# The effect of IMF communication on government bond markets: Insights from sentiment analysis*

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**Abstract**

By providing assessments and projections of countries' economic situation, the reports published regularly by the International Monetary Fund (IMF) are typically thought to influence market participants' expectations. This article examines whether the IMF sentiment conveyed by the Regional Economic Outlook (REO) provides new information capable of influencing government bond markets. To measure IMF sentiment, we use text mining techniques on an original dataset based on the qualitative content of the REO reports for 16 countries across three regions, *Asia and Pacific*, *Europe*, and *Western Hemisphere*, from 2005 to 2018. Our results suggest that the qualitative content of the REO reports has significant repercussions on bond yields, particularly in the *Asia and Pacific* region, and provides a positive signal in bond markets of countries participating in an IMF program in the *Europe* and *Western Hemisphere* regions. IMF sentiment towards the leading trade partner can also be an essential source of bond markets' reactions. These findings are robust when controlling for IMF quantitative forecasts in the empirical procedure and accounting for an alternative sentiment measure. They thus shed new light on the importance of IMF communication for guiding and managing markets' expectations.

Keywords: Bond markets, High-frequency, IMF, Sentiment index, Text analysis

JEL classification: F53, G15, Z13

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# 1. Introduction

Since the 1990s, the environment for multilateral surveillance has become more challenging for the International Monetary Fund (IMF), as reflected by the recurrent episodes of shocks and crises, a surge in members' calls for the Fund to reinvigorate its surveillance activities,[1] and increased concerns about economic and financial stability over the longer term (Lombardi and Woods, 2008). The Fund has adapted in part by stepping up information delivered to its members. As an illustration, the variety and the frequency of IMF reports have grown constantly from 2000 to 2015 (see Table A.1 in the Appendix). Until the 2000s, the IMF published one annual document, the World Economic Outlook (WEO). Since then, the IMF has doubled the frequency of this existing publication and increased the number of published reports with the publication of the Global Financial Stability report (since 2002), the Regional Economic Outlook reports (since 2005), and the Fiscal Monitor report (since 2011).

By pooling, analyzing, and disseminating data gathered from member countries, the IMF reports convey new information as well as constant feedback on the Fund's sentiment towards countries' economic performance, expressed through positive or negative comments (Breen et al., 2019), and capable of influencing financial markets (Lombardi and Woods, 2008). Indeed, to the extent that these documents provide a general assessment and projections of member countries' economic situation, they may lead market participants to revise their allocation decisions.

To date, however, very few studies have examined the effect of the qualitative information contained in IMF's communication, such as sentiment, on financial markets, even though communication plays a crucial role in crisis management such as with the IMF (see Boin et al., 2016), and sentiments conveyed in documents or speeches are recognized as essential determinants of asset prices. As a case in point, Schmeling and Wagner (2019) find that the tone of central bank communication moves asset prices, even after controlling for policy actions and economic fundamentals. This paper attempts to fill this gap by considering that the sentiment of the Fund expressed in its reports may shape government bond yields through (at least) two channels. First, it

[1] See the statement of G7 Finance Ministers and Central Bank Governors (http://www.g7.utoronto.ca/finance/fm103098.htm), and the memorandum on the Work Program on Strengthening the Architecture of the International Monetary System, issued by the IMF Executive Directors of the G7 countries, to the IMF Director and Executive Board, October 30, 1998 (https://www.imf.org/external/np/g7/103098ed.htm)

may convey new and detailed information about countries economic fundamentals that can alter market participants' expectations: a "fundamental information" transmission channel. Indeed, in the presence of asymmetric information between policy-makers and the public, communication can hold important information for market participants. For instance, IMF opinion can be more optimistic than what investors would expect, implying a favorable market response, while negative IMF statements unanticipated by investors would undermine their confidence. Second, IMF's reports may give qualitative information on the IMF's own views about the policy choices being made in the country. This might influence market participants' views of how the IMF may intervene in the economy going forward: a "policy information" transmission channel. Following this line of though, Breen et al. (2019) suggest that positive sentiment in an IMF report might signal the Fund's validation of member states' economic policies while, in contrast, a negative view brings with it an obligation to alter the status quo. Hence, these two channels might change investors' perception about the ability of countries to repay their debts, impacting, therefore, the premia they demand on assets like sovereign bonds.

Against this background, this paper aims to analyze the impact of the sentiment contained in the Regional Economic Outlook (REO) reports on government bond markets. In particular, we seek to determine whether market participants pay close attention to the sentiment expressed in the REO reports or, put differently, whether IMF communication on member countries' economic outlook has the ability to coordinate market participants' expectations, which is likely to alter government bond yields. The rationale is that market participants tend to overweight the public information when faced with official communication from the IMF and underweight their own private signals. This leads to more aligned expectations among market participants, which ultimately affects bond yields. We focus on the REO reports since they contain numerous qualitative information about countries' economic conditions and government policies, likely to influence market participants' evaluation of states' solvency. They can also signal possible cross-border financial instability by examining spillovers and linkages across countries within geographical areas. We, therefore, expect these reports to convey relevant information regarding IMF sentiment about the economic outlook of its members and provide market participants new information on the basis of which they will revise their expectations about countries' economic conditions.

To conduct the empirical analysis, we proceed in four steps. First, we construct a unique and novel database by extracting text contents from each of the REO reports for

a sample of 16 countries from three regions over the period 2005-2018.[2] These countries were chosen based on the following criteria: (i) the level of financial development of the region where the country geographically belongs, (iii) the IMF "attention" towards the country, proxied by the number of times it has been cited in the REO reports and (iii) the availability of financial data at the country level. Second, we measure the IMF sentiment expressed for each country's text content in the REO reports using the lexicon of positive and negative words defined by the General Inquirer; that is, the Harvard IV-4 and the Lasswell value dictionaries. As a third step, we assess the effect of IMF sentiment on countries' government bond yields. Indeed, by observing the changes in yields associated with IMF communication, we can capture the immediate investor response based on the current and expected future fundamentals (see, e.g., Evrensel and Kutan, 2008). We control for IMF GDP growth and CPI-based inflation forecasts and countries' participation in IMF-Supported Programs to make sure that the qualitative information contained in the REO reports matters beyond the quantitative economic forecasts and the potential bias in the Fund's sentiment towards countries participating in IMF programs. Finally, we conduct several robustness tests: (i) investigating the effect of IMF sentiment towards the main regional trading partner and (ii) accounting for an alternative sentiment measure.

In doing so, this paper relates to two strands of the literature. First, the literature that investigates the effect of IMF news on financial markets. This literature has mainly focused on the investor relation to IMF news during financial crises, usually proxied by dummy variables. For instance, Ganapolsky and Schmukler (1998) examine the impact of the IMF program-related news during the Tequila crisis in Argentina and find a positive effect on bond and stock returns. Brealey and Kaplanis (2004) use a broader sample of IMF programs and cover an extensive range of financial assets. They detect a significant decline in asset prices around announcements of IMF programs. Hayo and Kutan (2005) examine the reaction of financial stock returns in a group of emerging markets to a set of IMF events during the Asian, Russian, and Brazilian crises of 1997-1999. They find that IMF-related news affects daily stock returns while only bad news affects foreign exchange market returns. Finally, Kutan et al. (2012) expand this line of research on the stock market into various economic sectors and conclude that IMF news play an important role in affecting sectoral returns. The second and the

[2] *Western Hemisphere*: Argentina, Brazil, Canada, Mexico and the United States. *Europe*: France, Germany, Poland, Russia, Turkey and the United Kingdom. *Asia and Pacific*: Australia, China, India, Japan and South Korea.

more recent strand is the analysis of IMF publications using text mining. Fratzscher and Reynaud (2011) assess the degree of favorableness in the Public Information Notices (PINs) issued after Executive Board discussions of Article IV consultations with member countries on several topics. For a set of emerging market economies over the period 2001-2007, they find that the degree of favorableness significantly influences the sovereign spreads for most countries. Anderson et al. (2021) analyse the International Monetary and Financial Committee (IMFC) communiqués and constituency statements from 2000 to 2019.[3] They calculate the topic distribution of each statement to determine how have economic policy priorities of the IMF's governing body evolved over the past two decades. They find a significant emphasis on debt and development issues in the early-2000s, while the late-2000s focused on the financial crisis and the 2010s highlighted economic growth.

Our paper makes several contributions to these two strands of the literature. First, we extend and complement the analysis of Fratzscher and Reynaud (2011) by providing a comprehensive database of IMF sentiment conveyed in another category of IMF reports, the REO reports,[4] using a sentiment analysis that distinguishes objectively between words with different tones. Second, the paper uses this original dataset to analyze bond markets' reactions to the release of these reports for a set of emerging and developed economics for a larger time span. Finally, this feature makes our approach original in the literature linking IMF-related news and bond markets by suggesting that the IMF sentiment conveyed in its reports could be one potential additional explanation for this link.

The sentiment analysis of the REO reports reveals that the 2008 financial crisis led to a significant drop in IMF sentiment for all countries. Some European countries, such as Germany, were also characterized by a negative IMF sentiment during the sovereign debt crisis. For Asian countries, the 2011 Chinese economic downturn and the trade tensions between China and the United States coincided with a significant deterioration in IMF sentiment. Furthermore, our econometric analysis shows that IMF sentiment conveyed by the REO reports provides bond markets with incremental information content. As an illustration, a positive change of IMF sentiment is significantly associated with an easing of financial conditions in countries belonging to the *Asia and Pacific* region. We also find that the qualitative information related to the *Europe* and the

[3]The IMFC advises the IMF Board of Governors on the supervision and management of the international monetary and financial system, in particular during events that may disrupt the system.

[4]The REO reports focus on the same topics than those of the PINs, but on a regional scale.

*Western Hemisphere* regions is biased towards pessimism, while countries involved in IMF programs in those regions benefit from a favorable assessment of their economic situation. IMF sentiment towards the main leading trade partner can also be an essential source of bond markets' reactions, especially in *Asia and Pactific*. Moreover, when shifts in IMF sentiment are associated with changes in domestic bond returns, the effect is independent of any GDP or inflation forecasts provided by the REO reports. Therefore, government bond markets seem to view IMF sentiment as a valuable source of information by itself, regardless of the quantitative assesments contained in the reports. These findings are robust to the use of an alternative sentiment measure.

The rest of the paper is structured as follows. Section 2. provides an overview of the contents of the REO reports and presents information on the country coverage. Section 3. details the approach we use to measure IMF sentiment based on the REO reports. Section 4. presents our econometric setup, the data, and our main results. Section 5. conducts some extensions and robustness checks. The last Section offers some concluding remarks.

## 2. The Regional Economic Outlook: An overview

We focus on the REO reports because, besides the frequency and the regularity of their publications, they disseminate more targeted information on IMF member countries than the global reports. In particular, the regional outlooks review the latest economic developments in five regions of the world (*Asia and Pacific*, *Europe*, *Middle East and Central Asia*, *Sub-Saharan Africa*, and *Western Hemisphere*) and provide a discussion of recent growth performance, structural reforms, and the latest forecasts for the economies of these five regions.[5]

The publication of the first REO report dates back to October 2004, and the reports' frequency is bi-annual (April/May and in October/November). The first report of the year is usually the most comprehensive document (80 to 120 pages) and provides many observations and economic policy analysis. The second one, smaller (around 30 pages), is an updated version of the first report.

[5]Figure A.1 in the Appendix shows the geographical coverage of the REO reports.

### 2.1. An Analysis of the Regional Economic Outlooks

We collect all REO reports from the starting date of publication to the end of 2018.[6] We extract the more frequently used words/expressions in each region's documents over the sample period. The aim is to highlight regional-specific patterns by identifying the main topics raised in each region's reports. In Figure 1, each cloud plots the 200 most prominent words/expressions over a total of 5 to 6 million words for each geographical area over the period 2005-2018.

