R-squared			0.42	Adjusted R-squared			0.61
	S.E. of regression			0.08	S.E. of regression			0.07	S.E. of regression			0.08	S.E. of regression			0.06
	Observations		43		Observations		43		Observations		43		Sum squared resid			0.10
													Log likelihood			56.35
													F-statistic		7.96	
													Prob(F-statistic)		0.00	
													Observations		43	
SWITZERLAND	**constant**	**-0.52**	**-2.60**	**0.01**	**constant**	**-0.49**	**-2.68**	**0.01**	**constant**	**-0.58**	**-3.25**	**0.00**	Constant	**-0.57**	**-5.11**	**0.00**
	Inflation	-0.02	-0.61	0.55	Inflation	-0.04	-1.00	0.32	Inflation	0.01	0.30	0.76	Inflation	-0.02	-0.92	0.37
	Domestic	0.00	0.08	0.94	Domestic	0.02	0.54	0.59	Domestic	0.04	1.54	0.14	Domestic	0.02	0.89	0.38
	Global	0.01	0.09	0.93	Global	0.04	0.39	0.70	Global	-0.13	-1.35	0.19	Global	-0.03	-0.43	0.67
	Commodity prices	-0.00	-1.05	0.30	Commodity prices	-0.00	-0.83	0.42	Commodity prices	-0.00	-1.12	0.27	Commodity prices	-0.00	-1.07	0.29
	Output gap	**0.07**	**2.34**	**0.03**	**Output gap**	**0.07**	**2.59**	**0.01**	**Output gap**	**0.05**	**2.18**	**0.04**	**Output gap**	**0.07**	**4.83**	**0.00**
	Asset price gap	**-0.02**	**-3.64**	**0.00**	**Asset price gap**	**-0.01**	**-3.34**	**0.00**	Asset price gap	-0.01	-1.56	0.13	**Asset price gap**	**-0.01**	**-4.29**	**0.00**
	SPREAD	-0.02	-1.01	0.32	SPREAD	-0.02	-0.84	0.41	SPREAD	-0.04	-1.38	0.18	SPREAD	-0.02	-1.59	0.12
	Transparency	**0.07**	**3.18**	**0.00**	**Transparency**	**0.07**	**3.50**	**0.00**	**Transparency**	**0.09**	**5.05**	**0.00**	**Transparency**	**0.08**	**7.16**	**0.00**
	Ps. R-squared			0.41	Ps. R-squared			0.52	Ps. R-squared	0.68			R-squared			0.82
	Adj R-squared			0.24	Adj R-squared			0.38	Adj R-squared	0.59			Adjusted R-squared			0.77
	S.E. of regression			0.05	S.E. of regression			0.04	S.E. of regression	0.06			S.E. of regression			0.04
	Observations		37		Observations		37		Observations		37		Sum squared resid			0.05
													Log likelihood			70.58
													F-statistic		15.80	
													Prob(F-statistic)		0.00	
													Observations		37	

U.K.	**constant**	**-14.80**	**-2.40**	**0.02**	constant	-16.59	-1.83	0.08	constant	-13.22	-1.73	0.09	**Constant**	**-16.82**	**-1.95**	**0.06**
	Inflation	**-0.03**	**-1.66**	**0.10**	**Inflation**	**-0.05**	**-1.95**	**0.06**	**Inflation**	**-0.06**	**-2.01**	**0.05**	Inflation	**-0.06**	**-3.06**	**0.00**
	Domestic	0.01	0.34	0.73	Domestic	-0.02	-0.58	0.57	Domestic	-0.02	-0.55	0.59	Domestic	-0.01	-0.63	0.54
	Global	0.09	0.47	0.64	Global	-0.10	-0.62	0.54	Global	-0.05	-0.40	0.69	Global	-0.05	-0.51	0.62
	Commodity prices	**-0.00**	**-2.07**	**0.05**	Commodity prices	-0.00	-1.36	0.18	**Commodity prices**	**-0.001**	**-1.64**	**0.10**	**Commodity prices**	**-0.001**	**-1.71**	**0.10**
	Output gap	**0.12**	**5.55**	**0.00**	**Output gap**	**0.17**	**6.25**	**0.00**	**Output gap**	**0.18**	**7.32**	**0.00**	**Output gap**	**0.16**	**8.34**	**0.00**
	Asset price gap	**-0.01**	**-3.95**	**0.00**	**Asset price gap**	**-0.01**	**-4.91**	**0.00**	**Asset price gap**	**-0.01**	**-3.26**	**0.00**	**Asset price gap**	**-0.01**	**-7.07**	**0.00**
	SPREAD	-0.02	-1.25	0.22	SPREAD	-0.03	-0.89	0.38	**SPREAD**	-0.03	-0.48	0.63	SPREAD	-0.01	-0.47	0.64
	Transparency	**1.21**	**2.45**	**0.02**	**Transparency**	**1.36**	**1.87**	**0.07**	**Transparency**	**1.10**	**1.80**	**0.08**	**Transparency**	**1.38**	**2.00**	**0.06**
	Ps. R-squared			0.64	Ps. R-squared			0.65	Ps. R-squared			0.71	R-squared			0.85
	Adj R-squared			0.54	Adj R-squared			0.55	Adj R-squared			0.63	Adjusted R-squared			0.80
	S.E. of regression			0.09	S.E. of regression			0.06	S.E. of regression			0.08	S.E. of regression			0.06
	Observations		43		Observations		43		Observations		43		Sum squared resid			0.10
													Log likelihood			57.42
													F-statistic		19.54	
													Prob(F-statistic)		0.00	
													Observations		43	
U.S.A.	constant	0.14	0.16	0.87	constant	-0.26	-0.23	0.82	constant	-0.53	-0.43	0.64	Constant	-0.45	-0.51	0.61
	Inflation	0.00	0.17	0.86	Inflation	0.00	0.10	0.92	**Inflation**	**0.02**	**1.76**	**0.09**	**Inflation**	**0.02**	**1.72**	**0.09**
	Domestic	NA	NA	NA	Domestic	NA	NA	NA	Domestic	NA	NA	NA	Domestic	NA	NA	NA
	Global	NA	NA	NA	Global	NA	NA	NA	Global	NA	NA	NA	Global	NA	NA	NA
	Commodity prices	-0.00	-0.12	0.90	Commodity prices	-0.00	-0.56	0.58	Commodity prices	-0.00	-0.82	0.42	**Commodity prices**	**-0.001**	**-2.31**	**0.03**
	Output gap	0.01	0.94	0.35	Output gap	0.01	1.15	0.26	Output gap	0.00	0.01	0.99	**Output gap**	**0.03**	**2.31**	**0.03**
	Asset price gap	-0.00	-0.85	0.40	Asset price gap	-0.00	-0.96	0.34	Asset price gap	-0.00	-1.27	0.21	**Asset price gap**	**-0.003**	**-2.42**	**0.02**
	SPREAD	-0.00	-0.09	0.93	SPREAD	-0.00	-0.13	0.89	SPREAD	-0.01	-0.84	0.41	SPREAD	0.00	0.01	0.95
	Transparency	-0.01	-0.15	0.88	Transparency	0.03	0.25	0.80	Transparency	0.05	0.44	0.66	Transparency	0.04	0.09	0.65
	VIX	0.00	0.05	0.96	VIX	0.00	0.14	0.89	**VIX**	**0.001**	**0.32**	**0.09**	**VIX**	**0.002**	**0.001**	**0.02**
	Ps. R-squared			0.07	Pseudo R-squared			0.12	Pseudo R-squared			0.26	R-squared			0.62
	Adj R-squared			0.01	Adjusted R-squared			0.01	Adjusted R-squared			0.11	Adjusted R-squared			0.55
	S.E. of regression			0.06	S.E. of regression			0.05	S.E. of regression			0.04	S.E. of regression			0.04
	Observations			44	Observations			44	Observations			44	Sum squared resid			0.05
													Log likelihood			88.62
													F-statistic		8.57	
													Prob(F-statistic)		0.00	
													Observations		44	

Notes: Bootstrap standard errors are shown. Coefficient derived based on Epanechnikov kernel estimation. Coefficients that are statistically significant at least at the 10% level of significance are in **bold.** For Australia and Canada non-fuel commodity prices are used; for all the others, oil prices (world oil price index from IMF's *International Financial Statistics*). The aggregate measure of central bank transparency used in all cases, except for the euro area, where the sub-index of economic transparency is used. All other results are insensitive to the sub-index of transparency that is usable in estimation (see text for the description and the appendix for fuller details). The spread is the difference between a long-term government bond yield and a short-term money market rate. The asset price indicators used are as follows: nominal aggregate asset prices, as calculated by the BIS, for the euro area, New Zealand, the U.K., and the U.S., nominal real estate prices for Australia, Sweden and Switzerland, the real exchange rate for Canada, and nominal equity returns for Japan. The number of observations is after differencing and lags.

