Expectations' Dispersion Convergence towards Central Banks' IR forecasts: Chile, Colombia, Mexico, Peru United Kingdom, 2004-2014

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EXPECTATIONS' DISPERSION & CONVERGENCE TOWARDS CENTRAL BANKS' *IR* FORECASTS: CHILE, COLOMBIA, MEXICO, PERU & UNITED KINGDOM, 2004 - 2014

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Abstract

The study evaluates the effect of both the publication of *Inflation Report* (*IR*)'s forecasts and the subsequent media diffusion efforts (made by 5 central banks) on (i) the **dispersion** of 'fixed-event' forecasts for inflation (π) and real growth (g) produced by the macroeconomic insiders of a country (and gathered by *Consensus Economics Inc.*), as well as (ii) the **distance** between their median and the aforementioned official forecasts. The 5 central banks correspond to the monetary authorities in Chile, Colombia, Mexico, Peru and United Kingdom. Statistically testing the effects on the dispersion and distance uses a common sample of monthly forecasts from 2004 to 2014 and reach high specificity by using separate samples according to the forecasting horizon (short and medium 'term') and the macroeconomic uncertainty level (*IR* publication months are classified as either high- or low-uncertainty months).

With a significance level of 10%, the general results are that (i) increases and decreases in the **dispersion** can be attributed to either *IR* forecast publication or media diffusion; and (ii) increases and decreases in the **distance** can be attributed to either *IR* forecast publication or media diffusion, although the number of increases in the distance is low relative to (i).

On the whole, the number of decreases in the dispersion and distance is low for 4 of 5 *inflation-targeting* central banks considered, which suggests the expectation management is still an elusive goal (Colombia is relatively close to achieve it, though). The scarce positive findings reflect the monetary authorities maintain an *insufficient* degree of credibility and thus they confront a context of monetary policy and expectations management that has been denominated *exogenous influence* in Hubert (2011)'s heterogeneous-agent model. Under such a framework, the monetary authorities (1) should respond to shocks by using an optimal rule depending upon the private forecasts (instead of their own internal forecasts); and (2) would not be able to drive the private expectations towards the fundamental values of the macroeconomic variables, for their influence would only come from their qualitative policy signals. The *increases* in dispersion and distance reflect the poor results central banks are obtaining by 'leaning against the wind' with respect to the *IR* forecasts publication and the subsequent media diffusion efforts, that is, by rejecting (1) and (2) and acting 'as if' their policy context was the most favorable one.

Keywords: central bank, forecasting, coordination.
JEL Classification: E37, E47, E58, G14.

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I. Introduction

Under normal conditions, as the institutional arrangement in a particular country limits the agents' capabilities to acquire and process relevant information for their decisions, their expectation formation is slow. The majority of economic agents delegate information processing and acquisition tasks to macroeconomic insiders.[1] From all those insiders,[2] the central bank stands out for its macroeconomic policy actions affect the dynamics of many variables relevant to the decisions of the majority of economic agents. It is natural that the other macroeconomic insiders pay attention to monetary authority's actions, especially when it discloses the future macroeconomic outlook to justify them. By the same token, corporations usually delegate information acquisition and processing tasks to the insiders while their price setting power is greater than the households'.

This is nearly the monetary policy framework for inflation targeting (IT), an institutional arrangement adopted by a growing number of countries. Under this framework, the central bank is accountable for any deviation the observed inflation may have with respect to a previously announced target range (or target value). In addition to taking monetary policy actions to reach the explicit target, a central bank under IT must disclose the future medium-term outlook which is consistent with those actions (by publishing its *Inflation Report* (IR) on a regular basis). Therefore, it is reasonable to expect that, if an IT central bank achieves the buildup of an intangible stock of specific credibility from a history of milestones,[3] *at least* the insiders will consider the central bank's announced forecasts[4] as **quantitative** or **qualitative** signals inside their own expectation formation process about the future (these signals condition the economic decision problems of the insiders and the corporations hiring them). If not, it will confront its monetary policy scenario with relatively low credibility.

The paper aims to statistically test under which specific circumstances there exists a **signal effect** on the insiders' forecasts whenever the central banks of Chile, Colombia, Mexico, Peru and United Kingdom disclose their corresponding announced forecasts: ¿does a signal effect exist when such a disclosure takes place under low macroeconomic uncertainty (before the consequences of low-magnitude shocks)? or instead ¿does a signal effect exist when such a disclosure takes place under high macroeconomic uncertainty (before the consequences of high-magnitude shocks like those generated in the aftermath of the recent international crisis)? By considering a sample of monthly data (2004-2014), the high specificity of these questions can be achieved. After more than a decade of these countries' adoption of the inflation targeting framework, the search for answers to these questions has come at an opportune time if at least the 'type' of each central bank as a *one-digit inflation stabilizer* has passed the test of time.

While considering statistical tests conditional on the degree of macroeconomic uncertainty, a high macroeconomic uncertainty does encompass exceptional events such as international financial crises, structural changes and climate shocks. All these events

[1] This environment is supported by U.S. data (Coibion & Gorodnichenko, 2010; Fuhrer, 2011), in contrast to the stories told by models assuming the rational expectations hypothesis.

[2] The set of professional forecasters and financial market participants.

[3] Credibility is specific to the value of information the agents ignored until the period $\tau \leq t$. Referring to the specific goal the central bank is considering, the credibility built when the central bank's goal is the inflation reduction to a one-digit inflation level is clearly different from the one built when its goal is to stabilize inflation around the price-stability level (an annual rate between 1 and 3%), which is different from the one built when the latter goal is coupled with the goal of financial stability. Referring to how and why the monetary authority takes specific policy actions, the credibility built when the central bank only discloses the set of forecast scenarios to justify those actions is qualitatively different from the one built when the model or the scenario-generating system is also disclosed.

[4] Since these forecasts are disclosed to the public as the central bank's context for its future monetary policy actions, they are not independent from the Board members' informed opinions. See Robertson (2000), Blinder *et al.* (2008), Edge & Gurkaynak (2011), Kang *et al.* (2013), and Nunes (2013).

increase the macroeconomic uncertainty, induce herd behavior and liberate consumers' and investors' animal spirits. Upon the uncertainty jump, diverse economic agents' perceptions about future macroeconomic outlook greatly deteriorate, thus expectations turn out adverse with respect to maintaining the levels of inflation (π) and real growth (g) observed in the temporal vicinity of the corresponding forecasts' announcement.[5] If and only if the monetary authorities' announced forecasts (used to justify monetary policy actions) have successfully been perceived as credible,[6] they will be able to stabilize the other insiders' perceptions about the economy's future outlook. A secondary hypothesis is that this expectations stabilization ability is stronger in periods of high macroeconomic uncertainty than in periods of low macroeconomic uncertainty (economic agents become highly attentive under high uncertainty).

To achieve the study's goals, the insiders' forecasts and the corresponding central bank' announced forecasts are jointly considered. For each country, the insiders' forecasts are gathered by *Consensus Economics Inc.* as a forecast survey whose results are published monthly. On the other hand, the IT central banks' announced forecasts are included inside their regularly published *inflation reports* (*IR*s). Next section presents an stylized discussion of the main conceptual issues behind the study's hypothesis. The ensuing sections describe the data, the hypothesis being tested with them, as well as the results. The last section concludes with some policy recommendations.

II. Conceptual framework

Filacek & Saxa (2012) defend the idea that the central bank's macroeconomic outlook will be adequately transmitted or communicated to the majority of economic agents if the insiders' expectations are in line with the central bank's announced expectations. These authors conducted statistical tests to ascertain whether the insiders' expectations are in line with the central bank's announced forecasts by focusing on the changes in both the *dispersion* of the insiders' informed opinions or forecasts (see next section) and the *distance* between these informed opinions' median and the central bank's announced forecasts.

However, what is really being tested is whether the insiders use the central bank's announced forecasts to form their own expectations; and for this to happen, the insiders must value the announced forecasts as information.[7] This re-interpretation is perfectly consistent with Hubert (2011): if the insiders' expectations are adjusted towards the central bank's because they have proved to be superior as **quantitative policy signals**, then the central bank will confront a context of private expectations management known as *endogenous influence*. It is only inside this context that the monetary authority can drive private expectations towards 'the fundamental value of the variables', and thus the disclosure of the monetary authority's announced forecasts should generate a significantly negative *impact effect* on the aforementioned dispersion and distance. In fact, such a decrease is constrained to the two-month period immediately after the publication month of any *IR* forecast (in line with Filacek & Saxa, 2012).

[5] This is also reflected in the forecasting performance decline of the majority of multi-equation models built for the sake of forecasting key macroeconomic variables. See Stock & Watson (2010)'s assessment of the structural models for forecasting U.S. inflation as well as a forecasting evaluation of non-structural models for the Peruvian case (Barrera, 2013).

[6] The last section will provide some recommendations for improving their credibility on this regard.

[7] Huang & Trehan (2008) consider the firms' expectations about π are closer to the professional forecasters' expectations (i.e., the insiders' expectations about π) than to the households' expectations because firms contract insiders to gauge the future inflation. While firms' price setting is usually based on this information, insiders' expectations about π are (relative to households'): (i) less sensible to increases in energy and food prices (see Trehan 2011) and (ii) less temporarily biased in those periods when, for this reason, relatively high levels of π are observed. Therefore, insiders' medium-term π expectations are particularly useful for assessing monetary authorities' credibility (see Trehan & Zorrilla 2012).

Inside the context of private expectations management known as *exogenous influence* (Hubert, 2011), in contrast, the monetary authority must follow a policy rule that depends on the private forecasts instead of its own internal forecasts and thus the monetary authority's influence comes only through its **qualitative policy signals**. In our interpretation, the insiders will drive private expectations towards 'the fundamental value of the variables' in the best of cases (only if the monetary authority accepts to operate under these conditions) while the dispersion and distance would not respond to the monetary authority's announced forecasts. However, if the researcher finds out increases in the dispersion and/or the distance, it will mean that the monetary authority is obtaining counterproductive results by 'leaning against the wind' with respect to the publication and the media diffusion of its announced forecasts about π and g. In other terms, the monetary authority would be reacting with a different policy rule and assuming its influence comes through its **quantitative policy signals** (*as if* its policy context was the most favorable one).

By getting the best of Filacek & Saxa (2012)'s proposed tests, the study uses 2 measures of implicit coordination:[8] the **dispersion** of the insiders' forecasts and the **distance** between the median of these forecasts and the monetary authority's announced forecast (with respect to either π or g). This is in spite of Lahiri & Sheng (2009)'s criticism towards the usage of dispersion, which is based on expressing the aggregate uncertainty of one individual macroeconomic variable's forecasts as the sum of the forecasts' dispersion and the insiders' *perceived ex ante volatility* (associated to the future aggregate shocks affecting the variable). Since all insiders can quantify the same *ex post volatility* associated to aggregate shocks affecting the variable in the past, it is argued here that *ex post volatility* explains the levels of dispersion and distance, instead. Therefore, next section's statistical tests will control for its effect on the dispersion and distance measures.

The study evaluates whether the central banks' announced forecasts (a) reduce the measures of coordination (dispersion and distance) on average across all two-month periods (immediately following the months of *IR* publication) available in the whole sample period (i.e., whether announced forecasts 'anchor private expectations'), and (b) allow anchoring expectations in periods of low macroeconomic uncertainty (on average across all two-month periods immediately following those months of *IR* publication classified as 'normal times') as well as in periods of high macroeconomic uncertainty (on average across all two-month periods immediately following those months of *IR* publication classified as 'abnormal times' -in the aftermath of large shocks). Evaluation (b) can be useful for the policymaker because learning to manage expectations during calm periods can actually make it easy to learn to manage expectations during turbulent periods.

III. Data and hypothesis tests

Data

The sample of the insiders' monthly forecasts for the british, chilean, colombian, mexican and peruvian economies is january 2004 - december 2014, a period encompassing important portions of the corresponding elapsed times from the adoption of inflation targeting framework to date (1991 for Chile, 2000 for Colombia, 1995 for Mexico, 1994 for Peru and 1993 for United Kingdom).[9] These forecasts are surveyed monthly by *Consensus Economics Inc.* and refer to two fixed events, the end of current year and the end of next year; therefore, the forecast horizons with respect to these fixed events vary from 1 to 24

[8]The implicit assumption here is that the insiders' net profits from coordinating their forecasts with the central bank's announced forecasts are sufficiently high (i.e., coordination gross profits well above coordination costs).

[9]See Table 1 in Schmidt-Hebbel (2009). The *formal* adoption for Peru took place in 2002, when the monetary authority opted for managing short-term interest rate as the monetary policy's instrument.

months.[10]

In general, the central banks published their *IR*s with forecasts for the same fixed events, but the key issue considering hypothesis testing, as the reader will see next, is to correctly match each central bank's announced forecast to the specific set of Consensus-surveyed insiders' forecasts it **can** directly and immediately influence as a policy signal (two months of Consensus Forecasts for either π or g). To tackle this problem, the emphasis is placed on the exact dates on which each central bank discloses the announced forecasts in its *IR*s (see Annex C). Once the dates of the two corresponding *Consensus Forecasts* surveys are determined, the *IR* announced forecasts for both variables are assigned to the corresponding place in row 'g' of the aforementioned data matrix, the row just below the one with 'standard deviations'.[11] Note that at the beginning of the sample, the series of official forecasts are not continuous because forecasts inside the corresponding *IR* are 'not available'.[12]

One must also take into account that each individual insider considered in *Consensus Forecasts* has a sub-sequence of 'not available' forecasts (e.g., inside each row in Annex A). Therefore, although the usual statistics (the standard deviation for the dispersion and the median for the calculation of the distance) can always be computed from the set of forecasts associated to those insiders who did send their forecasts for each variable in each specific matrix (specific month in the sample 2004-2014), the available forecasts are not numerous. The number of the insiders effectively surveyed by *Consensus Economics Inc.* in some countries becomes less than 10 for some months and does not usually reach the 85% of the total number of insiders surveyed during the whole sample period.[13]

Besides, the performance of the standard deviation (the dispersion estimator used by Filacek & Saxa, 2012, and *Consensus Forecasts*) is known to be poor when data is generated by a non-symmetric distribution or a heavy-tail distribution. Under these circumstances, robust dispersion estimators have been proposed by Rousseeuw & Croux 1993 (S_n y Q_n), which are defined below for the sake of completeness. Given a sample of n points, $x = \{x_1, x_2, ..., x_n\}$, the S_n- and Q_n-dispersion estimators are defined as

$$S_n \equiv s_{mp} s_{mg} med_i\{med_j\{|x_i - x_j|\}\}$$

$$Q_n \equiv q_{mp} q_{mg}\{|x_i - x_j|; \quad i < j\}_{(k)}, \quad k \equiv \binom{h}{2}, \quad h \equiv \lfloor n/2 \rfloor + 1$$

where s_{mg} and q_{mg} are the adjustment factors compensating for the (asymptotic) large-sample bias with respect to a normal distribution, and s_{mp} and q_{mp}, the adjustment factors compensating for the small-sample bias. The usage of the former keeps the homogeneity between the dispersion estimated measure and that one would obtain if the data came from a Gaussian distribution; the usage of the latter compensates for the potentially small number of surveyed insiders, which can be less than 10 for some countries (see Croux &

[10] *Consensus Economics Inc.* publishes forecasts surveys for Latin America in *Latin American Consensus Forecasts*, a publication with bi-monthly frequency between March 1993 and April 2001 and monthly frequency afterwards; for *G7* countries such as United Kingdom, the forecasts surveys are availabe in *(G7-) Consensus Forecasts*, a publication with monthly frequency since the beginnings of the 90s. As an illustration, Annex A lists the whole set of insiders surveyed for Peruvian forecasts during 2004-2014; Annex B lists the Peruvian variables whose forecasts are surveyed. *Consensus Forecasts* will be used to refer to both publications interchangeably from here on.

