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Expectations and Central Banks' Forecasts: The Experience of Chile, Colombia, Mexico, Peru and the United Kingdom, 2004 – 2014*

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Abstract

The paper tests the hypotheses associated to whether or not the publication of central banks' forecasts (and subsequent media-diffusion efforts) affects the professional forecasters' expectations in terms of both their cross-section dispersion and the distance between their median and the central banks' forecasts. The study considers the monetary authorities of Chile, Colombia, Mexico, Peru and the United Kingdom. The focus is on forecasts for inflation and real growth and the common sample of monthly fixed-event forecasts goes from 2004 to 2014. This sample of forecasts allows highly specific tests by splitting it according to the forecasting horizon (short and medium terms) and the level of macroeconomic uncertainty (high- or low-uncertainty months). With a significance level of 10%, the general findings are that (i) the dispersion and the distance can significantly increase or decrease as a result of the publication of the official forecasts and the media-diffusion efforts, the number of increases in the distance being low with respect to the number of increases in the dispersion, though; and (ii) the number of decreases in the dispersion and distance is low for all inflation-targeting central banks considered. These findings point out the expectation management is still an elusive goal in the majority of countries considered.

1. 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. In a typical environment, the majority of economic agents delegate information processing and acquisition tasks to 'macroeconomic insiders' (a conspicuous set of professional forecasters and financial market participants).[1] From all those insiders, 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 all other macroeconomic

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[1] Such an environment is supported by US data (Coibion and Gorodnichenko, 2012; Fuhrer, 2011).

insiders pay attention to monetary authority's actions, especially when its macroeconomic outlook is disclosed to justify those actions. 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 environment 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 does disclose its medium-term outlook by publishing its *Inflation Report* (IR) on a regular basis (whose consistency with those actions should be evaluated). 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,[2] **at least** the insiders will consider the central bank's announced forecasts as 'coordinating signals' inside their own expectation formation process about the future, thus stabilizing their expectations in the vicinity of the official forecasts (Skorepa and Kotlán, 2003). If this is the case, these signals become conditioning variables for the economic decision problems of the insiders and the price-setting corporations hiring them. If this is not the case, the central bank will confront its monetary policy scenario with relatively low credibility.

The paper aims to statistically test whether there exists a *coordination effect* on the insiders' forecasts whenever the central banks of Chile, Colombia, Mexico, Peru and the United Kingdom disclose their corresponding announced forecasts. The paper tackles two key issues: (1) Does a coordination effect exist when such a disclosure takes place under high [low] macroeconomic uncertainty, as the aftermath of high- [low-] magnitude shocks? and (2) Does the forecasting horizon play any role? By considering a sample of monthly data (2004-2014), these highly specific questions can be answered.

Note that a high macroeconomic uncertainty does encompass exceptional events such as international financial crises, structural changes and climate shocks. All these events increase the macroeconomic uncertainty, induce herd behavior and liberate consumers' and investors' animal spirits. Upon the uncertainty jump, diverse economic agents' perceptions about the macroeconomic outlook greatly deteriorate, thus expectations may 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. If and only if the monetary authorities' announced forecasts (used to justify monetary policy actions) have successfully been perceived as credible,

[2] Credibility is specific to the value of information the agents have ignored until the current period t. For instance, 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%). Although the former may somehow help the latter, it may not be enough. Szyszko (2017) provides key evidence supporting this distinction as relevant for Czech Republic, Hungary, Poland and Sweden.

they will be able to stabilize the other insiders' perceptions about the economy's outlook.[3]

Instead of measures of correlation and association, the study closely follows Filacekand Saxa (2012): the publication of central bank' announced forecasts (a dichotomous variable) is considered jointly with the subsequent changes in second moments of insiders' forecast (continuous variables) in a pseudo-treatment-effect approach to achieve the study's goals. Next section presents a 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 recommendations for improving central banks' credibility with respect to the goal of price-stability inflation.

2. Conceptual Framework

Filacek and 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 relevant information.[4] This re-interpretation is 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, i.e., these two measures should decrease significantly. Since *IRs* are usually published quarterly, such a decrease is constrained to the two-month period immediately after the publication month of any *IR* forecast (in agreement with Filacek and Saxa, 2012).[5]

[3] It is possible to consider a secondary hypothesis: if economic agents became highly attentive under high uncertainty, the expectations stabilization ability would even be stronger in periods of high macroeconomic uncertainty than in periods of low macroeconomic uncertainty.

[4] Huang and Trehan (2008) consider the firms' π expectations are closer to the professional forecasters' expectations (i.e., the insiders' π expectations) than to the households' expectations because firms contract insiders to gauge future inflation. While firms' price setting is usually based on this information, insiders' π expectations 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 and Zorrilla, 2012).

[5] The ensuing sections will use 'experimental quarters', which are defined by the central banks' publication months in the sample.

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 those 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 for 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).