Table 3 – GMM Estimates of Determinants of Forecast Disagreement, 1999-2009

I – All forecasts

Variable	Coeff	t-Stat	Prob.
Domestic	**-3.01**	**-14.03**	**0.00**
Global	**15.60**	**5.93**	**0.00**
Inflation	**-0.97**	**-1.95**	**0.05**
IT	**87.11**	**3.04**	**0.00**
Transparency	**4.69**	**3.45**	**0.00**
IT*Transparency	**-7.75**	**-3.02**	**0.00**
Asset price gap	**0.46**	**11.52**	**0.00**
Output gap	0.22	1.10	0.27
SPREAD	**-6.22**	**-12.87**	**0.00**
Commodity	**-0.09**	**-12.83**	**0.00**
J-statistic	0.000		0.99
Observations	324	Cross-sections: 9	

II – All forecasts except survey-based forecasts

Domestic	**4.83**	**2.34**	**0.02**
Global	**3.79**	**2.40**	**0.02**
Inflation	**-1.51**	**-2.29**	**0.02**
IT	14.93	0.54	0.59
Transparency	**2.55**	**1.79**	**0.07**
IT*Transparency	-1.31	2.44	0.59
Asset price gap	**0.13**	**2.61**	**0.01**
Output gap	**-2.02**	**-2.02**	**0.04**
SPREAD	**-2.74**	**-10.31**	**0.00**
Commodity	0.01	0.45	0.65
J-statistic	0.00		0.99
Observations	324	Cross-sections: 9	

III – All except U.S. forecasts

Domestic	**-3.38**	**-4.19**	**0.00**
Global	**21.30**	**2.66**	**0.01**
Inflation	**-3.29**	**1.82**	**0.07**
IT	**76.22**	**2.43**	**0.02**
Transparency	**6.88**	**4.74**	**0.00**
IT*Transparency	**-6.97**	**-2.46**	**0.01**
Asset price gap	**0.66**	**4.78**	**0.00**
Output gap	-0.18	-0.34	0.74
SPREAD	**-10.02**	**-4.43**	**0.00**
Commodity	**-0.09**	**-4.42**	**0.00**
J-statistic	0.00		0.99
Observations	315	Cross-sections: 9	

IV – U.S. forecasts only

Domestic	**-6.26**	**-2.01**	**0.05**
Global	1.95	0.53	0.60
Inflation	**-4.22**	**-1.75**	**0.08**
IT	14.26	0.22	0.83
Transparency	3.73	1.20	0.23
IT*Transparency	-1.38	-0.24	0.81
Asset price gap	**0.91**	**3.39**	**0.00**
Output gap	-0.14	-0.27	0.79
SPREAD	-13.44	-3.43	0.00
Commodity	-0.004	-0.06	0.95
J-statistic	0.00		0.99
Observations	315	Cross-sections: 9	

V – Survey-based forecasts only

Domestic	-0.24	-0.53	0.60
Global	**7.92**	**2.00**	**0.05**
Inflation	**-1.98**	**-1.78**	**0.08**

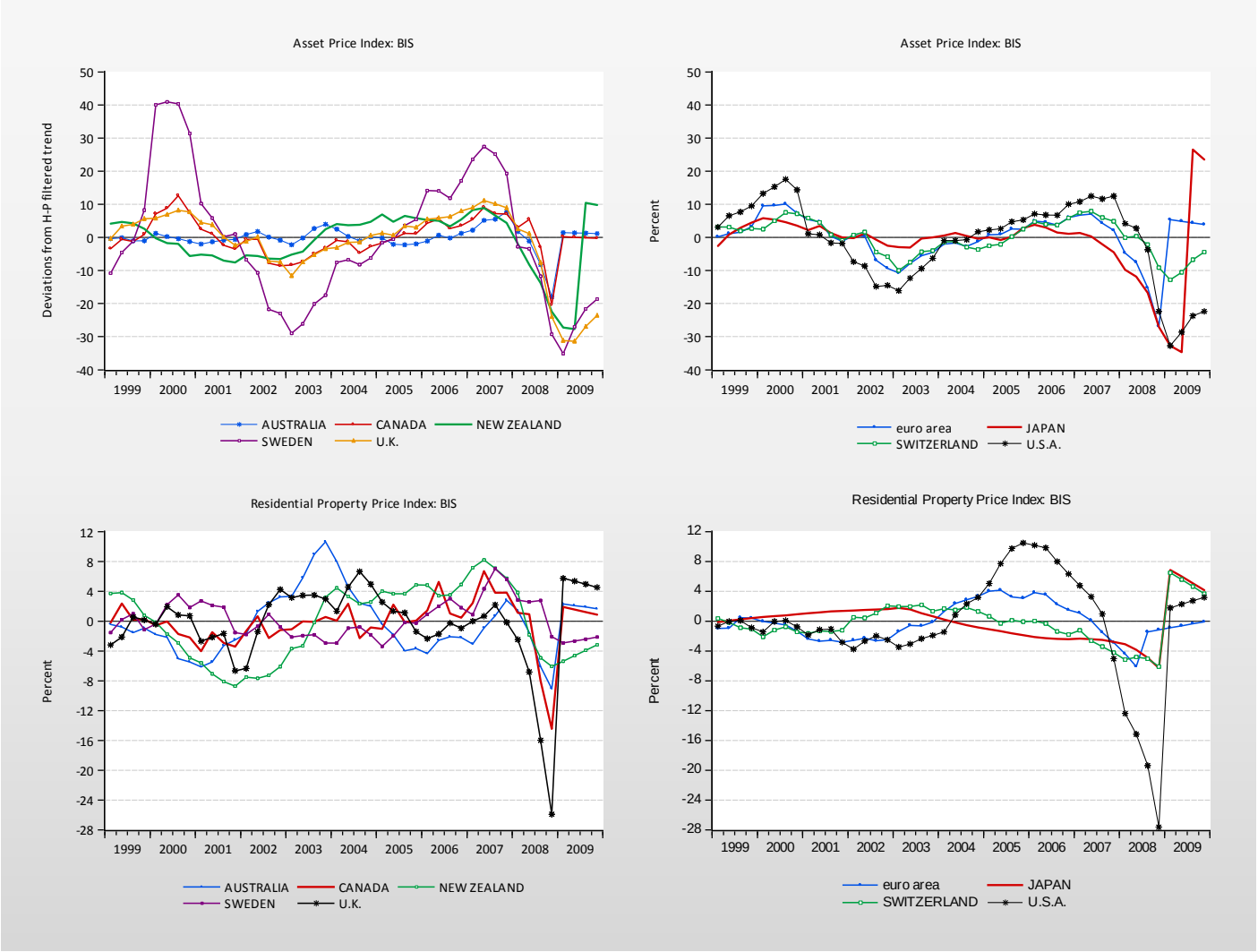
		IT	63.58	1.06	0.29	
		Transparency	5.34	1.34	0.18	
		IT*Transparency	-5.80	-1.07	0.29	
		Asset price gap	**0.36**	**2.13**	**0.03**	
		Output gap	0.50	1.22	0.22	
		SPREAD	**-6.11**	**-2.37**	**0.02**	
		Commodity	**-0.05**	**-1.75**	**0.08**	
		J-statistic	0.13		0.99	
		Observations	315	Cross-sections: 9		