[11] As an illustration, see the first 2 columns of such a matrix in Annex A for the Peruvian case; the other columns therein come in pairs (current year and next year), a pair for each variable in Annex B.

[12] The preferred series of official forecasts do not assume a fixed monetary policy rate during the forecasting period (i.e., analogous to the insiders' forecasts.)

[13] In Annex A the reader can verify *Consensus Economics Inc.* surveyed a *total* of 28 insiders for Peru during the whole sample period. The *total* number of surveyed insiders reaches 44 for United Kingdom, the maximum of the 5 countries considered.

Rousseeuw, 1992). With respect to the notation, $\{y_i\}_{(k)}$ refers to the k-th order statistic obtained from the data set $\{y_i\}$; $\binom{a}{b}$, to the combinations of a elements taken in groups of b elements; and $\lfloor c \rfloor \equiv \max\{d \in \mathbb{Z} | d \leq c\}$, to the maximum integer of c.

The benefits from using other alternative dispersion estimators (such as the inter-quartil range, the bi-weight mid-variance or any member of the truncated-median family) are minimized by the aforementioned scarce number of effectively surveyed forecasts. The statistical efficiency, that is, an estimator's convergence velocity towards its population value, is another criterion for not considering other alternative dispersion estimators (such as the median of the absolute deviations with respect to the median, MAD).[14]

Hypothesis tests

Two hypothesis will be contrasted with each country's data (somewhat similar to Filacek & Saxa (2012)'s):

- Ha. The insiders consider the central bank's announced forecasts as **policy signals** to form their expectations (forecasts) about their economy (π or g), so these signals favor an **implicit coordination**: the disclosure of monetary authority's announced forecasts generates an immediate decrease in the robust measures of dispersion or distance.

- Hb. The coordination's effects depend upon the level of macroeconomic uncertainty. Assuming fixed the coordination costs with respect to the uncertainty, the greater the uncertainty, the greater the gross benefit obtained from coordinating, and therefore, coordination is reinforced: under a high level of macroeconomic uncertainty, the disclosure of monetary authority's announced forecasts generates an immediate decrease in the robust measures of dispersion or distance.

These hypotheses are contrasted considering forecasts for both the Consumer-Price-Index (CPI) inflation rate (π) and the Gross-Domestic-Product (GDP) growth rate (g), two complementary robust measures of the insiders' forecasts *dispersion*, S_n y Q_n,[15] as well as the *distance* between the insiders' forecast median and the central bank's announced forecasts (already used in Filacek & Saxa, 2012).

The forecast horizon h allows to make a key distinction between two types of forecasts (and between the corresponding two types of each coordination measure computed with them): the short-term forecast set ($h \leq 12$, with respect to the 'end-of-current-year' fixed event) and the medium-term forecast set ($h > 12$, with respect to the 'end-of-next-year' fixed event).[16]

The 3 measures of implicit coordination are plotted in Figures 1-6, depending upon which specific forecasts are used in their computation (π's or g's), and only for the months corresponding to the first forecast surveys that *can be* directly and immediately affected by the sequence of disclosures of monetary authority's announced forecasts (as will be clear next, those surveys are labeled $\{2\}$). Then follows a stylized description of Ha and Hb tests, only for the case of dispersions and the universe set of forecasts corresponding to the 'end-of-current-year' fixed event.

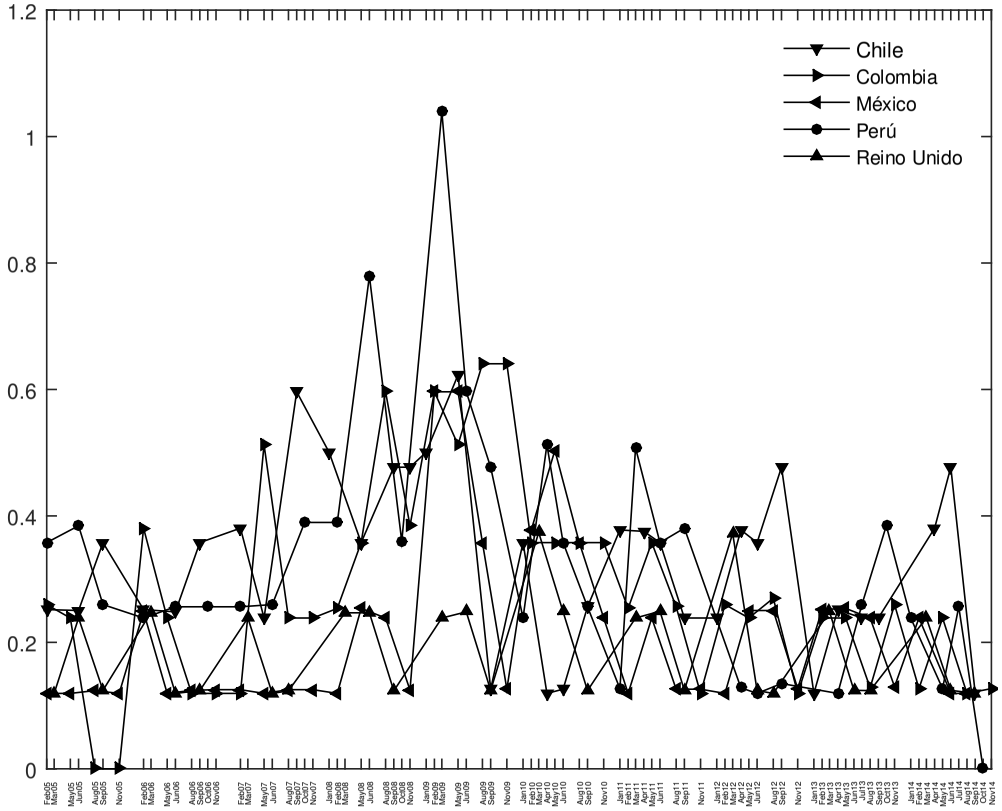
[14]MAD's statistical efficiency with respect to the usual estimator is only 37% with samples from the Gaussian distribution, while the statistical efficiencies corresponding to S_n and Q_n are 58% and 88%, respectively. See Rousseeuw & Croux (1992,1993).

[15]Since Rousseeuw & Croux (1993) support S_n because it behaves better than Q_n with small samples, it appears we can only emphasize the results associated with S_n. However, results for S_n and Q_n will be considered here because (1) Q_n is more statistically efficient than S_n, and (2) Q_n's *influence function* is free from discontinuities.

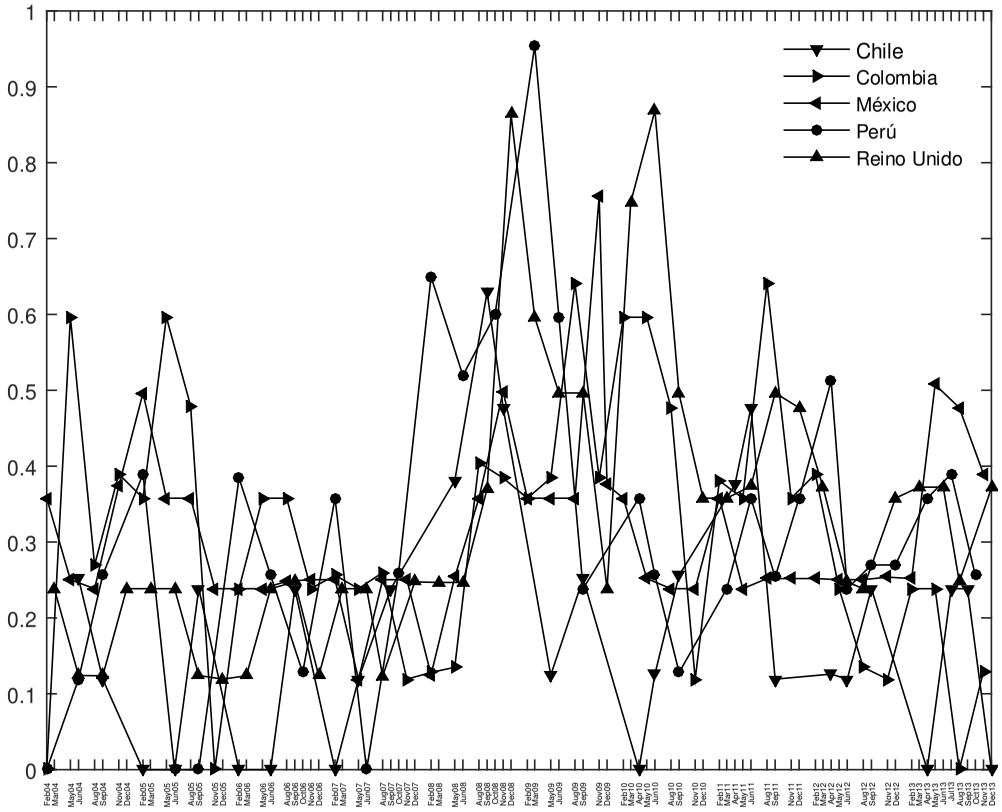
[16]Filacek & Saxa (2012) *do not* maintain that, for their 'joint tests' (i.e., without discriminating by the range of h) to be valid, it is required to control for the effect of h on dispersion and distance.

Figure 1: Measures of implicit coordination of π forecasts (YoY % change)

(a) S_n Dispersion of short-term forecasts made on {2} month



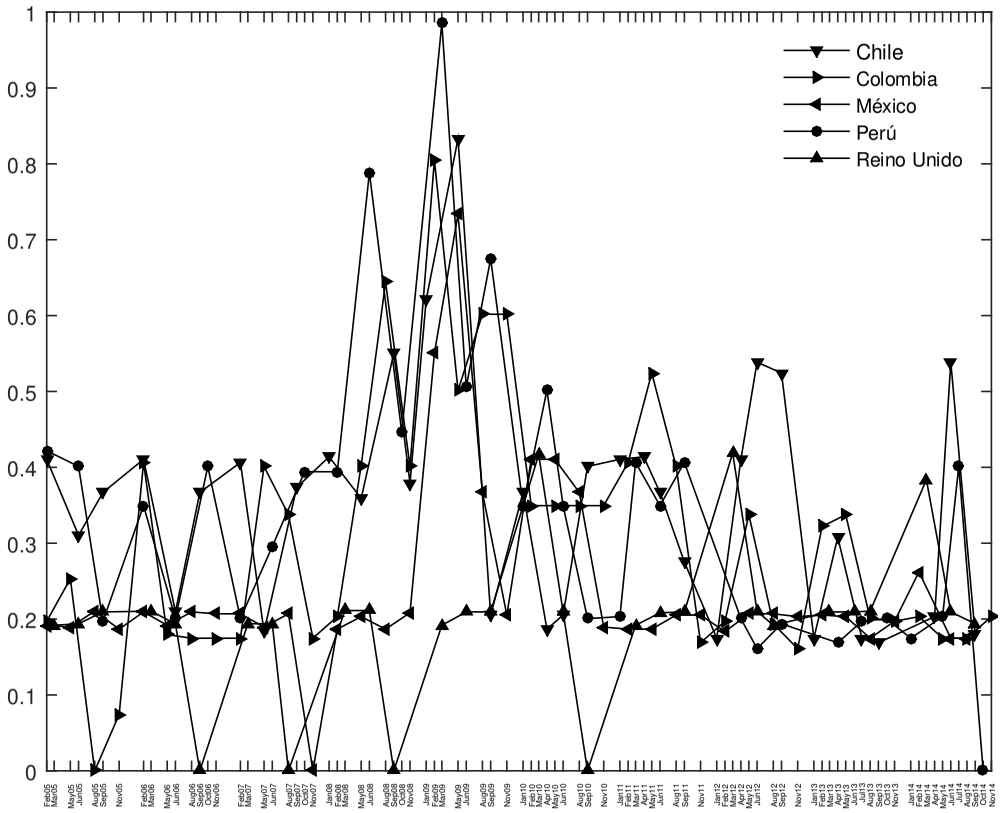
(b) S_n Dispersion of medium-term forecasts made on {2} month



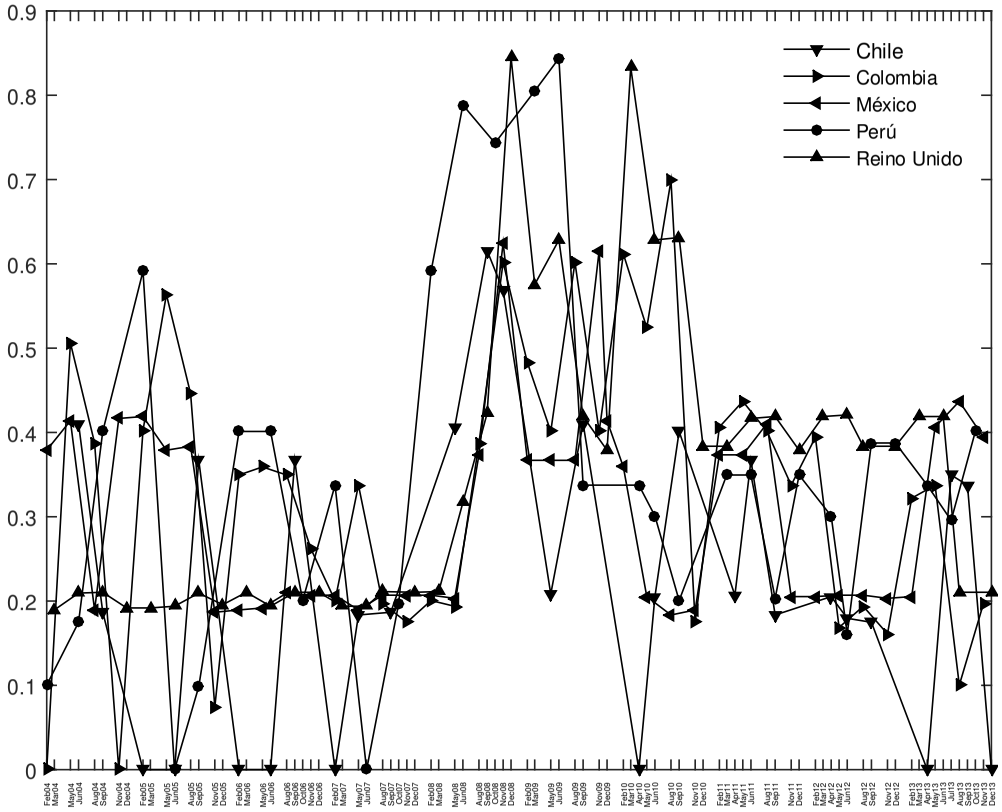
Note: The graphics show the S_n dispersion of the π forecasts surveyed on the current month ({2}), which can be affected by the central bank's announced forecast (*IR* publication). Although these forecasts have differente forecast horizons, they can be grouped as either short-term-horizon forecasts when they aim to the end of current year (panel (a)) or medium-term-horizon forecasts when they aim to the end of next year (panel (b)).

