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Fiscal Consolidation under Market's Scrutiny: How Government Communication Affects Bond Yields

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Abstract

We estimate short-run reactions of government bond spreads of selected EU countries to prime ministers' and finance ministers' public statements about fiscal policy from 2000 to 2019. Our dataset, which is based on the Factiva database, covers news that reached the markets via Reuters. Depending on their tone, we have classified them as hawkish (committing attitude towards austerity and prudent budget) or dovish (passive/reluctant attitude) and tested their impact on credit risk premia measured by government bond yields against risk-free rate (German Bund). Our results suggest that hawkish statements and signals by prime ministers decrease the credit risk premia, but this result masks a considerable time and country variation. The effect of hawkish fiscal communication is large and statistically significant, especially after the European Sovereign Debt Crisis acknowledging ECB's interventions, but not before or during that crisis, suggesting limited power of communication to decrease a credit risk premium when markets are under stress or insensitive to underlying fundamentals.

1. Introduction

Under normal circumstances, sovereign debt is a welcome opportunity for investors to safely store their money, as it tends to be viewed as an essentially risk-free asset. However, this quickly changes once investors start to doubt the government's solvency and the long-term sustainability of public finances. This was precisely the mechanism behind the European debt crisis in 2010-2012. Due to the

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concerns about the sustainability of public finances, the credit risk premium demanded by investors for holding sovereign debt rose substantially, and this debt intolerance made the costs to roll over sovereign debts prohibitively expensive, further undermining countries' fiscal positions.

Governments in these situations can never change the stock of public debt overnight, nor do they usually have the ability to persuade central banks to intervene in bond markets. One of the few ways to reduce the credit risk premium is through targeted communication by key policymakers such as prime ministers and finance ministers. They try to convince the markets that their future fiscal adjustments and consolidation will restore public finances' sustainability. But, the efficiency of these public statements remains debatable due to the dynamic inconsistency problem because the governments cannot credibly commit to future tax policies, as recently demonstrated analytically by Liu and Shen (2022). The developments of the European debt crisis seemingly corroborate this skepticism toward the power of communication at times of market stress, as there were numerous attempts to announce fiscal consolidation plans by prime ministers of EU member states during those years. However, their effects remain unclear since the key statement that ultimately stabilized the eurozone government bond markets was the European Central Bank's (ECB) President Draghi's "whatever it takes" speech on July 26, 2012, followed by the subsequent announcement of the Outright Monetary Transactions on August 2, 2012 (see De Grauwe and Ji, 2013; Aizenman, Hutchison, and Jinjarak, 2013; and Bi and Leeper, 2013, for competing explanations of the anatomy of the European debt crisis). These measures also have changed the overall bond price dynamics and their sensitivity to fundamentals (Afonso et al. 2018).

Several studies evaluate the impact of various announcements and statements related to fiscal developments and policies on bond yields in EU countries. Beetsma, Guiliodori, de Jong and Widijanto (2013) studied the impact of broadly defined "news" compiled in the Euro Intelligence newsflash, finding that more bad news about the fiscal position on average raised domestic interest spreads, while the impact of good news was negligible. The results of Büchel (2013) lead to an even more skeptical perspective over the power of government officials to affect bond yields. Based on his estimates on a 2009-2011 sample, only the communication by representatives of Germany, France, members of the ECB Governing Council, and the EU officials had an impact on bond yield spreads of Greece, Italy, Ireland, Portugal and Spain, while he had not found any effect of communication of national representatives of those fiscally-stressed eurozone countries. Little effect of austerity programs' announcements during the European debt crisis is found by Bergman, Hutchinson, and Jensen (2019), too.

On the other hand, the significant power of the ECB communication and policy announcements on bond yields are confirmed by Falagiarda and Reitz (2015) or by Afonso, Jalles, and Kazemi (2020). They demonstrate the significant effects of the European Commission's releases of short-term economic forecasts and the announcements of the excessive deficit procedure. Besides, the limited role of fiscal announcements from government representatives has been documented in emerging market economies by David, Guajardo, and Yepez (2022).