Notes: J is Sargan' test for the null that the over identifying restrictions are valid. p-values are in the next column based on the chi-square distribution where the degrees of freedom are the number of instruments less the number of regressors. Instruments are: the constant, one lag of all the right hand side variables as well as one lag of the dependent variable. Orthogonal deviations were used, while the standard errors are period SURE based, and 2SLS weights are used. The models refer to the variables, for all economies *j* used in deriving the Global and Domestic component of Inflation forecasts. Coefficients that are statistically significant at least at the 10% level of significance are in **bold.** The asset price indicator is the nominal asset price index as constructed by the BIS. Transparency is evaluated according to the aggregate measure, commodity prices are proxied by the world oil price index from the IMF's *International Financial Statistics*, and IT is a [0,1] dummy variable identifying inflation targeting economies. IT*Transparency is an interaction term. All data are for the 1999Q1-2009Q4 sample before differencing or lags. Hence, with 324 observations, the panel consists of the 2000Q1-2009Q4 period, with 315 observations the sample is 2001Q1-2009Q4.

APPENDIX

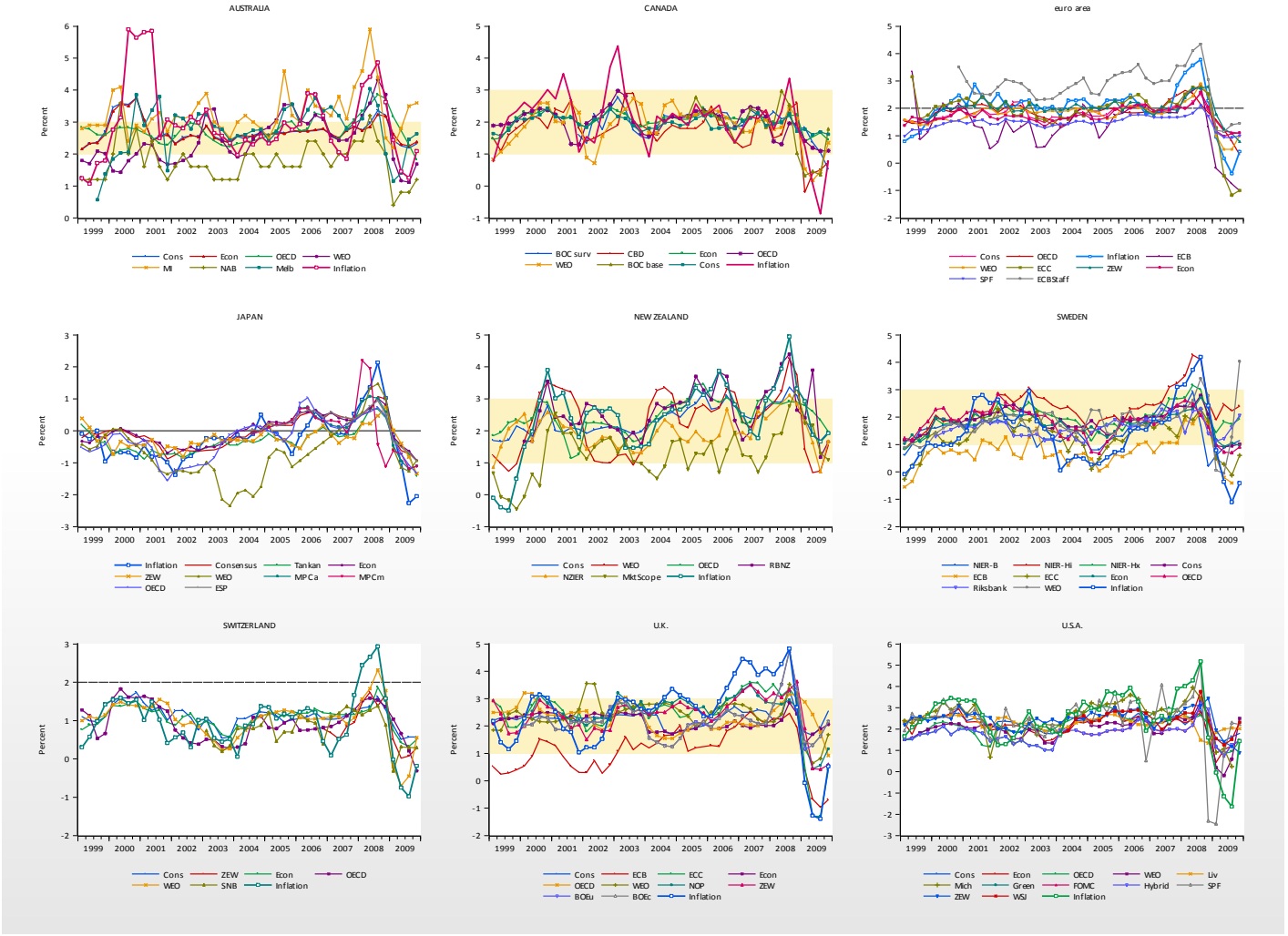
Omitted Tables and Figures
and Detailed Data Sources & Definitions

Figure A1 – Asset Price Inflation, 1999-2009



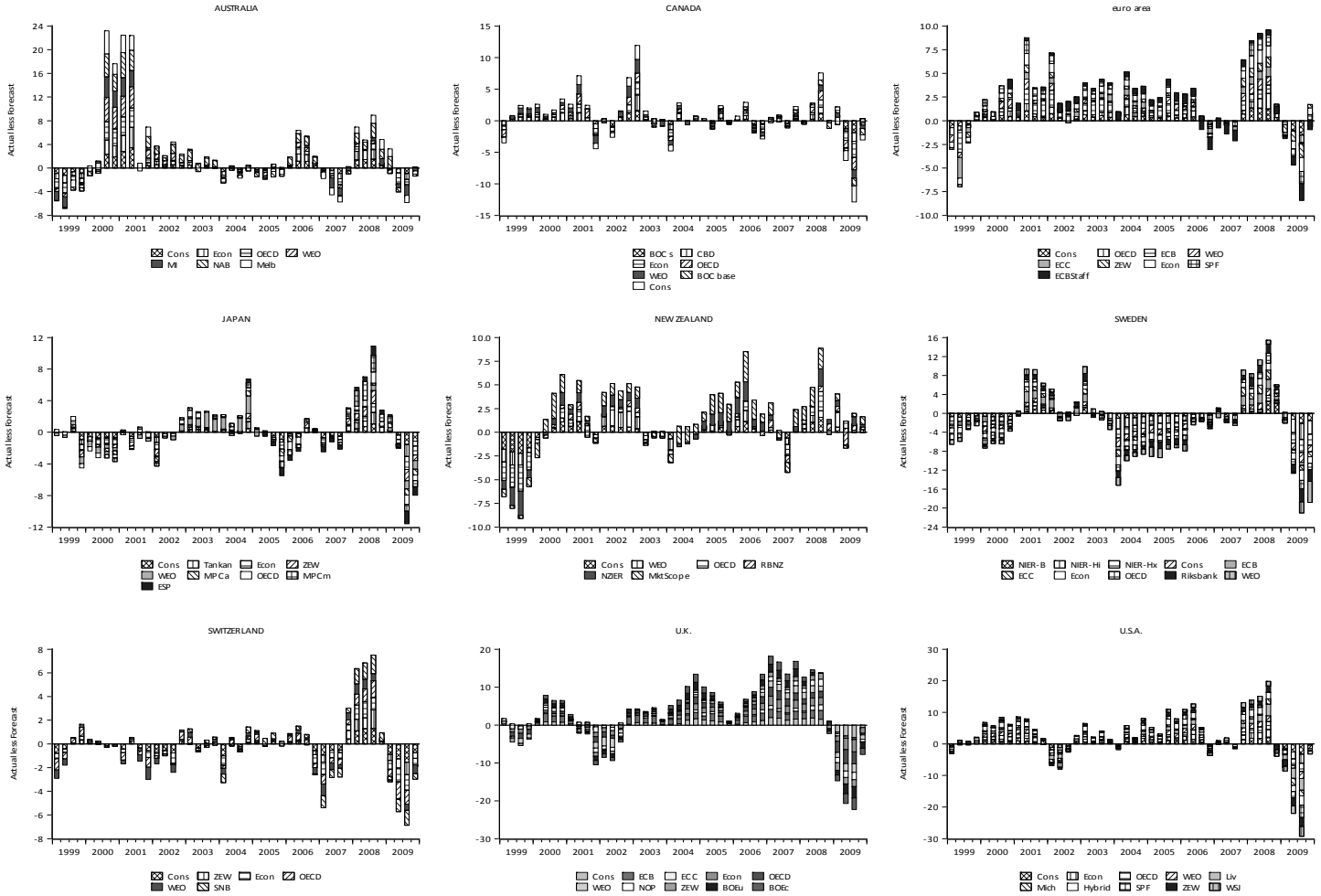
Note: An H-P filter was applied to the log levels of the data with a smoothing parameter of 1600.