Figure 2: Measures of implicit coordination of π forecasts (YoY % change)

(a) Q_n Dispersion of short-term forecasts made on {2} month



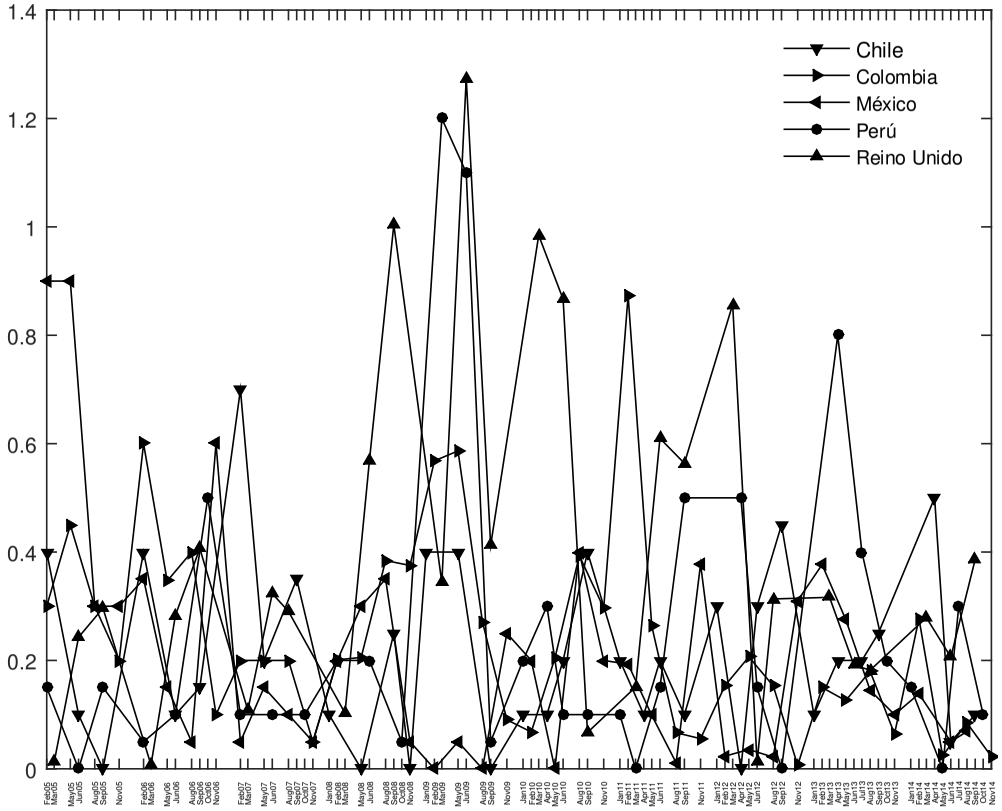
(b) Q_n Dispersion of medium-term forecasts made on {2} month



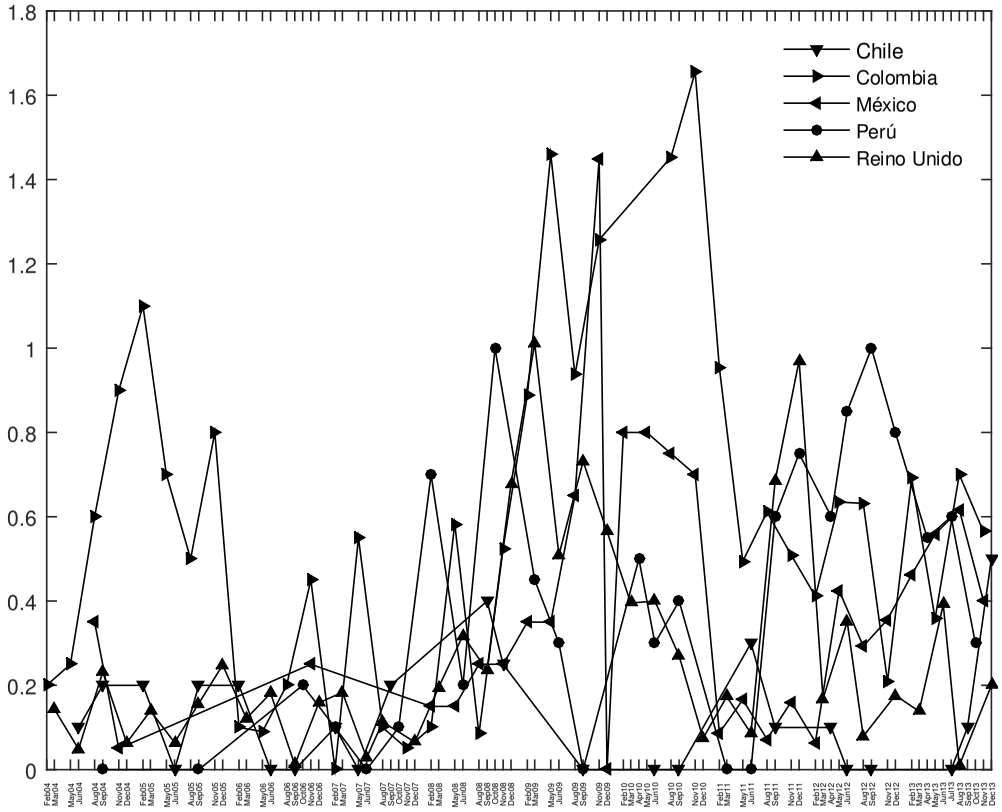
Note: The graphics show the Q_n dispersion of the π forecasts surveyed on the current month ({2}), which can be affected by the central bank's announced forecast (*IR* publication). Although these forecasts have differente forecast horizons, they can be grouped as either short-term-horizon forecasts when they aim to the end of current year (panel (a)) or medium-term-horizon forecasts when they aim to the end of next year (panel (b)).

Figure 3: Measures of implicit coordination of π forecasts (YoY % change)

(a) Distance of short-term forecasts made on {2} month



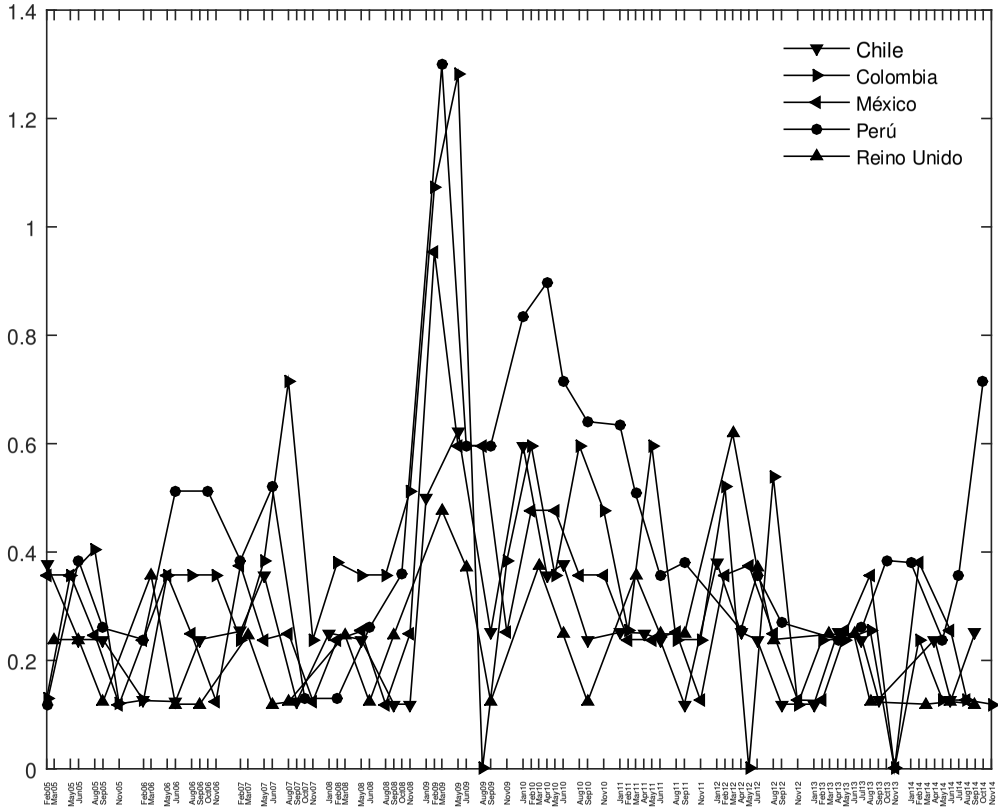
(b) Distance of medium-term forecasts made on {2} month



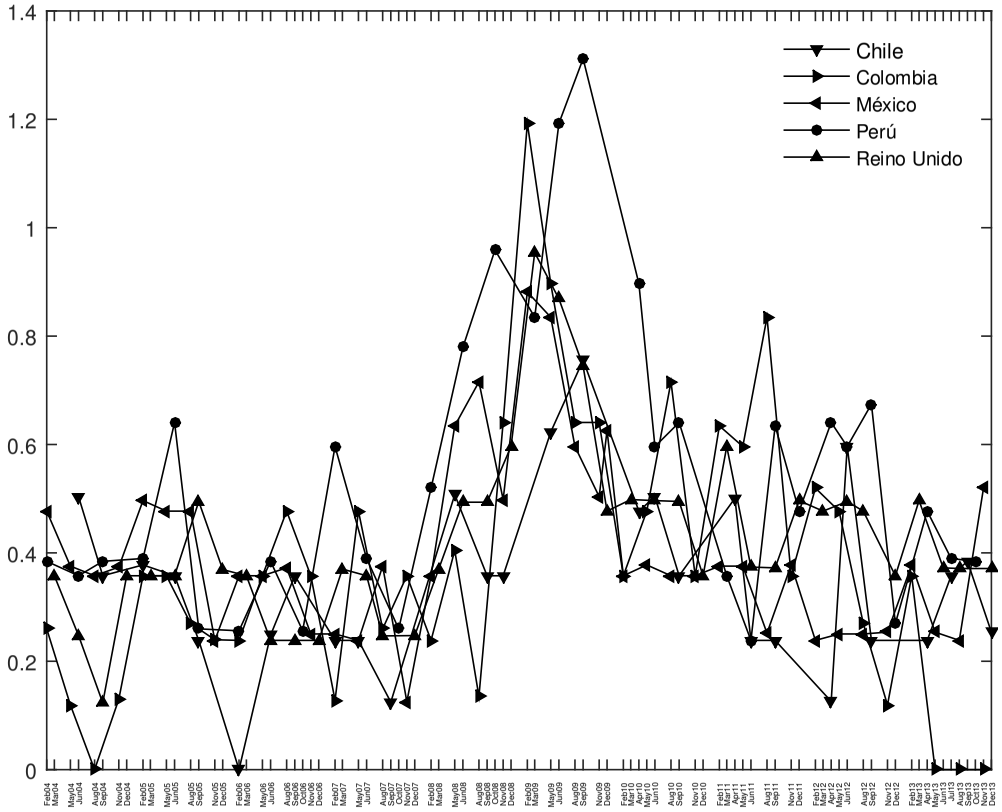
Note: The graphics show the distance between the median of the surveyed π forecasts and the central bank's announced forecast. The former forecasts were surveyed on the current month ({2}) such that they can be affected by the central bank's announced forecast (*IR* publication). Although these forecasts have differente forecast horizons, they can be grouped as either short-term-horizon forecasts when they aim to the end of current year (panel (a)) or medium-term-horizon forecasts when they aim to the end of next year (panel (b)).

Figure 4: Measures of implicit coordination of g forecasts (12-mo. avg. % change)

(a) S_n Dispersion of short-term forecasts made on {2} month



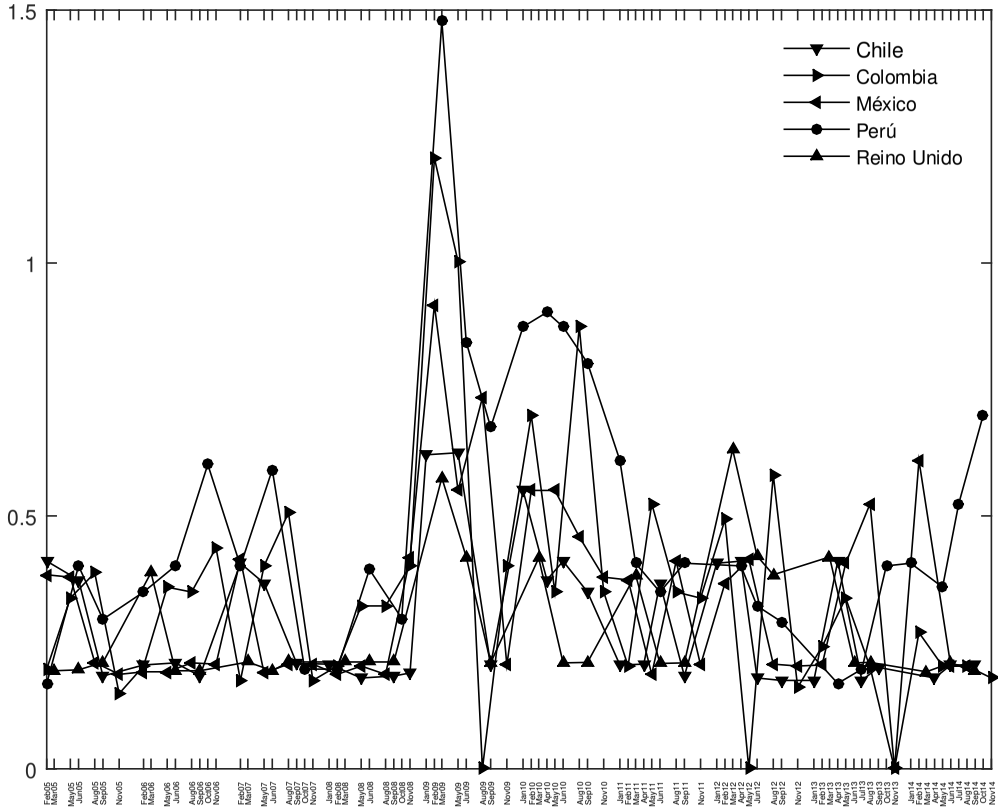
(b) S_n Dispersion of medium-term forecasts made on {2} month



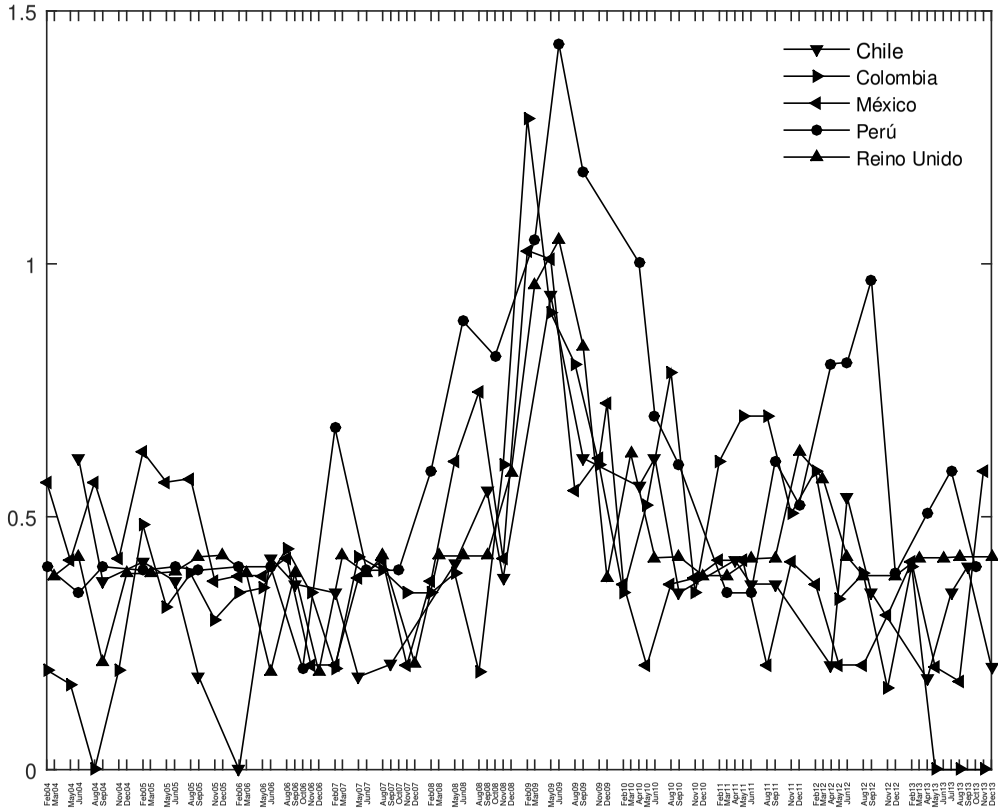
Note: The graphics show the S_n dispersion of the g forecasts surveyed on the current month ({2}), which can be affected by the central bank's announced forecast (*IR* publication). Although these forecasts have differente forecast horizons, they can be grouped as either short-term-horizon forecasts when they aim to the end of current year (panel (a)) or medium-term-horizon forecasts when they aim to the end of next year (panel (b)).