Single-country case studies typically indicate a higher potential for government officials to impact bond spreads via fiscal policy announcements. For the

Netherlands, De Jong (2018) shows that the announcements of improvements in the Dutch budget balance decreased the yield spreads relative to Germany. Falagiarda and Gregori 2015), focusing on Italy, show that fiscal announcements by Monti's cabinet had a significant impact on bond spreads, while the announcements by Berlusconi's and Lenza's administrations did not. Both papers suggest that differences in credibility across governments led by various prime ministers matter for the impact of policy announcements; therefore, the investments into credibility may pay off in lower bond yields.

This paper analyzes short-run market reactions to the public statements by prime ministers and finance ministers of selected EU member states over a long period of 2000-2019 to assess the power of their communication to influence the markets. Our "news" sample contains countries of the southern EU periphery (Greece, Italy, Portugal, Spain), Ireland, some of the new EU member states (Czech Republic, Hungary, Poland, Slovakia), and two EU core countries (France and Netherlands). Germany is serving as a benchmark as government bonds spreads – our main dependent variable – are expressed as spreads against the German government bond yields. The countries in our sample faced periods in which financing via debt issuance was available and cheap, and the European debt crisis of 2010-2012, in which the fiscal sustainability of some of them was questioned, and their bond yields skyrocketed.

Our main contribution to the literature on bond yields and spreads is in our explicit focus on the effects of communication of government officials rather than on well-defined but rare announcements of fiscal adjustment programs studied by Afonso, Jalles, and Kazemi (2020) or Beetsma et al. (2021). To estimate the effects of communication, we constructed a unique dataset by collecting articles in which the prime ministers or the finance ministers expressed their stance towards fiscal consolidation in their countries from a newswire database Factiva.

We selected articles released by Reuters since those articles are followed by the market participants systematically. Then, we estimated the impact of such public statements on fiscal consolidation on bond yield spreads vis-à-vis the German government bonds (Bunds). Along with this full sample analysis, conducted for the analyzed countries as a whole and individually, we separately analyze hawkish (committing) and dovish (reluctant) statements and investigate the potential asymmetry of their impacts.

Since the behavior of bond spreads went through significant time-variation, linked to changes of the ECB monetary policy stance (Afonso, et al., 2018), we also analyze in three non-overlapping periods: in the years preceding the European debt crisis (up to 2009), over the crisis period (2009-2012), and in the period after Draghi's "whatever it takes" speech in 2012 when the ECB promised to intervene in the bond markets to assure proper transmission of monetary policy across the eurozone. Thus, our second contribution to the existing literature is in using a much longer time period - almost 20 years of daily data – covering sufficiently long periods before as well as after the Great Recession, and in a relatively diverse set of countries covered by our analysis. Therefore, our results are more general than earlier studies, such as Büchel (2013), with a sample covering solely the crisis years and the most affected countries (Greece, Spain, Italy, Portugal, and Ireland).

Our results reveal several important insights. First, using the full sample, the general hawkish communication on fiscal policy decreases the bond spreads. This can be interpreted as markets being forward-looking and government announcements being credible since comments of prime ministers and finance ministers would be reflected in bond prices even though no legal action has been taken yet. Second, in a majority of cases, the dovish signals neglecting the need to consolidate budget deficits contribute to increases in bond yields. Third, the signals given by prime ministers are followed by the market, whereas communication by finance ministers, in general, is not.

However, the full sample results mask the time and country variation in the effects of the announcements. Most importantly, the significantly negative impact of fiscal consolidation announcements appears in the post-crisis period following the Draghi's "whatever it takes" speech. In other periods, the coefficients measuring the announcement impact often remain negative but insignificant.

The paper is structured as follows: section 2 provides a survey of related literature, while section 3 explains the construction of our dataset and the variables used. Section 4 presents the methodology and the results, while section 5 concludes.