Figure A2 – Inflation Forecasts and Expectations, 1999-2009



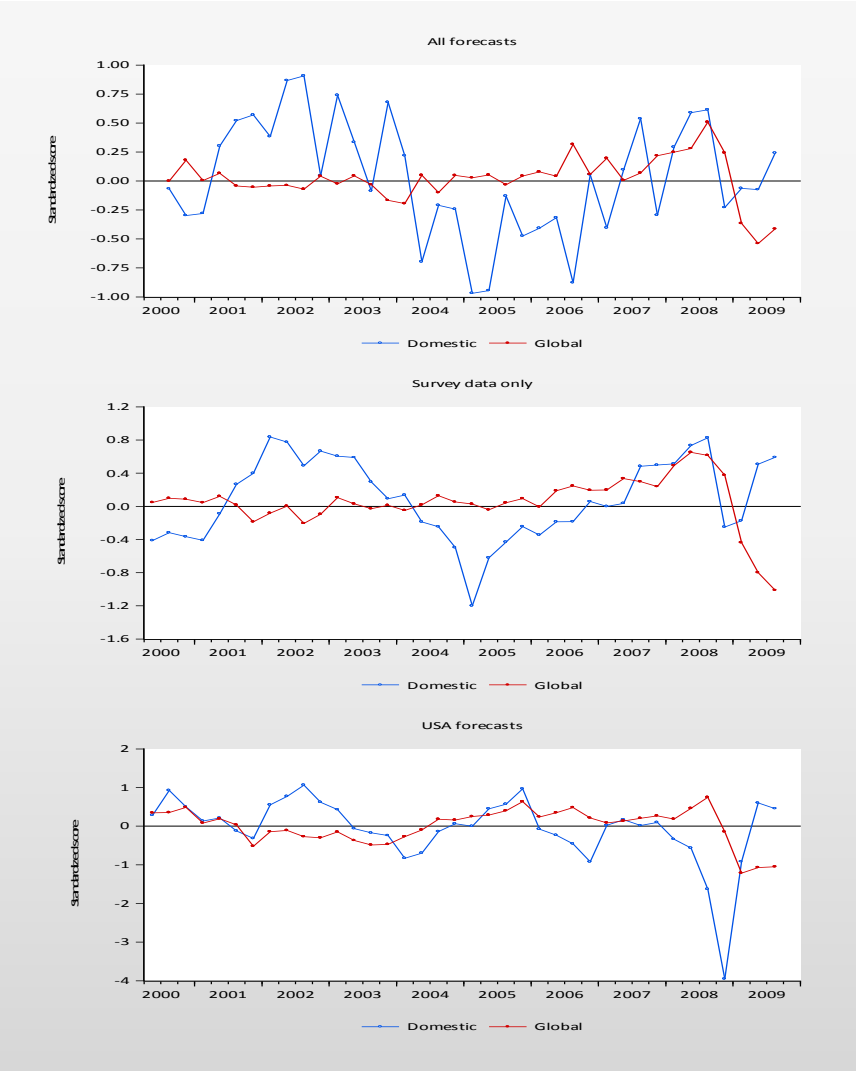
Note: see note to Figure 1, Table 2, and the appendix for data sources and definitions.

Figure 2 – Forecast Errors, 1999-2009



Note: The forecast errors is $\pi_{t+1}^{FH} - \pi_t$, where the first term is the one year ahead fixed horizon (FH) forecast and the second term is realized inflation. Also see Figure 1. The errors are 'stacked' one on top of the others.

Figure A3 – Domestic and Global Components of Forecasts



Note: Based on factor model estimates (equation (3)). The headings provide information about what variables were included in generating the factor model estimates.