Figure 5: Measures of implicit coordination of g forecasts (12-mo. avg. % change)

(a) Q_n Dispersion of short-term forecasts made on {2} month



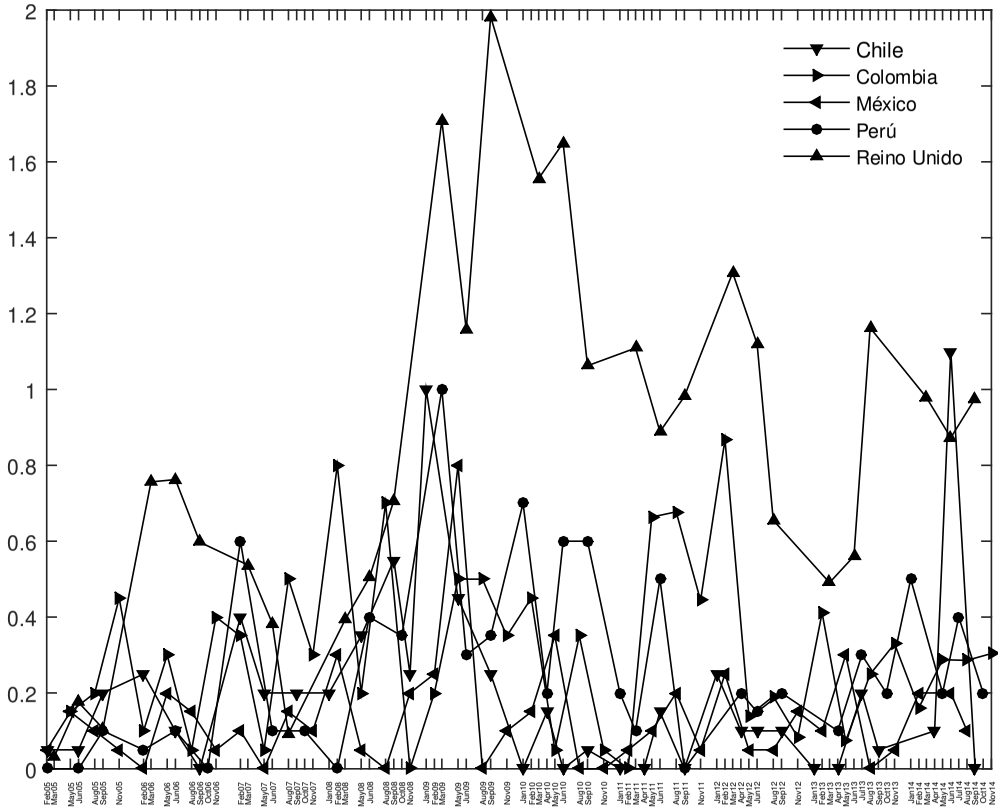
(b) Q_n Dispersion of medium-term forecasts made on {2} month



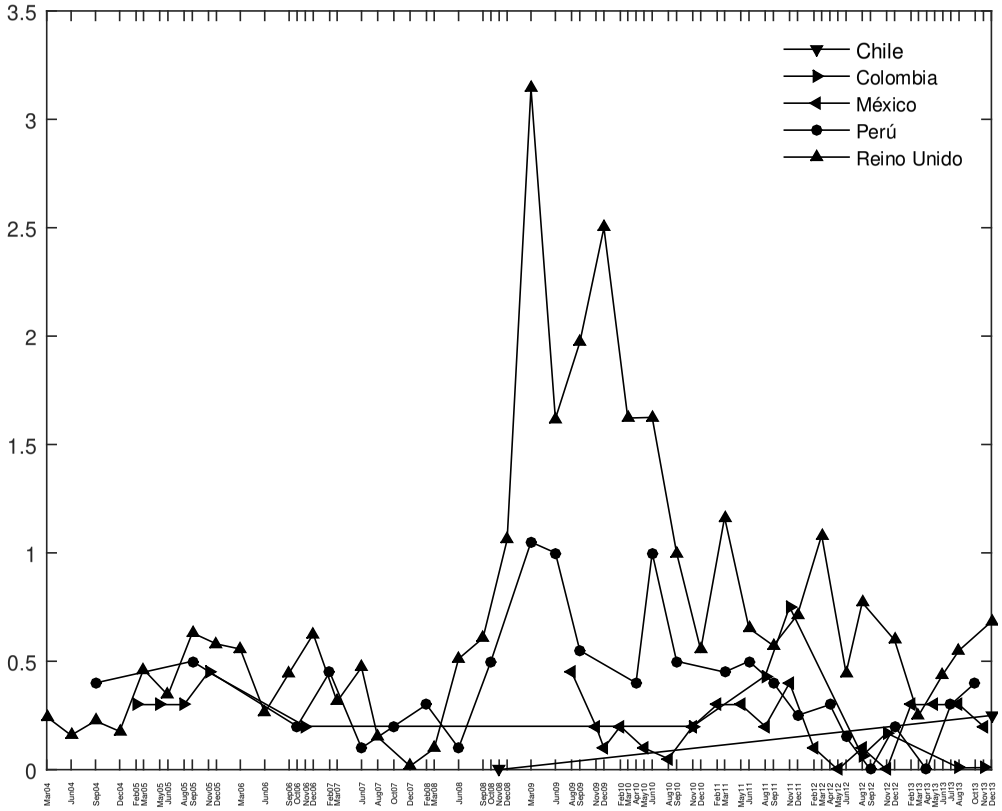
Note: The graphics show the Q_n dispersion of the g forecasts surveyed on the current month ({2}), which can be affected by the central bank's announced forecast (*IR* publication). Although these forecasts have differente forecast horizons, they can be grouped as either short-term-horizon forecasts when they aim to the end of current year (panel (a)) or medium-term-horizon forecasts when they aim to the end of next year (panel (b)).

Figure 6: Measures of implicit coordination of g forecasts (12-mo. avg. % change)

(a) Distance of short-term forecasts made on {2} month



(b) Distance of medium-term forecasts made on {2} month



Note: The graphics show the distance between the median of the surveyed g forecasts and the central bank's announced forecast. The former forecasts were surveyed on the current month ({2}) such that they can be affected by the central bank's announced forecast (*IR* publication). Although these forecasts have differente forecast horizons, they can be grouped as either short-term-horizon forecasts when they aim to the end of current year (panel (a)) or medium-term-horizon forecasts when they aim to the end of next year (panel (b)).

For the sake of specificity, the paper distinguishes two kinds of hypotheses. **Firstly**, the Ha hypothesis considers the insiders coordinate their forecasts about a particular variable (say π) with the corresponding central bank's announced forecasts in the sense that the latter's publication and media diffusion, when this forecast has the function of a quantitative coordination signal, generates a reduction in the *average net dispersion* of the insiders' forecasts (dispersion *net* of other sources of variation; see below). To contrast this hypothesis, the universe set of all monthly cross sections of insiders' forecast corresponding to the 'end-of-current-year' fixed event must be partitioned into 3 disjoint sets of cross sections according to their temporal relationship with respect to each IR announced forecast's publication month of the corresponding central bank:

1. the forecasts of the month just before the month of the IR publication date (and evidently before all the media diffusion efforts for the already published announced forecast);

2. the forecasts of the month after 1., i.e., the month of the first survey that **can be** immediately affected by the IR announced forecast's *publication* (if this forecast is considered as a 'quantitative signal'); and

3. the forecasts of the month after 2., i.e., the month of the second survey that **can be** immediately affected by both the IR announced forecast's publication and the following media diffusion efforts (if this forecast is considered as a 'quantitative signal').

The robust dispersion (say Q_n) is computed for each cross section in these three subsets of monthly forecast cross sections. The first series of monthly dispersions corresponds to the 'controls'; the second series corresponds to the 'subjects' treated by the publication; and the third series corresponds to the 'subjects' treated by the publication and the media diffusion efforts. After computing the average of the monthly dispersions for each series, it is possible to plot the *average gross dispersion*'s 'temporal evolution' over the 'average quarter' $\{1, 2, 3\}$, which provides the raw material for testing the effects of the publication and the media diffusion of central bank's announced forecasts.

In effect, it is not valid to implement the tests with this raw material. It is mandatory to estimate an auxiliary regression with all the three groups of monthly dispersions (the control groups and the two groups of 'subjects') to control for other causal sources of variation, i.e., different from the publication and the media diffusion of central bank's announced forecasts. The final product is the estimated residual vector: the three groups of monthly *net* dispersions, i.e., the *adjusted* group of controls and the *adjusted* two groups of 'subjects'. Lastly, upon obtaining the averages of these groups, the resulting *average net dispersion*'s 'temporal evolution' can only be attributed to the publication and the media diffusion of central bank's announced forecasts. All the results on section 4 below (in particular, the dispersion's results) were obtained by controlling for the following 'other sources of variation':

- the effect associated to the forecast horizon h along each fixed-event forecast sequence of 24 months, i.e., the calendar effects corresponding to a decreasing forecasts' uncertainty to the extent that h decreases (the fixed event's realization date approaches); and

- the effect associated to π's or g's *ex post* volatility, i.e., the volatility of aggregate shocks affecting the historical macroeconomic variable (π or g), which can be quantified by all insiders just at the date when they are surveyed (see description of Hb hypothesis below).

and Filacek & Saxa (2012) *did not* try to exclude these effects.[17]

Therefore, the goal of the 'auxiliary regression' is to explain dispersions in the whole sample (all 3 groups of monthly dispersions, a total of N observations) by the *ex post* volatility and a quadratic trend in the forecast horizon h corresponding to each monthly dispersion in the sample.[18]

The functional form of the auxiliary regression is key for the results' robustness. Filacek & Saxa (2012) use $\sigma_{js} = \exp(x_{js}\beta + \bar{u}_{js})$, $s \in \{1,2,3\}$, more specifically, $\log(\sigma_{js}) = x_{js}\beta + \bar{u}_{js}$. Since this functional form does not allow the inclusion of zero inside the dependent variable's range, the β parameters are not identified for admissible observations of the process under study (see Figures 1-6). Furthermore, since this functional form converts all zero and near-zero dispersions σ_{js} into very 'abnormal observations', it becomes problematic.[19]

The solution is to choose a functional form which allows zero inside the dependent variable's range, $\sigma_{js} = exp(x_{js}\beta) + u_{js}$, $s \in \{1,2,3\}$. This specification is estimated by a non-linear least squares (NLLS) procedure, plus a previous procedure enforcing suitable seeds, thus providing global NLLS estimates and improved auxiliary regression's stability. The latter procedure begins with the estimation of a simple linear regression $\sigma_{js} = x_{js}\beta + u_{js}$, $s \in \{1,2,3\}$, by ordinary least squares (OLS), which yields the values $\hat{\beta}_i$. Since these values should be equal to the new specification's average marginal effects, the solution of the resulting non-linear system of equations, $\beta_i/\hat{\beta}_i = [\sum_{js} \exp(x_{js}\beta)/N]^{-1}$, provides the seeds for the former procedure.[20]

The statistical tests are applied separately to the two available changes in *net dispersion* $\{u^*_{js}\}$: the change from $\{1\}$ month to $\{2\}$ month ($\{s = 2|s = 1\}$) and the change from $\{1\}$ month to $\{3\}$ month ($\{s = 3|s = 1\}$), where $u^*_{js} \equiv \sigma_{js} - exp(x^*_{js}\beta^*)$ are the estimated errors after excluding the explaining components related to the individual *ex post* volatility, the quadratic trend and the intercept, $x^*_{js}\beta^*$. Although Filacek & Saxa (2012) use the *net dispersions* $\{exp(\bar{u}_{js})\}$ in accordance with their specification, these authors also exclude the explaining component related to the other two dummy variables (c_2, c_3), thus eliminating a significant part of the effect they desire to contrast! (see footnote 18).

For either $\{s = 2|s = 1\}$ or $\{s = 3|s = 1\}$, the null hypothesis that there is no immediate change in the *average net dispersion* of the insiders' forecasts generated by the insiders' observing the coordination signal (the central bank's announced forecast) is tested against the alternative hypothesis that there is either an increase or a decrease in the *average net dispersion*. Thus, the paired-t test is a one-tail test and the computation of the *p-value* depends on the sign of its calculated value

$$t_{cal} = \hat{\bar{D}}_{\sigma_F} / (\frac{\hat{\sigma}_{D_{\sigma_F}}}{\sqrt{n}})$$

where $\hat{\bar{D}}_{\sigma_F}$ and $\hat{\sigma}_{D_{\sigma_F}}$ are the sample mean and sample variance of the n differences of the dispersion pairs after and before the aforementioned observation, $\{D^j_{\sigma_F}\}$, which are distributed $N(\bar{D}_{\sigma_F}, \sigma_{D_{\sigma_F}})$. Therefore, t_{cal} is distributed *t-Student* with $n-1$ degrees of freedom. Note n is the number of 'quarters' $\{1,2,3\}$ effectively used in the sample mean

[17] To exclude the effects of changes in the groups of insiders effectively surveyed (those who sent *at least the forecast of one variable* during the whole sample period), the inclusion of another set of dummy variables into the auxiliary regression was considered. Annex A shows the average participation of the insiders for Peru to illustrate how onerous the inclusion of such a number of dummies can be.

[18] For the sake of the regression's stability, three dummy variables (c_1, c_2, c_3) are included to capture the temporal evolution over the average quarter $\{1,2,3\}$, where c_1 corresponds to the intercept. These dummies are the only explanatory variables considered by Filacek & Saxa (2012), without encouraging results (see below).

[19] For the test based on the distances, this functional form converts every zero into $-\infty$.

[20] By the way, the suitable seeds for the non-linear system of equations are $\beta_i^{sys} = 0.025 * \text{sign}(\hat{\beta}_i)$.

after controlling for the 'not available' data (an issue in the case of the distance, which also requires the central bank's announced forecast).[21]

Secondly, the Hb hypothesis considers that whenever the IR publication dates correspond to periods of high uncertainty, the coordination between the insiders' forecasts and the central bank's announced forecasts is reinforced, so robust measures of dispersion and distance decrease upon monetary authority's signal. To implement this hypothesis, all the 'quarters' $\{1, 2, 3\}$ must be separated depending upon there was a high or low uncertainty during the corresponding $\{2\}$ months. Filacek & Saxa (2012)'s proposed two uncertainty measures are: (a) the average dispersion for each 'quarter', i.e., computed over the 3 cross-sections-of-forecasts sets (an uncertainty measure specific to each forecasted variable under study), or (b) the sum of the standardized 'quarterly average dispersions' of the M_k variables under study for each country k, that is, each of the M_k 'quarterly-average-dispersions' time series must be previously standardized (a country-specific uncertainty measure).