2. Review of Related Literature

There is a large empirical evidence that countries without sound public finance, i.e. with high public debt or substantial fiscal deficit, are likely to face higher risk premia in their bond yields, reflecting an increased risk of potential sovereign default (Maltritz and Molchanov, 2013; Poghosyan, 2014; Costantini, et al., 2014; Caggiano and Greco, 2012). However, it is not only the existing fiscal fundamentals but especially their outlook for the medium term - as captured by various signals and news on economic and policy developments potentially impacting the fiscal position - that determines the sovereign bond yield behavior (Boffelli and Urga, 2015; Kim et al., 2015; Afonso, Gomes and Taamouti, 2014; Drago and Gallo, 2016; Afonso, Jalles, and Kazemi, 2020).

Countries benefiting from low costs of funding thanks to sound fiscal fundamentals may still be subject to yield shocks even if the outlook remains unchanged because of the possible changes in market sentiment, re-assessment of countries' risks, and contagion effects. Gregori and Sacchi (2019) show how comments of European leaders about a possible exit of Greece from the euro area ("Grexit") drove up the government bond yields of Italy, Spain and Portugal. Similar findings have been found by Silvapulle et al. (2016), and Ters and Urban (2018). De Grauwe (2012), De Grauwe and Ji (2013), Saka, Fuertes, and Kalotychou (2015) and Smolik, Vacha, and Baxa (2019) analyze the interconnectedness problem and fragility of the euro area bond market during the European sovereign debt crisis 2010-2012 and provide evidence that the main cause was the unclear commitment of the ECB regarding the support for over-indebted European countries. Kinateder and Wagner (2017) utilize multi-country panel data and find out that the unconventional monetary policy that the ECB has performed to avoid a euro area breakdown had a spread-decreasing effect.

Countries with high public debt and ongoing fiscal deficits that further deteriorate the outlook for fiscal sustainability would be forced to implement fiscal

consolidation and pursue a path of fiscal austerity. However, this is often tricky as such fiscal adjustment could be self-defeating: the worsened fiscal situation is usually a consequence of an economic recession and tightening fiscal policy to improve public finances may jeopardize economic recovery. A negative feedback loop may develop in which fiscal austerity further deepens the economic recession, with negligible or even negative impact on government debt to GDP and an additional rise in bond yields, ultimately increasing the funding costs and thus worsening the fiscal balance despite the austerity measures (Gros and Maurer, 2012; Holland and Portes, 2012; Guajardo et al., 2014; Attinasi and Metelli, 2017; Lopes and Do Amaral, 2017; Botta, 2020). On the other hand, successful, well-paced austerity measures should in general lead to improvements in fiscal balance, a decrease in funding costs and, in turn, to a general decrease in the level of interest rates in the economy, stimulating domestic demand and helping the economy to get out of recession (the so-called "expansionary fiscal consolidation" argument, see Kandil, 2001; Krugman, 2010; Corsetti et al., 2014; Giavazzi and Pagano, 1990).

Jadhav, Neelankavil and Andrews (2013) point out that further increases in public debt can stimulate the economy in the recessionary periods but once the debt level increases too much, the marginal effect on growth declines and becomes negative. Thus, it depends on the sustainable level of public debt as perceived by financial markets whether fiscal consolidation is or is not needed, but that level is uncertain and can be subject to changes over the economic cycle. This may lead to two different outcomes regarding the signals of austerity measures issued by governments. The markets may find it unnecessary, thus staying indifferent or even increasing the risk premia if there is news on consolidation that may harm the economy. On the other hand, if the austerity is expected to strengthen public finance and sends clear signals of government responsibility, the announcements of such plans would bring the bond yields down.

The strength of market reactions to government news about fiscal consolidation depends on credibility of government, i.e. to what extent markets believe that the announced measures will be really implemented and how effective they will be in improving fiscal fundamentals (Christensen, 1999; Falagiarda and Gregori, 2015; Afonso, Jalles, and Kazemi, 2020). Moreover, the process leading to the final legal acts implementing the consolidation plan takes quite a long time, over which markets may adjust their pricing with respect to the expected outcome based on available information.