Figure A4 – Central Bank Transparency Index, 1999-2009

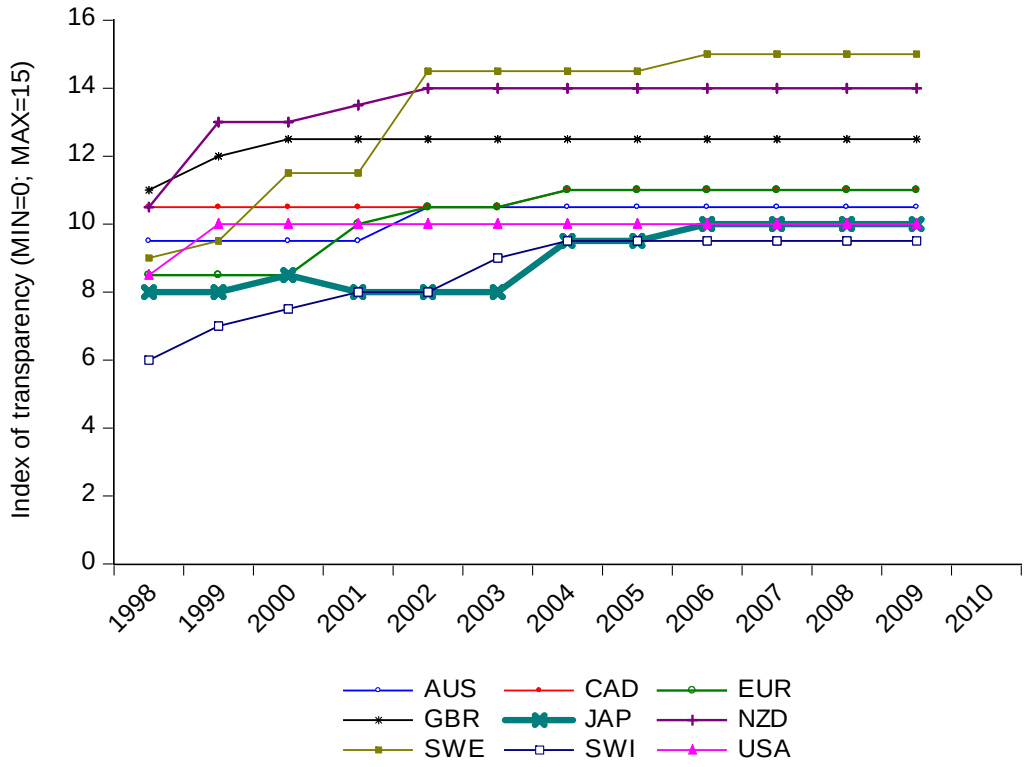


Figure A5 - Selected VIX Measures

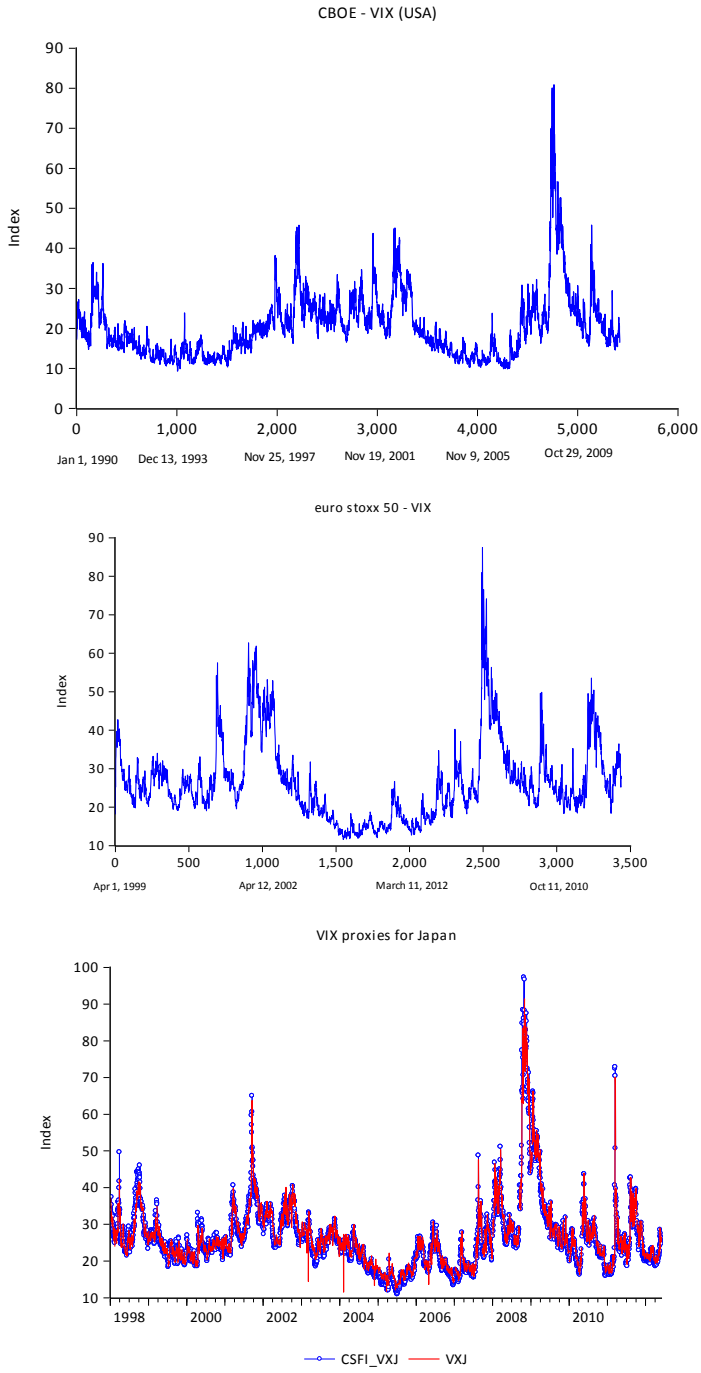


Table A1 – Forecasts, Forecast Frequency, and Horizon Type Used in the Empirical Analysis

AUSTRALIA	CANADA	Euro area	JAPAN	NEW ZEALAND	SWEDEN	SWITZERLAND	U.K.	U.S.A.
Consensus FE/m	Consensus FE/sa	Consensus FE/m	Consensus FE/m	Consensus FE/m	Consensus FE/m	Consensus FE/m	Consensus FE/m	Consensus FE/m
OECD FE/sa	OECD FE/sa	OECD FE/sa	OECD FE/sa	OECD FE/sa	OECD FE/sa	OECD FE/sa	OECD FE/s	OECD FE/sa
WEO FE/sa	WEO FE/sa	WEO FE/sa	WEO FE	WEO FE	WEO FE	WEO FE	WEO FE	WEO FE
Economist FE/m	Economist FE/m	Economist FE/m	Economist FE/m	Economist FE/m	Economist FE/m	Economist FE/m	Economist FE/m	Economist FE/m
Nat'l Australia Bank FE/q	Conference Board FE/q	European Commission survey X 2 FH/m	BOJ X 2 FE/sa	RBNZ X 2 FH/q	European Commission X2 FH/m	Swiss National Bank/q	European Commission X2 FH/m	Michigan –survey FE/m
Melbourne Institute X2 FH/q	Bank of Canada – baseline FE/q	ZEW – Survey FH/m	Tankan – survey FH/m	NZIER FE/q	NIER X 3 FH/m	ZEW – Survey FH/m	ZEW – survey FH/m	Livingston – survey FE/sa
	Bank of Canada –	SPF	ZEW –survey		Riksbank		BoE X 2	SPF

	survey FH/q	FE/q	FH/m	FE/q	FH/q	FE/q
	ECB Staff Projections FE/q		Bank of Japan Household survey FE/q		NOP FH/q	ZEW – survey FH/m
			Economic Planning Association CPI forecasts FE/m		YOUGOV FH/q	FOMC FE/sa
						Greenbook FE/q
						WSJ FH/q
						ZEW – survey FH/m

NOTE: FE means a fixed event forecast; FH signifies and fixed horizon forecast. q refers to quarterly; m is monthly, and sa is semi-annual. Additional details and definitions are contained in the data appendix.

Source: See data sources outlined below.

Table A2– Monetary Policy Strategies in the Sample of Economies Investigated, 1999-2009

Economy	Type of Monetary Policy Strategy	Details
AUSTRALIA	Inflation targeting	2-3%; on average, over the cycle, CPI inflation
CANADA	Inflation targeting	1-3%, target mid-point of band, CPI inflation
Euro area	Price stability	2% or less (but positive), euro area-wide CPI inflation
JAPAN	Price stability	Price stability is the principal aim but no stated value
NEW ZEALAND	Inflation targeting	1-3%, target mid-point of band over the medium-term, CPI inflation
SWEDEN	Inflation Targeting	1-3% target mid-point of band, CPI inflation
SWITZERLAND	Price stability	2% medium-term CPI inflation forecast. Price stability is 2%, or less, CPI inflation
U.K.	Inflation targeting	1-3% (1.5-3.5% until 2004), CPI inflation
U.S.A.	Dual objective	Price stability (no stated number) and full employment

Sources: central bank websites. See www.bis.org/cbanks.htm.

Table A3 Select Correlations Between Aggregate Transparency and Its Sub-Indices, 1999-2009

Type of Transparency	AUS	CAD	EUR	JAP	NZD	SWE	SWI	GBR	USA
Political						.72	.94		
Economic	1	1	.99	.95	.72	.99	.97	.95	
Procedural						.95			
Policy			.92	.82	.99	.99		.82	1
Operational				.61	.92	.83	.83	.61	

Note: Blanks means that there were no changes in the sub-indices over the period in question.

Table A4 – Pesaran-Tmmermann Test of Predictability of Changes in Inflation

	ECONOMY								
	Australia	**Canada**	**euro area**	**Japan**	**New Zealand**	**Sweden**	**Switzerland**	**U.K.**	**U.S.A.**
Forecast	Test Statistic (p-value)								
Consensus	1.61#	0.31	1.50#	0.93	2.73*	-0.37	2.36*	0.61	1.57#
Economist	0.95	0.92	0.81	1.85	NA	-0.11	0.84	0.66	-0.31
OECD	1.20	2.74*	-0.27	2.48	1.54#	2.44	1.32#	-0.32	0.61
WEO	1.25	1.83*	1.19	0.21	2.44*	-1.18	0.49	0.03	2.44*
MI	1.24								
Melb	0.66								
NAB	-2.41								
BOC base		-4.17							
BOC surv		-1.34							
CBD		-1.84							
ECB			1.85*			-0.06		2.14*	
ECC			0.27			2.54		2.44*	

SPF	0.62						
NOP						1.19	
BOEu						-0.03	
BOEc						0.59	
ZEW	0.70	-0.35			-5.03	2.44*	0.91
MPC all		-0.04					
MOC maj		-0.35					
Tankan		0.59					
NIER-B				0.88			
NIER-Hi				1.86			
NIER-Hx				1.42			
NZIER			0.68				
RBNZ			1.25				
Mkt Scope			0.93				
Riksbank				-0.37			
SNB					-1.60		
Greenbook							-3.87

FOMC	-3.52
Hybrid	0.31
Livingston	0.94
Michigan	1.22
WSJ	-1.96

* Signifies rejection of the null hypothesis of no forecast timing at the 5% level.