To identify the 'quarters' with high or low uncertainty, the selected uncertainty measure must be compared with its sample mean. Although Filacek & Saxa (2012) prefer choice (b) as the most appropriate macroeconomic uncertainty measure, the present study considers that

- it is feasible to compute a time series of *ex post* volatility for any individual variable from the corresponding historical data available in *Consensus Forecasts* (i.e., a moving window with 36 observations ending with those available in each month's *Consensus Forecasts* survey in the sample); and
- the set of available variables in *Consensus Forecasts* varies for each country (π and g belong to any country set considered, though).

Therefore, a proper country-specific uncertainty measure is just the sum of the standardized time series of *ex post* volatilities for each country k's π and g.

Abstracting from this macroeconomic uncertainty, the set of Hb tests becomes similar to the set of Ha tests. The need of two separated auxiliary regressions *seems* correct, one for the sub-sample of high-uncertainty quarters and one for the sub-sample of low-uncertainty quarters. Finally, since only one of the *ex post* volatility series included in the macroeconomic uncertainty series is actually an explanatory variable in the Ha-test auxiliary regression, the macroeconomic uncertainty series can be used to separate the same *net dispersion* data obtained from the Ha-test auxiliary regression for implementing the Hb tests.

IV. Results

This section presents the main results from both sets of tests (Ha y Hb) for the 5 countries considered and the 3 computed statistics with the π and g forecasts available on the *Consensus Economics Inc.*'s surveys. The number of 'hard facts'[22] obtained from the full-sample Ha tests is small, which motivates the inclusion of 'soft results' or 'weak evidence' corresponding to a 'range of significance' (*p-values* between 10% and 13%).[23] Annexes D, E and F show the details (degrees of fredom, Tcal's and *p-values*).

[21] The paired-t test is more robust than the non-parametric permutation test (which does not assume normality of the 2 groups of data being compared).

[22] These results correspond to a significance level of 10%.

[23] A wider range implies the prohibitive cost of these soft results' being false.

Table No. 1. *Ha* tests with dispersion (*) & full sample 1R

Country	S_n **effect**	**variable**		**survey's month**		**horizon range**
		π	g	current	next	
Mexico	decrease	x		x		$h \leq 12$
Peru	decrease		x	x		$h \leq 12$
United Kingdom	increase	x		x		$h > 12$

(*) S_n and Q_n are robust estimators for the dispersion of *Consensus Economics Inc.*'s forecasts (π or g). Neither a hard nor a weak result has been found with Q_n.

Robust Dispersion (S_n & Q_n)

Table No. 1 shows that official forecasts' publication decreased S_n dispersion of short-term π [g] forecasts in **Mexico [Peru]**. Official forecasts increased S_n dispersion of medium-term π forecasts in United Kingdom at the same month of their publication (see 'current' column). Note that the joint effect of publication *and* media diffusion of official forecasts is null in all countries under study according to these tests (see 'next' column): they have not decreased S_n dispersion of forecasts (fortunately, there is no hard evidence about increased S_n dispersion, either). These results are consistent with those based on Q_n dispersion: both the publication effect and its joint effect with media diffusion on Q_n dispersion of forecasts are null in all countries under study (there is no hard evidence that they either increase or decrease this dispersion).

On the one hand, the results above illustrate the usefulness of separating the official forecasts' publication effect from its joint effect with the associated media diffusion. Only the joint effects consider the potentially important benefits from making the majority of agents become attentive to the already published official forecasts. This idea should be present while interpreting the following tables, despite of using 'the disclosure' of the official forecasts as equivalent to either 'the publication' or 'the publication and the media diffusion' of the official forecasts.

On the other hand, the small number of full-sample hard results suggests the tests must be carried out with two separated samples, each with its own characteristics. This strategy avoids the full sample's 'masking effect': for instance, two opposite-sign effects (obtained from two complementary sub-samples and significantly different from zero) can cancel each other out, giving rise to a not-statistically-significant full-sample effect.[24]

Therefore, the full sample is divided into two sub-samples, depending on whether the level of macroeconomic uncertainty is high or low. By focusing on the hard results, Table No. 2 shows that official forecasts' disclosure decreased S_n dispersion of *short-term* π forecasts in **Chile** (a) within the official forecasts' publication month (the current month) whenever this publication month is labeled a 'high-uncertainty month' (HU month), as well as (b) within the month *after* the publication month (the next month) whenever the publication month is labeled as a 'low-uncertainty month' (LU month). There was no statistically significant result associated with Q_n dispersion.

In **Colombia** official forecasts' disclosure increased S_n dispersion of *medium-term* g forecasts within the next month whenever the publication month is a HU month *but* decreased it whenever the publication month is a LU month. Considering Q_n dispersion, official forecasts' disclosure decreased Q_n dispersion of *medium-term* g forecasts within the next month whenever the publication month is a LU month. There were no full-sample hard results similar to these findings for Chile and Colombia (see Table No. 1).

In **Mexico** official forecasts' disclosure decreased S_n dispersion of *short-term* π forecasts within the current month whenever the publication month is a HU month; it also decreased S_n dispersion of *medium-term* g forecasts within the current month whenever

[24] Each sub-sample effect is obtained with degrees of freedom which are close to half of the full-sample effect's.

Table No. 2. *Hb* tests with dispersion (*) & separated samples 5R

Country	S_n **effect**	**variable**		**survey's month**		**horizon range**	***IR* level of uncertainty**
		π	g	current	next		
Chile	¿decrease?		x	x		$h \leq 12$	high
	decrease	x		x		$h \leq 12$	high
	decrease	x			x	$h \leq 12$	low
Colombia	increase		x		x	$h > 12$	high
	decrease		x		x	$h > 12$	low
Mexico	decrease	x		x		$h \leq 12$	high
	¿decrease?	x			x	$h \leq 12$	high
	decrease		x	x		$h > 12$	high
	increase		x		x	$h > 12$	low
Peru	decrease		x	x		$h \leq 12$	low
	increase	x			x	$h \leq 12$	high
	increase		x		x	$h > 12$	high
	¿increase?		x	x		$h > 12$	low
	¿increase?	x		x	x	$h > 12$	low
United Kingdom	increase	x		x		$h > 12$	high

Country	Q_n **effect**	**variable**		**survey's month**		**horizon range**	***IR* level of uncertainty**
		π	g	current	next		
Colombia	decrease		x		x	$h > 12$	low
Mexico	decrease	x			x	$h \leq 12$	high
	increase	x			x	$h \leq 12$	low
	¿increase?	x			x	$h > 12$	low
Peru	¿decrease?		x	x		$h \leq 12$	low
	decrease	x		x	x	$h > 12$	high
United Kingdom	decrease		x		x	$h \leq 12$	high
	¿increase?		x		x	$h \leq 12$	low

(*) S_n and Q_n are robust estimators for the dispersion of *Consensus Economics Inc.*'s forecasts (π or g). When the effect appears between signs of interrogation, it is a 'weak evidence' obtained with a 'significance range' greater than 10% and less than 13%.

the publication month is a HU month, *but* it increased S_n dispersion of *medium-term* g forecasts within the next month whenever the publication month is a LU month. Considering Q_n dispersion, official forecasts' disclosure decreased Q_n dispersion of *short-term* π forecasts within the next month whenever the publication month is a HU month (the analogous S_n dispersion reduction was only a weak evidence; see table). However, official forecasts' disclosure increased Q_n dispersion of *short-term* π forecasts within the next month whenever the publication month is a LU month.

In **Peru** official forecasts' disclosure decreased S_n dispersion of *short-term* g forecasts within the current month whenever the publication month is a LU month, but it increased (1) S_n dispersion of *short-term* π forecasts within the next month whenever the publication month is a HU month, and (2) S_n dispersion of *medium-term* g forecasts within the next month whenever the publication month is a HU month. Considering Q_n dispersion, the analogous dispersion reduction mentioned at the beginning of this paragraph is actually a weak result; considering hard results, official forecasts' disclosure decreased Q_n dispersion of *medium-term* π forecasts within both the current and next month whenever the publication month is a HU month.

Finally, in **United Kingdom** official forecasts' disclosure increased S_n dispersion of *medium-term* π forecasts within the current month whenever the publication month is a HU month. Considering Q_n dispersion, official forecasts' disclosure decreased Q_n dispersion of *short-term* g forecasts within the next month whenever the publication month is a HU month.

Distance

The Table No. 3 considers the same kind of tests as in Table No. 1 (full sample)

Table No. 3. *Ha* tests with distance (*) & full sample 2R

Country	**Effect**	**distance**		**survey's monthly**		**horizon**
		π	g	current	next	**range**
Chile	decrease	x		x	x	$h \leq 12$
	¿decrease?	x			x	$h > 12$
Colombia	decrease	x		x	x	$h \leq 12$
	decrease		x	x	x	$h > 12$
Mexico	decrease	x			x	$h > 12$
Peru	decrease	x			x	$h \leq 12$
United Kingdom	¿decrease?	x		x		$h > 12$

(*) Distance between the median of *Consensus Economics Inc.*'s forecasts (π or g) and the central bank's announced forecast. When the effect appears between signs of interrogation, it is a 'weak evidence' obtained with a 'significance range' greater than 10% and less than 13%.

but applied to the distance between the median of *Consensus Economics Inc.*'s (π or g) forecasts and the central bank's announced forecast (o simply, the distance). The number of hard results increases. In **Chile** and **Colombia** official forecasts' disclosure decreased the distance associated with *short-term* π forecasts within the current month and the next month. Surprisingly, **Colombia** achieved a similar success considering *medium-term* g forecasts.

In **Mexico** and **Peru** official forecasts' disclosure decreased the distance associated with π forecasts within the next month (*short-term* forecasts in Peru and *medium-term* forecasts in Mexico). In **United Kingdom** official forecasts' disclosure did not decrease the distance; fortunately, there is no hard evidence about increased distance, either.

The number of hard results from full-sample tests is reasonable and suggests the distance is an improved measure for evaluating the effect of official forecasts' disclosure. Considering the 'weak evidence', in **Chile** and **United Kingdom** official forecasts' disclosure *would have* decreased the distance of *medium-term* π forecasts (within the next month and the current month, respectively).

The tests applied to the average distance in the complementary sub-samples (separated according to the dichotomy between high and low macroeconomic uncertainty) are presented in Table No 4. Although these tests use nearly the half of available observations, they avoid the possible cancellation of two opposite-sign effects and thus provide more specific hard results.

In **Chile** official forecasts' disclosure decreased the distance of *short-term* π forecasts within both the current month and the next month, whenever the publication month is a LU month. This specific hard result is also complemented with a more specific weak result: it *would have* decreased the distance of *short-term* π forecasts within the next month, *but* whenever the publication month is a HU month. Those results are actually consistent with the associated hard result from full-sample tests in the preceding table.

All the following results are hard results. In **Colombia** official forecasts' disclosure decreased the distance of *short-term* π forecasts within the current month, no matter what the level of macroeconomic uncertainty; it also decreased the distance of *medium-term* g forecasts within both the current month and the next month, whenever the publication month is a HU month. These hard results are consistent with the associated hard results from full-sample tests in the preceding table.

In **United Kingdom** official forecasts' disclosure decreased the distance of *short-term* π forecasts within both the current month and the next month, as well as the distance of *medium-term* π forecasts within the current month, whenever the publication month is a HU month (in both cases). Note the latter hard result is consistent with the corresponding weak result in the preceding table.

In **Mexico** official forecasts' disclosure decreased the distance of *medium-term* π forecasts within the next month, whenever the publication month is a LU month. Similarly, in

Table No. 4. *Hb* tests with distance (*) & separated samples 6R

Country	**Effect**	**distance**		**survey's month**		**horizon**	***IR* level of**
		π	g	current	next	**range**	**uncertainty**
Chile	¿decrease?	x			x	$h \leq 12$	high
	decrease	x		x	x	$h \leq 12$	low
Colombia	decrease	x		x		$h \leq 12$	high
	¿decrease?	x			x	$h \leq 12$	high
	decrease	x		x		$h \leq 12$	low
	decrease		x	x	x	$h > 12$	high
Mexico	¿decrease?		x	x	x	$h > 12$	high
	decrease	x			x	$h > 12$	low
Peru	increase		x	x	x	$h \leq 12$	high
	decrease		x	x		$h \leq 12$	low
	decrease	x			x	$h \leq 12$	low
	¿decrease?	x		x		$h > 12$	low
United Kingdom	¿increase?		x	x		$h \leq 12$	high
	decrease	x		x	x	$h \leq 12$	high
	decrease	x		x		$h > 12$	high

(*) Distance between the median of *Consensus Economics Inc.*'s forecasts (π or g) and the central bank's announced forecast. When the effect appears between signs of interrogation, it is a 'weak evidence' obtained with a 'significance range' greater than 10% and less than 13%.

Peru it decreased the distance of *short-term* π forecasts within the next month, whenever the publication month is a LU month. Newly, these hard results for the two countries are consistent with the corresponding hard results in the preceding table.

Finally, and furthermore with respect to previous paragraph, in **Peru** official forecasts' disclosure decreased the distance of *short-term* g forecasts within the current month whenever the publication month is a LU month. However, it also *increased* the distance of *short-term* g forecasts within both the current month and the next month, whenever the publication month is a HU month.

Table No. 5. Performance measures from *Hb* tests (*)

Country	**Month**	**Dispersion**			**Distance**	**Total**
		S_n	Q_n	σ_z^i	d_z^i	t_z^i
Chile	current	$(1+0)/8$	$(0+0)/8$	$1/16$	$(1+0)/8$	$3/16$
	next	$(1+0)/8$	$(0+0)/8$	$1/16$	$(1+0)/8$	$3/16$
Colombia	current	$(0+0)/8$	$(0+0)/8$	$0/16$	$(2+1)/8$	$6/16$
	next	$(0+0)/8$	$(0+1)/8$	$1/16$	$(0+1)/8$	$3/16$
Mexico	current	$(1+1)/8$	$(0+0)/8$	$2/16$	$(0+0)/8$	$2/16$
	next	$(0-1)/8$	$(0+0)/8$	$-1/16$	$(0+1)/8$	$1/16$
Peru	current	$(1+0)/8$	$(0+1)/8$	$2/16$	$(0+0)/8$	$2/16$
	next	$(-1-1)/8$	$(0+1)/8$	$-1/16$	$(0+0)/8$	$-1/16$
United Kingdom	current	$(0-1)/8$	$(0+0)/8$	$-1/16$	$(1+1)/8$	$3/16$
	next	$(0+0)/8$	$(1+0)/8$	$1/16$	$(1+0)/8$	$3/16$

(*) The 1^{st} [2^{nd}] summand on each parenthesis corresponds to the sub-total associated to the short-term [medium-term] forecasts. The measure of performance σ_z^i is 'calculated' by dividing the total score obtained by the maximum feasible score with respect to both the S_n dispersion and the Q_n dispersion.