In a study similar to ours, Büchel (2013) analyzed the effects of speeches of important European representatives regarding the five euro area countries that were mostly impacted by market scrutiny during the European sovereign debt crisis (Greece, Italy, Ireland, Portugal and Spain, GIIPS). He divides a large news dataset to *"dovish"* and *"hawkish"* statements. Utilizing event study methodology and the EGARCH framework between 2009 and 2011, he finds that the CDS spreads react more intensively to negative communication that indicates a limited commitment of ECB, EU, and EMU representatives to support the GIIPS countries and protect its creditors. Supporting communication yields a weaker pattern; conversely, they still decrease CDS spreads. Compared to Büchel (2013), we cover more countries, longer time period, and focus solely on communication of government officials related to

their own budgets. Also, since we cover more countries, we rely on the panel rather than time series methods.[1]

Beetsma et al. (2013) studied the daily effects of country news using pooled OLS for groups of countries divided between i) GIIPS and ii) other. Contrary to previously presented papers, they employ another approach to the estimation since they use word count, amount of news, and other similar explanatory variables in their estimation. They find that, on average, more news related to a particular country raises the domestic interest spread of GIIPS countries since September 2009.

Falagiarda and Gregori (2015) studied the fiscal communication effects on long-term bond spreads of Italy using daily data. Utilizing GARCH model, they divide 201 news to 3 administration periods (from 2009 to 2013) and find a significant effect only made by members of Monti's cabinet for both types: budget improvements and budget deteriorations. They retrieve the fiscal policy announcements from ECB Real Time Information System and classify them according to their signaling content about future budget developments to a dummy variable with a positive, negative, and neutral sentiment. Control variables used consist of a volatility index, total stock market index, TED spread, and CDS of Greece. They suggest that the credibility gap of governments in power plays a role.

Similar research was done by De Jong (2018) for Dutch spreads, although he focuses on direct changes and not on volatility effects. He finds that news indicating an improvement in the budget lowers the yield spreads in the Dutch case. However, his approach to news acquisition is different since he filters retrieved announcements from Dutch newspapers heavily. From 10 000 initially gained news, only 144 are kept for further analysis. They represent rather the negotiation process of consolidation packages rather than final agreements. Furthermore, he mentions that the results may be inflated because they were estimated over a period of high market sensitivity (2008-2014).

Using dynamic panel regressions, Bergman, Hutchison, and Jensen (2019) study several types of announcements for GIIPS: i) ECB policy actions, ii) EU programs, and iii) domestic austerity measures. With daily data on CDS spreads changes, they find "very little" (albeit negative) immediate impact on sovereign, or bank CDS spreads of the announced domestic austerity measures. More significant results were found for the ECB policy actions.

3. Construction of the Dataset

We collected public statements of prime and finance ministers on a need (or lack thereof) for fiscal consolidation, austerity, or debt reduction for 11 European countries using the FACTIVA newswire database with an extensive time span from 1 January 2000 to 31 December 2019. We use articles released by Reuters. It is one of the world's leading news agencies, having branches in all countries in our dataset, with timely news dispersed fast to financial market traders. The utilization of Reuters

[1] Büchel (2013) estimates public statements of government officials from all GIIPS countries on spreads and CDS of individual countries while in this paper we focus on the effects of country's government officials on their government bonds spreads because our intention was to show what the country's official can achieve with their communication used as a policy instrument. As shown in the subsequent sections, our results are for the crisis period and the power of communication of domestic officials comparable.

news assures that we include statements of policymakers that reached financial markets and were considered relevant (Büchel, 2013). At the same time, our reliance on news mitigates the problem of anticipation of policy actions inherent to papers that restrict their attention to pre-specified decisions of national or EU institutions since those decisions are closely related to macroeconomic developments and thus can be predicted, at least to some extent. Moreover, since we focus on market response to policy communication, using Reuters news spread across market participants almost in real time mitigates the selection bias that would arise when relying on newspapers with inherently limited news.