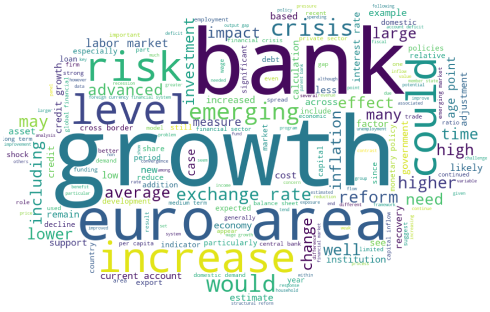
We note that the word "growth" is often quoted in the REO reports of the five regions, although related expressions differ among regions. In *Europe*, the main concerns raised by the IMF seem to be related to financial issues, "banks", and "risks" in particular. Several other topics appear also to be important, such as "exchange rate", "crisis", and "labor market", which are all closely related to macroeconomic fundamentals. We note that for the *Western Hemisphere* region, there are more references to some words/expressions, such as "commodity prices", "investment", "inflation", "exchange rate", and "interest rates". These words refer to fundamentals that either exert a strong influence on economic growth in Latin America or are of particular concern for policymakers, such as the levels of interest rates and exchange rates, given their influence on the sustainability of domestic and external debt in most of the countries in this region. The clouds of the regions *Asia and Pacific* and *Sub-Saharan Africa* show some similarities with *Western Hemisphere*, with a high frequency of the words "exchange rate" and "inflation". Figure 1 also shows a high recurrence of the words "export" in *Asia and Pacific* and "resource intensive" in *Sub-Saharan Africa*. These keywords indicate how exports and commodities play a crucial role in determining the business cycles of each region. The REO reports of *Middle East and Central Asia* seem to express more concerns on oil exporters than oil importers, suggesting that the former have been more exposed to shocks over the period. Finally, although words that indicate fluctuations such as "increase", "decline", "lower", and influences such as "effect" and "impact" are common to all regions, they are more prominent in the *Asia and Pacific*, the *Sub-Saharan Africa*, and the *Middle East and Central Asia* regions. This suggests higher economic and financial instability and a stronger dependence of these regions to external conditions.

[6]The publication of the REO report starts at different dates, depending on the regions: in October 2004 for *Sub-Saharan Africa*, September 2005 for the *Asia and Pacific* and *Middle East and Central Asia*, April 2006 for the *Western Hemisphere*, and November 2007 for *Europe*

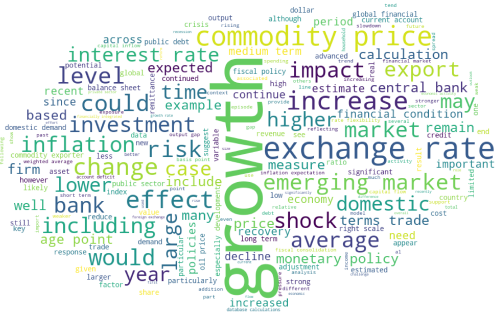
**Figure 1: Word cloud per region, average over the sample period (2005-2018)**

***Asia and Pacific***


***Europe***




***Western Hemisphere***




***Middle East and Central Asia***


***Sub-Saharan Africa***


*Note: The size of the words indicates the frequency of use across all reports of a specific region; that is, larger words have a larger count in the REO reports of a particular region.*

## 2.2. An Analysis of the Selected Sample Countries

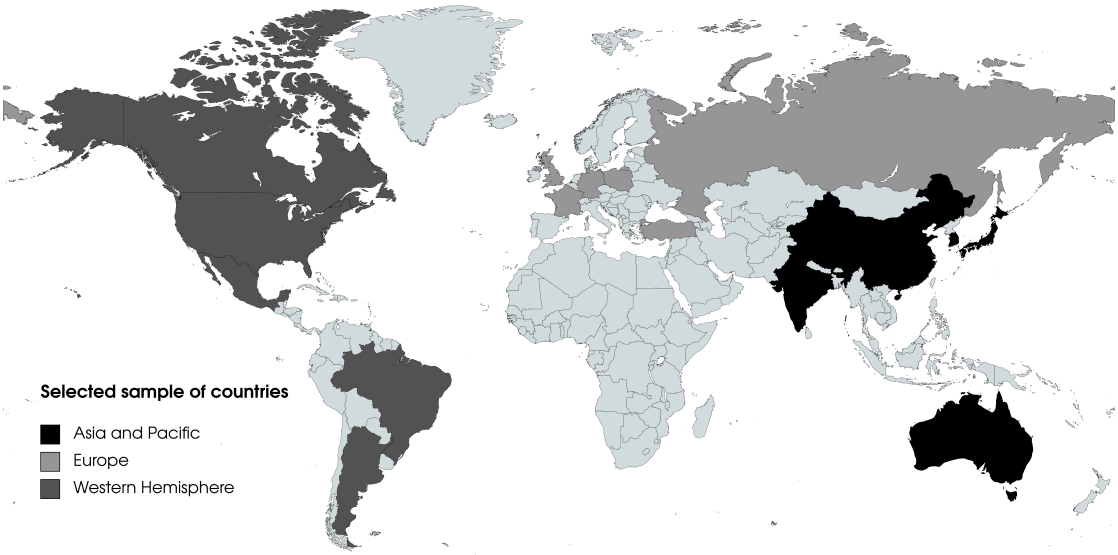
We apply several criteria to select our country sample across the different regions. First, we have to make sure that countries have financial markets sufficiently developed to react to the REO reports' publication. We use the IMF Financial Development Index (FDI), which provides a comprehensive picture of financial institutions and markets in

terms of financial depth, access, and efficiency (Svirydzenka, 2016).[7] The 2016 FDI index shows that the least financially developed regions were *Sub-Saharan Africa* (0.15) and the *Middle East and Central Asia* (0.27). We thus exclude these regions from our sample. Second, the extraction of countries' citation in the REO reports of the three most financially developed regions (*Europe*, *Western Hemisphere*, and *Asia and Pacific*) suggests that the countries that receive more attention from the IMF are usually the leading contributors to regional GDP. Such economies include China, Japan, South Korea, and India in *Asia and Pacific*, Germany, France and the United Kingdom in *Europe*, and the United States, Canada, Brazil, and Mexico in the *Western Hemisphere* region (see Table B.1 in Appendix B). The IMF's attention has also been pronounced for some smaller emerging economies. However, several of these economies from the *Western Hemisphere* and the *Asia and Pacific* regions have been excluded from the analysis because of missing financial data (such as Thailand, Indonesia, Philippines, Chile, Peru, and Colombia). Finally, our sample does not include some countries from Southern Europe (Spain, Italy, and Greece) because of their episodic appearance in the reports during specific events, like e.g. the European sovereign debt crisis.

Therefore, we select among the three most financially developed regions the countries (i) that have been most frequently mentioned and for which financial data are available, and (ii) with potential regional influence as key trading partners or giving their economic weight in the region. With these criteria, we obtain a sample of 16 countries evenly distributed across the three regions. For *Asia and Pacific*: Australia, China, India, Japan, South Korea; for *Europe*: France, Germany, Poland, Russia, Turkey, the United Kingdom; and for *Western Hemisphere*: Argentina, Brazil, Canada, Mexico, and the United States. Figure 2 illustrates the geographical coverage of our country sample.

[7] Available at: https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B.

**Figure 2: Geographical coverage of our country sample**




# 3. Extracting IMF sentiment from the REO reports

## 3.1. A content analysis of the REO reports

We develop a country-based dataset according to the following steps. First, we manually extract the text content related to each country included in our sample. This process enables us to convert the information provided at a regional scale to a country-specific level. Second, we manually identify the relevant paragraphs and sentences following the principle of parsimony. We select (i) paragraphs and frames that focus exclusively on the country of interest and the (ii) sentences that quote a specific pattern of the country (adding the previous or the following sentences if they are tightly related). As a result, we obtain a time-varying transcript for each country included in our sample. Third, we extract and quantify IMF sentiment contained in the REO reports for each country. For this purpose, we use a bag-of-words approach with a rule-based method of extraction from the texts of each country. This method represents all words appearing in the REO reports as a document-term matrix. The matrix elements capture the information value of each word in each REO report, corresponding to the relative frequencies of the words that convey a positive and negative sentiment within the REO report.

We rely on the General Inquirer (GI), mostly built on the Harvard-IV and Lasswell

dictionaries, to identify words that convey a positive and negative sentiment. The GI contains 1,915 (2,291) words describing a positive (negative) sentiment. The following sentences provide evidence of statements conveying a positive (bold and underlined) or a negative (italics and underlined) tone, according to the GI:

> "Contrary to previous episodes, reserve accumulation has been driven primarily by current account surpluses, rather than capital inflows, reflecting **favorable** terms of trade (especially in Argentina, Bolivia, Chile, Colombia, Ecuador, Peru, and Venezuela; and to a lesser extent in Mexico), stronger fiscal positions, and relatively competitive real exchange rates."
>
> —IMF REO report for the *Western Hemisphere* region, 02 November 2006.

> "Growth is expected to remain around 1/2 percent for 2015, with heavy foreign exchange controls continuing to *depress* investment and imports, while the weakening terms of trade, the ongoing *recession* in Brazil (Argentina's main trading partner), and the real appreciation of the peso weigh on exports and contribute to a further *decline* in the trade surplus."
>
> —IMF REO report for the *Western Hemisphere* region, 07 October 2015.

We use these word lists to select the positive and negative words in each REO report depicting the economic situation for each of the selected countries. We check that negative (positive) words are not combined in a way that indicates a positive (negative) tone of the economy to avoid measurement errors and obtain an acurate number of positive and negative words for each of the selected countries. Table B.1 in the Appendix displays some descriptive statistics on the average share of positive and negative words identified by the GI across countries and over the sample period (from the second half of 2005 to the end of 2018). We note that, on average, the share of positive words is higher than the share of negative words, except for Russia. This suggests that, during the analyzed period, the REO reports have provided more positive sentiments than negative ones. Poland exhibits the highest share of positive words (7.6%) and the United Kingdom the lowest (2.8%), while the percentage of negative words is the highest for Russia (6.3%) and the lowest for France (2.1%).

### 3.2. Measuring IMF sentiment

We combine the positive and the negative words to produce a sentiment measure for each country $i$ quoted in each REO report published at date $t$. We use a relative measure to

better identify whether a piece of text is relatively positive or relatively negative and to evaluate the magnitude of sentiment compared to the length of the text. This relative measure, $T_{i,t}$, subtracts the share of positive words from the share of negative words over the sum of positive and negative words:

$$T_{i,t} = \frac{Pos_{i,t} - Neg_{i,t}}{Pos_{i,t} + Neg_{i,t}}; \tag{1}$$

where $Pos_{i,t}$ and $Neg_{i,t}$ reflect the number of positive and negative words, respectively. A higher value of $T_{i,t}$ is indicative of a more positive sentiment about the economic situation of a given country $i$ in the REO report published at a particular time $t$.

This sentiment measure is standardized[8] to adjust for changes in the distribution of words that convey the tone through the different reports,[9] and allow for a more reliable comparison over time and across countries. Figures B.1, B.2, and B.3 in the Appendix report the evolution over time of the standardized scores (Z-scores) for the sentiment measure, denoted $t_{i,t}$, for each country over the sample period. Positive (negative) Z-scores indicate that the degree of optimism (pessimism) in the text is above (below) average. Unsurprisingly, the figures show that the 2008 financial crisis leads to relatively synchronous troughs since it severely hit the global economy. However, the sentiment measure displays some differences across countries and time variation. In particular, IMF sentiment was particularly negative (more pessimistic sentiment) following the global crisis of 2008, especially towards Russia and Turkey. In fact, the minimum sentiment realization has not been just confined to this episode. In Germany, for example, the minimum sentiment occurred during the European sovereign debt episode. Within the *Asia and Pacific* region, sentiment measures exhibit a greater amplitude since the early 2000s. The economic downturn of China in 2011 has coincided with the peak reached by the IMF negative sentiment towards this country. This confidence drop has contaminated other Asian economies and emerging countries due to the central role played by China in world trade. A significant deterioration in IMF sentiment towards the United States can be seen in October 2013, coinciding with expectations of a fiscal cliff (large spending cuts and tax increases) that could have thrown the US economy into recession. IMF sentiment towards most countries became negative at the end of the period, possibly due to increased trade tensions between the United States and China.

[8]The standardization consists, for each sentiment measure, in subtracting the sample period's mean and dividing by the sample period's standard deviation of the sentiment measure.

[9]These changes are explained mainly by variations in the writing style due to turnover in the IMF's writing teams.

# 4. IMF sentiment and bond markets

We use a high-frequency methodology to investigate the extent to which changes in IMF sentiment generate responses of government bond yields around the publication of a REO report and during the post-publication period. This approach allows us to account for the effect that the market still absorbs news after several days, evidence of which has been found in empirical studies of central bank communication (Evans and Lyons, 2005). Two main assumptions underlie our approach: (i) during the time window around the release day, news contained in a REO report dominates all other news in government bond markets, and (ii) asset prices are forward-looking and react over very short time windows and accurately to news provided in the REO reports.