The study evaluates five cases of implicit coordination related to central banks' forecasts: *Banco Central de Chile*, *Banco de la República* (Colombia), *Banco de México*, *Banco Central de Reserva del Perú*, and Bank of England (the United Kingdom). By getting the best of Filacek and Saxa (2012)'s proposed tests, the study uses two *inverse measures* of implicit coordination for each case:[6] 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). The study evaluates whether each central bank's announced forecasts (a) reduce the inverse measures of coordination, on average across all two-month periods immediately following the *IR*-publication months available in the sample (i.e., whether announced forecasts 'anchor' private expectations), and (b) allow anchoring expectations in low-macroeconomic-uncertainty periods (on average across all two-month periods immediately following the *IR*-publication months classified as 'normal times'), as well as in high-macroeconomic-uncertainty periods (on average across all two-month periods immediately following the *IR*-publication months classified as 'abnormal times', in the aftermath of large shocks). Evaluation (b) can be useful for policymakers because learning to manage expectations during calm periods can actually make it easy to learn to manage expectations during turbulent periods.

3. 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. This period encompasses important portions of the corresponding elapsed times from the adoption of inflation targeting framework (1991 for Chile, 2000 for Colombia, 1995 for Mexico, 1994 for Peru and 1993 for the United Kingdom)[7] to date. The insiders are

[6] 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).

[7] 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.

surveyed monthly by *Consensus Economics Inc.* and their macroeconomic forecasts are specific to two *fixed events*, the end of current year and the end of next year. Therefore, the forecast horizons with respect to each fixed event vary from 1 to 24 months.[8] Furthermore, it should be noted that, while *Consensus* survey forecasts for Latin American countries' π are expressed as December-to-December (end-year 12-month) percentage changes, *Consensus* survey forecasts for the United Kingdom's π are expressed as average percentage changes over the previous calendar year. The same unit convention is followed by Bank of England's π announced forecasts.

Although the central banks published their *IR*s announced forecasts for the same fixed events, *IR* publication dates vary across countries. Therefore, a key issue behind this paper's hypothesis testing 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: at least two months of insiders' forecasts for either π or g. To tackle this problem, the exact dates on which each central bank discloses the announced forecasts in its *IR*s must be used to determine those two months of the insiders' forecasts (as surveyed by *Consensus Economics Inc.*; see Supplementary Material's Annex C). The *IR* announced forecasts for both variables are then assigned to the corresponding places in those months' *Consensus Forecasts* data matrices (to be more specific, in row 'g' just below the one with 'standard deviations'),[9] to be used for required computations (e.g., for the distance measure). Note that, for some observations near the beginning of the sample, the announced forecasts may be 'not available' in the corresponding *IR* (the series of official forecasts may not be continuous).[10]

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 Supplementary Material's 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 send by the insiders and tabulated in data matrices (one for each month/country in the sample), the available forecasts are not always numerous (a real problem for some variables other than g and π). In addition to the participating insiders' incomplete monthly forecast set, an important proportion of the 'not available' *Consensus* forecasts can be explained by the dropping of 'old' insiders, the appearance of 'new' insiders, and the eventual dropping/re-appearance of usual insiders. In fact, the number of forecasts obtained from the insiders by *Consensus Economics Inc.* does not usually reach the 85% of the

[8] *Consensus Economics Inc.* publishes survey forecasts 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 the United Kingdom, the survey forecasts are available in *G7 and Western Europe Consensus Forecasts*, a publication with monthly frequency since the beginnings of the 90s. Supplementary Material's Annex A lists the whole set of insiders surveyed for Peruvian forecasts during 2004-2014; Supplementary Material's Annex B lists the Peruvian variables in the surveys of forecasts. Henceforth, *Consensus Forecasts* will be used to refer to both publications interchangeably.

[9] As an illustration, see the first 2 columns of such a matrix in Supplementary Material's Annex A for the Peruvian case; the other columns inside the aforementioned data matrices come in pairs (current year and next year), a pair for each variable in Supplementary Material's Annex B.

[10] 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). For a relevant discussion about this issue, see Szyszko (2017).

total number of insiders surveyed during the whole sample period. In Supplementary Material's 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 the United Kingdom, the maximum of the 5 countries considered.[11]

To tackle the associated problem of eventually appearing non-symmetric distributions or a heavy-tail distributions behind the set of available cross-sections of forecasts, this paper uses robust dispersion estimators as proposed by Rousseeuw and Croux (1993): S_n and Q_n.[12] A short description of these robust estimators is provided here for the sake of completeness. Given a sample of n points, $x = \{x_1, x_2, \dots, x_n\}$, the S_n- and Q_n-dispersion estimators are defined as

$$S_n \equiv s_{mp} s_{mg} med_i \{ med_j |x_i - x_j| \} \tag{1}$$

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

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 insiders effectively surveyed, which can be less than 10 (see Croux and Rousseeuw, 1992) for specific variables, months and countries (π and g data are not touched by this small-sample problem). 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 $\lfloor c \rfloor \equiv max\{d \in \mathbb{Z} | d \leq c\}$ $c \equiv max\{d \in \mathbb{Z} | d \leq c\}$, to the maximum integer of c.

The benefits from using other 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 insiders (a real problem for some variables other than g and π). The statistical efficiency, that is, an estimator's convergence velocity towards its population value, is another criterion for not considering other dispersion estimators such as the median of the absolute deviations with respect to the median, MAD.[13]

[11] Although the number of forecasts obtained from the insiders by *Consensus Economics Inc.* can become less than 10 for specific variables, months and countries, neither π nor g have this problem.

[12] Despite the poor performance of the standard deviation under these conditions, it is currently used by *Consensus Forecasts*.