Terms that had to appear in the headlines of the articles are divided into three sets: i) identification of the country, ii) identification of the representative, and iii) relevant fiscal term. The first set for the identification of the country uses not only the title of the country or the corresponding adjective (e.g. Italy or Italian) but also the distinctive identification of inhabitants (e.g. Italians). The second set identifies the person the news is related to, and we aim at capturing all news expressed publicly by the finance minister (*FINMIN*) and the prime minister (PM). It includes not only the terms such as *"PM"* or *"FINMIN"* but primarily all names of prime and finance ministers who served throughout the analyzed time period in each country. In addition, given France's semi-presidential nature, we include the term "president" and all respective names in our search. The third set is used to identify news related to fiscal issues. We used three key words - *budget*, *fiscal,* and *debt* which cover the most relevant fiscal categories. All parameters of each set are presented in the Table 1.

Based on the search query specified in Table 1, we retrieved 2 663 news for all 11 countries. The resulting dataset is then manually checked, and unrelated articles are removed. Specifically, we omit news where officials commented on the state of affairs in other countries and comments and news unrelated to future fiscal plans. The decisions follow from human-based assessment of titles and headers of all articles, as demonstrated in Table 2. This way, we discarded 922 articles.

Table 1 Wording Types Used for News Search and Combinations

First set: country identification	
EUROZONE	
ES - Spain	(Spain *or* Spanish *or* Spaniards)
FR - France	(France *or* French *or* Frenchmen)
GR - Greece	(Greece *or* Greek *or* Greeks)
IE - Ireland	(Ireland *or* Irish)
IT - Italy	(Italy *or* Italian *or* Italians)
NL - Netherlands	(Netherlands *or* Dutch *or* Dutchmen *or* Netherlanders)
PT - Portugal	(Portugal *or* Portuguese)
SK - Slovakia	(Slovakia or Slovak or Slovaks)
CEE non Eurozone	
CZ - Czechia	(Czech Republic *or* Czechia *or* Czech *or* Czechs)
HU - Hungary	(Hungary *or* Hungarian *or* Hungarians)
PL - Poland	(Poland *or* Polish *or* Poles)

Table 1 Wording Types Used for News Search and Combinations Continued

Second set: representative identification	
EUROZONE	
ES - Spain	PM, FINMIN, Aznar, Zapatero, Rajoy, Sánchez, Figaredo, Mira, Méndez, de Guindos, Jurado, Romero, Montero
FR - France	PM, FINMIN, PRESIDENT, Sautter, Fabius, Mer, Sarkozy, Gaymard, Breton, Borloo, Lagarde, Baroin, Moscovici, Sapin, Le Maire, Jospin, Raffarin, de Villepin, Fillon, Ayrault, Valls, Cazeneuve, Philippe, Castex, Chirac, Hollande, Macron
GR - Greece	PM, FINMIN, Simitis, Karamanlis, Papandreou, Papademos, Pikrammenos, Samaras, Tsipras, Thanou-Christophilou, Mitsotakis, Papantoniou, Christodoulakis, Alogoskoufis, Papathanasiou, Papakonstantinou, Venizelos, Sachinidis, Zanias, Stournaras, Hardouvelis, Varoufakis, Tsakalotos, Houliarakis, Staikouras
IE - Ireland	PM, FINMIN, Ahern, Cowen, Kenny, Varadkar, Martin, McCreevy, Cowen, Lenihan, Noonan, Donohoe
IT - Italy	PM, FINMIN, Amato, Berlusconi, Prodi, Monti, Letta, Renzi, Gentiloni, Conte, Draghi, Del Turco, Tremonti, Siniscalco, Padoa-Schioppa, Grilli, Saccomanni, Carlo, Padoan, Tria, Gualtieri, Franco
NL - Netherlands	PM, FINMIN, Kok, Balkenende, Rutte, Zalm, Hoogervorst, Bos, de Jager, Dijsselbloem, Hoekstra
PT - Portugal	PM, FINMIN, de Pina Moura, de Oliveira Martins, Ferreira Leite, Bagão Félix, de Campos e Cunha, dos Santos, Gaspar, de Albuquerque, de Freitas Centeno, de Freitas Centeno, Leão, Guterres, Barroso
SK - Slovakia	PM, FINMIN, Dzurinda, Fico, Radičová, Pellegrini, Matovič, Heger, Schmögnerová, Hajnovič, Mikloš, Počiatek, Kažimír, Kamenický
CEE non Eurozone	
CZ - Czechia	PM, FINMIN, Mertlík, Rusnok, Sobotka, Tlustý, Kalousek, Janota, Fischer, Babiš, Pilný, Schillerová, Zeman, Špidla, Gross, Paroubek, Topolánek, Fischer, Nečas, Rusnok
HU - Hungary	PM, FINMIN, Varga, László, Draskovics, Veres, Oszkó, Matolcsy, Németh, Antall, Boross, Horn, Orbán, Medgyessy, Gyurcsány, Bajnai
PL - Poland	PM, FINMIN, Buzek, Miller, Belka, Marcinkiewicz, Kaczyński, Tusk, Kopacz, Szydło, Morawiecki, Bauc, Wasilewska-Trenkner, Kołodko, Raczko, Gronicki, Lubińska, Gilowska, Wojciechowski, Kluza, Vincent-Rostowski, Szczurek, Szałamacha, Czerwińska, Banaś, Kwieciński, Kościński
Third set: relevant fiscal term	
	Budget, debt, fiscal