## 4.1. Econometric set-up

We follow our main hypothesis that IMF sentiment conveyed in the REO reports influences bond yields by bringing qualitative information about the economic situation of the economy – a "fundamental information" transmission channel – and IMF's own views about the policy choices being made in the country, a "policy information" transmission channel.

Given the relatively low number of observations for each country, 21 to 27 observations, we estimate specific panel models to each geographical region.[10] We follow the standard methodology used in the literature that highlight institutional peculiarities in domestic bond markets (see, for example, Jaramillo and Weber (2013)) by introducing time-invariant country characteristics in the form of fixed effects.[11] The basic regression, for each country $i$, takes the form:

$$r_{i,t+h} - r_{i,t-1} = \mu_i + \alpha^h \Delta T_{i,t} + \epsilon_{i,t}; \tag{2}$$

where $r_{i,t+h} - r_{i,t-1}$ reflects cumulative changes over $h$ days of government bond yields in the country $i$.[12] $h$ stands for the different time windows used to calculate the cumulative

[10] Running a single regression including all countries was not feasible, given that the report release dates may be different among the different regions.

[11] We perfomed the Hausman test (Hausman, 1978) to check whether a fixed effects model is preferable to a random effects model. The test show a strong and significant heterogeneity amongst countries for most regressions. We thereby consider that a fixed-effect specification matches better the data generating process.

[12] $\sum_{i=0}^{h} (r_{i,t+i} - r_{i,t-1}) = (r_{i,t+h} - r_{i,t+h-1}) + ... + (r_{i,t} - r_{i,t-1}) = r_{i,t+h} - r_{i,t-1}$.

returns. $\Delta T_{i,t}$ is the first difference of the IMF sentiment measure for country $i$ at time $t$ between two subsequent reports. $\mu_i$ denotes country fixed effects. Finally, $\epsilon_{i,t}$ is a stochastic error term that captures the effect of other factors that influence bond returns.

We control for countries' participation in IMF programs to check whether the nexus between bonds yields and IMF sentiment is influenced by this participation. There are a number of studies upon which we can draw to expect that bond yields may be impacted by IMF programs. First, there is ample evidence that the Fund's assistance affects financial returns (Brealey and Kaplanis, 2004). By involving a combination of adjustment and financing, programs negotiated with the IMF might signal to market participants the extent to which they can be costly or release the external constrainst of the countries concerned. Second, as demonstrated by Bird (2005), the Fund may be predisposed towards excessive optimism in IMF programs due to some political economy factors. This over-optimism is likely to make the sentiment of the Fund endogenous to its own programs and involve a potential selection bias, by altering investors' perception of economic conditions in countries under the Fund's assistance. To investigate these issues, we introduce a variable, IMF program, which is captured through a dummy variable ($IMF_{i,t}$). If for a given year $t$, a country $i$ is under agreement with the IMF, the dummy takes the value "1" and the value "0" otherwise. We include an interaction term between this dummy variable and the sentiment variable to check if changes in the IMF sentiment affect differently bond returns in countries under an IMF program.

Finally, to check if the asset price movement around the release day of the REO report is a reaction to the qualitative information in the text or to the updated IMF forecasts provided in the REO reports, we control for GDP growth and CPI-based inflation forecasts, when they are available in the REO reports. By doing so, we aim to test whether the qualitative information contained in the IMF reports, i.e. the sentiment, brings additional information to market participants beyond the quantitative ones, i.e. the economic forecasts, hence the existence of a "fundamental information" transmission channel. Consequently, Equation. 2 is modified as:

$$\begin{aligned} r_{i,t+h} - r_{i,t-1} = \mu_i + \alpha_1^h \Delta T_{i,t} + \alpha_2^h IMF_{i,t} + \alpha_3^h \left(\Delta T_{i,t} \times IMF_{i,t}\right) \\ + \beta_1^h \Delta g_{i,t}^f + \beta_2^h \Delta \pi_{i,t}^f + \epsilon_{i,t}; \end{aligned} \tag{3}$$

where $\Delta g_{i,t}^f$ and $\Delta \pi_{i,t}^f$ reflect changes in GDP growth and CPI-based inflation forecasts

of country $i$, respectively, between two subsequent reports. The coefficient $\alpha_2^h$ measures the direct impact of IMF programs on domestic bond markets. The coefficient $\alpha_1^h$ stands for the sentiment effect on domestic bond markets for countries not participating in an IMF program, whereas the sum of the two coefficients, $\alpha_1^h + \alpha_3^h$, represents the sentiment effect for countries under an IMF program.

Eq. (3) is estimated for the period spanning from September 2005 until December 2018. We perform a modified Wald test to detect for the existence of groupwise heteroskedasticity in the residuals of our fixed-effect regressions, and a Breusch-Pagan LM test to test for cross-sectional dependence in the error term. Tests results suggest that we should not use the standard fixed effect procedure without considering spatial correlation and panel heteroskedasticity. Therefore, we use a panel corrected standard errors (PCSEs) regression developed by Beck and Katz (1995) for all estimations. PCSEs estimator suits best to small panels and accounts for finite sample bias while producing panel-corrected standard errors that allow heteroskedasticity and correlation within panels.

### 4.2. Data

We collect the 5-year and 10-year yields on government bonds for each country from Thomson Reuters back to September 2005, i.e. the start of our sample period to December 2018.[13] We compute for each country $i$'s 5 and 10-year government bond yields (i) the one-day return calculated between the day of publication ($t$) and the previous day ($i_{i,t}^{5y}$, $i_{i,t}^{10y}$), and (ii) the cumulative return calculated over $h$ days following the day of publication ($i_{i,t+h}^{5y}$, $i_{i,t+h}^{10y}$) with $h$= 1,...,4. We follow the financial literature and employ a Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model à la Bollerslev (1986) to capture the time-varying volatility in bond returns. Specifically, we use a GARCH(1,1) model as the first lag is usually sufficient to capture the movements of the volatility (Javed and Mantalos, 2013).[14]

Since the REO reports are released twice a year, we are able to compute changes in the GDP growth and CPI-based inflation forecasts of each country $i$ between two subsequent reports. However, the CPI-based inflation forecats are missing for the *Asia*

[13] Due to data availability, this analysis is not carried out for Turkey, Argentina, and Australia. Similarly, it is not possible to extend the analysis to the 20-year and 30-year government bond yields.

[14] For the sake of brevity, the results are not reported in the paper but are available from the authors upon request.

*and Pacific* region in the REO reports.

Finally, the list of countries and the period during they were under IMF programs are obtained from the IMF's Monitoring of Fund Arrangements database.[15] Countries under IMF programs in our sample period are Turkey[16], and Poland[17] for the *Europe* region. In the *Western Hemisphere* region, Argentina[18] and Mexico[19] participated in IMF-supported programs, while no country in the *Asia Pacific* region was concerned by the IMF's financial assistance over the study period.

### 4.3. Baseline results

Tables 1 and 2 report the estimated values for the parameters of interest of Eq. (3) according to the region analysed by the REO reports, and the time horizon over which cumulative changes of 5-year government bond yields and 10-year government bond yields are calculated.

The results in Table 1 yield statistically significant evidence for bond market reaction in the *Asia and Pacific* region. We find that a more positive IMF sentiment is correlated with lower domestic bond yields the release day of the REO reports. Specifically, a one SD increase in the IMF sentiment, as expressed by $\Delta T_{i,t}$, is associated with a decrease of 20% of a SD in bond yields the release day of the report. In contrast, in the *Europe* region, the coefficient associated with IMF sentiment is positive and significant several days after the report's release. This positive relationship might reflect the over-optimistic expectations that financial markets have, on average, about the European region's economic and financial outlook, and which are not necesserarly consistent with the economic and financial analysis provided in the REO reports. This is in line with Batchelor (2001), who compares IMF forecasts with private sector forecasts and shows that the IMF forecasts can be biased toward pessimism with respect to the Consensus Economic forecasts. Furthermore, several studies find that forecasts realized by European countries have an over-optimistic bias compared to forecasts made by international organizations such as the IMF (Jonung and Larch, 2006; Hallerberg et al., 2009; Marinheiro, 2011). According to Frankel and Schreger (2013), the constraints imposed by the Stability and Growth Pact explain this European

[15] See https://www.imf.org/external/np/pdr/mona/Country.aspx.
[16] Standby Agreement from 05/11/2005 to 05/10/2008.
[17] 5 Flexible Credit Lines from 05/06/2009 to 11/02/2017.
[18] Standby Agreement approved on 20/06/2018.
[19] 8 Flexible Credit Lines from 17/04/2009 to 21/11/2021.

Union's over-optimism.[20] However, the participation in an IMF program seems to provide positive signals to bond markets, causing a significant decline in the 5-year bond yields in European markets on the release day of the REO report. Our results also suggest that the REO reports convey a more positive sentiment from the Fund on its borrowing members than they do on others. As suggested by Aldenhoff (2007), IMF projections may be positively biased in favor of member governments that have received credits from the international organization, causing an over-optimism of the Fund towards countries entering into one of its financial arrangements (Bird, 2005). An overly optimistic outlook for economic conditions in the recipient countries would increase the perceived probability that they meet the expectations set out in the IMF program or, put it another way, that the financial assistance is successful.

Similar to *Europe*, the effect of IMF sentiment on the 5-year bond yields in *Western Hemisphere* appears to be long-lasting with a positive and significant coefficient – up to five days after the release of the REO report. This rise in bond yields may reflect a bias toward pessimism in the IMF qualitative information compared to private-sector expectations. As an illustration, Dreher et al. (2008)'s focus on the political economy of IMF forecasts lead them to conclude that some countries opposed to the major shareholders may receive a more pessimistic evaluation by the IMF. Nevertheless, for countries under an IMF program, the market response to the release of IMF qualitative information drives bond yields lower. Therefore, the decline in bond yields indicates that financial markets in the *Western Hemisphere* region perceive IMF programs as credible and beneficial for countries' economic conditions. Finally, this region is the only one where quantitative forecasts have an impact on bond yields. Indeed, the market response to IMF inflation forecasts is significant several days after the report's release and positive as expected. Higher inflation expectations tend to signal a possible rise in nominal short-term interest rates and thus, in the borrowing cost for long-term government securities.

[20]Specifically, euro area countries appear to have responded to the 3% limit imposed by the Stability and Growth Pact by offering over-optimistic forecasts when they are most in danger of breaching the limit.

**Table 1: Testing the effect of changes in the IMF sentiment on cumulative changes in 5-year bond yields**

| | *Asia and Pacific* | | | | |
|---|---|---|---|---|---|
| | $i_t^{5y}$ | $i_{t+1}^{5y}$ | $i_{t+2}^{5y}$ | $i_{t+3}^{5y}$ | $i_{t+4}^{5y}$ |
| $\Delta T_{i,t}$ | -0.908* | -0.883 | -0.943 | -0.935 | -1.082 |
| | (0.054) | (0.220) | (0.160) | (0.264) | (0.296) |
| $\Delta g_{i,t}^f$ | 0.0705 | 0.0798 | -0.0523 | -0.252* | -0.112 |
| | (0.465) | (0.607) | (0.677) | (0.091) | (0.589) |
| Obs. | 100 | 100 | 100 | 100 | 100 |
| | *Europe* | | | | |
| | $i_t^{5y}$ | $i_{t+1}^{5y}$ | $i_{t+2}^{5y}$ | $i_{t+3}^{5y}$ | $i_{t+4}^{5y}$ |
| $\Delta T_{i,t}$ | 0.732*** | 1.086*** | 1.818*** | 1.672** | 1.797*** |
| | (0.008) | (0.008) | (0.001) | (0.014) | (0.009) |
| $IMF_{i,t}$ | -0.447* | -0.742 | -0.678 | -0.367 | -0.473 |
| | (0.082) | (0.193) | (0.563) | (0.777) | (0.677) |
| $\Delta T_{i,t} \times IMF_{i,t}$ | -1.261** | -0.514 | -1.744 | -2.488 | -2.195 |
| | (0.011) | (0.615) | (0.390) | (0.224) | (0.267) |
| $\Delta g_{i,t}^f$ | 0.000324 | 0.166 | 0.0957 | 0.0427 | 0.0830 |
| | (0.996) | (0.179) | (0.604) | (0.830) | (0.674) |
| $\Delta \pi_{i,t}^f$ | 0.0434 | 0.0744 | 0.0722 | -0.00875 | 0.120 |
| | (0.565) | (0.596) | (0.694) | (0.964) | (0.524) |
| Obs. | 56 | 56 | 56 | 56 | 56 |
| | *Western Hemisphere* | | | | |
| | $i_t^{5y}$ | $i_{t+1}^{5y}$ | $i_{t+2}^{5y}$ | $i_{t+3}^{5y}$ | $i_{t+4}^{5y}$ |
| $\Delta T_{i,t}$ | 1.351*** | 1.310** | 1.404* | 1.596** | 1.631** |
| | (0.007) | (0.041) | (0.055) | (0.025) | (0.035) |
| $IMF_{i,t}$ | -0.592** | -0.889** | -0.893* | -0.869** | -1.012** |
| | (0.037) | (0.019) | (0.053) | (0.037) | (0.035) |
| $\Delta T_{i,t} \times IMF_{i,t}$ | -2.571*** | -3.041** | -2.215 | -1.979 | -2.661* |
| | (0.002) | (0.020) | (0.152) | (0.140) | (0.099) |
| $\Delta g_{i,t}^f$ | 0.0719 | 0.0369 | -0.00902 | 0.0267 | -0.0229 |
| | (0.606) | (0.795) | (0.958) | (0.871) | (0.902) |
| $\Delta \pi_{i,t}^f$ | 0.636*** | 0.774*** | 0.961*** | 0.940*** | 0.767*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.004) |
| Obs. | 90 | 90 | 90 | 90 | 90 |