Epilogue

A useful way to summarize the results above is to define an adequate score based on the total number of Hb hypothesis for every country. Let any increase [reduction] in the coordination measure (S_n dispersion, Q_n dispersion or distance) be valued as one negative point (-1) [one positive point ($+1$)]. Four sub-totals are obtained from aggregating the points across all Hb tests (π and g; high and low uncertainties), one pair for forecasts made at the same month of their publication (see 'current' row) -one for short-term forecasts and one for medium-term forecasts- and another pair for forecasts made at the next month of their publication (see 'next' row) -one for short-term forecasts and one for medium-term forecasts-. The **absolute scores** for each country i are obtained by summing each pair of sub-totals: the total points from forecasts made at the 'current' month and the total points from forecasts made at the 'next' month.[25] However, a **relative score** requires a normalization by dividing each country i's absolute score by the total number of Hb tests leading to either the maximum or the minimum absolute score. Let σ_z^i be country i's dispersion relative score for month z, let d_z^i be country i's distance relative score for month z; these two measures can be summed into the total measure t_z^i by simple arithmetic.[26]

Table No. 5 shows the big picture of these countries' limited success while managing *insiders*'s expectations, that is, the forecasts made by professional forecasters and financial markets' participants; notwithstanding the foregoing, the 'ranking' favors Colombia, Chile and United Kingdom. These results should be appreciated from the view of Kumar *et al.* (2015)'s results referring to the expectation surveys to CEOs in New Zealand: their π expectations display a low degree of anchoring as well as high levels of short-term and long-term dispersion (in spite of NZ *inflation targeting*'s being 25 years old). By using many quantitative criteria, Kumar *et al.* (2015) find that CEOs' expectations are more similar to households' than to *insiders*', and that monetary authority's communication strategy in New Zealand would not have been sufficiently effective with respect to the *insiders*' either.[27]

The explanations for these findings concerning the second link of the coordination chain: firms in New Zealand obtain scarce net benefits from coordinating their forecasts with the insiders' (gross benefits from coordination are close to coordination costs). A reasonable explanation is related to the first link of the coordination chain: the insiders in New Zealand obtain scarce net benefits from coordinating their forecasts with the primary insider's, i.e., the central bank's official forecasts. For the cases of Chile, Colombia, Mexico, Peru and United Kingdom, the results concerning the first link of the coordination chain clearly point out that the insiders therein obtain scarce net benefits from coordinating their forecasts with the central bank's, thus anticipating the state of affairs concerning the following links of the coordination chain of expectations.

[25]For the watchful reader, he can just sum the points associated to each significative *p-value* -bold letters- (while considering the corresponding *Tcal*'s sign, immediately to its left) down through the two *p-values* columns in Tables D.2, E.2 y F.2 (Anexos D, E y F).

[26]The fractions t_z^i have common denominator 16, so let n be its denominator in general. Then any t_z^i can be transformed to the usual scale via the equation $m = 20(n+16)/32$, so $\{-1, 1, 2, 3, 6\}$ are equivalent to {9.4,10.6,11.3,11.9,13.8}.

[27]As already referenced in footnote 7, Huang & Trehan (2008) consider U.S. firms' expectations about π are closer to *professional forecasters*' because firms hire these forecasters to gauge future π. Kumar *et al.* (2015) report that only 20% of their surveyed firms in New Zealand rely on professional forecasts about π.

V. Conclusions

The goal is to evaluate the signal effect of the central-bank-forecast disclosure on both (1) the dispersion of 'fixed-event forecasts' elaborated by the insiders (surveyed by *Consensus Economics Inc.*) with respect to π and g, as well as (2) the convergence of these insiders' forecasts towards the forecasts announced by the central banks (decreases in the distance) in Chile, Colombia, Mexico, Peru and United Kingdom from 2004 to 2014.

In spite of the important achievements of inflation targeting in all these countries, there are few occasions in which both *net dispersion* and *net distance* decrease (even for Colombia, Chile and United Kingdom), thus indicating that monetary authorities therein do have difficulties in managing private expectations. In this regard, their monetary-policy and expectation-management contexts correspond to Hubert (2011)'s *endogenous influence* where, disregarding their forecasting performances, the only source of monetary authorities' influence is related to their qualitative policy signals, and thus these authorities must respond by using a policy rule depending upon private forecasts instead of these authorities' own internal forecasts. The disclosure of the central bank 'perceptions' becoming a monetary policy instrument is a possibility only when both *net dispersion* and *net distance* frequently and regularly decrease. This is the unique instance in which this disclosure can generate 'good-news' shocks to compensate 'bad-news' shocks (the converse is also true), thus making the monetary authority be able to drive private expectations about key variables towards their fundamental values.

These findings concern the first link of the coordination chain of expectation (the transmission of monetary authority's quantitative signals) since those effects are measured with *Consensus Economics Inc.*'s forecasts survey of the professional forecasters and the financial-market participants (referred all together as 'insiders'). So it may be argued that the confirmation of the conclusions above requires to consider the forecasts and expectations of a wide range of economic agents, such as surveys of households and/or firms about their economic perceptions. However, New Zealand's case shows this is not necessary: (1) within the first link of the coordination chain, if the insiders' net benefits from coordinating their forecasts with the central bank's official forecasts are zero or negative, then it is possible to anticipate that (2) within the second link of this coordination chain, the firms' net benefits from coordinating their forecasts with the insiders' forecasts will be zero or negative, and that (3) within the third link of this coordination chain, the households' net benefits from coordinating their forecasts with the firms' forecasts will be zero or negative (a simplifying assumption here is that retail firms are the same as the wholesale firms). And all these ideas are consistent with the known sensibility of households' expectations to food and energy commodities prices' fluctuations, as well as their persistent biases with respect to these fluctuations (a key difficulty faced by inflation-targeting central banks).

The extension of the study to variables other than π and g (whose forecasts are also included inside the announcements - *IR* - published by inflation-targeting central banks) can be justified by the requirement that both the announced forecasts and the detailed modeling information reflect the effort to improve the forecasting precision of the whole macroeconomic policy scenario (i.e., including sectoral real growth forecasts, individual forecasts for a wide range of items included in the consumer price index's basket, etc.). It would increase the central banks' comprehensive 'perception' about the economy (which they publish and disseminate by press conferences) and facilitate the formation of a coordination chain of expectations. Eventually, it would potentially change the context of the management of private expectations in the medium term towards the one called *endogenous influence*, under which monetary authorities are able (and obliged) to respond by using a policy rule depending upon their own internal forecasts (see Hubert 2011).

There are many recommendations from this study. First, it is mandatory to design an

internal mechanism of incentives favoring (a) the development of forecasting models based on both their precision and their robustness, and (b) the frequent *ex post* evaluation of internal forecasts. Second, the elements associated with media diffusion of the announced forecasts (already disclosed to the public) must be appropriately considered, in particular (i) that the publication date should always be among the first days of the corresponding month, so as to maximize the probability of being considered by the majority of the targeted set of insiders (for instance, those surveyed by *Consensus Economics Inc.*); (ii) that the appropriate use of media favor the knowledge of the announced forecasts by the maximum number of agents, for instance by announcing in private TV stations in absence of a self-owned TV station, such as the case of Colombia (see the footnotes to the corresponding Annex C's Table); and (iii) that the format of the announced forecasts provides them for the same number of years into the future ('fixed events'), excluding the preliminary numbers for the year which is ending this month or has already ended one or two months ago (nowcasting).

In as much as both the monetary authorities can pass through the Colombian monetary authorities' media-diffusion experience and all aforementioned countries' central banks can improve their strategies of predictive modeling and publication of comprehensive macroeconomic scenarios to support their policy decisions, an increase in the number of significant net *distance* and *dispersion* reductions will be observed on each link of the coordination chain. The changes associated with financial stability goals should not affect the inflation targeting efforts. The disclosure improvements will reduce the sensitiveness of households' expectations before commodity prices' ups and downs, and convert the context of private expectations management into one of *endogenous influence*: inflation targeting v2.0!

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ANNEX A: Insiders surveyed by *Consensus Economics Inc.* about Peru's macroeconomic variables

Surveyed insiders: participation and absences					
Item #	Insider's Name	Months of participation	As a % of total number of months ($T = 129$ 1/)	Months of absence	As a % of the months of particip. (%)
1	Larraín Vial	9	7.0	0	0.0
2	Oxford Economics	9	7.0	1	11.1
3	BTG Pactual	17	13.2	2	11.8
4	Barclays Capital	6	4.7	8	133.3
5	Deutsche Bank	32	24.8	3	9.4
6	HBSC	60	46.5	13	21.7
7	BofA - Merrill Lynch	29	22.5	1	3.4
8	Inteligo SAB	51	39.5	7	13.7
9	Capital Economics	58	45.0	7	12.1
10	IDEAglobal	32	24.8	4	12.5
11	Global Insight	104	80.6	13	12.5
12	Dresdner Bank	33	25.6	6	18.2
13	Credit Suisse	52	40.3	24	46.2
14	Scotiabank	80	62.0	18	22.5
15	Banco de Crédito del Perú	73	56.6	56	76.7
16	EIU	127	98.4	2	1.6
17	Apoyo Consultoría	102	79.1	27	26.5
18	Banco Wiesse Sudameris	31	24.0	1	3.2
19	CS First Boston	19	14.7	1	5.3
20	JP Morgan Chase	121	93.8	8	6.6
21	Macroconsult	87	67.4	42	48.3
22	BankBoston	12	9.3	0	0.0
23	BBVA Banco Continental	92	71.3	37	40.2
24	CESLA (Klein-UAM)	117	90.7	12	10.3
25	IPE	106	82.2	23	21.7
26	Centura SAB	66	51.2	5	7.6
27	Santander Perú	19	14.7	1	5.3
28	Citigroup	67	51.9	62	92.5
a	*Consensus Forecasts* average				
b	Last month's average				
c	Average three months ago				
d	Maximum				
e	Minimum				
f	Standard deviation				
g	BCRP's forecasts 2/				
h	CAF's forecasts				
i	IMF's forecasts				
j	ECLAC's forecasts				

Source: *Latin American Consensus Forecasts* (*LACF*).
Notes: 1/ Between January 2004 and December 2014 there are $T = 132$ months. 2/ Assigned to this row in the database (See Annex C).

ANNEX B: Peru's macroeconomic variables whose forecasts are surveyed by *Consensus Economics Inc.*

Macroeconomic variables	
Number	**Description**
1	Gross Domestic Product (12-mo. avg. % change)
2	Private Consumption (12-mo. avg. % change)
3	Gross Fixed Investment (12-mo. avg. % change)
4	Manufacturing Production (12-mo. avg. % change)
5	Metropolitan Lima Consumer Price Index (YoY % change)
6	Goods Exports (US$ bllns. FOB)
7	Goods Imports (US$ bllns. FOB)
8	Trade Balance (US$ bllns. FOB)
9	Current Account Balance (US$ bllns. FOB)
10	IMF-related International Reserves (US$ bllns. FOB)

Source: ***Latin American Consensus Forecasts*** **(*LACF*).**

ANNEX C: Assignment of *IR* forecasts to *Consensus Economics Inc.* surveys

Dates associated with Chile's *IR*s					
Number	*IPoM*	Presentation the the Senate 1/	Tentative assignment of the *IR* from *LACF* survey 2/	*LACF Survey Date* close to the present. to the Senate	Final assignment of the *IR* from *LACF* survey 2/
	Sep03	10sep03	(Sep03)	15sep03	(Sep03)
1	Jan04	14jan04	Jan04	19jan04	Jan04
2	May04	01jun04	Jun04	21jun04	Jun04
3	Sep04	14sep04	Sep04	20sep04	Sep40
5	Jan05	19jan05	Feb05	17jan05	Feb05
6	May05	18may05	Jun05	16may05	Jun05
7	Sep05	31aug05	Sep05	15aug05	Sep05
9	Jan06	18jan06	Feb06	16jan06	Feb06
10	May06	17may06	Jun06	15may06	Jun06
11	Sep06	13sep06	Sep06	18sep06	Sep06
13	Jan07	17jan07	Feb07	15jan07	Feb07
14	May07	16may07	Jun07	21may07	May07
15	Sep07	05sep07	Sep07	17sep07	Sep07
17	Jan08	16jan08	Feb08	21jan08	Jan08
18	May08	12may08	May08	19may08	May08
19	Sep08	11sep08	Sep08	15sep08	Sep08
20	Nov08	14nov08 3/	Nov08	17nov08	Nov08
21	Jan09	14jan09	Jan09	19jan09	Jan09
22	May09	13may09	May09	18may09	May09
23	Sep09	15sep09	Sep09	21sep09	Sep09
24	Dec09	16dec09	Jan10	14dec09	Jan10
25	Mar10	06apr10	Apr10	19apr10	Apr10
26	Jun10	16jun10	Jul10	21jun10	Jun10
27	Sep10	08sep10	Sep10	20sep10	Sep10
28	Dec10	20dec10	Jan11	13dec10	Jan11
29	Mar11	04apr11	Apr11	11apr11	Apr11
30	Jun11	20jun11	Jul11	20jun11	Jun11
31	Sep11	07sep11	Sep11	19sep11	Sep11
32	Dec11	20dec11	Jan12	19dec11	Jan12
33	Mar12	03apr12	Apr12	16apr12	Apr12
34	Jun12	18jun12	Jul12	18jun12	Jun12
35	Sep12	05sep12	Sep12	17sep12	Sep12
36	Dec12	18dec12	Jan13	17dec12	Jan13
37	Mar13	02apr13	Apr13	15apr13	Apr13
38	Jun13	01jul13	Jul13	15jul13	Jul13
39	Sep13	04sep13	Sep13	16sep13	Sep13
40	Dec13	03dec13	Dec13	16dec13	Dec13
41	Mar14	31mar14	Apr14	17mar14	Apr14
42	Jun14	16jun14	Jul14	16jun14	Jun14
43	Sep14	03sep14	Sep14	15sep14	Sep14
44	Dec14	15dec14	Dec14	15dec14	Dec14
	Mar15	30mar15	(Apr15)		

1/ Presentation dates of the 'Monetary Policy Report' (*IPoM*) to the Senate Committee on Finance; see *IPoM* prefaces.

2/ *Consensus Economics Inc.* carries out the Latin-American-country survey every month's 3^{rd} Monday (Consensus 2015). A tentative assignment of the central bank *IR* forecasts to the *Consensus Economics Inc.* surveys considers that these forecasts will surely affect the survey's forecasts from the very month of an *IR* publication (until they become affected by the following *IR*'s forecasts) if the *IR* publication date falls before or at the 14th day of that month; otherwise, they will surely affect the survey from the following month to the publication month (until they become affected by the following *IR*'s). The final assignment uses the closing date of the corresponding *Consensus Economics Inc.*'s survey.

3/ The Sep08's IPoM forecasts update, which took place in November 2008, was extraordinary. Although it was not presented to the Senate Committee on Finance, there was a press conference on Friday Nov. 14, 2008, the publication day (one day after that month's Monetary Policy Meeting). For all other cases, *IPoM* publication is simultaneous with the moment the president of the Banco Central de Chile initiates his address to the Senate Committee on Finance (Banco Central de Chile, 2015).