[13] 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 and Croux (1992,1993).

Hypothesis tests

In summary, two hypotheses will be contrasted in terms of two complementary robust measures of the insiders' forecasts *dispersion*, S_n and Q_n,[14] as well as the *distance* between the insiders' forecast median and the central bank's announced forecasts (already used in Filacek and Saxa, 2012):

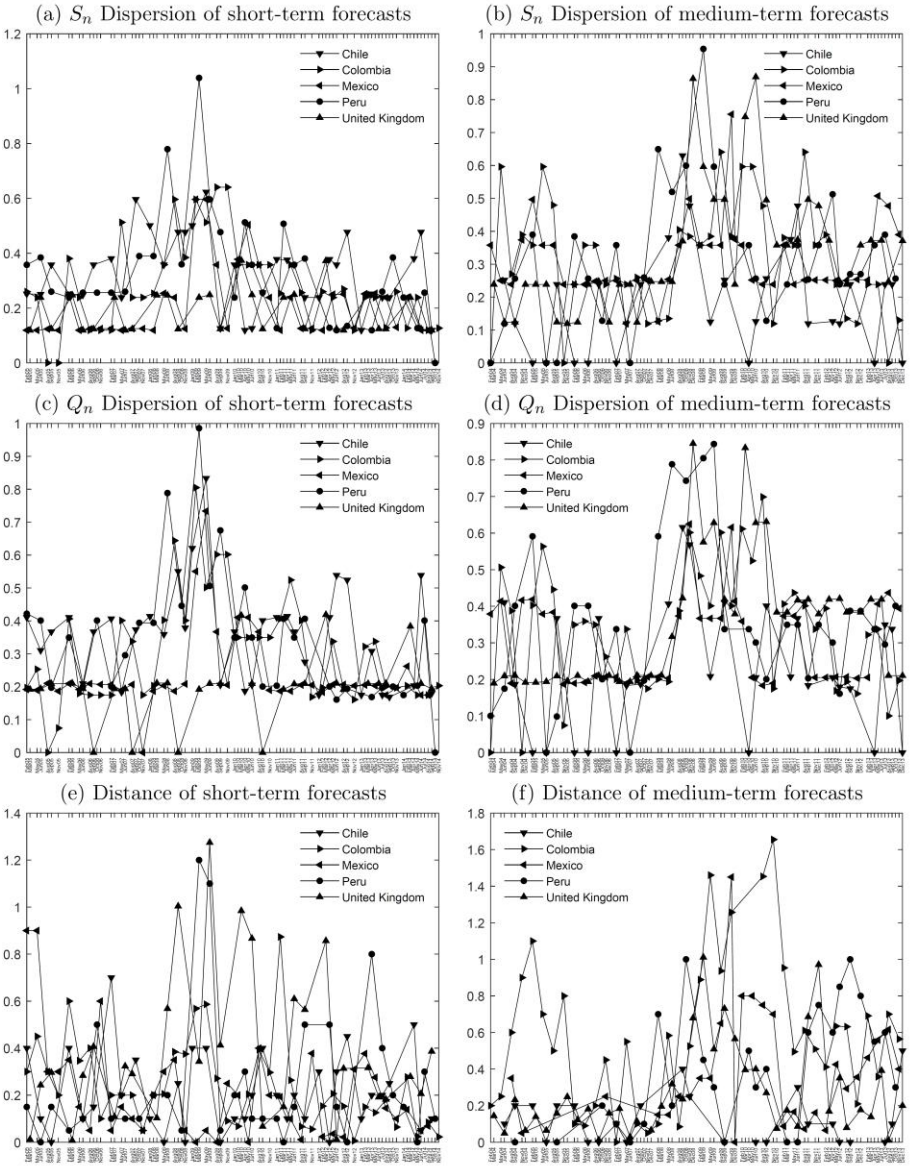
- *Ha.* The insiders consider the central bank's announced forecasts as **policy signals** to form their expectations (forecasts) about their economy (π or g), so these signals favor an **implicit coordination**: the disclosure of monetary authority's announced forecasts generates an immediate *decrease* in the robust measures of dispersion or distance (i.e., the *inverse* measures of implicit coordination).
- *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 (timely information is valuable), 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 the forecast horizon h, which allows to make a key distinction between two types of forecasts, i.e., between the two types of each coordination measure computed with them: the short-term forecast set ($h \leq 12$, forecasts for the 'end-of-current-year' fixed event) and the medium-term forecast set ($h > 12$, forecasts for the 'end-of-next-year' fixed event).[15] By focusing on the first months (surveys of forecasts) that *can be* directly and immediately affected by the sequence of disclosures of monetary authority's announced forecasts (to be labeled as $\{2\}$ months/surveys), all measures of implicit coordination (S_n, Q_n, and distance) are plotted in Figure 1 (from π forecasts) and Figure 2 (from g forecasts).

[14] Results for S_n and Q_n will be considered equally here. Rousseeuw and Croux (1993) support S_n because it behaves better than Q_n with small samples. However, (i) Q_n is more statistically efficient than S_n; and (ii) Q_n's *influence function* is free from discontinuities.