*Note: Inflation forecasts are not reported in the REO reports of the Asian and Pacific region. Prais-Winsten (PSCE) estimates (Beck and Katz, 1995). ***, **, and * indicate respectively 1%, 5%, and 10% significance.*

**Table 2: Testing the effect of changes in the IMF sentiment on cumulative changes in 10-year bond yields**

| | *Asia and Pacific* | | | | |
|---|---|---|---|---|---|
| | $i_t^{10y}$ | $i_{t+1}^{10y}$ | $i_{t+2}^{10y}$ | $i_{t+3}^{10y}$ | $i_{t+4}^{10y}$ |
| $\Delta T_{i,t}$ | -1.026*** | -0.821 | -1.383** | -1.640** | -1.842* |
| | (0.001) | (0.165) | (0.024) | (0.033) | (0.060) |
| $\Delta g_{i,t}^f$ | 0.0285 | 0.0583 | -0.0276 | -0.172 | -0.185 |
| | (0.655) | (0.666) | (0.829) | (0.218) | (0.343) |
| Obs. | 100 | 100 | 100 | 100 | 100 |
| | *Europe* | | | | |
| | $i_t^{10y}$ | $i_{t+1}^{10y}$ | $i_{t+2}^{10y}$ | $i_{t+3}^{10y}$ | $i_{t+4}^{10y}$ |
| $\Delta T_{i,t}$ | 0.283 | 0.686* | 1.485** | 1.380* | 1.697** |
| | (0.207) | (0.096) | (0.011) | (0.060) | (0.018) |
| $IMF_{i,t}$ | -0.863*** | -1.154*** | -1.073 | -0.613 | -1.112 |
| | (0.002) | (0.000) | (0.179) | (0.454) | (0.204) |
| $\Delta T_{i,t} \times IMF_{i,t}$ | -0.402 | -0.537 | -1.503 | -2.303* | -2.329* |
| | (0.374) | (0.354) | (0.251) | (0.072) | (0.090) |
| $\Delta g_{i,t}^f$ | -0.0153 | 0.0761 | 0.0944 | 0.0409 | 0.113 |
| | (0.766) | (0.222) | (0.415) | (0.785) | (0.442) |
| $\Delta \pi_{i,t}^f$ | 0.0196 | 0.0624 | 0.143 | -0.000559 | 0.105 |
| | (0.668) | (0.428) | (0.223) | (0.997) | (0.445) |
| Obs. | 56 | 56 | 56 | 56 | 56 |
| | *Western Hemisphere* | | | | |
| | $i_t^{10y}$ | $i_{t+1}^{10y}$ | $i_{t+2}^{10y}$ | $i_{t+3}^{10y}$ | $i_{t+4}^{10y}$ |
| $\Delta T_{i,t}$ | -0.510 | -0.391 | -0.329 | -0.321 | -0.206 |
| | (0.181) | (0.429) | (0.595) | (0.603) | (0.765) |
| $IMF_{i,t}$ | 0.124 | -0.151 | -0.147 | 0.0236 | 0.218 |
| | (0.697) | (0.676) | (0.767) | (0.961) | (0.690) |
| $\Delta T_{i,t} \times IMF_{i,t}$ | -0.538 | -1.584 | -0.413 | -0.473 | -1.392 |
| | (0.530) | (0.218) | (0.799) | (0.777) | (0.364) |
| $\Delta g_{i,t}^f$ | 0.0767 | -0.0363 | -0.0825 | -0.0787 | -0.0992 |
| | (0.494) | (0.742) | (0.598) | (0.627) | (0.612) |
| $\Delta \pi_{i,t}^f$ | 0.311* | 0.293 | 0.316 | 0.328 | 0.260 |
| | (0.055) | (0.133) | (0.224) | (0.215) | (0.350) |
| Obs. | 90 | 90 | 90 | 90 | 90 |

*Note: Inflation forecasts are not reported in the REO reports of the Asian and Pacific region. Prais-Winsten (PSCE) estimates (Beck and Katz, 1995). ***, **, and * indicate respectively 1%, 5%, and 10% significance.*

Table 2 shows that the sentiment conveyed through the IMF reports of the *Asia and Pacific* region affects negatively and significantly the 10-year bond yields up to four days after the release of the REO report, thus showing that a more positive IMF sentiment is associated with an easing of financial conditions. Specifically, a one SD increase in IMF sentiment is associated with a decrease of 34% SD in the 10-year bond yields on the REO release day. For the *Europe* region, we find similar evidence of a positive effect of IMF sentiment for the 10-year bond yields as those for the 5-year bond yields. Hence, a positive change of the sentiment conveyed in the REO reports is positively related to the 10-year government bond yields several days after the report's release. At the same time, results still suggest that participation in IMF programs is associated with a decline in bond yields. Finally, when considering the *Western Hemisphere* region, the effect of IMF sentiment and IMF programs is no more statistically significant across the different time horizons. Only, inflation forecasts conveyed in the REO reports still bring relevant information to market participants the release day of the reports.

To summarize the main results of this empirical application, we find that IMF sentiment conveyed by the REO reports moves bond yields, and thus, provides relevant qualitative information to financial market participants about countries' economic conditions. More precisely, in *Asia and Pacific*, bond market responds significantly to a change in the IMF sentiment. Hence, a more positive IMF sentiment is associated with an easing of financial conditions in this region. In *Europe* and *Western Hemisphere*, the positive response of the bond yields following the release of the REO report implies a more pessimistic IMF assessment of countries' economic conditions in these regions than what is expected by market participants. Furthermore, the IMF sentiment drives a decline in the 5-year yield (in *Europe* and *Western Hemisphere*) and the 10-year yield (in *Europe*) in countries under an IMF program, suggesting a positive perception of IMF programs by market participants.

## 5. Extensions

In this section, we undertake several additional checks, including investigating the possible role of IMF sentiment towards the main trade partner and accounting for an alternative sentiment measure.

### 5.1. Adding IMF sentiment towards the main trade partner

The REO reports' purpose is also to better understand regional economic effects by analyzing spillovers and linkages within geographical areas. The word clouds depicted in Figure 1 confirm that, in some regions, there is a strong dependence on external economic and financial conditions. One might, therefore, conjecture that higher financial and trade integration allows domestic bond markets to also respond to IMF sentiment towards foreign countries. To proxy for economic interdependence across countries, we appeal to an easy-to-interpret measure by selecting the sentiment measure towards the main regional trading partner $j$ of each country $i$, $T_{j,t}$. Therefore, we augment our baseline specification, Eq. 3, as follows:

$$\begin{aligned} r_{i,t+h} - r_{i,t-1} = \mu_i + \alpha_1^h \Delta T_{i,t} + \alpha_2^h IMF_{i,t} + \alpha_3^h \left(\Delta T_{i,t} \times IMF_{i,t}\right) \\ + \beta_1^h \Delta g_{i,t}^f + \beta_2^h \Delta \pi_{i,t}^f + \beta_3^h \Delta T_{j,t} + \epsilon_{i,t}; \end{aligned} \tag{4}$$

where $\Delta T_{j,t}$ is the first difference of the sentiment measure for country $i$'s main regional trading partner, $j$, at time $t$, between two subsequent reports.

Table C.1 in Appendix C reports the selected trading partner for each country. Unsurprisingly, China is the major trading partner of countries from the *Asia and Pacific* region, while in the *Europe* and *Western Hemisphere* regions no single country emerges as the major player in the regional trade. Tables C.2 and C.3 in Appendix C present the results from specifications incorporating the sentiment measure towards the main regional trading partner. In *Asia and Pacific*, the relationship between IMF sentiment of the domestic economy and the 5-year bond yields does not appear to be as significant as the one of the main trading partner. The latter seems to serve as an indirect signal about the economic situation of the region, which might explain the significant market response. The 10-year yields are also significantly related to IMF sentiment of the main trading partner of each domestic economy in this region. These findings can be explained by the fact that the REO reports of the *Asia and Pacific* region deal mainly with the Chinese economy, the leading trading partner for several countries in this region (see Table C.1 in Appendix C). Financial markets in these countries are thus primarily driven by the Chinese economy. Hence, a positive assessment of China in the IMF REO is associated, on average, to a persistent decrease of the 10-year bond yields in Japan, South Korea, India, and Australia over several days. Finally, in the *Europe* and *Western Hemisphere* regions, the coefficients on IMF sentiment towards the main regional trading partner

are not significant. Nevertheless, the main results remain similar, in terms of sign and significance, to the baseline ones (see Tables 1 and 2).

### 5.2. Using an alternative normalization

It is not clear whether the sentiment measure used above, $T_{i,t}$, accurately captures a document's tone. To address this potential bias, we examine the robustness of our results to the use of an alternative measurement of sentiment also found in the literature (Shapiro et al., 2020). This alternative measure, $T^{alt}_{i,t}$, consists in subtracting the share of positive words from the share of negative words over the total number of words:

$$T^{alt}_{i,t} = \frac{Pos_{i,t} - Neg_{i,t}}{Total_{i,t}}; \tag{5}$$

A higher index stands for a more positive IMF sentiment about the economic situation of a given country $i$ in the REO report published at a particular time $t$. This alternative measure is also standardized to adjust for changes in the distribution of words that convey the tone through the different reports. Its evolution over time is reported, along with $t_{i,t}$, in Figures B.1, B.2, and B.3 in the Appendix. We observe that this new measure $t^{alt}_{i,t}$, on average, follows the evolution of $t_{i,t}$ but may lead to more or less significant sentiment anomalies depending on particular countries and periods.

We replace the initial sentiment measure with the one computed in Eq. (5) in the baseline specification (Eq. (3)) and in the augmented regression including IMF sentiment towards the main trading partner of each country (Eq. (4)):

$$\begin{aligned} r_{i,t+h} - r_{i,t-1} = \mu_i + \alpha_1^{h,alt}\Delta T^{alt}_{i,t} + \alpha_2^{h,alt} IMF_{i,t} + \alpha_3^{h,alt}\left(\Delta T^{h,alt}_{i,t} \times IMF_{i,t}\right) \\ + \beta_1^{h,alt}\Delta g^f_{i,t} + \beta_2^{h,alt}\Delta \pi^f_{i,t} + \epsilon_{i,t}; \end{aligned} \tag{6}$$

$$\begin{aligned} r_{i,t+h} - r_{i,t-1} = \mu_i + \alpha_1^{h,alt}\Delta T^{alt}_{i,t} + \alpha_2^{h,alt} IMF_{i,t} + \alpha_3^{h,alt}\left(\Delta T^{h,alt}_{i,t} \times IMF_{i,t}\right) \\ + \beta_1^{h,alt}\Delta g^f_{i,t} + \beta_2^{h,alt}\Delta \pi^f_{i,t} + \beta_3^{h,alt}\Delta T^{alt}_{j,t} + \epsilon_{i,t}; \end{aligned} \tag{7}$$

Tables D.1 and D.2 in Appendix D report the estimation results. Our benchmark panel results for the informational content of the sentiment index remain robust. The results for the bond yields confirm that a positive change of the new index imply a decrease of the 5-year and the 10-year yields in *Asia and Pacific*, and a prominent effect of the sentiment of the main trade partner on the domestic bond markets in this

region. A similar observation can be made for the *Europe* region where we still find a positive and significant relationship between bond yields and the new sentiment index of the domestic economy, except for the 5-year bond yields of countries under a Fund's program, and a direct impact of IMF programs on the 10-year bond yields. Finally, the results for the *Western Hemisphere* region are also similar to those of the baseline specification and the augmented regression including IMF sentiment towards the main trading partner of each country. A more favorable IMF sentiment is associated with increased 5-year yields, except in bond markets of countries under an IMF program where they move in an opposite direction, while 10-year bond yields are only affected by inflation forecasts conveyed in the REO reports.