Dates associated with Colombia's *IR*s						
Number	*ISI*	Present. to the Board	G.M. presentation 1/	*IR* tentative assignment from *LACF* survey 2/	*LACF Survey Date* close to the G.M. presentation	*IR* final assignment from *LACF* survey 2/
	Sep03	n.d.	11nov03	(Nov03)	17nov03	(Nov03)
1	Dec03	n.d.	07feb04	Feb04	16feb04	Feb04
2	Mar04	n.d.	04may04	May04	17may04	May04
3	Jun04	n.d.	03aug04	Aug04	16aug04	Aug04
4	Sep04	n.d.	11nov04	Nov04	15nov04	Nov04
5	Dec04	n.d.	07feb05 $\sim ab$	Feb05	21feb05	Feb05
6	Mar05	n.d.	04may05 $\sim ab$	May05	16may05	May05
7	Jun05	n.d.	03aug05 b	Aug05	15aug05	Aug05
8	Sep05	n.d.	11nov05 b	Nov05	21nov05	Nov05
9	Dec05	n.d.	10feb06 b	Feb06	20feb06	Feb06
10	Mar06	n.d.	12may06 b	May06	15may06	May06
11	Jun06	n.d.	14aug06	Aug06	21aug06	Aug06
12	Sep06	n.d.	10nov06 $\sim a$	Nov06	20nov06	Nov06
13	Dec06	n.d.	09feb07 a	Feb07	19feb07	Feb07
14	Mar07	n.d.	11may07 b	May07	21may07	May07
15	Jun07	n.d.	13aug07 b	Aug07	20aug07	Aug07
16	Sep07	n.d.	02nov07 b	Nov07	19nov07	Nov07
17	Dec07	n.d.	08feb08 a	Feb08	18feb08	Feb08
18	Mar08	n.d.	12may08 a	May08	19may08	May08
19	Jun08	n.d.	01y14aug08	Aug08	18aug08	Aug08
20	Sep08	24oct08	10nov08	Nov08	17nov08	Nov08
21	Dec08	30jan09	12feb09	Feb09	16feb09	Feb09
22	Mar09	30apr09	08may09	May09	18may09	May09
23	Jun09	n.d.	03aug09	Aug09	17aug09	Aug09
24	Sep09	n.d.	09nov09 3/	Nov09	16nov09	Nov09
25	Dec09	29jan10	12feb10	Feb10	15feb10	Feb10
26	Mar10	30apr10	10may10	May10	17may10	May10
27	Jun10	23jul10	30jul10	Aug10	19jul10	Aug10
28	Sep10	29oct10	05nov10	Nov10	15nov10	Nov10
29	Dec10	31jan11	04feb11	Feb11	21feb11	Feb11
30	Mar11	29apr11	09may11	May11	16may11	May11
31	Jun11	29jul11	01aug11	Aug11	15aug11	Aug11
32	Sep11	28oct11	11nov11	Nov11	21nov11	Nov11
33	Dec11	30jan12	13feb12	Feb12	20feb12	Feb12
34	Mar12	30apr12	18may12	Jun12	21may12	May12
35	Jun12	27jul12	30jul12	Aug12	16jul12	Aug12
36	Sep12	26oct12	09nov12	Nov12	19nov12	Nov12
37	Dec12	28jan13	08feb13	Feb13	18feb13	Feb13
38	Mar13	26apr13	29apr13	May13	15apr13	May13
39	Jun13	26jul13	09aug13	Aug13	19aug13	Aug13
40	Sep13	25oct13	08nov13	Nov13	18nov13	Nov13
41	Dec13	31jan14	14feb14	Feb14	17feb14	Feb14
42	Mar14	25apr14	09may14	May14	19may14	May14
43	Jun14	31jul14	04aug14	Aug14	18aug14	Aug14
44	Sep14	30oct14	07nov14	Nov14	17nov14	Nov14
	Dec14	30jan15	02feb15	(Feb15)		

1/ Included in the first 3 pages of the 'Inflation Report' (*ISI*), it is the date of the *ISI* presentation to the Congress. Furthermore, the corresponding presentation of the Banco de la República (*BdR*) General Manager (G.M.) includes the *ISI* presentation date to the public. The latter date corresponds to the *ISI* publication.
2/ See note 2 to the preceding table.
3/ Until September 2009's *ISI* there are doubts about the publication dates because the presentation-*ISI* link is usually broken or the presentations do not specify any date. These dates can explicitly correspond to [a] presentations of the *Informe de política monetaria y rendición de cuentas*, [b] presentations of the report about *Situación actual y perspectivas de la economía colombiana*, or to none of these, $\sim ab$. In these cases the press releases available at the *BdR* website were used (first choice in the 'pop-up list' under the mark of *Publicaciones investigación*, where it is possible to list any month's releases ¡from the year 2000!).
There are not exact publication dates for the first *ISI*s -nor for the associated reports [a],[b]- beyond the reasonable times for those *ISI*s previous to November 10, 2006, the reason being the press releases do not follow the presentations of neither of these reports. There are some indications about presentations of a 'quarterly report about inflation'; for instance, on February 10, 2006, it mentions: "On this day, the *BdR*'s G.M., doctor José Darío Uribe, presented the Inflation Report corresponding to the IV quarter of 2005 in Bogotá city. From the beginnings of 2004, doctor Uribe has been making quarterly presentations of this report containing a detailed analysis of inflation and economic growth as well as their perspectives, which are the basis for monetary policy decision-making by the *BdR*'s Board. The G.M.'s presentation was broadcasted around the country through via the public TV channels." From the end of 2003, the forecasts available in the publications (a) or (b) are considered as complements to the *ISI* forecasts.

Dates associated with United Kingdom's *IR*s 1/					
Number	*IR*	Press Conference	*IR* tentative assignment from $G7-CF$ survey 1/	*G7-CF Survey Date* close to the Press Conference	*IR* final assignment from $G7-CF$ survey 1/
	Nov03	12nov03	(Dec03)	10nov03	(Dec03)
1	Feb04	11feb04	Mar04	09feb04	Mar04
2	May04	12may04	Jun04	10may04	Jun04
3	Aug04	11aug04	Sep04	09aug04	Sep04
4	Nov04	10nov04	Dec04	08nov04	Dec04
5	Feb05	16feb05	Mar05	14feb05	Mar05
6	May05	11may05	Jun05	09may05	Jun05
7	Aug05	10aug05	Sep05	08aug05	Sep05
8	Nov05	16nov05	Dec05	14nov05	Dec05
9	Feb06	15feb06	Mar06	13feb06	Mar06
10	May06	10may06	Jun06	08may06	Jun06
11	Aug06	09aug06	Sep06	14aug06	Sep06
12	Nov06	15nov06	Dec06	13nov06	Dec06
13	Feb07	14feb07	Mar07	12feb07	Mar07
14	May07	16may07	Jun07	14may07	Jun07
15	Aug07	08aug07	Sep07	13aug07	Aug07
16	Nov07	14nov07	Dec07	12nov07	Dec07
17	Feb08	13feb08	Mar08	11feb08	Mar08
18	May08	14may08	Jun08	12may08	Jun08
19	Aug08	13aug08	Sep08	11aug08	Sep08
20	Nov08	12nov08	Dec08	10nov08	Dec08
21	Feb09	11feb09	Mar09	09feb09	Mar09
22	May09	13may09	Jun09	11may09	Jun09
23	Aug09	12aug09	Sep09	10aug09	Sep09
24	Nov09	11nov09	Dec09	09nov09	Dec09
25	Feb10	10feb10	Mar10	08feb10	Mar10
26	May10	12may10	Jun10	10may10	Jun10
27	Aug10	11aug10	Sep10	09aug10	Sep10
28	Nov10	10nov10	Dec10	08nov10	Dec10
29	Feb11	16feb11	Mar11	14feb11	Mar11
30	May11	11may11	Jun11	09may11	Jun11
31	Aug11	10aug11	Sep11	08aug11	Sep11
32	Nov11	16nov11	Dec11	14nov11	Dec11
33	Feb12	15feb12	Mar12	13feb12	Mar12
34	May12	16may12	Jun12	14may12	Jun12
35	Aug12	08aug12	Sep12	13aug12	Aug12
36	Nov12	14nov12	Dec12	12nov12	Dec12
37	Feb13	13feb13	Mar13	11feb13	Mar13
38	May13	15may13	Jun13	13may13	Jun13
39	Aug13	07aug13	Aug13	12aug13	Aug13
40	Nov13	13nov13	Dec13	11nov13	Dec13
41	Feb14	12feb14	Mar14	10feb14	Mar14
42	May14	14may14	Jun14	12may14	Jun14
43	Aug14	13aug14	Sep14	11aug14	Sep14
44	Nov14	12nov14	Dec14	10nov14	Dec14
	Feb15	12feb15	(Mar15)		

1/ *Consensus Economics Inc.* carries out the *G*7-country survey every month's 2^{nd} Monday (Consensus 2015). A tentative assignment of the central bank *IR* forecasts to the *Consensus Economics Inc.* surveys considers that these forecasts will surely affect the survey's forecasts from the very month of an *IR* publication (until they become affected by the following *IR*'s forecasts) if the *IR* publication date falls before or at the 7th day of that month; otherwise, they will surely affect the survey from the following monthto the publication month (until they become affected by the following *IR*'s). The final assignment uses the closing date of the corresponding *Consensus Economics Inc.*'s survey.

Dates associated with Mexico's *IR*s						
Number	*IR*	Data as of:	Publi-cation	*IR* tentative assignment from *LACF* survey 1/	*LACF Survey Date* close to the Publication	*IR* final assign-ment from *LACF* survey 1/
	JulSep03	24oct03	31oct03	(Nov03)	20oct03	(Nov03)
1	OctDec03	26jan04	31jan04	Feb04	19jan04	Feb04
2	JanMar04	26apr04	30apr04	May04	19apr04	May04
3	AprJun04	26jul04	28jul04	Aug04	19jul04	Aug04
4	JulSep04	25oct04	31oct04	Nov04	18oct04	Nov04
5	OctDec04	28jan05	31jan05	Feb05	17jan05	Feb05
6	JanMar05	26apr05	27apr05	May05	18apr05	May05
7	AprJun05	26jul05	27jul05	Aug05	18jul05	Aug05
8	JulSep05	28oct05	31oct05	Nov05	17oct05	Nov05
9	OctDec05	27jan06	31jan06	Feb06	16jan06	Feb06
10	JanMar06	24apr06	26apr06	May06	24apr06	May06
11	AprJun06	28jul06	31jul06	Aug06	17jul06	Aug06
12	JulSep06	27oct06	31oct06	Nov06	16oct06	Nov06
13	OctDec06	29jan07	31jan07	Feb07	15jan07	Feb07
14	JanMar07	27apr07	30apr07	May07	16apr07	May07
15	AprJun07	27jul07	31jul07	Aug07	16jul07	Aug07
16	JulSep07	30oct07	31oct07	Nov07	15oct07	Nov07
17	OctDec07	29jan08	30jan08	Feb08	21jan08	Feb08
18	JanMar08	29apr08	30apr08	May08	21apr08	May08
19	AprJun08	29jul08	30jul08	Aug08	21jul08	Aug08
20	JulSep08	28oct08	29oct08	Nov08	20oct08	Nov08
21	OctDec08	26jan09	27jan09	Feb09	19jan09	Feb09
22	JanMar09	29apr09	29apr09	May09	20apr09	May09
23	AprJun09	29jul09	29jul09	Aug09	20jul09	Aug09
24	JulSep09	27oct09	28oct09	(Nov09)	19oct09	(Nov09)
25 2/	JulSep09	01dec09	02dec09	Dec09	14dec09	Dec09
26	OctDec09	26jan10	27jan10	Feb10	18jan10	Feb10
27	JanMar10	27apr10	28apr10	May10	19apr10	May10
28	AprJun10	28jul10	28jul10	Aug10	19jul10	Aug10
29	JulSep10	26oct10	27oct10	Nov10	18oct10	Nov10
30	OctDec10	08feb11	09feb11	Feb11	21feb11	Feb11
31	JanMar11	09may11	11may11	May11	16may11	May11
32	AprJun11	08aug11	10aug11	Aug11	15aug11	Aug11
33	JulSep11	07nov11	09nov11	Nov11	21nov11	Nov11
34	OctDec11	13feb12	15feb12	Feb12	20feb12	Feb12
35	JanMar12	14may12	16may12	Jun12	21may12	May12
36	AprJun12	13aug12	15aug12	Aug12	20aug12	Aug12
37	JulSep12	05nov12	07nov12	Nov12	19nov12	Nov12
38	OctDec12	11feb13	13feb13	Feb13	18feb13	Feb13
39	JanMar13	06may13	08may13	May13	20may13	May13
40	AprJun13	05aug13	07aug13	Aug13	19aug13	Aug13
41	JulSep13	04nov13	06nov13	Nov13	18nov13	Nov13
42	OctDec13	10feb14	12feb14	Feb14	17feb14	Feb14
43	JanMar14	19may14	21may14	Jun14	19may14	Jun14
44	AprJun14	11aug14	13aug14	Aug14	18aug14	Aug14
45	JulSep14	17nov14	19nov14	Dec14	17nov14	Dec14
	OctDec14	16feb15	18feb15	(Mar15)		

1/ See first table's footnote 2 on this annex.

2/ The JulSep09's *IR* forecasts were subsequently published in this *addendum*. For this reason, the AprJun09's *IR* forecasts are assigned to the *Consensus Economics Inc.*'s surveys from Aug09 to even Nov09.

Dates associated with Peru's *IR*s					
Number	*IR*	Press Release	*IR* tentative assignment from *LACF* survey 1/	*LACF Survey Date* close to the Press Release	*IR* final assignment from *LACF* survey 1/
	Aug03	29aug03	(Sep03)	18aug03	(Sep03)
1	Jan04	06feb04	Feb04	16feb04	Feb04
2	May04	04jun04	Jun04	21jun04	Jun04
3	Aug04	10sep04	Sep04	20sep04	Sep04
4	Jan05	04feb05	Feb05	21feb05	Feb05
5	May05	03jun05	Jun05	20jun05	Jun05
6	Aug05	02sep05	Sep05	19sep05	Sep05
7	Jan06	03feb06	Feb06	20feb06	Feb06
8	May06	02jun06	Jun06	19jun06	Jun06
9	Sep06	06oct06	Oct06	16oct06	Oct06
10	Jan07	09feb07	Feb07	19feb07	Feb07
11	May07	08jun07	Jun07	18jun07	Jun07
12	Sep07	05oct07	Oct07	15oct07	Oct07
13	Jan08	08feb08	Feb08	18feb08	Feb08
14	May08	13jun08	Jun08	16jun08	Jun08
15	Sep08	10oct08	Oct08	20oct08	Oct08
16	Mar09	13mar09	Mar09	16mar09	Mar09
17	Jun09	12jun09	Jun09	15jun09	Jun09
18	Sep09	18sep09	Oct09	21sep09	Sep09
19	Dec09	18dec09	Jan10	14dec09	Jan10
20	Mar10	26mar10	Apr10	15mar10	Apr10
21	Jun10	18jun10	Jul10	21jun10	Jun10
22	Sep10	17sep10	Oct10	20sep10	Sep10
23	Dec10	17dec10	Jan11	13dec10	Jan11
24	Mar11	18mar11	Apr11	21mar11	Mar11
25	Jun11	17jun11	Jul11	20jun11	Jun11
26	Sep11	16sep11	Oct11	19sep11	Sep11
27	Dec11	16dec11	Jan12	19dec11	Dec11
28	Mar12	23mar12	Apr12	19mar12	Apr12
29	Jun12	15jun12	Jun12	18jun12	Jun12
30	Sep12	14sep12	Sep12	17sep12	Sep12
31	Dec12	14dec12	Dec12	17dec12	Dec12
32	Mar13	22mar13	Apr13	18mar13	Apr13
33	Jun13	21jun13	Jul13	17jun13	Jul13
34	Sep13	20sep13	Oct13	16sep13	Oct13
35	Dec13	20dec13	Jan14	16dec13	Jan14
36	Apr14	25apr14	May14	22apr14	May14
37	Jul14	18jul14	Aug14	21jul14	Jul14
38	Oct14	17oct14	Nov14	20oct14	Oct14
	Jan15	23jan15	(Feb15)		
	May15	22may15	(Jun15)		

1/ See first table's footnote 2 on this annex.