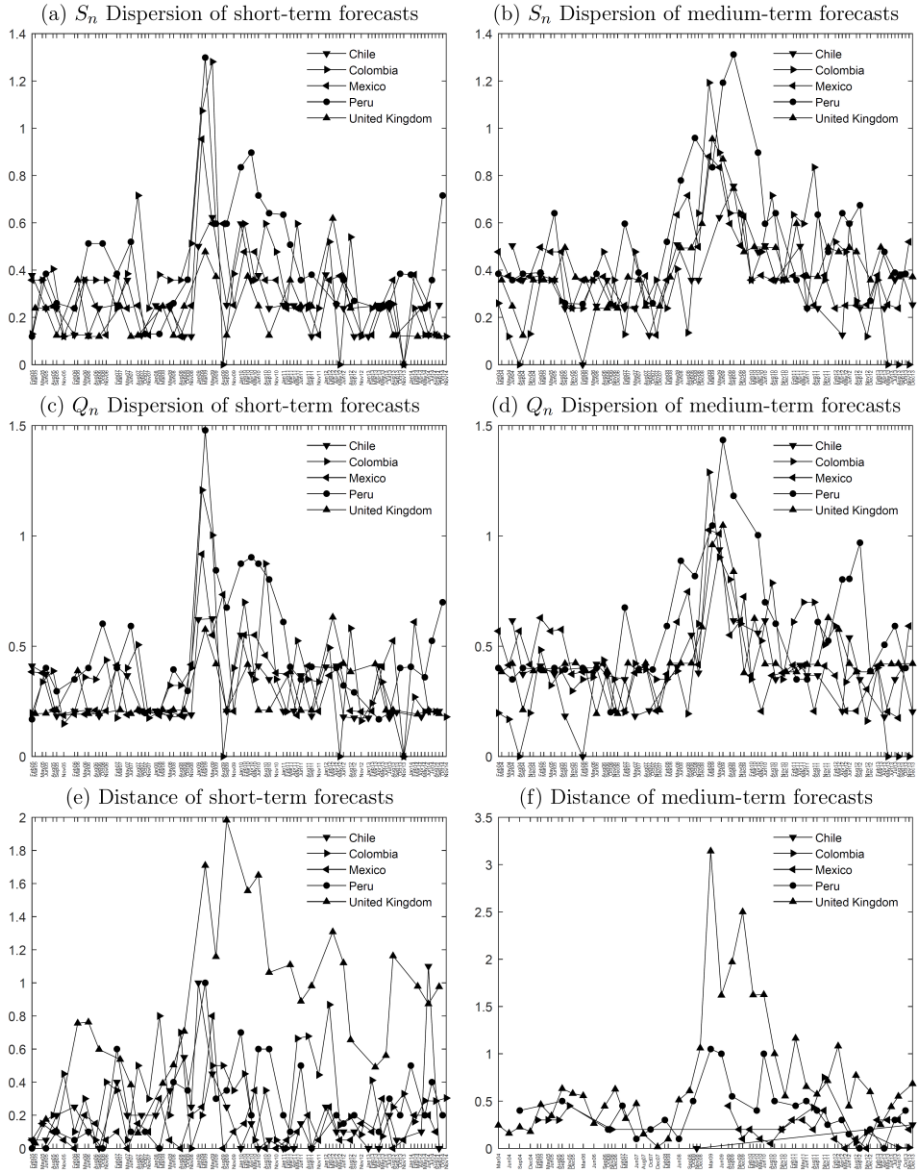
[15] Filacek and Saxa (2012) *do not* maintain that, for their 'joint tests' (i.e., without discriminating by the range of h) to be valid, it is required to control for the effect of h on dispersion and distance.

Figure 1 Measures of Implicit Coordination of π forecasts (YoY % change)



Notes: The time evolution of the three moments of the {2} cross-sections of π forecasts, i.e., those cross-sections corresponding to the first survey/month that can be immediately affected by the central bank's announced forecast (IR publication), may appear discontinuous (the x-axis tick labels are clustered). As the fixed-event forecasts have different forecast horizons, they can be grouped as either short-term forecasts when they aim at the end of current year (first column of subplots) or medium-term forecasts when they aim at the end of next year (second column of subplots). Also note the United Kingdom is the only country whose forecasts are expressed as 12-mo. average percentage changes.

Figure 2 Measures of Implicit Coordination of *g* Forecasts (12-mo. avg. % change)



Notes: The time evolution of the three moments of the {2} cross-sections of *g* forecasts, i.e., those cross-sections corresponding to the first survey/month that can be immediately affected by the central bank's announced forecast (IR publication), may appear discontinuous (the x-axis tick labels are clustered). As the fixed-event forecasts have different forecast horizons, they can be grouped as either short-term forecasts when they aim at the end of current year (first column of subplots) or medium-term forecasts when they aim at the end of next year (second column of subplots).