## 6. Conclusion

The effect of communication from international organisations such as the IMF on financial markets has garnered almost no attention in the literature. In this paper, we use the General Inquiry dictionary to compute a sentiment index based on the text from the Regional Economic Outlook (REO) reports published by the IMF. The IMF sentiment is supposed to signal staff's views about a country's economic and financial health as well as the sustainability of its economic policies; it can thus be interpreted by investors as signaling more optimism or pessimism. We, therefore, test whether the qualitative content of the REO reports, as captured by the IMF sentiment index, influences the domestic bond markets of 16 countries from three regions, *Asia and Pacific*, *Europe*, and *Western Hemisphere*, over the 2005-2018 period.

Our findings suggest that the qualitative content of the REO reports may have significant repercussions on bond markets. However, there are clear differences across regions. Results suggest that a more positive IMF sentiment has a significant positive relationship with bond yields in *Europe* and *Western Hemisphere* and a significant negative one in *Asia and Pacific*. A key finding is that financial markets seem to recognize and favorably respond to IMF sentiment towards countries involved in IMF programs. We observe these effects while we control for IMF quantitative forecasts. Equally important, bond markets in the *Asia and Pacific* region seem to gradually incorporate the information embedded in the IMF reports of the region's leading trading partner several days after the REO reports' release. This finding is independent of the sentiment index used in the empirical analysis.

These results, taken together, confirm the existence of pure sentiment effect, through which the IMF tone conveyed by the REO reports affects bond returns. They lend further credence to the view that IMF sentiment contains price-relevant information for market participants by capturing how the international organization shapes its judgment about countries' economic conditions. They also emphasize the importance of coordinating the expectations of market participants at a regional scale to address potential risks linked to cross-border financial instability, a conclusion that is further corroborated by our finding that the IMF sentiment seems to provide forward guidance to help reduce market uncertainty and restore confidence towards countries under an IMF program.

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# Appendix A

**Table A.1: Number of reports published by the IMF (2000-2016)**

| Report | 2000 | 2004 | 2008 | 2012 | 2016 |
|---|---|---|---|---|---|
| World Economic Outlook | 2 | 2 | 5 | 4 | 4 |
| Regional Economic Outlook | 0 | 2 | 10 | 8 | 10 |
| Global Financial Stability report | 0 | 1 | 2 | 2 | 2 |
| Fiscal Monitor | 0 | 0 | 0 | 4 | 2 |
| **Total** | **2** | **5** | **17** | **18** | **18** |

**Figure A.1: Geographical coverage of the REO reports**

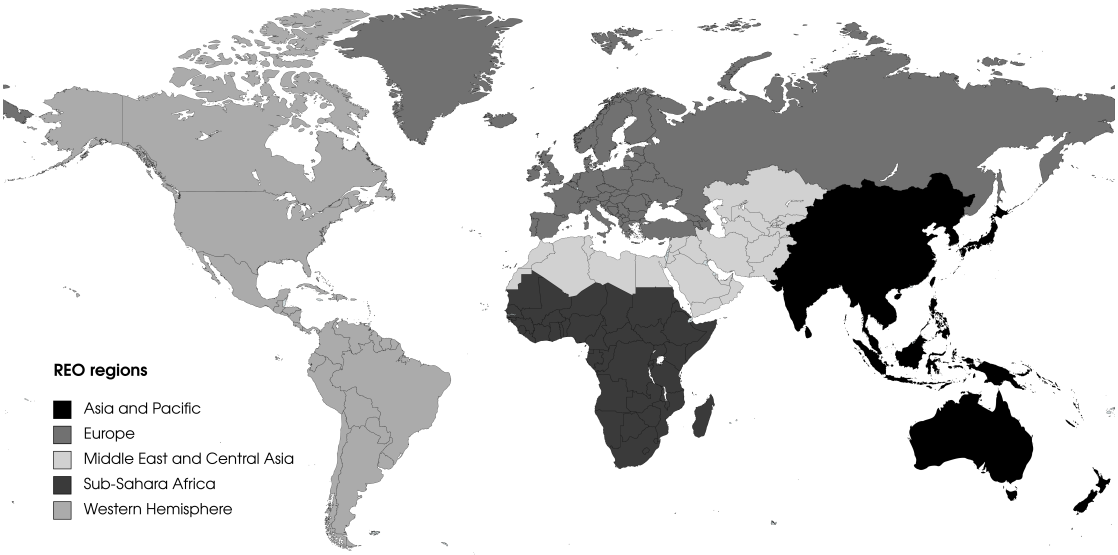


**Table A.2: Summary statistics – Number of times a country is cited in the REO reports**

| *Asia and Pacific* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Countries | Number of reports | Mean | Std | Min | 25% | 50% | 75% | Max |
| Australia | 27 | 40.3 | 27.2 | 6 | 18.5 | 36.0 | 52.5 | 106 |
| China | 27 | 155.2 | 114.0 | 18 | 87.0 | 142.0 | 209 | 600 |
| India | 27 | 70.9 | 40.7 | 13 | 37.5 | 71.0 | 96.5 | 148 |
| Indonesia | 27 | 54.4 | 34.0 | 10 | 28.0 | 46.0 | 80.0 | 114 |
| Japan | 27 | 82.2 | 52.2 | 10 | 37.0 | 77.0 | 130.0 | 173 |
| Philippines | 27 | 45.9 | 30.2 | 8 | 23.0 | 42.0 | 57.5 | 112 |
| Singapore | 27 | 42.0 | 26.6 | 4 | 19.0 | 42.0 | 56.5 | 97 |
| South Korea | 27 | 63.2 | 38.0 | 9 | 38.5 | 63.0 | 93.5 | 151 |
| Taiwan | 27 | 30.7 | 18.4 | 2 | 17.0 | 33.0 | 40.0 | 67 |
| Thailand | 27 | 49.5 | 30.6 | 8 | 26.0 | 46.0 | 63.5 | 116 |
| *Europe* | | | | | | | | |
| Countries | Number of reports | Mean | Std | Min | 25% | 50% | 75% | Max |
| France | 22 | 16.9 | 26.7 | 0 | 2.0 | 7.0 | 17.8 | 95 |
| Germany | 22 | 24.4 | 36.5 | 2 | 3.0 | 7.5 | 30.5 | 129 |
| Greece | 22 | 18.9 | 32.0 | 0 | 2.0 | 7.0 | 20.5 | 116 |
| Italy | 22 | 20.0 | 31.8 | 0 | 2.3 | 8.0 | 23.5 | 135 |
| Netherlands | 22 | 15.7 | 28.8 | 0 | 1.0 | 5.0 | 14.3 | 125 |
| Poland | 22 | 43.0 | 28.0 | 5 | 27.0 | 34.5 | 53.5 | 115 |
| Russia | 22 | 42.9 | 25.5 | 3 | 26.5 | 37.5 | 62.5 | 93 |
| Spain | 22 | 22.2 | 37.4 | 0 | 1.3 | 8.5 | 28.8 | 145 |
| Switzerland | 22 | 8.5 | 15.4 | 0 | 1.0 | 4.5 | 10.8 | 73 |
| Turkey | 22 | 41.5 | 29.3 | 0 | 19.5 | 37.5 | 67.0 | 95 |
| United-Kingdom | 22 | 21.3 | 27.3 | 0 | 2.0 | 12.0 | 31.5 | 113 |
| *Western Hemisphere* | | | | | | | | |
| Countries | Number of reports | Mean | Std | Min | 25% | 50% | 75% | Max |
| Argentina | 26 | 31.8 | 21.3 | 5 | 16.5 | 28.5 | 35.0 | 92 |
| Brazil | 26 | 64.6 | 36.3 | 15 | 28.3 | 68.5 | 93.5 | 132 |
| Canada | 26 | 20.3 | 18.2 | 1 | 6.0 | 15.0 | 29.8 | 59 |
| Chile | 26 | 54.8 | 30.2 | 12 | 28.5 | 56.5 | 79.0 | 110 |
| Colombia | 26 | 49.9 | 28.4 | 12 | 23.0 | 49.4 | 63.5 | 104 |
| Ecuador | 26 | 16.5 | 10.1 | 5 | 9.0 | 13.5 | 20.0 | 44 |
| Mexico | 26 | 62.3 | 32.3 | 14 | 34.0 | 65.0 | 85.8 | 133 |
| Peru | 26 | 49.9 | 26.9 | 12 | 26.3 | 46.5 | 70.0 | 105 |
| United-States | 26 | 43.5 | 29.5 | 6 | 24.0 | 47.5 | 56.0 | 148 |
| Venezuela | 26 | 22.7 | 12.5 | 6 | 14.0 | 19.0 | 30.5 | 50 |

*Note: this table displays the number of reports, the mean, the standard deviation, the minimum, the maximum and the 25%, 50%, and 75% quantiles for the number of times a country is identified in the REO reports.*