Table 2 Decision on Retaining and Discarding News – Examples

Date	*Title*	*Decision*	*Classification*	*Comment*
30.01.2008	EU hopes Italy to stick to Prodi plan on budget	Discarded		Not a comment of Italian government official.
Header	*BRUSSELS, Jan 30 (Reuters) - The EU's monetary chief said on Wednesday he hoped Italy would continue with the budgetary policies followed by Prime Minister Romano Prodi, whose government collapsed last week.*			
15.02.2008	Italy's Prodi: Debt fell below 105 pct of GDP	Retained	Hawkish	Interpreted as a prime minister's commitment toward debt reduction.
Header	*MILAN, Feb 15 (Reuters) - Italian Prime Minister Romano Prodi said on Friday the country's public debt had fallen below 105 percent of gross domestic product (GDP) under his outgoing government.*			
23.11.2009	Tremonti's budget rigour causes Italy cabinet rifts	Discarded		Not a comment of the prime minister or the finance minister.
Header	** Tremonti's fiscal rigour deemed bad for recovery * Colleague says he favours junior coalition partner * Another says economic decisions should be shared*			
25.06.2010	Italians strike against Berlusconi's austerity budget	Discarded		Not a comment of a government official.
Header	** Strike called by Italy's largest union * Workers will strike for either four or eight hours * Opponents say budget hits workers, spares rich*			
13.04.2011	Berlusconi says Italy aims to balance budget by 2014	Retained	Hawkish	Commitment towards fiscal stabilization.
Header	*ROME, April 13 (Reuters) - Italy will seek to bring its budget into balance by 2014, Prime Minister Silvio Berlusconi said on Wednesday, after the government revised down its growth forecasts for 2011-2013.*			
21.06.2011	Berlusconi says Italy will keep budget commitments	Retained	Hawkish	Commitment towards fiscal stabilization.
Header	*ROME, June 21 (Reuters) - Prime Minister Silvio Berlusconi said on Tuesday Italy would maintain the commitments it had made to European partners, financial markets and private savers that it would keep control of its public finances.*			
08.11.2011	Key Italy budget vote indicates Berlusconi has lost majority	Discarded		Not a comment of government official.
Header	*ROME, Nov 8 (Reuters) - A key vote in Italy's Chamber of Deputies on Tuesday indicated Prime Minister Silvio Berlusconi has lost his parliamentary majority, piling further pressure on him to resign.*			
09.11.2011	Slovak PM says Italy can cope with debt crisis	Discarded		Not a comment of Italian government official.
Header	*BRATISLAVA, Nov 9 (Reuters) - Italy has the internal capacity to handle its worsening debt crisis but needs to act quickly, Slovak Prime Minister Iveta Radicova said on Wednesday.*			
22.11.2011	Italy's Monti promises fiscal focus, steps for growth	Retained	Dovish	Attempt to balance fiscal consolidation with maintaining economic growth - changing position over the previous government committed towards fiscal consolidation.
Header	*BRUSSELS, Nov 22 (Reuters) - Italian Prime Minister Mario Monti said on Tuesday his new government was focused on fiscal discipline but also on boosting economic growth.*			
24.11.2011	Italy's Monti sticks to budget goals sees discussion on cycle	Retained	Dovish	Attempt to decrease the pace of consolidation amid recession.
Header	*STRASBOURG, France, Nov 24 (Reuters) - Italian Prime Minister Mario Monti repeated the goal of achieving a balanced budget by 2013 but said there was scope for discussion about how budget targets could be adjusted during serious recession.*			
20.02.2012	Italy PM says no need for further austerity budget	Retained	Neutral	Not a signal of policy change when facing news of coming recession.
Header	*MILAN, Feb 20 (Reuters) - Italian Prime Minister Mario Monti said on Monday there would be no need for a new austerity budget even as the euro zone's third biggest economy slides into recession.*			
23.02.2012	Italy PM Monti rules out new budget measures	Retained	Dovish	Rejection of fiscal consolidation to meet balanced budget.
Header	*ROME, Feb 23 (Reuters) - Italy will not need any supplementary budget measures to ensure that it meets its target of a balanced budget by 2013, Prime Minister Mario Monti reiterated on Thursday after a European Commission forecast pointed ...*			