\# Signifies rejection of the null hypothesis of no forecast timing at the 10% level.

Table A5i – Disagreement Correlations Using Only Core Forecasts, 1999-2009

Correlation	t-statistic/p-value								
	AUS	CAD	EUR	JAP	NZD	SWE	SWI	GBR	USA
AUS	1.00								

CAD	0.12	1.00							
	0.80	-----							
	0.43	-----							
EUR	0.18	0.26	1.00						
	1.21	1.72	-----						
	0.23	0.09	-----						
JAP	-0.41	-0.08	-0.19	1.00					
	-2.95	-0.54	-1.26	-----					
	0.01	0.59	0.22	-----					
NZD	0.18	0.34	0.18	-0.14	1.00				
	1.20	2.38	1.19	-0.93	-----				
	0.24	0.02	0.24	0.36	-----				
SWE	0.05	-0.04	0.53	-0.15	-0.12	1.00			
	0.34	-0.25	4.09	-0.97	-0.82	-----			
	0.73	0.81	0.00	0.34	0.42	-----			
SWI	0.32	0.55	0.55	-0.17	0.46	0.13	1.00		
	2.17	4.27	4.32	-1.11	3.35	0.82	-----		
	0.04	0.00	0.00	0.27	0.00	0.42	-----		
GBR	0.33	0.63	0.45	-0.12	0.33	0.29	0.68	1.00	
	2.26	5.30	3.26	-0.80	2.29	1.95	6.08	-----	
	0.03	0.00	0.00	0.43	0.03	0.06	0.00	-----	
USA	**0.33**	**0.46**	**0.54**	**-0.38**	**0.50**	**0.25**	**0.65**	**0.47**	**1.00**
	2.30	**3.35**	**4.15**	**-2.63**	**3.76**	**1.66**	**5.55**	**3.44**	**-----**
	0.03	**0.00**	**0.00**	**0.01**	**0.00**	**0.10**	**0.00**	**0.00**	**-----**

Table A5ii – Disagreement Correlations Using All Forecasts, 1999-2009

Correlation	t-Statistic/Probability								
	AUS	CAD	EUR	JAP	NZD	SWE	SWI	GBR	USA
AUS	1.00								

CAD	0.13	1.00							
	0.82	-----							
	0.42	-----							
EUR	0.22	0.49	1.00						
	1.44	3.68	-----						
	0.16	0.00	-----						

JAP	-0.05	-0.12	-0.23	1.00					
	-0.35	-0.79	-1.52	-----					
	0.73	0.44	0.14	-----					
NZD	-0.01	-0.37	-0.16	-0.10	1.00				
	-0.07	-2.60	-1.08	-0.63	-----				
	0.94	0.01	0.29	0.53	-----				
SWE	0.25	0.31	0.65	-0.10	-0.31	1.00			
	1.68	2.12	5.57	-0.63	-2.13	-----			
	0.10	0.04	0.00	0.53	0.04	-----			
SWI	-0.02	0.72	0.47	-0.19	-0.16	0.43	1.00		
	-0.15	6.74	3.48	-1.26	-1.04	3.05	-----		
	0.88	0.00	0.00	0.21	0.30	0.00	-----		
GBR	0.29	0.45	0.75	-0.31	0.01	0.59	0.49	1.00	
	1.99	3.30	7.31	-2.08	0.05	4.72	3.63	-----	
	0.05	0.00	0.00	0.04	0.96	0.00	0.00	-----	
USA	-0.12	0.49	0.22	-0.13	-0.17	0.22	0.52	0.06	1.00
	-0.81	3.66	1.44	-0.84	-1.13	1.48	3.99	0.36	-----
	0.43	0.00	0.16	0.41	0.27	0.15	0.00	0.72	-----

Table A6 – Root Mean Squared Errors for Individual Forecasts, 1999-2009

	Economy								
Forecast	**AUS**	**CAD**	**EUR**	**JAP**	**NZD**	**SWE**	**SWI**	**GBR**	**USA**
CONS	1.03	.78	.61	.54	.82	.91	.61	1.25	1.05
OECD	1.13	.69	.54	.52	.92	.86	.59	1.40	1.03
WEO	1.30	.70	.52	.95	.85	1.14	.45	1.13	1.00
ECON	1.04	.74	.64	.56		.92	.57	1.35	.99
ECC			.58			.71		.61	
ECB			.91			1.00		1.49	
ZEW			.41	.53			.75	.78	.98
SPF			.80						1.15
NAB	1.56								
Melb	1.15								
MI	1.31								
BOC surv		.67							
BOC		.57							
CBD		.74							
MktScope					1.37				
NZIER					1.04				
RBNZ					.52				
NIER – Bus						.91			
NIER – Hx						1.00			
NIER – Hi						1.22			
NOP								.82	
BOE u								1.25	
BOE c								1.25	
WSJ									1.15

Mich				.72
Liv				1.13
FOMC				1.53
Green				1.00
Hybrid				1.28
Riksbank		1.08		
SNB			.70	
BOJ maj	.73			
BOJ all	.73			
Tankan	.48			

Table A7 – Residual Serial Correlation, Individual Regressions, 1999-2009

Economy	Quantile = 0.25	Quantile = 0.5	Mean	Quantile = 0.75
AUSTRALIA	.46	.37	.41	.50
CANADA	.47	.56	.56	.33
Euro area	.76	.67	.67	.71
JAPAN	.84	.67	.59	.83
NEW ZEALAND	.56	.35	.57	.73
SWEDEN	.68	.65	.52	.38
SWITZERLAND	.33	.40	.31	*.28*
U.K.	.53	*.14*	*.27*	*.08*
U.S.A.	.87	.54	.50	.36

NOTE: in italics are values that are NOT statistically significant at the 5% level of significance.

Table A8 – Instrument Adequacy Tests

Economy	F-test	F-test
AUSTRALIA	8.77	33.82
CANADA	8.43	146.88
Euro area	3.60	190.14
JAPAN	3.63	77.29
NEW ZEALAND	12.41	32.73
SWEDEN	9.62	114.73
SWITZERLAND	17.54	159.89
U.K.	12.50	161.19
U.S.A.	6.20	135.29

NOTE: The first columns gives the F-test of forecast disagreement on the instruments listed in Table 6 excluding the lagged dependent variable. The second column is the F-test when one lag of the dependent variable is added to the instrument list.