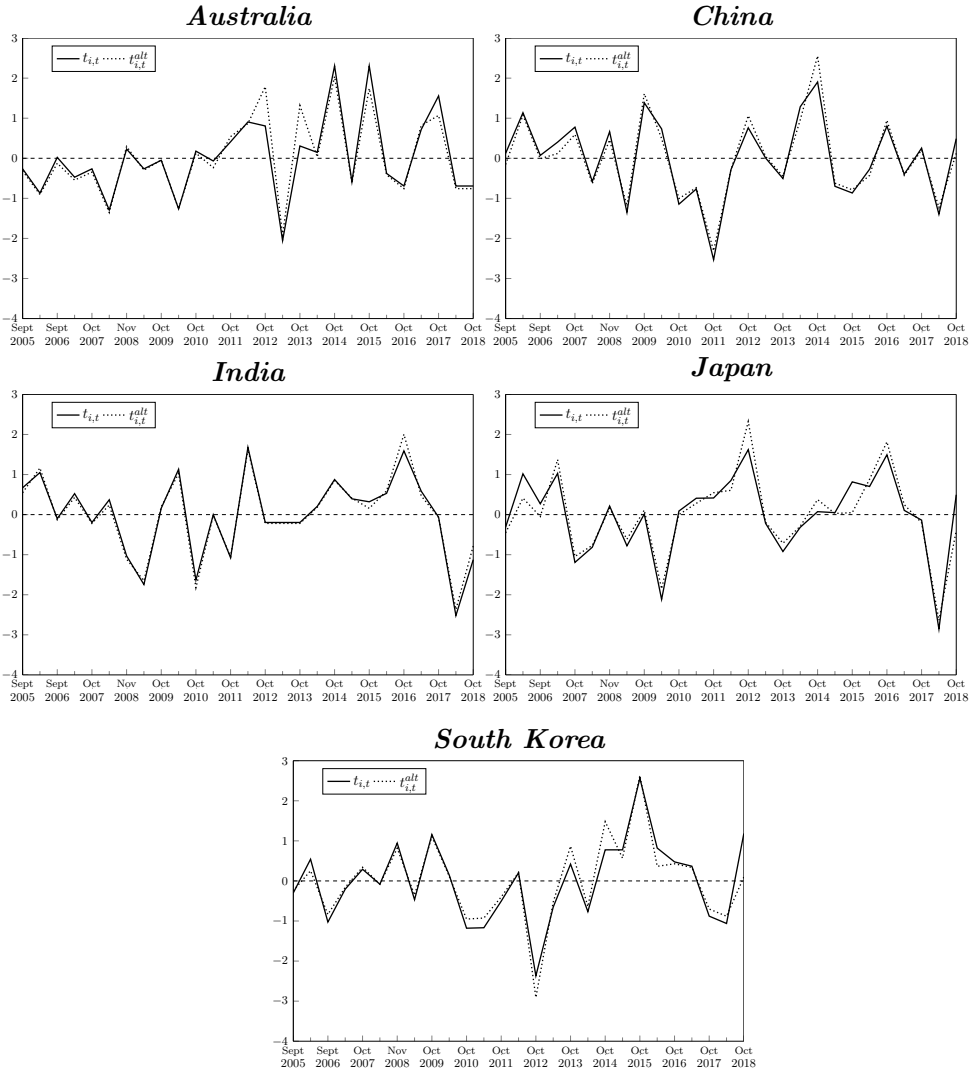
# Appendix B

**Table B.1: Share of sentiment words (in % of the total number of words)**

| *Asia and Pacific* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Share of positive words | | | | Share of negative words | | | |
| Countries | Mean | Std | Min | Max | Mean | Std | Min | Max |
| Australia | 6.84 | 3.01 | 0.00 | 14.81 | 4.13 | 2.01 | 0.00 | 7.41 |
| China | 6.74 | 1.45 | 5.05 | 11.11 | 4.60 | 0.91 | 3.38 | 7.30 |
| India | 5.79 | 2.02 | 0.00 | 9.85 | 5.25 | 1.77 | 0.00 | 8.35 |
| Japan | 7.16 | 1.89 | 3.30 | 11.49 | 5.38 | 1.41 | 2.20 | 8.43 |
| South Korea | 6.65 | 2.11 | 3.25 | 12.50 | 5.01 | 2.15 | 1.30 | 12.96 |
| *Europe* | | | | | | | | |
| | Share of positive words | | | | Share of negative words | | | |
| Countries | Mean | Std | Min | Max | Mean | Std | Min | Max |
| France | 2.95 | 3.71 | 0.00 | 12.12 | 2.14 | 2.85 | 0.00 | 9.09 |
| Germany | 5.00 | 4.38 | 0.00 | 17.65 | 3.26 | 2.65 | 0.00 | 7.69 |
| Poland | 7.59 | 3.77 | 0.00 | 18.18 | 4.48 | 2.96 | 0.00 | 13.16 |
| Russia | 5.93 | 2.96 | 0.00 | 12.50 | 6.29 | 4.31 | 0.00 | 21.05 |
| Turkey | 5.60 | 2.73 | 0.00 | 9.68 | 4.32 | 2.86 | 0.00 | 10.61 |
| United Kingdom | 2.78 | 2.54 | 0.00 | 6.50 | 3.68 | 3.23 | 0.00 | 9.09 |
| *Western Hemisphere* | | | | | | | | |
| | Share of positive words | | | | Share of negative words | | | |
| Countries | Mean | Std | Min | Max | Mean | Std | Min | Max |
| Argentina | 6.13 | 3.00 | 2.41 | 14.81 | 4.25 | 2.46 | 0.00 | 7.81 |
| Brazil | 5.84 | 1.47 | 3.49 | 8.44 | 4.82 | 1.20 | 2.97 | 7.59 |
| Canada | 4.86 | 2.80 | 0.00 | 9.09 | 3.70 | 2.51 | 0.00 | 8.00 |
| Mexico | 5.92 | 1.88 | 0.00 | 8.90 | 4.12 | 2.08 | 0.00 | 11.18 |
| United States | 5.75 | 1.31 | 3.00 | 7.92 | 4.87 | 1.56 | 1.00 | 9.55 |

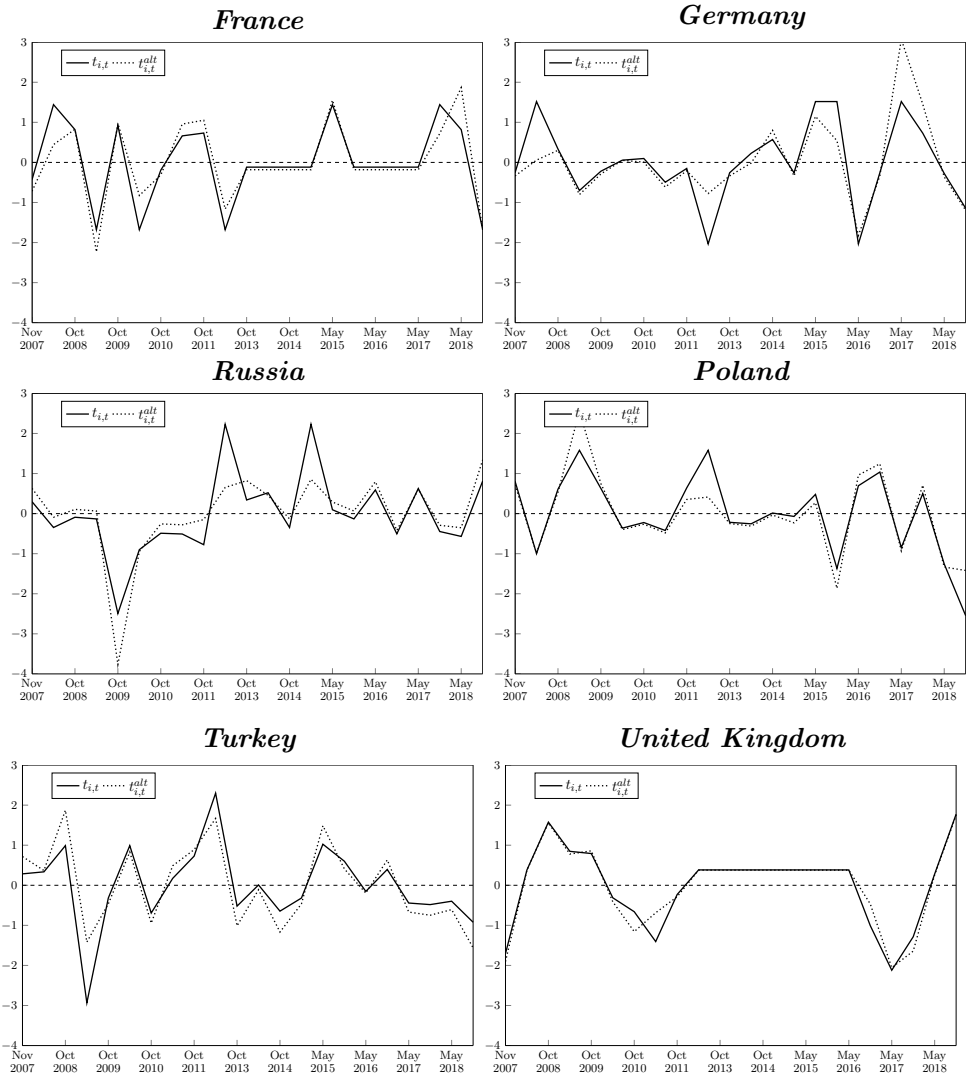
*Note: std, min and max stand respectively for standard deviation, minimum and maximum. this table reports, for each country, descriptive statistics for the share of positive and negative words, as a percentage of all distinct words included in the REO reports.*

**Figure B.1: IMF Sentiment towards each country, Asia and Pacific**



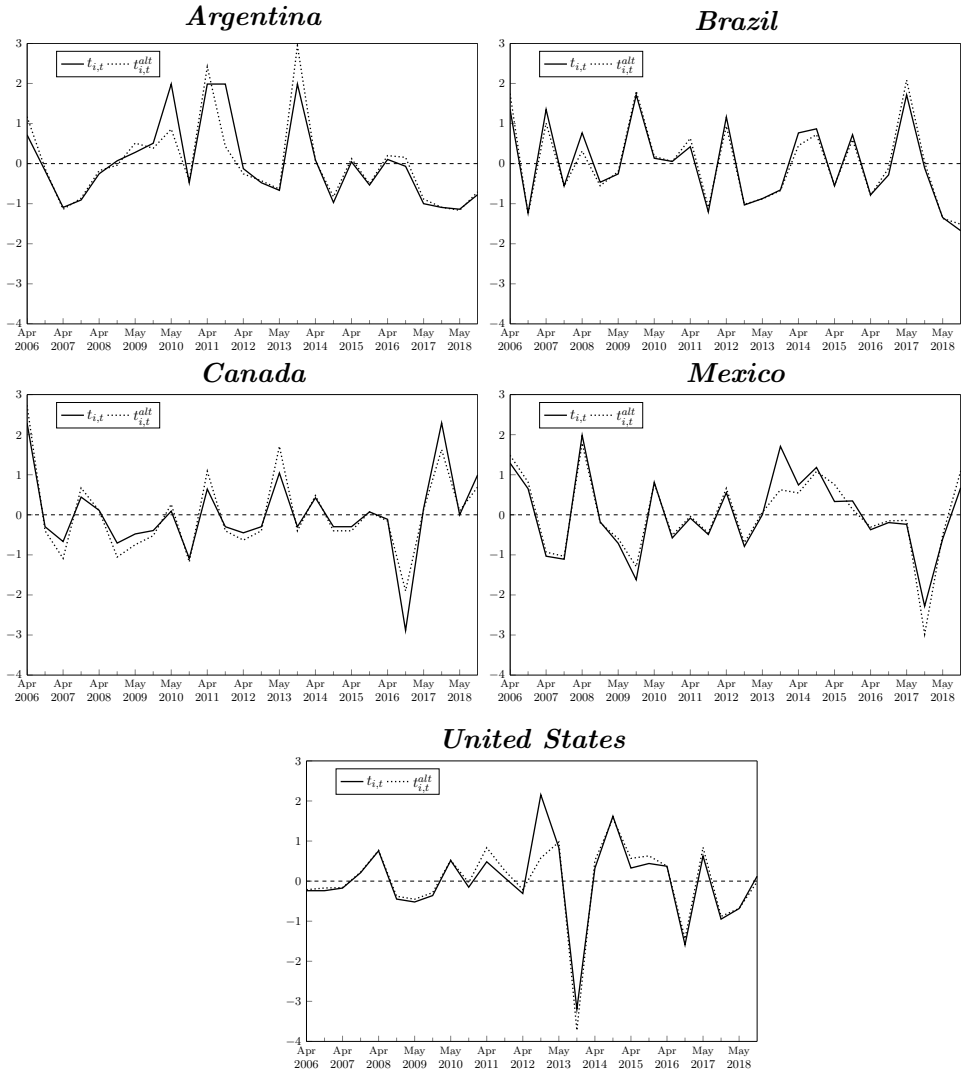

*Note: The figures show the evolution of Z-score for each sentiment index – $t_{i,t}$ (solid line), $t^{alt}_{i,t}$ (dotted line) – and for each selected country within the Asia and Pacific region.*

**Figure B.2: IMF Sentiment towards each country, Europe**




*Note: The figures show the evolution of Z-score for each sentiment index – $t_{i,t}$ (solid line), $t^{alt}_{i,t}$ (dotted line) – and for each selected country within the Europe region.*

**Figure B.3: IMF Sentiment towards each country, Western Hemisphere**




*Note: The figures show the evolution of Z-score for each sentiment index – $t_{i,t}$ (solid line), $t^{alt}_{i,t}$ (dotted line) – and for each selected country within the Western Hemisphere region.*

# Appendix C

**Table C.1: Main trading partners**

| *Asia and Pacific* | | | |
|---|---|---|---|
| Countries | First position | Second position | Third position |
| Australia | China* | Japan | South Korea |
| China | United States | Japan* | South Korea |
| India | China* | United States | United Arab Emirates |
| Japan | China* | United States | South Korea |
| South Korea | China* | Japan | Vietnam |
| *Europe* | | | |
| Countries | First position | Second position | Third position |
| France | Germany* | United States | Spain |
| Germany | United States | France* | China |
| Poland | Germany* | China | Russia |
| Russia | China | Germany* | Netherlands |
| Turkey | Germany* | United Kingdom | Italy |
| United Kingdom | United States | Germany* | Netherlands |
| *Western Hemisphere* | | | |
| Countries | First position | Second position | Third position |
| Argentina | Brazil* | China | United States |
| Brazil | China | United States* | Argentina |
| Canada | United States* | China | United Kingdom |
| Mexico | United States* | China | Canada |
| United States | Canada* | Mexico | China |

*Note: Within each region, a specific country plays an hegemonic role in the regional trade: Germany for Europe, the United States for Western Hemisphere, and China for Asia and Pacific. For each country, we select the hegemonic country to test whether its sentiment index alters the financial markets of the other countries, except for Argentina. For the three hegemonic countries, we select the main regional trading partner, that is Japan for China, France for Germany, Canada for the United States. For each country, the selected main regional trade partner is marked with an asterisk.*
*Source: Authors' calculation based on World Integrated Trade Solution (WITS) dataset.*