Statistical tests

The following paragraphs provide a detailed description of Ha and Hb statistical tests. This description uses the combination of the dispersion measure and the universe set of short-term forecasts (i.e., those for the 'end-of-current-year' fixed event) as the archetypical case. **Firstly**, the Ha hypothesis considers the insiders coordinate their forecasts for 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, each country's universe set of all monthly cross-sections of insiders' short-term forecasts must be partitioned into 4 disjoint sets of cross-sections according to their temporal relationship with respect to the corresponding central bank's *IR* announced forecast's publication months (i.e., dates, see tables in Supplementary Material's Annex C):

- $\{\mathbf{1}\}$**.** The forecasts 'surveyed' the month *just before* the month of the *IR* publication date (and evidently before the corresponding media diffusion).
- $\{\mathbf{2}\}$**.** The forecasts 'surveyed' the month after {1}'s month, i.e., the month of the first survey that **can be** immediately affected by the *IR* announced forecast's *publication* (under the assumption that this forecast is considered as a 'quantitative signal'). Henceforth, these (cross-sections of) forecasts will also be referenced as 'current-month' forecasts.[16]
- $\{\mathbf{3}\}$**.** The forecasts 'surveyed' the month after {2}'s month, 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 (under the assumption that this forecast is considered as a 'quantitative signal'). Henceforth, these (cross-sections of) forecasts will also be referenced as 'next-month' forecasts.
- $\{\boldsymbol{\phi}\}$**.** The forecasts 'surveyed' the month not complying with any of the conditions defining {1}, {2}, or {3}.

The robust Q_n-dispersion (say) is computed for each cross-section in the first three subsets of monthly cross-sections of forecasts, {1}, {2}, or {3}. The {1} dispersions correspond to the 'controls'; the {2} dispersions correspond to the 'subjects' treated by the publication; and the {3} dispersions correspond 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 experimental quarter' {1,2,3}, which **may** provide the raw material for testing the effects of the publication and the media diffusion of central bank's announced forecasts.

However, it is not valid to implement the tests with this raw material. It is mandatory to estimate an auxiliary regression with at least the first three groups of monthly dispersions (the control group and the two groups of 'subjects') to control for other sources of variation, i.e., different from the publication and the media diffusion

[16] Figures 1 and 2 show the measures of implicit coordination which were computed only with these {2} months/surveys/cross-sections of forecasts.

of central bank's announced forecasts. The final product is an estimated residual vector including the three groups of monthly *net* dispersions (the *adjusted* group of controls and the two *adjusted* 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 (e.g., the Q_n-dispersion results) were obtained by controlling for the following 'other sources of variation':

- the effect associated with the forecast horizon h along each fixed-event forecast sequence of 24 months (a trend in h), i.e., the calendar effects corresponding to a decreasing forecasts' uncertainty to the extent that h decreases (and the fixed event's realization date approaches);
- the effect associated with the forecasts' monthly calendar time t, i.e., the calendar time of forecasts' uncertainty (a trend in t); and
- the effect associated with 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 statistical tests below).

and Filacek and 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, a quadratic trend in the forecast horizon h and a linear trend in t.[18]

The functional form of the auxiliary regression is key for the results' robustness. Filacek and 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 and 2). 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, $\sigma_{js} = x_{js}\beta + u_{js}$, $s \in \{1,2,3\}$. This specification is estimated by a non-linear least squares (NLLS) procedure, including a stratagem for enforcing suitable seeds, thus providing global NLLS estimates and improved auxiliary regression's stability. Such a stratagem 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 close to the new specification's

[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 could have been considered. However, Supplementary Material's Annex A shows the average participation of the insiders for Peru to illustrate how onerous the inclusion of such a number of dummies would have been as a 'solution'.

[18] Three dummy variables (c_1, c_2, c_3) could have been included here to capture the temporal evolution over the average experimental quarter $\{1,2,3\}$, where c_1 corresponds to the intercept. These dummies are the only explanatory variables considered by Filacek and Saxa (2012), without encouraging results (see below).

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

average marginal effects, the solution of the resulting non-linear system of equations, $\beta_i/\hat{\beta}_i = \left[\sum_{js} exp(x_{js}\beta)/N\right]^{-1}$, 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 month {1} to month {2} ($\{s = 2|s = 1\}$) and the change from month {1} to month {3} ($\{s = 3|s = 1\}$), where $u_{js}^* \equiv \sigma_{js} - exp(x_{js}^*\beta^*)$ are the estimated errors after excluding the explaining components related to the historical macroeconomic variable's *ex post* volatility, the quadratic h trend, the linear t trend[21] and the intercept, $x_{js}^*\beta^*$. Although Filacek and Saxa (2012) use the *net dispersions* $\{exp(\bar{u}_{js})\}$ in accordance with their specification, these authors also exclude the component explained by the other two dummy variables (c_2, c_3), thus eliminating a substantial 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

$$t_{cal} = \hat{\bar{D}}_{\sigma_F} \Big/ \left(\frac{\hat{\sigma}_{D_{\sigma_F}}}{\sqrt{n}}\right) \tag{3}$$

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 observation of the coordination signal, $\left\{D_{\sigma_F}^j\right\}_{j=1}^{n}$, which are distributed $N\left(\bar{D}_{\sigma_F}, \sigma_{D_{\sigma_F}}\right)$. Therefore, t_{cal} is distributed *t-Student* with $(n-1)$ degrees of freedom. Note n is the number of 'experimental quarters' {1,2,3} effectively used in the sample mean after controlling for the 'not available' data (an issue in the case of the distance, which also requires the central bank's announced forecast).[22]

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 the statistical tests, all the 'experimental quarters' {1,2,3} must be separated depending upon there was a high or low uncertainty during the corresponding {2} months. Filacek and Saxa (2012) proposed two uncertainty measures: (a) the average dispersion for each 'experimental quarter', i.e., computed over the 3 cross-sections-of-forecasts sets (an uncertainty measure specific to the forecast for each macroeconomic variable under study), or (b) the sum of the standardized 'quarterly average dispersions' of the M_k variables under study for each country k. Each of the M_k 'quarterly-average-

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

[21] A linear t trend is a required explanatory variable in the difference-in-difference approach (see Bertrand *et al.*, 2004).