APPENDIX – Data

A. Private Sector , Governmental or International Institutions

Economy	Forecast (Frequency[1])	Horizons[2]	START	Survey (Frequency)	Horizons[2]	START
AUSTRALIA (AUD)	*The Economist* (M)	cy, 1y	1990.08	Melbourne Institute (Q)	cy	1993Q2
	Consensus (M)	cy, 1y	1990.01	Melbourne – consumer		
	World Economic Outlook (SA)	cy, 1y	1993S1	inflationary	ya-balance[4]	1985.1
	OECD (SA)	ya	1990S1	expectations		
				Institute (M) – consumer sentiment		
				National Australia Bank Survey	cy	1989Q2
CANADA (CAD)	*The Economist* (M)	cy, 1y	1990.08	Bank of Canada (Q) - Survey	2y-bins	2001.2
	Consensus (M)	cy, 1y	1989.10			
	World Economic Outlook (SA)	cy, 1y	1993S1			
	Conference Board of Canada (Q)	cy, 1y	1990Q1			
	OECD (SA)	ya	1990S1			
EURO AREA	*The Economist*	cy, 1y	1998.11	SPF[3] (Q)	cy, 1y, 2y, 5y	1999.1

(EUR)	(M)			EC Consumer & Business Survey (M) ZEW (M)	ya-balance[4]	1985.01
	Consensus (M)	cy, 1y	1989.10			
	OECD (SA)	ya	1990S1		ya-bins[5]	1991.12
JAPAN (JAP)	*The Economist* (M)	cy, 1y	1990.08	ZEW (M)	ya-bins	1991.12
				BoJ (Q)	ya, 5y-bins	2001.2 (2004.2/5y)
	Consensus (M)	cy, 1y	1989.10			
	World Economic Outlook (SA)	cy, 1y	1993S1	TANKAN ESP(M)	Diffusion Index ya, distribution	1985.1 2004.6
	OECD (SA)	ya	1990S1			
NEW ZEALAND (NZD)	Consensus (M)	cy, 1y	1990.01	RBNZ (Q)	qa, 1y, 2y	1987.3
	World Economic Outlook (SA)	cy, 1y	1993S1	Market scope (Q)	ya-bins	1987.4/1995.1
	New Zealand Institute of Economic Research (Q; NZIER)	cy, ya, 2,3,4 ya	1988			
	OECD (SA)	ya	1990S1			
SWEDEN (SWE)	*The Economist* (M)	cy, 1y	1990.08	EC Consumer & Business Survey (M)	ya-balance[4]	1995.01 (1990.01)
	Consensus (M)	cy, 1y	1989.11			
	World Economic Outlook (SA)	cy, 1y	1993S1			
	OECD (SA)	ya	1990S1			
SWITZERLAND (SWI)	*The Economist* (M)	cy, 1y	1990.08	ZEW (M)	ya-bins	1991.12
	Consensus (M)	cy, 1y	1989.11			
	World Economic Outlook (SA)	cy, 1y				

	OECD (SA)	ya	1990S1			
UNITED KINGDOM (GBR)	*The Economist* (M)	cy, 1y	1991.01	EC Consumer & Business Survey (M)	ya-balance[4]	1985.01
	Consensus (M)	cy, 1y	1989.11			
	World Economic Outlook (SA)	cy, 1y	1993S1	YOUGOV (M)	ya	2005.12
	BoE MPC (Q)		1993Q1	BoE/NOP (Q)	1y-bins	2000.1
	OECD (SA)	ya	1990S1	H.M. Treasury (Q)	4 yr ahead	2006Q1
UNITED STATES (USA)	*The Economist* (M)	cy, 1y	1990.08	SPF[3] (Q)	cq, qb, cy, ya, 1qa, 2qa, 3qa, 4qa, 10y	1981.3 (1991.4 for 10y)
	Consensus (M)	cy, 1y	1989.11			
	Greenbook (Q)	cy, 1q, 2q, 3q, 4q, 5q, 6q, 7q, 8q, 9q	1965.4, 1966.1, 1968.1, 1968.1, 1969.4, 1972.3, 1979.1, 1981.4, 1990.3	Michigan Survey (Q)	ya	1978.1
				Livingston Survey (SA)	cm, cy, 6m, 12m, 1y, 2y, 10y	1985S1
	World Economic Outlook (SA)	cy, 1y	1993S1			
	OECD (SA)	ya	1990S1	ZEW (M)	ya-bins	1991.12
	Wall Street Journal (SA)	cy	2003S1			

Notes to part A:

1. M, Q, SA are monthly, quarterly and semi-annual, respectively.

2. Cy, 1y, ya, represent mean current year and one year ahead and year ahead, respectively. There is little substantive difference between 1y and ya other than different source use different language to refer to forecasts that pertain to the year following the publication of the forecast. In some cases, however, the forecast can refer to the calendar year ahead, or to a forecast for a calendar year ahead from the time of publication, in which case the forecast horizon may overlap the current and following calendar year. #m, #q, or #y refer to forecasts # months, quarters or years ahead.

3. Survey of Professional Forecasters.

4. Balance refers to the horizon stated applicable to the remainder (i.e., balance) of the year. Bins refers to the fact that forecasts are arranged in the form of a distribution of responses.

B. Central Bank Forecasts

Economy	Frequency/AUTHOR	Horizons	START
UNITED STATES **(USA)**	**Semi-Annual/FOMC**	**Up to 9 quarters ahead**	**2000**
CANADA ***(CAD)***	**Quarterly/BoC**[1]	**Up to 8 quarters ahead**	**2005**
JAPAN ***(JAP)***	**Semi-Annual/BOJ**	**Current and 1 year ahead**	**2000**
UNITED KINGDOM **(GBR)**	**Quarterly/BoE** **Quarterly/MPC**	**Up to 8 quarters ahead** **One Year ahead**	**1993, 1998 (conditional on market interest rates or constant + QE)** **Since 2006 Quarterly**
SWITZERLAND ***(SWI)***	**Quarterly/SNB**	**Up to 2 years ahead**	**2003**
SWEDEN **(SWE)**	**Quarterly/Riksbank**	**Up to 8 quarters ahead**	**2000**
NEW ZEALAND ***(NZD)***	**Quarterly/RBNZ**	**Up to 12 quarters ahead**	**1997**
EURO AREA ***(EUR)***	**Quarterly/ECB Staff**	**Up to 2 years ahead**	**2000**[2]

Note to Part B: *1.* A mix of semi-annual and quarterly forecasts provided until 2009 when fully quarterly forecasts are available. Referred to as the Bank's baseline forecast. *2.* Until 2004, projections are semi-annual; thereafter quarterly.

C. Sources for Forecasts and Surveys

Economy	Source(s)
AUSTRALIA	http://www.melbourneinstitute.com/ http://www.consensuseconomics.com/ http://www.imf.org/external/ns/cs.aspx?id=29 http://www.economist.com/ [1] http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html http://www.rba.gov.au/statistics/tables/index.html#prices_inflation (Table G4)
CANADA	http://www.consensuseconomics.com/ http://www.imf.org/external/ns/cs.aspx?id=29 http://www.conferenceboard.ca/ http://www.economist.com/ http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html http://www.bankofcanada.ca/en/
EURO AREA	http://www.consensuseconomics.com/ http://www.economist.com/ [2] http://ec.europa.eu/economy_finance/db_indicators/surveys/time_series/index_en.htm http://www.ecb.int

	http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html
JAPAN	http://www.consensuseconomics.com/ http://www.economist.com/ http://www.imf.org/external/ns/cs.aspx?id=29 http://www.zew.de/en/daszew/daszew.php3 http://www.boj.or.jp/en/ http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html http://www.epa.org.jp
NEW ZEALAND	http://www.consensuseconomics.com/ http://www.rbnz.govt.nz/ http://www.nzier.org.nz/ http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html
SWEDEN	http://www.consensuseconomics.com/ http://www.economist.com/ http://ec.europa.eu/economy_finance/db_indicators/surveys/time_series/index_en.htm http://www.imf.org/external/ns/cs.aspx?id=29 http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html http://riksbank.com/

	http://www.konj.se/382.html
SWITZERLAND	http://www.consensuseconomics.com/ http://www.economist.com/ http://www.imf.org/external/ns/cs.aspx?id=29 http://www.zew.de/en/daszew/daszew.php3 http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html http://www.snb/ch
UNITED KINGDOM	http://www.consensuseconomics.com/ http://www.economist.com/ http://ec.europa.eu/economy_finance/db_indicators/surveys/time_series/index_en.htm http://www.imf.org/external/ns/cs.aspx?id=29 http://www.bankofengland.co.uk/ http://sixthsense.yougov.com/household-economic-activity-tracker.aspx **[charge introduced in 2011; can be obtained via Reuters/Bloomberg search: U.K. YouGov Citi *month* Inflation Expectations]** http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html
UNITED STATES	http://www.consensuseconomics.com/ http://www.economist.com/ http://www.imf.org/external/ns/cs.aspx?id=29

	http://www.philadelphiafed.org/research-and-data/real-time-center/ http://www.src.isr.umich.edu/http://www.src.isr.umich.edu/ http://www.oecd.org/document/59/0,3343,en_2649_34109_42234619_1_1_1_37443,00.html http://online.wsj.com/home-page http://www.zew.de/en/daszew/daszew.php3

Notes to Part C:

1. For year ahead forecasts the data for January-February for each year until 2007 were added by interpolating the forecasts for the available adjacent months. This was necessary because the forecasts are for the calendar year (current or one year ahead) published each month and the table published omitted these two months.