**Table C.2: Testing the effect of changes in the IMF sentiment on cumulative changes in 5-year bond yields, controlling for IMF sentiment towards the main trade partner**

| | *Asia and Pacific* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $i_t^{5y}$ | | $i_{t+1}^{5y}$ | | $i_{t+2}^{5y}$ | | $i_{t+3}^{5y}$ | | $i_{t+4}^{5y}$ | |
| $\Delta T_{i,t}$ | -0.908* | -0.453 | -0.883 | -0.0292 | -0.943 | -0.208 | -0.935 | -0.421 | -1.082 | -0.152 |
| | (0.054) | (0.348) | (0.220) | (0.968) | (0.160) | (0.755) | (0.264) | (0.633) | (0.296) | (0.885) |
| $\Delta g_{i,t}^f$ | 0.0705 | 0.0788 | 0.0798 | 0.113 | -0.0523 | -0.0479 | -0.252* | -0.235 | -0.112 | -0.0584 |
| | (0.465) | (0.376) | (0.607) | (0.420) | (0.677) | (0.686) | (0.091) | (0.117) | (0.589) | (0.767) |
| $\Delta T_{j,t}$ | | -1.486** | | -2.749*** | | -2.388*** | | -1.640 | | -2.850** |
| | | (0.017) | | (0.005) | | (0.006) | | (0.140) | | (0.036) |
| Obs. | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | *Europe* | | | | | | | | | |
| | $i_t^{5y}$ | | $i_{t+1}^{5y}$ | | $i_{t+2}^{5y}$ | | $i_{t+3}^{5y}$ | | $i_{t+4}^{5y}$ | |
| $\Delta T_{i,t}$ | 0.732*** | 0.745** | 1.086*** | 1.204*** | 1.818*** | 2.079*** | 1.672** | 2.080*** | 1.797*** | 2.212*** |
| | (0.008) | (0.012) | (0.008) | (0.005) | (0.001) | (0.001) | (0.014) | (0.004) | (0.009) | (0.002) |
| $IMF_{i,t}$ | -0.447* | -0.465 | -0.742 | -0.658 | -0.678 | -0.723 | -0.367 | -0.561 | -0.473 | -0.524 |
| | (0.082) | (0.146) | (0.193) | (0.392) | (0.563) | (0.634) | (0.777) | (0.728) | (0.677) | (0.727) |
| $\Delta T_{i,t} \times IMF_{i,t}$ | -1.261** | -1.784*** | -0.514 | -1.809 | -1.744 | -2.978 | -2.488 | -4.134* | -2.195 | -3.886* |
| | (0.011) | (0.003) | (0.615) | (0.141) | (0.390) | (0.201) | (0.224) | (0.069) | (0.267) | (0.087) |
| $\Delta g_{i,t}^f$ | 0.000324 | -0.0161 | 0.166 | 0.136 | 0.0957 | 0.0338 | 0.0427 | -0.0453 | 0.0830 | -0.0213 |
| | (0.996) | (0.807) | (0.179) | (0.295) | (0.604) | (0.851) | (0.830) | (0.804) | (0.674) | (0.907) |
| $\Delta \pi_{i,t}^f$ | 0.0434 | 0.0868 | 0.0744 | 0.0122 | 0.0722 | 0.206 | -0.00875 | 0.131 | 0.120 | 0.132 |
| | (0.565) | (0.462) | (0.596) | (0.957) | (0.694) | (0.500) | (0.964) | (0.681) | (0.524) | (0.670) |
| $\Delta T_{j,t}$ | | 0.107 | | 0.203 | | 0.110 | | 0.135 | | 0.493 |
| | | (0.532) | | (0.452) | | (0.769) | | (0.763) | | (0.237) |
| Obs. | 56 | 46 | 56 | 46 | 56 | 46 | 56 | 46 | 56 | 46 |
| | *Western Hemisphere* | | | | | | | | | |
| | $i_t^{5y}$ | | $i_{t+1}^{5y}$ | | $i_{t+2}^{5y}$ | | $i_{t+3}^{5y}$ | | $i_{t+4}^{5y}$ | |
| $\Delta T_{i,t}$ | 1.351*** | 1.926*** | 1.310** | 1.848*** | 1.404* | 2.094*** | 1.596** | 2.266*** | 1.631** | 2.333*** |
| | (0.007) | (0.001) | (0.041) | (0.007) | (0.055) | (0.009) | (0.025) | (0.004) | (0.035) | (0.006) |
| $IMF_{i,t}$ | -0.592** | -0.621** | -0.889** | -0.835** | -0.893* | -0.909* | -0.869** | -0.928** | -1.012** | -1.056** |
| | (0.037) | (0.043) | (0.019) | (0.034) | (0.053) | (0.062) | (0.037) | (0.036) | (0.035) | (0.035) |
| $\Delta T_{i,t} \times IMF_{i,t}$ | -2.571*** | -3.225*** | -3.041** | -3.655*** | -2.215 | -3.013* | -1.979 | -2.743* | -2.661* | -3.419* |
| | (0.002) | (0.001) | (0.020) | (0.007) | (0.152) | (0.071) | (0.140) | (0.067) | (0.099) | (0.051) |
| $\Delta g_{i,t}^f$ | 0.0719 | 0.0509 | 0.0369 | 0.0220 | -0.00902 | -0.0467 | 0.0267 | -0.0108 | -0.0229 | -0.0739 |
| | (0.606) | (0.714) | (0.795) | (0.877) | (0.958) | (0.784) | (0.871) | (0.948) | (0.902) | (0.688) |
| $\Delta \pi_{i,t}^f$ | 0.636*** | 0.718*** | 0.774*** | 0.872*** | 0.961*** | 1.110*** | 0.940*** | 1.097*** | 0.767*** | 0.964*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.004) | (0.001) |
| $\Delta T_{j,t}$ | | -0.545 | | -0.384 | | -0.355 | | -0.418 | | -0.833 |
| | | (0.175) | | (0.479) | | (0.600) | | (0.519) | | (0.214) |
| Obs. | 90 | 82 | 90 | 82 | 90 | 82 | 90 | 82 | 90 | 82 |

*Note: Inflation forecasts are not reported in the REO reports of the Asian and Pacific region. Prais-Winsten (PSCE) estimates (Beck and Katz, 1995). ***, **, and * indicate respectively 1%, 5%, and 10% significance.*

**Table C.3: Testing the effect of changes in the IMF sentiment on cumulative changes in 10-year bond yields, controlling for IMF sentiment towards the main trade partner**

| | *Asia and Pacific* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $i_t^{10y}$ | | $i_{t+1}^{10y}$ | | $i_{t+2}^{10y}$ | | $i_{t+3}^{10y}$ | | $i_{t+4}^{10y}$ | |
| $\Delta T_{i,t}$ | -1.026*** | -0.728** | -0.821 | 0.0593 | -1.383** | -0.430 | -1.640** | -0.931 | -1.842* | -0.684 |
| | (0.001) | (0.016) | (0.165) | (0.913) | (0.024) | (0.476) | (0.033) | (0.234) | (0.060) | (0.456) |
| $\Delta g_{i,t}^f$ | 0.0285 | 0.0377 | 0.0583 | 0.108 | -0.0276 | -0.0228 | -0.172 | -0.169 | -0.185 | -0.148 |
| | (0.655) | (0.529) | (0.666) | (0.366) | (0.829) | (0.842) | (0.218) | (0.210) | (0.343) | (0.394) |
| $\Delta T_{j,t}$ | | -0.866** | | -2.707*** | | -2.953*** | | -2.338** | | -3.918*** |
| | | (0.033) | | (0.001) | | (0.000) | | (0.016) | | (0.001) |
| Obs. | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | *Europe* | | | | | | | | | |
| | $i_t^{10y}$ | | $i_{t+1}^{10y}$ | | $i_{t+2}^{10y}$ | | $i_{t+3}^{10y}$ | | $i_{t+4}^{10y}$ | |
| $\Delta T_{i,t}$ | 0.283 | 0.190 | 0.686* | 0.694 | 1.485** | 1.665*** | 1.380* | 1.638** | 1.697** | 2.027*** |
| | (0.207) | (0.378) | (0.096) | (0.102) | (0.011) | (0.007) | (0.060) | (0.031) | (0.018) | (0.010) |
| $IMF_{i,t}$ | -0.863*** | -0.854** | -1.154*** | -1.019** | -1.073 | -1.000 | -0.613 | -0.844 | -1.112 | -0.907 |
| | (0.002) | (0.011) | (0.000) | (0.012) | (0.179) | (0.328) | (0.454) | (0.417) | (0.204) | (0.411) |
| $\Delta T_{i,t} \times IMF_{i,t}$ | -0.402 | -0.561 | -0.537 | -1.259** | -1.503 | -2.656* | -2.303* | -3.200*** | -2.329* | -3.721** |
| | (0.374) | (0.221) | (0.354) | (0.029) | (0.251) | (0.055) | (0.072) | (0.007) | (0.090) | (0.013) |
| $\Delta g_{i,t}^f$ | -0.0153 | -0.0432 | 0.0761 | 0.0606 | 0.0944 | 0.0702 | 0.0409 | -0.0248 | 0.113 | 0.0613 |
| | (0.766) | (0.373) | (0.222) | (0.370) | (0.415) | (0.560) | (0.785) | (0.871) | (0.442) | (0.682) |
| $\Delta \pi_{i,t}^f$ | 0.0196 | 0.0330 | 0.0624 | 0.0570 | 0.143 | 0.174 | -0.000559 | 0.241 | 0.105 | 0.141 |
| | (0.668) | (0.648) | (0.428) | (0.676) | (0.223) | (0.380) | (0.997) | (0.332) | (0.445) | (0.561) |
| $\Delta T_{j,t}$ | | 0.294** | | 0.172 | | 0.0632 | | 0.166 | | 0.455 |
| | | (0.048) | | (0.463) | | (0.840) | | (0.706) | | (0.328) |
| Obs. | 56 | 46 | 56 | 46 | 56 | 46 | 56 | 46 | 56 | 46 |
| | *Western Hemisphere* | | | | | | | | | |
| | $i_t^{10y}$ | | $i_{t+1}^{10y}$ | | $i_{t+2}^{10y}$ | | $i_{t+3}^{10y}$ | | $i_{t+4}^{10y}$ | |
| $\Delta T_{i,t}$ | -0.510 | -0.337 | -0.391 | -0.215 | -0.329 | 0.00400 | -0.321 | 0.00771 | -0.206 | 0.190 |
| | (0.181) | (0.424) | (0.429) | (0.675) | (0.595) | (0.995) | (0.603) | (0.991) | (0.765) | (0.791) |
| $IMF_{i,t}$ | 0.124 | 0.157 | -0.151 | -0.0897 | -0.147 | -0.104 | 0.0236 | 0.0219 | 0.218 | 0.223 |
| | (0.697) | (0.627) | (0.676) | (0.809) | (0.767) | (0.837) | (0.961) | (0.964) | (0.690) | (0.683) |
| $\Delta T_{i,t} \times IMF_{i,t}$ | -0.538 | -0.755 | -1.584 | -1.774 | -0.413 | -0.778 | -0.473 | -0.832 | -1.392 | -1.866 |
| | (0.530) | (0.406) | (0.218) | (0.173) | (0.799) | (0.638) | (0.777) | (0.631) | (0.364) | (0.243) |
| $\Delta g_{i,t}^f$ | 0.0767 | 0.0576 | -0.0363 | -0.0477 | -0.0825 | -0.113 | -0.0787 | -0.111 | -0.0992 | -0.146 |
| | (0.494) | (0.606) | (0.742) | (0.665) | (0.598) | (0.462) | (0.627) | (0.482) | (0.612) | (0.444) |
| $\Delta \pi_{i,t}^f$ | 0.311* | 0.374** | 0.293 | 0.347* | 0.316 | 0.433 | 0.328 | 0.441 | 0.260 | 0.413 |
| | (0.055) | (0.026) | (0.133) | (0.088) | (0.224) | (0.104) | (0.215) | (0.105) | (0.350) | (0.151) |
| $\Delta T_{j,t}$ | | -0.207 | | -0.136 | | -0.183 | | -0.322 | | -0.877 |
| | | (0.592) | | (0.757) | | (0.760) | | (0.610) | | (0.174) |
| Obs. | 90 | 82 | 90 | 82 | 90 | 82 | 90 | 82 | 90 | 82 |

*Note: Inflation forecasts are not reported in the REO reports of the Asian and Pacific region. Prais-Winsten (PSCE) estimates (Beck and Katz, 1995). ***, **, and * indicate respectively 1%, 5%, and 10% significance.*