[22] Surprisingly, the paired-t test is more robust than the non-parametric permutation test, even when the latter does not assume normality of the 2 groups of data being compared.

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 and 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 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 issue, 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. However, the macroeconomic uncertainty series allows to separate the same *net dispersion* data obtained from the Ha-test auxiliary regression for implementing the Hb tests. This is feasible because only one of the *ex post* volatility series embedded in the macroeconomic uncertainty series is an explanatory variable in the Ha-test auxiliary regression.

4. Results

This section summarizes the results from both sets of tests (Ha y Hb) for the three computed measures of implicit coordination, the π and g forecasts and the five countries. The scarcity of 'hard facts', obtained with a significance level of 10%, motivated the inclusion of 'soft results' or 'weak evidence' corresponding to a 'range

Table 1 *Ha* Tests with Dispersion (full sample)

Country	S_n	*Variable*		*Survey's month*		*Horizon*
	effect	π	g	*current*	*next*	*range*
Mexico	decrease?	x		x		$h \leq 12$
Peru	decrease?		x	x		$h \leq 12$
The United Kingdom	increase?		x		x	$h > 12$
	increase?	x		x		

Notes: The dispersion of *Consensus Economics Inc.*'s forecasts (π or g) is gauged by two robust dispersion estimators, S_n and Q_n. Neither a hard nor a weak result has been found with Q_n dispersion.

of significance' (*p-values* between 10% and 13%).[23] Supplementary Material's Annexes D, E, and F provide the detailed results (degrees of freedom, *Tcal*'s and *p-values*).

[23] To use a wider range would bear the prohibitive cost of these soft results' being false.

Robust Dispersion (S_n & Q_n)

There is 'weak evidence' that the publication of the coordination signal *would have* decreased S_n dispersion of short-term π [g] forecasts in **Mexico** [**Peru**] at the same month of their publication ('current month' column in Table 1) and that it *would have* increased S_n dispersion of medium-term π forecasts in the **United Kingdom** at the same month of their publication. There is only 'weak evidence' that the publication *and* media diffusion of official forecasts *would have* jointly increased S_n dispersion of medium-term g forecasts in the **United Kingdom** at the next month of their publication ('next month' column in Table 1). Fortunately, there is no hard evidence about increased S_n dispersion. On the other hand, considering the effects on Q_n dispersion of survey forecasts, both the publication effect and its joint effect with media diffusion are null in all countries under study: there is neither hard nor weak evidence that publication (with or without media diffusion) either increase or decrease Q_n dispersion.

These results may 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: for the sake of saving space, 'the disclosure of the official forecasts' will be used as equivalent to either 'the publication of the official forecasts' or 'the publication and the media diffusion of the official forecasts'.

Besides, 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': 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] The full sample is thus divided into two sub-samples, depending on whether the level of macroeconomic uncertainty is high or low.

By focusing on the hard results, Table 2 shows that the disclosure of official forecasts in **Chile** *did* decrease S_n dispersion of g and π short-term forecasts within the official forecasts' publication month (the current month) whenever this publication month is labeled a 'high-uncertainty month' (HU month). There was no statistically significant result associated with Q_n dispersion.

The disclosure of official forecasts in **Colombia** increased S_n dispersion of medium-term g forecasts within the month *after* the publication month (the next month) whenever the publication month is a HU month *but* decreased it whenever this publication month is labeled as a 'low-uncertainty month' (LU month). Surprisingly, these effects on S_n dispersion are fully backed (and reflected like a mirror) by the effects on Q_n dispersion in Colombia.

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

Table 2 *Hb* Tests with Dispersion (separated samples)

Country	S_n	Variable		Survey's month		Horizon	IR level of
	effect	π	g	current	next	range	uncertainty
Chile	decrease		x	x			high
	decrease	x		x		$h \leq 12$	high
	increase?	x		x			low
	increase?	x			x	$h > 12$	high
Colombia	increase		x		x	$h > 12$	high
	decrease		x		x		low
Mexico	decrease	x		x		$h \leq 12$	high
	decrease		x	x		$h > 12$	high
	increase		x		x		low
Peru	decrease		x	x		$h \leq 12$	low
	decrease	x		x	x	$h > 12$	high
Country	**Q_n**	**Variable**		**Survey's month**		**Horizon**	**IR level of**
	effect	π	g	current	next	**range**	**uncertainty**
Chile	decrease?	x			x	$h > 12$	low
Colombia	increase		x		x	$h > 12$	high
	decrease		x		x		low
Mexico	increase?		x	x			high
	increase		x		x	$h \leq 12$	high
	decrease	x			x		high
	increase	x			x		low
Peru	decrease	x		x	x	$h > 12$	high
The United Kingdom	decrease		x	x	x	$h \leq 12$	high
	decrease	x			x	$h > 12$	high

Notes: The dispersion of *Consensus Economics Inc.*'s forecasts (π or g) is gauged by two robust dispersion estimators, S_n and Q_n. When the effect is marked with a question mark, it means a 'weak evidence' was obtained with a 'significance range' greater than 10% and less than 13%.