2. For the euro area forecasts are for EUR 11 countries until 2000 December, thereafter EUR forecasts**. The same calculation applies to the Consensus forecasts.**

3. For Germany the forecasts are for greater or consolidated Germany beginning in November 1995.

D. TIME SERIES INFORMATION

Economy	Series Name	Source(s)
AUSTRALIA (AUD)	Real GDP, CPI, Commodity prices, Real and Nominal exchange rates, Stock price index, money market rate, 3 month LIBOR rates, long-term government bond yields, Housing prices, central bank policy rate (cash rate)	BIS, International Financial Statistics, Australian Bureau of Statistics, Reserve Bank of Australia
CANADA (CAD)	Real GDP, CPI, Commodity prices, Real and Nominal exchange rates, Stock price index, overnight rate, 3 month LIBOR rates, long-term government bond yields, Housing prices, central bank policy rate (overnight rate target)	BIS, International Financial Statistics, Statistics Canada, Bank of Canada
EURO AREA (EUR)	Real GDP, CPI, Commodity prices, Real and Nominal exchange rates, Stock price index (mean of indexes for Germany, France, Italy), interbank rate, 3 month LIBOR rates, long-term government bond yields, Housing prices, central bank policy rate (main refinancing operations)	BIS, International Financial Statistics, European Central Bank
JAPAN (JAP)	Real GDP, CPI, Commodity prices, Real and Nominal exchange rates, Stock price index, 3 month LIBOR rates, long-term government bond yields, central bank policy rate (uncollateralized call rate)	BIS, International Financial Statistics, Cabinet Office, Bank of Japan

NEW ZEALAND (NZL)	**Real GDP, CPI, Commodity prices, Real and Nominal exchange rates, Stock price index, money market rate, 3 month LIBOR rates, long-term government bond yields, Housing prices, central bank policy rate (cash rate)**	**BIS, International Financial Statistics, Reserve Bank of New Zealand**
SWEDEN (SWE)	**Real GDP, CPI, Commodity prices, Real and Nominal exchange rates, Stock price index, STIBOR rates, long-term government bond yields, Housing prices, central bank policy rate (repo rate)**	**BIS, International Financial Statistics, Riksbank**
SWITZERLAND (SWI)	**Real GDP, CPI, Real and Nominal exchange rates, Stock price index, money market rate, 3 month LIBOR rates, long-term government bond yields, central bank policy rate (3 month LIBOR – targeted), Commodity prices**	**BIS, International Financial Statistics, Swiss National Bank**
UNITED KINGDOM (GBR)	**Real GDP, CPI, Real and Nominal exchange rates, Stock price index, overnight rate, 3 month LIBOR rates, long-term government bond yields, Housing prices, central bank policy rate (bank rate)**	**BIS, International Financial Statistics, , Nationwide, Bank of England**
UNITED STATES (USA)	**Real GDP, CPI, Commodity prices, Real and Nominal exchange rates, Stock price index, fed funds rate, 3 month LIBOR rates, long-term government bond yields,**	**BIS, International Financial Statistics, OFHEO, Bureau of Labour Statisitics, Federal Reserve**

Housing prices, central bank policy rate
(fed funds target)

E . Descriptors Used for Forecasts in Tables & Figures

Forecast Name	Code
The Economist	ECON
Consensus	CONS
European Commission Consumer Survey	ECC
European Commission Business Survey	ECB
European Central Bank	ECB Staff
WEO	World Economic Outlook
Conference Board of Canada	CBD
Center for European Economic Research	ZEW
Reserve Bank of New Zealand	RBNZ
Market Scope (New Zealand)	Scope
Tankan (Japan)	TANAO
Yougov Opinion Polling Survey (UK)	YOUGOV
Greenbook, US Federal Reserve	GREEN
Federal Open Market Committee (US)	FOMC
Livingston Survey (US)	LIV
Survey of Professional Forecasters (US, euro area)	SPF
Bank of England (UK)	BOE
University of Michigan Survey (US) - mean	MICH
	MIMN
National Opinion Poll (UK)	NOP
Melbourne Institute (Australia)	MLB
Bank of Japan	BOJ

Bank of Japan Monetary Policy Committee	**PBOJMAJ (Majority of Committee)** **PBOJALL (Entire Committee)**
Bank of Canada Business Survey	**BOC**
New Zealand Institute for Economic Research	**NZIER**
Riksbank (Sweden)	**RIKS**
Organization for Economic Cooperation and Development	**OECD**
Swiss National Bank	**SNB**
National Institute of Economic Research	**NIER, BNIER, CNIER**
Infitted	**Regression method conversion**
Infitted1	**Probability approach conversion**

F. Last available observation

Economy	**Forecast Source** **Last Observation (M= month; Q= Quarter; S= Semi-Annual**
AUSTRALIA	Economist: 2010M04 Consensus: 2009M12 Melbourne Cons. Sentiment: 2010M04 Melbourne Institute: 2009Q4 Nat'l AUS Bank: 2009Q4 WEO: 2009S2 OECD: 2009S2
CANADA	Economist: 2010M04 Consensus: 2009M12 Bank of Canada Survey: 2010Q1 Conference Board: 2010Q1 WEO: 2009S2 OECD: 2009S2 BoC Base case: 2010Q2
EURO AREA	Economist: 2010M04 Consensus: 2009M12 European Commission: 2010M02 ZEW: 2010M02 Survey of Prof. Forecasters: 2009Q4 WEO: 2009S2 OECD: 2009S2
JAPAN	Economist: 2010M04 Consensus: 2009M12 ZEW: 2010M02 BOJ Survey: 2010Q1 Tankan: 2009Q4 WEO: 2009S2 OECD: 2009S2 BOJ MPC: 2010S1
NEW ZEALAND	Economist: 2010M04 Consensus: 2009M12 RBNZ Survey: 2010Q1 Marketscope: 2010Q1 WEO: 2009S2

	OECD: 2009S2 RBNZ: 2010Q1
SWEDEN	Economist: 2010M04 Consensus: 2009M12 European Commission: 2010M02 NIER: 2010Q1 WEO: 2009S2 OECD: 2009S2 Riksbank: 2010Q1
SWITZERLAND	Economist: 2010M04 Consensus: 2009M12 Financial Market Report: 2010M03 WEO: 2009S2 OECD: 2009S2 SNB: 2010Q1
UNITED KINGDOM	Economist: 2010M04 Consensus: 2009M12 European Commission: 2010M02 ZEW: 2010M02 Yougov: 2010M03 NOP: 2009Q4 WEO: 2009S2 OECD: 2009S2 BoE: 2010Q1
UNITED STATES	Economist: 2010M04 Consensus: 2009M12 ZEW: 2010M02 Survey of Prof. Forecasters: 2010Q1 Livingston: 2009S2 Wall Street Journal: 2009S2 Michigan: 2009M08 WEO: 2009S2 OECD: 2009S2 Greenbook: 2003Q4 FOMC: 2010S1