# Appendix D

**Table D.1: Testing the effect of changes in the IMF sentiment on cumulative changes in 5-year bond yields, using an alternative sentiment measure**

| | *Asia and Pacific* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $i_t^{5y}$ | | $i_{t+1}^{5y}$ | | $i_{t+2}^{5y}$ | | $i_{t+3}^{5y}$ | | $i_{t+4}^{5y}$ | |
| $\Delta T_{i,t}^{alt}$ | -6.553* | -3.731 | -6.492 | -0.939 | -6.655 | -1.495 | -6.090 | -3.467 | -7.174 | -2.301 |
| | (0.060) | (0.301) | (0.204) | (0.859) | (0.171) | (0.759) | (0.339) | (0.599) | (0.347) | (0.769) |
| $\Delta g_{i,t}^{f}$ | 0.0699 | 0.0659 | 0.0961 | 0.104 | -0.0194 | -0.0351 | -0.205 | -0.204 | -0.0628 | -0.0440 |
| | (0.441) | (0.449) | (0.509) | (0.444) | (0.874) | (0.766) | (0.176) | (0.183) | (0.763) | (0.831) |
| $\Delta T_{j,t}^{alt}$ | | -9.707** | | -18.68*** | | -17.02*** | | -9.143 | | -16.03 |
| | | (0.034) | | (0.009) | | (0.008) | | (0.272) | | (0.126) |
| Obs. | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 |
| | *Europe* | | | | | | | | | |
| | $i_t^{5y}$ | | $i_{t+1}^{5y}$ | | $i_{t+2}^{5y}$ | | $i_{t+3}^{5y}$ | | $i_{t+4}^{5y}$ | |
| $\Delta T_{i,t}^{alt}$ | 6.563** | 7.122** | 10.94*** | 12.58*** | 14.50** | 16.37*** | 15.06** | 16.95** | 15.82** | 17.58** |
| | (0.016) | (0.013) | (0.006) | (0.002) | (0.014) | (0.008) | (0.016) | (0.010) | (0.012) | (0.011) |
| $IMF_{i,t}$ | -0.491* | -0.404 | -0.773 | -0.619 | -0.750 | -0.770 | -0.454 | -0.169 | -0.566 | -0.249 |
| | (0.071) | (0.156) | (0.187) | (0.351) | (0.538) | (0.576) | (0.734) | (0.910) | (0.633) | (0.857) |
| $\Delta T_{i,t}^{alt} \times IMF_{i,t}$ | -10.96*** | -14.69*** | -7.945 | -15.92** | -14.33 | -21.16 | -20.32 | -23.14* | -19.04 | -22.50 |
| | (0.002) | (0.000) | (0.241) | (0.036) | (0.277) | (0.139) | (0.116) | (0.100) | (0.133) | (0.100) |
| $\Delta g_{i,t}^{f}$ | 0.00803 | 0.00299 | 0.171 | 0.135 | 0.128 | 0.108 | 0.0536 | -0.0380 | 0.0993 | -0.0261 |
| | (0.904) | (0.966) | (0.184) | (0.307) | (0.535) | (0.616) | (0.799) | (0.863) | (0.643) | (0.910) |
| $\Delta \pi_{i,t}^{f}$ | 0.0217 | 0.0250 | 0.0460 | 0.0496 | 0.0105 | 0.0190 | -0.0611 | -0.112 | 0.0673 | -0.0451 |
| | (0.773) | (0.743) | (0.737) | (0.732) | (0.958) | (0.930) | (0.756) | (0.603) | (0.731) | (0.840) |
| $\Delta T_{j,t}^{alt}$ | | 0.477 | | 0.715 | | -0.0686 | | 9.070 | | 15.20* |
| | | (0.875) | | (0.867) | | (0.993) | | (0.310) | | (0.082) |
| Obs. | 56 | 52 | 56 | 52 | 56 | 52 | 56 | 52 | 56 | 52 |
| | *Western Hemisphere* | | | | | | | | | |
| | $i_t^{5y}$ | | $i_{t+1}^{5y}$ | | $i_{t+2}^{5y}$ | | $i_{t+3}^{5y}$ | | $i_{t+4}^{5y}$ | |
| $\Delta T_{i,t}^{alt}$ | 19.12*** | 32.06*** | 18.68** | 31.20*** | 19.66** | 34.70*** | 21.41** | 37.73*** | 21.77** | 36.82*** |
| | (0.001) | (0.000) | (0.011) | (0.000) | (0.024) | (0.001) | (0.011) | (0.000) | (0.015) | (0.000) |
| $IMF_{i,t}$ | -0.536** | -0.549* | -0.762** | -0.699* | -0.834* | -0.848* | -0.863** | -0.914** | -0.998** | -1.031** |
| | (0.048) | (0.073) | (0.031) | (0.063) | (0.054) | (0.063) | (0.031) | (0.035) | (0.031) | (0.037) |
| $\Delta T_{i,t}^{alt} \times IMF_{i,t}$ | -29.12*** | -41.64*** | -38.03*** | -50.68*** | -33.09** | -48.61*** | -30.79** | -47.09*** | -31.01** | -44.72** |
| | (0.001) | (0.000) | (0.001) | (0.000) | (0.024) | (0.004) | (0.021) | (0.003) | (0.042) | (0.010) |
| $\Delta g_{i,t}^{f}$ | 0.0714 | 0.0548 | 0.0477 | 0.0384 | -0.00214 | -0.0334 | 0.0351 | 0.00760 | -0.00989 | -0.0471 |
| | (0.615) | (0.700) | (0.745) | (0.797) | (0.990) | (0.847) | (0.830) | (0.964) | (0.958) | (0.804) |
| $\Delta \pi_{i,t}^{f}$ | 0.650*** | 0.775*** | 0.795*** | 0.939*** | 0.977*** | 1.171*** | 0.957*** | 1.172*** | 0.774*** | 1.045*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.004) | (0.000) |
| $\Delta T_{j,t}^{alt}$ | | -10.82* | | -9.919 | | -10.17 | | -10.56 | | -13.99* |
| | | (0.063) | | (0.141) | | (0.236) | | (0.189) | | (0.086) |
| Obs. | 92 | 84 | 92 | 84 | 92 | 84 | 92 | 84 | 92 | 84 |

*Note: Inflation forecasts are not reported in the REO reports of the Asian and Pacific region. Prais-Winsten (PSCE) estimates (Beck and Katz, 1995). ***, **, and * indicate respectively 1%, 5%, and 10% significance.*

**Table D.2: Testing the effect of changes in the IMF sentiment on cumulative changes in 10-year bond yields, using an alternative sentiment measure**

| | *Asia and Pacific* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $i_t^{10y}$ | | $i_{t+1}^{10y}$ | | $i_{t+2}^{10y}$ | | $i_{t+3}^{10y}$ | | $i_{t+4}^{10y}$ | |
| $\Delta T_{i,t}^{alt}$ | -6.524*** | -4.526** | -5.826 | 0.527 | -8.765* | -1.746 | -9.483 | -5.096 | -12.63* | -5.347 |
| | (0.004) | (0.047) | (0.153) | (0.891) | (0.055) | (0.697) | (0.103) | (0.386) | (0.073) | (0.438) |
| $\Delta g_{i,t}^{f}$ | 0.0111 | 0.0137 | 0.0542 | 0.0774 | -0.0198 | -0.0416 | -0.156 | -0.169 | -0.152 | -0.148 |
| | (0.859) | (0.820) | (0.668) | (0.497) | (0.872) | (0.710) | (0.273) | (0.235) | (0.424) | (0.417) |
| $\Delta T_{j,t}^{alt}$ | | -6.109** | | -20.32*** | | -22.21*** | | -15.61** | | -25.82*** |
| | | (0.048) | | (0.000) | | (0.000) | | (0.037) | | (0.005) |
| Obs. | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 | 102 |
| | *Europe* | | | | | | | | | |
| | $i_t^{10y}$ | | $i_{t+1}^{10y}$ | | $i_{t+2}^{10y}$ | | $i_{t+3}^{10y}$ | | $i_{t+4}^{10y}$ | |
| $\Delta T_{i,t}^{alt}$ | 1.017 | 1.187 | 4.567 | 5.522 | 10.49* | 11.88** | 9.885* | 11.43* | 15.04*** | 16.56*** |
| | (0.610) | (0.586) | (0.229) | (0.166) | (0.050) | (0.035) | (0.097) | (0.071) | (0.002) | (0.003) |
| $IMF_{i,t}$ | -0.887*** | -0.733** | -1.195*** | -0.989*** | -1.105 | -1.026 | -0.670 | -0.544 | -1.190 | -0.797 |
| | (0.002) | (0.013) | (0.000) | (0.007) | (0.185) | (0.287) | (0.447) | (0.603) | (0.215) | (0.463) |
| $\Delta T_{i,t}^{alt} \times IMF_{i,t}$ | -2.511 | -5.216 | -4.090 | -8.908** | -10.37 | -14.83* | -14.44* | -14.03* | -18.28** | -20.50** |
| | (0.423) | (0.113) | (0.349) | (0.026) | (0.206) | (0.077) | (0.064) | (0.082) | (0.026) | (0.025) |
| $\Delta g_{i,t}^{f}$ | -0.00668 | -0.0136 | 0.0893 | 0.0743 | 0.109 | 0.0784 | 0.0559 | -0.0295 | 0.119 | 0.0293 |
| | (0.904) | (0.809) | (0.174) | (0.323) | (0.403) | (0.586) | (0.727) | (0.865) | (0.444) | (0.860) |
| $\Delta \pi_{i,t}^{f}$ | 0.00614 | 0.00568 | 0.0369 | 0.0324 | 0.109 | 0.0908 | -0.0365 | -0.0941 | 0.0931 | 0.0114 |
| | (0.893) | (0.908) | (0.650) | (0.693) | (0.401) | (0.508) | (0.815) | (0.563) | (0.441) | (0.932) |
| $\Delta T_{j,t}^{alt}$ | | 0.684 | | 1.132 | | 2.541 | | 9.189 | | 11.43 |
| | | (0.780) | | (0.786) | | (0.698) | | (0.258) | | (0.175) |
| Obs. | 56 | 52 | 56 | 52 | 56 | 52 | 56 | 52 | 56 | 52 |
| | *Western Hemisphere* | | | | | | | | | |
| | $i_t^{10y}$ | | $i_{t+1}^{10y}$ | | $i_{t+2}^{10y}$ | | $i_{t+3}^{10y}$ | | $i_{t+4}^{10y}$ | |
| $\Delta T_{i,t}^{alt}$ | -4.964 | -2.985 | -3.962 | -1.852 | -3.765 | 0.926 | -2.914 | 2.735 | -0.0477 | 4.510 |
| | (0.292) | (0.614) | (0.504) | (0.790) | (0.626) | (0.917) | (0.711) | (0.770) | (0.995) | (0.640) |
| $IMF_{i,t}$ | 0.269 | 0.306 | 0.0399 | 0.101 | 0.00797 | 0.0510 | 0.165 | 0.164 | 0.307 | 0.318 |
| | (0.358) | (0.297) | (0.907) | (0.770) | (0.987) | (0.917) | (0.728) | (0.726) | (0.566) | (0.547) |
| $\Delta T_{i,t}^{alt} \times IMF_{i,t}$ | -4.312 | -6.328 | -16.11 | -18.06 | -7.892 | -12.39 | -8.472 | -13.99 | -11.40 | -15.00 |
| | (0.596) | (0.483) | (0.159) | (0.134) | (0.599) | (0.431) | (0.582) | (0.391) | (0.428) | (0.330) |
| $\Delta g_{i,t}^{f}$ | 0.0838 | 0.0642 | -0.0242 | -0.0328 | -0.0660 | -0.0962 | -0.0592 | -0.0911 | -0.0894 | -0.136 |
| | (0.453) | (0.563) | (0.823) | (0.761) | (0.672) | (0.531) | (0.714) | (0.564) | (0.648) | (0.478) |
| $\Delta \pi_{i,t}^{f}$ | 0.322** | 0.390** | 0.301 | 0.358* | 0.324 | 0.451* | 0.337 | 0.471* | 0.258 | 0.445 |
| | (0.047) | (0.022) | (0.121) | (0.078) | (0.213) | (0.094) | (0.204) | (0.086) | (0.352) | (0.125) |
| $\Delta T_{j,t}^{alt}$ | | -2.308 | | -2.142 | | -1.775 | | -3.412 | | -8.310 |
| | | (0.656) | | (0.684) | | (0.806) | | (0.663) | | (0.289) |
| Obs. | 92 | 84 | 92 | 84 | 92 | 84 | 92 | 84 | 92 | 84 |

*Note: Inflation forecasts are not reported in the REO reports of the Asian and Pacific region. Prais-Winsten (PSCE) estimates (Beck and Katz, 1995). ***, **, and * indicate respectively 1%, 5%, and 10% significance.*