In **Mexico**, the disclosure of official forecasts 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 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, the disclosure of official forecasts decreased Q_n dispersion of short-term π forecasts within the next month whenever the

publication month is a HU month. However, it increased (a) Q_n dispersion of short-term π forecasts within the next month whenever the publication month is a LU month, as well as (b) Q_n dispersion of short-term g forecasts within the next month whenever the publication month is a HU month.

In **Peru**, the disclosure of official forecasts decreased S_n dispersion of short-term g forecasts within the current month whenever the publication month is a LU month. A remarkable result is the following: it decreased both S_n and Q_n dispersions of medium-term π forecasts within both the current and next months and whenever the publication month is a HU month.

Finally, in the **United Kingdom**, the disclosure of official forecasts really decreased Q_n dispersion of short-term g forecasts within both the current and next months and whenever the publication month is a HU month. Moreover, it decreased Q_n dispersion of medium-term π forecasts within the next month whenever the publication month is a HU month.

Table 3 *Ha* Tests with Distance (full sample)

Country	*Distance effect*	*Variable*		*Survey's month*		*Horizon range*
		π	*g*	*current*	*next*	
Chile	decrease	*x*		x	x	*h≤12*
Colombia	decrease	*x*		x		*h≤12*
Mexico	decrease		x		x	*h≤12*
	decrease?		x	x		
	decrease	x			x	*h>12*
Peru	decrease		x		x	*h≤12*
	decrease	x			x	
	decrease?	x			x	*h>12*
The United Kingdom	decrease	x			x	*h≤12*
	decrease?		x		x	*h>12*

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

Distance

The Table 3 considers the same kind of tests as in Table 1 (full sample) but focused on the distance measure. The number of hard results is now greater than zero. In **Chile**, the disclosure of official forecasts really decreased the distance associated with short-term π forecasts within the current and next months. In **Colombia**, it decreased the distance associated with short-term π forecasts within the current month. In **Mexico** and **Peru** the disclosure of official forecasts decreased the distance associated with (a) short-term π forecasts within the next month, and (b) g forecasts within the next month (Mexican medium-term g forecasts and Peruvian short-term g

forecasts). Finally, in the **United Kingdom**, the disclosure of official forecasts decreased the distance associated with short-term π forecasts within the next month.

The number of hard results from full-sample tests is reasonable and suggests the distance is a relevant measure for evaluating the effect of the disclosure of official forecasts. Considering the 'weak evidence', the disclosure of official forecasts *would have* decreased the distance of

- short-term g forecasts within the current month in **Mexico**;
- medium-term π forecasts within the next month in **Peru**; and
- medium-term g forecasts within the next month in the **United Kingdom**.

The tests applied to the average distance in the complementary sub-samples are presented in Table 4 (separated according to the dichotomy between high and low macroeconomic uncertainty). Although these tests use nearly the half of available observations, they avoid the full sample's 'masking effect' and thus provide more specific hard results.

Table 4 *Hb* Tests with Distance (separated samples)

Country	*Distance effect*	*Variable*		*Survey's month*		*Horizon range*	*IR level of uncertainty*
		π	g	*current*	*next*		
Chile	decrease	x		x		*h≤12*	low
	decrease?	x			x		
Colombia	decrease	x		x		*h≤12*	high
	decrease?	x			x		
Mexico	decrease		x		x		low
	increase	x		x		*h≤12*	high
	decrease	x			x		low
	increase		x	x		*h>12*	low
	decrease	x			x		
Peru	increase		x	x			high
	decrease		x	x	x	*h≤12*	low
	decrease	x			x		low
	decrease?	x		x		*h>12*	low
	decrease	x			x		
The United Kingdom	decrease	x		x	x	*h≤12*	high
	decrease?		x		x	*h>12*	high
	decrease?	x		x			

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

The separated-sample depiction emphasizes, as before, the hard results. In **Chile** [**Colombia**], the disclosure of official forecasts decreased the distance of short-term π forecasts within the current month whenever the publication month is a LU [HU] month.

In **Mexico**, the disclosure of official forecasts decreased the distance of short-term g forecasts within the next month whenever the publication month is a LU month; *but* it increased the distance of medium-term g forecasts within the current month whenever the publication month is a LU month. Moreover, the disclosure of official forecasts decreased both the distance of short-term π forecasts and the distance of medium-term π forecasts, within the next month whenever the publication month is a LU month; *but* it increased the distance of short-term π forecasts within the current month whenever the publication month is a HU month.

In **Peru**, the disclosure of official forecasts decreased the distance of short-term g forecasts within the current and next months whenever the publication month is a LU month; *but* it increased the distance of short-term g forecasts within the current month whenever the publication month is a HU month. Furthermore, the disclosure of official forecasts decreased both the distance of short-term π forecasts and the distance of medium-term π forecasts, within the next month whenever the publication month is a LU month.