ANNEX D: Tests with S_n dispersion of forecasts (π & g)

Table D.1. Ha tests with S_n dispersion (full sample 1)

Variable	**Country/d.f.**	Current vs. Previous ($\{s = 2 \mid s = 1\}$)		Next vs. Previous ($\{s = 3 \mid s = 1\}$)	
		$Tcal$	p_1 $(p - value)$	$Tcal$	p_2 $(p - value)$
Short-term sample ($h \leq 12$)					
GDP growth	Chile/34	-0.392	0.349	-0.101	0.460
	Colombia/39	-0.081	0.468	-0.523	0.302
	Mexico/38	0.377	0.354	-0.320	0.376
	Peru/32	-1.591	**0.061**	-0.202	0.420
	United Kingdom/29	-0.204	0.420	-0.235	0.408
CPI inflation	Chile/34	-0.630	0.266	-0.284	0.389
	Colombia/39	-0.508	0.307	-0.543	0.295
	Mexico/38	-1.332	**0.095**	-0.621	0.269
	Peru/32	0.666	0.255	0.646	0.262
	United Kingdom/29	-0.103	0.459	-1.022	0.158
Medium-term sample ($h > 12$)					
GDP growth	Chile/28	0.540	0.297	-0.021	0.492
	Colombia/39	0.089	0.465	-0.391	0.349
	Mexico/40	-0.700	0.244	0.101	0.460
	Peru/31	0.770	0.224	1.045	0.152
	United Kingdom/39	-0.097	0.462	0.381	0.353
CPI inflation	Chile/28	-0.163	0.436	0.036	0.486
	Colombia/39	-0.641	0.263	0.330	0.372
	Mexico/40	0.085	0.466	-0.716	0.239
	Peru/31	0.656	0.258	0.779	0.221
	United Kingdom/39	1.543	**0.065**	0.227	0.411

* Weak evidence.

Table D.2. *Hb* tests with S_n dispersion (separated samples 5)

Variable	**Country/d.f.**	Current vs. Previous ($\{s=2\|s=1\}$)		Next vs. Previous ($\{s=3\|s=1\}$)	
		$Tcal$	p_1 $(p-value)$	$Tcal$	p_2 $(p-value)$
Short-term sample ($h \leq 12$)					
GDP growth	High macroeconomic uncertainty				
	Chile/17	-1.191	0.125*	-0.402	0.346
	Colombia/17	-1.005	0.165	-1.087	0.146
	Mexico/19	-0.271	0.395	0.556	0.292
	Peru/15	0.354	0.364	-0.086	0.466
	United Kingdom/14	0.355	0.364	-0.130	0.449
	Low macroeconomic uncertainty				
	Chile/15	0.526	0.303	0.330	0.373
	Colombia/21	0.462	0.324	-0.026	0.490
	Mexico/18	0.783	0.222	-0.829	0.209
	Peru/16	-2.256	**0.019**	-0.200	0.422
	United Kingdom/14	-0.623	0.272	-0.191	0.426
CPI inflation	High macroeconomic uncertainty				
	Chile/17	-1.707	**0.053**	0.308	0.381
	Colombia/17	-0.774	0.225	-0.791	0.220
	Mexico/19	-1.769	**0.046**	-1.306	0.104*
	Peru/15	0.860	0.202	1.389	**0.093**
	United Kingdom/14	0.041	0.484	-0.949	0.179
	Low macroeconomic uncertainty				
	Chile/15	0.641	0.266	-1.380	**0.094**
	Colombia/21	-0.079	0.469	-0.085	0.467
	Mexico/18	-0.150	0.441	0.615	0.273
	Peru/16	0.260	0.399	0.131	0.449
	United Kingdom/14	-0.129	0.450	-0.425	0.338
Medium-term sample ($h > 12$)					
GDP growth	High macroeconomic uncertainty				
	Chile/12	0.772	0.228	0.583	0.285
	Colombia/15	0.897	0.192	1.666	**0.058**
	Mexico/22	-1.655	**0.056**	-1.046	0.153
	Peru/13	-0.434	0.336	1.487	**0.080**
	United Kingdom/15	-0.162	0.437	-0.026	0.490
	Low macroeconomic uncertainty				
	Chile/15	-0.023	0.491	-0.428	0.338
	Colombia/23	-0.398	0.347	-1.751	**0.047**
	Mexico/17	0.204	0.420	1.479	**0.079**
	Peru/17	1.309	0.104*	0.333	0.372
	United Kingdom/23	0.020	0.492	0.516	0.305
CPI inflation	High macroeconomic uncertainty				
	Chile/12	0.113	0.456	0.744	0.236
	Colombia/15	0.109	0.457	0.233	0.409
	Mexico/22	0.351	0.364	-0.310	0.380
	Peru/13	-1.063	0.153	-0.895	0.193
	United Kingdom/15	1.350	**0.098**	0.264	0.398
	Low macroeconomic uncertainty				
	Chile/15	-0.254	0.401	-0.472	0.322
	Colombia/23	-0.791	0.219	0.239	0.407
	Mexico/17	-0.116	0.454	-0.653	0.261
	Peru/17	1.193	0.125*	1.249	0.114*
	United Kingdom/23	0.784	0.221	0.014	0.495

* Weak evidence.

ANNEX E: Tests with Q_n dispersion of forecasts (π & g)

Table E.1. Ha tests with Q_n dispersion (full sample 1)

Variable	**Country/d.f.**	Current vs. Previous ($\{s=2\|s=1\}$)		Next vs. Previous ($\{s=3\|s=1\}$)	
		$Tcal$	p_1 $(p-value)$	$Tcal$	p_2 $(p-value)$
Short-term sample ($h \leq 12$)					
GDP growth	Chile/34	-0.544	0.295	-0.572	0.285
	Colombia/39	-0.318	0.376	0.327	0.373
	Mexico/38	0.047	0.481	0.292	0.386
	Peru/32	-0.592	0.279	-0.296	0.384
	United Kingdom/29	-0.512	0.306	0.279	0.391
CPI inflation	Chile/34	-0.115	0.454	0.051	0.480
	Colombia/39	-0.342	0.367	-0.469	0.321
	Mexico/38	0.779	0.220	0.308	0.380
	Peru/32	0.546	0.295	-0.046	0.482
	United Kingdom/29	-0.600	0.277	-0.598	0.277
Medium-term sample ($h > 12$)					
GDP growth	Chile/28	0.363	0.360	0.081	0.468
	Colombia/39	-0.346	0.366	-0.684	0.249
	Mexico/40	-0.788	0.218	-0.018	0.493
	Peru/31	0.138	0.446	-0.027	0.489
	United Kingdom/39	0.118	0.453	0.140	0.445
CPI inflation	Chile/28	1.097	0.141	0.116	0.454
	Colombia/39	-0.451	0.327	0.415	0.340
	Mexico/40	0.498	0.311	0.882	0.192
	Peru/31	0.116	0.454	-0.206	0.419
	United Kingdom/39	0.121	0.452	-0.363	0.359

* Weak evidence.

Table E.2. *Hb* tests with Q_n dispersion (separated samples 5)

Variable	**Country/d.f.**	Current vs. Previous ($\{s=2\|s=1\}$)		Next vs. Previous ($\{s=3\|s=1\}$)	
		$Tcal$	p_1 $(p-value)$	$Tcal$	p_2 $(p-value)$
Short-term sample ($h \leq 12$)					
GDP growth	High macroeconomic uncertainty				
	Chile/17	-0.728	0.238	-0.427	0.337
	Colombia/17	-0.355	0.364	0.223	0.413
	Mexico/19	0.794	0.218	0.912	0.187
	Peru/15	0.628	0.270	-0.117	0.454
	United Kingdom/14	0.019	0.493	-1.366	**0.097**
	Low macroeconomic uncertainty				
	Chile/15	0.670	0.256	0.299	0.385
	Colombia/21	-0.160	0.437	0.244	0.405
	Mexico/18	-0.708	0.244	-0.658	0.259
	Peru/16	-1.304	0.105*	-0.294	0.386
	United Kingdom/14	-0.821	0.213	1.310	0.106*
CPI inflation	High macroeconomic uncertainty				
	Chile/17	-0.706	0.245	0.465	0.324
	Colombia/17	-0.253	0.402	-0.381	0.354
	Mexico/19	-0.297	0.385	-1.642	**0.058**
	Peru/15	-0.177	0.431	0.198	0.423
	United Kingdom/14	0.187	0.427	-0.968	0.175
	Low macroeconomic uncertainty				
	Chile/15	0.799	0.218	-0.668	0.257
	Colombia/21	-0.226	0.412	-0.292	0.387
	Mexico/18	1.002	0.165	1.950	**0.033**
	Peru/16	0.703	0.246	-0.124	0.452
	United Kingdom/14	-0.744	0.235	0.200	0.422
Medium-term sample ($h > 12$)					
GDP growth	High macroeconomic uncertainty				
	Chile/12	0.867	0.202	0.965	0.177
	Colombia/15	0.264	0.398	1.119	0.140
	Mexico/22	-0.621	0.270	0.182	0.429
	Peru/13	0.308	0.381	0.637	0.268
	United Kingdom/15	0.155	0.439	-0.285	0.390
	Low macroeconomic uncertainty				
	Chile/15	-0.196	0.424	0.493	0.315
	Colombia/23	-0.520	0.304	-1.669	**0.054**
	Mexico/17	-0.505	0.310	-0.203	0.421
	Peru/17	-0.083	0.467	-0.472	0.322
	United Kingdom/23	0.020	0.492	0.442	0.331
CPI inflation	High macroeconomic uncertainty				
	Chile/12	0.730	0.240	0.932	0.185
	Colombia/15	-0.252	0.402	0.193	0.425
	Mexico/22	0.228	0.411	0.026	0.490
	Peru/13	-2.223	**0.022**	-1.785	**0.049**
	United Kingdom/15	-0.750	0.232	-1.109	0.142
	Low macroeconomic uncertainty				
	Chile/15	0.797	0.219	-0.452	0.329
	Colombia/23	-0.370	0.357	0.365	0.359
	Mexico/17	0.475	0.320	1.281	0.109*
	Peru/17	1.072	0.149	0.444	0.331
	United Kingdom/23	0.750	0.230	0.348	0.365

* Weak evidence.

ANNEX F: Tests with distance between forecasts' median and country-*IR* forecasts (π & g)

Table F.1. *Ha* tests with distance (full sample 2)

Variable	**Country**	d.f.	Current vs. Previous ($\{s = 2 \mid s = 1\}$)		Next vs. Previous ($\{s = 3 \mid s = 1\}$)	
			$Tcal$	p_1 $(p - value)$	$Tcal$	p_2 $(p - value)$
Short-term sample ($h \leq 12$)						
GDP growth	Chile	34	-1.024	0.157	-0.908	0.185
	Colombia	38	-0.247	0.403	0.094	0.463
	Mexico	38	0.987	0.165	0.934	0.178
	Peru	32	-0.044	0.483	0.073	0.471
	United Kingdom	29	0.793	0.217	-0.999	0.163
CPI inflation	Chile	34	-1.954	**0.029**	-1.830	**0.038**
	Colombia	39	-2.358	**0.012**	-1.480	**0.073**
	Mexico	38	-0.388	0.350	-0.380	0.353
	Peru	32	-0.036	0.486	-1.599	**0.060**
	United Kingdom	29	-0.954	0.174	-1.142	0.131
Medium-term sample ($h > 12$)						
GDP growth	Chile ⋄	0	n.d.	n.d.	n.d.	n.d.
	Colombia	11	-1.517	**0.079**	-1.549	**0.075**
	Mexico	18	-0.974	0.171	-0.993	0.167
	Peru	25	0.517	0.305	-0.336	0.370
	United Kingdom	39	0.340	0.368	-0.138	0.446
CPI inflation	Chile	23	-0.620	0.271	-1.257	0.111*
	Colombia	37	0.221	0.413	0.474	0.319
	Mexico	27	-0.495	0.312	-1.646	**0.056**
	Peru	25	-1.095	0.142	-0.892	0.191
	United Kingdom	39	-1.155	0.127*	-0.742	0.231

⋄ Since the distance is calculated with respect to the official forecast (instead of the long-term inflation target) and the Chilean central bank's publications have not provided enough official forecasts for the next year's real growth during the period 2004-2014, the tests have not enough degrees of freedom to be calculated. * Weak evidence.

Table F.2. *Hb* tests with distance (separated samples 6)

Variable	**Country/d.f.**	Current vs. Previous ($\{s=2\|s=1\}$)		Next vs. Previous ($\{s=3\|s=1\}$)	
		$Tcal$	p_1 $(p-value)$	$Tcal$	p_2 $(p-value)$
Short-term sample ($h \leq 12$)					
GDP growth	High macroeconomic uncertainty				
	Chile/17	-0.322	0.376	-0.226	0.412
	Colombia/17	-0.270	0.395	-1.055	0.153
	Mexico/19	0.618	0.272	0.954	0.176
	Peru/15	2.179	**0.023**	1.587	**0.067**
	United Kingdom/14	1.326	0.103*	-0.998	0.168
	Low macroeconomic uncertainty				
	Chile/15	-0.333	0.372	-0.315	0.379
	Colombia/20	-0.131	0.448	0.508	0.308
	Mexico/18	0.767	0.226	0.461	0.325
	Peru/16	-1.535	**0.072**	-0.841	0.206
	United Kingdom/14	-0.146	0.443	-0.527	0.303
CPI inflation	High macroeconomic uncertainty				
	Chile/17	-0.838	0.207	-1.265	0.111*
	Colombia/17	-1.562	**0.068**	-1.332	0.100*
	Mexico/19	0.559	0.291	0.271	0.395
	Peru/15	0.255	0.401	-0.779	0.224
	United Kingdom/14	-1.524	**0.075**	-1.372	**0.096**
	Low macroeconomic uncertainty				
	Chile/15	-1.789	**0.047**	-1.442	**0.085**
	Colombia/21	-1.754	**0.047**	-0.764	0.227
	Mexico/18	-0.916	0.186	-0.751	0.231
	Peru/16	-0.151	0.441	-1.396	**0.091**
	United Kingdom/14	0.062	0.476	-0.361	0.362
Medium-term sample ($h > 12$)					
GDP growth	High macroeconomic uncertainty				
	Chile/0 ⋄	n.d.	n.d.	n.d.	n.d.
	Colombia/6	-1.638	**0.076**	-2.052	**0.043**
	Mexico/13	-1.311	0.106*	-1.260	0.115*
	Peru/13	0.876	0.199	0.070	0.472
	United Kingdom/15	0.168	0.434	-0.143	0.444
	Low macroeconomic uncertainty				
	Chile/0 ⋄	n.d.	n.d.	n.d.	n.d.
	Colombia/4	-0.154	0.442	0.169	0.437
	Mexico/4	0.386	0.360	0.187	0.430
	Peru/11	-1.091	0.149	-0.801	0.220
	United Kingdom/23	0.296	0.385	-0.094	0.463
CPI inflation	High macroeconomic uncertainty				
	Chile/9	0.352	0.367	-0.834	0.213
	Colombia/13	-0.366	0.360	-0.389	0.352
	Mexico/15	0.760	0.229	0.435	0.335
	Peru/13	-0.096	0.462	-0.159	0.438
	United Kingdom/15	-1.525	**0.074**	-0.556	0.293
	Low macroeconomic uncertainty				
	Chile/13	-0.875	0.199	-1.050	0.156
	Colombia/23	0.488	0.315	0.854	0.201
	Mexico/11	-0.722	0.243	-1.852	**0.046**
	Peru/11	-1.294	0.111*	-1.153	0.137
	United Kingdom/23	-0.253	0.401	-0.480	0.318

* Weak evidence. ⋄ Since the distance is calculated with respect to the official forecast (instead of the long-term inflation target) and the Chilean central bank's publications have not provided enough official forecasts for the next year's real growth during the period 2004-2014, the tests have not enough degrees of freedom to be calculated.