Table 5 Performance Measures from *Hb* Tests

Country	*Survey's* month	Dispersion			Distance	Total
		S_n	Q_n	σ^i_z	d^i_z	t^i_z
Chile	current	(2+0)/8	(0+0)/8	2/16	(1+0)/8	3/24
	next	(0+0)/8	(0+0)/8	0/16	(0+0)/8	0/24
Colombia	current	(0+0)/8	(0+0)/8	0/16	(1+0)/8	1/24
	next	(0+0)/8	(0+0)/8	0/16	(0+0)/8	0/24
Mexico	current	(1+1)/8	(0+0)/8	2/16	(-1-1)/8	0/24
	next	(0-1)/8	(0-1)/8	-2/16	(2+1)/8	1/24
Peru	current	(1+1)/8	(0+1)/8	3/16	(0+0)/8	3/24
	next	(0+1)/8	(0+1)/8	2/16	(2+1)/8	5/24
The United Kingdom	current	(0+0)/8	(1+0)/8	1/16	(1+0)/8	2/24
	next	(0+0)/8	(1+1)/8	2/16	(1+0)/8	3/24

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

Finally, in the **United Kingdom**, the disclosure of official forecasts decreased the distance of short-term π forecasts within the current and next month, whenever the

publication month is a HU month.[25] Also note that, for the sake of saving space, all the results in "next month" columns (Tables 2, 3, and 4) have not been described in terms of the *joint* effect of the publication *and* media diffusion of official forecasts.

Epilogue

A useful way to summarize the results above is to define an adequate score based on the total number of Hb statistical tests for each country. Let any reduction [increase] in the coordination measure (S_n dispersion, Q_n dispersion or distance) be valued as one positive point $(+1)$ [one negative point (-1)]. For each {country, measure, survey's month} triplet, the maximum score is 8 (π and g; high and low uncertainties; and short- and medium-term forecasts). The watchful reader can just sum the points associated to each significant *p-value* -bold letters- (while considering the corresponding *Tcal*'s sign, immediately to its left) down through the two *p-values* columns (the 'current' month and the 'next' month) in Tables D.2, E.2, and F.2 (Supplementary Material's Annexes D, E, and F). Table 5 provides all *relative scores*, i.e., *absolute scores* divided by the maximum score.[26] Let σ_z^i be the relative score from 'aggregated dispersions' corresponding to country i and survey's month z (see footnote 26). Let d_z^i be the relative score from distances corresponding to country i and survey's month z. These two measures can be 'horizontally summed' to obtain the total relative score t_z^i.[27]

Table 5 shows the big picture of these countries' limited success while managing *insiders*' expectations, that is, the forecasts made by professional forecasters and financial markets' participants. Although the 'ranking' favors Peru, the United Kingdom and Chile, these results should be appreciated from the view of Kumar *et al.* (2015)'s results referring to the expectation surveys made 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.[28]

For the referred findings that are related to the second [first] link of the coordination chain, the explanation is that firms [insiders] in New Zealand obtain scarce net benefits from coordinating their forecasts with the insiders' [the primary insider's, i.e., the central bank's official forecasts] (gross benefits from coordination are close to coordination costs). For the present study's findings, all related to the first

[25] The reader can notice the hard results in Table 4 are consistent with those in Table 3.

[26] Aggregation of Table 5's *relative scores* is not arithmetically conventional. For instance, the *relative scores* for each {country, measure} pair would be the ratio of the sum of two numerators to the sum of two denominators, i.e., the 'vertical sum' of the current month's relative score and the the next month's relative score. Only two columns in Table 5 provide 'horizontal sums', though.

[27] The fractions t_z^i have common denominator 24, so let n be any numerator therein, $n \in \{-24, \dots, -1, 0, 1, \dots, 24\}$. t_z^i can then be transformed into the GPA-4 scale by using equation $m = 4(n + 24)/48$. Numerators $\{0,1,2,3,4,5\}$ (i.e., t_z^i's) are equivalent to $\{1.8\hat{3}, 2, 2.1\hat{6}, 2.25, 2.3\hat{3}\}$.

[28] As referred in footnote 18, Huang and Trehan (2008) consider U.S. firms' π expectations are closer to *professional forecasters*' because firms hire these forecasters to gauge future values of π. Kumar *et al*. (2015) report that only 20% of their surveyed firms in New Zealand rely on insiders' π forecasts.

link of the coordination chain, the explanation is that the insiders in Chile, Colombia, Mexico, Peru and the United Kingdom obtain scarce net benefits from coordinating their forecasts with the central bank's, thus anticipating the state of affairs in the ensuing links of the coordination chain of expectations.

5. Conclusions

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

In spite of the important achievements of inflation targeting in all these countries, there are few occasions when both *net dispersion* and *net distance* decrease, 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 the authorities must respond by using a policy rule depending upon private forecasts instead of the authorities' own internal forecasts. The disclosure of the central bank 'perceptions' can become a monetary policy instrument 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 for key variables towards their fundamental values.

All the findings in the study are related to 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 surveys made to the professional forecasters and the financial-market participants. It may be argued that confirmation of the conclusions above requires to consider the forecasts and expectations of a wide range of economic agents, such as surveys made to households and/or firms about their economic perceptions. However, the literature's findings about New Zealand's case shows such a confirmation is not mandatory: (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 forecasts for variables other than π and g (also included in the inflation-targeting central banks' *IR*s) 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, forecasts for key sub-indexes 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 Supplementary Material's 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 (whenever the current month is December) or has already ended one or two months ago (nowcasting).

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