Then, we assign values of -1, 0 or 1 to each of article according to the tone of the fiscal communication they represent. Following De Jong (2018), 1 stands for a hawkish statement, 0 if the news is neutral, and -1 for a dovish statement.

$$COMMUNICATION_{i,t} \begin{cases} +1 & HAWKISH\ suggests\ commiting\ attitude\ to\ austerity \\ & (full\ description\ in\ Table\ 3) \\ 0 & Neutral\ or\ no\ signal\ about\ future\ policy \\ & DOVISH, showing\ passivity\ regarding\ austerity \\ -1 & (full\ description\ in\ Table\ 3) \end{cases}$$

Since the style of actions and comments found is quite heterogenous, we provide typical content of articles for each of the three communications in Table 3.

Table 3 Classification of Communication

Hawkish communication	• Cuts in budget supporting comment or action now or in near future • Announcement of future balanced budget • Callings for tighter budget • Declared support for outgoing austerity measures, sticking with the austerity plan • Announcement of "better than expected" results regarding state budget
Neutral communication	• Statement revealing indifference regarding the fiscal consolidations • Statement that public finances are sound
Dovish communication	• Proclamation of unnecessity to cut fiscal deficit now or in near future • Announcement of "worse than expected" results regarding state budget • Pointing to risks related to the state budget

Examples of articles are provided below:

Hawkish

- *Berlusconi says Italy to balance budget in 2003 (11.10.2001)*
- *Spain dedicated to fiscal reform, sacrifice must be spread-Rajoy (27.9.2012)*

Neutral

- *Conte says not getting "hung up" over decimal places in budget (20.09.2018)*
- *Spain's PM says will make 2019 budget proposal in January (5.12.2018)*

Dovish

- *Polish 2001 budget revision still unclear-FinMin. (5.1.2001)*
- *Hungary needs no more budget cuts in 2004-finmin. (26.5.2004)*

The next step was to decide on which day the communication should be assigned. As news appeared throughout the whole day, we assumed (where it was possible as not all articles had a timestamp of the release) that the effect may arise until 16:58 hours of the working day. News released after this threshold was counted

for the next working day. This is also applied by Büchel (2013). News published during the weekend we moved to the next working day (Monday).

If multiple communications occur in one day, we assign the (1, 0, or -1) tone based on the prevalent value. Moreover, if PM stated the news, PM was assigned disregarding the number of various news occurrences on that day. We keep communication occurring on consecutive days in the dataset as we follow only one source of news (Reuters). With the abovementioned filtering, we retrieved 1 424 news days for all 11 countries. Table 4 presents the resulting news dataset based on countries, communication tone assigned, and cited government members.

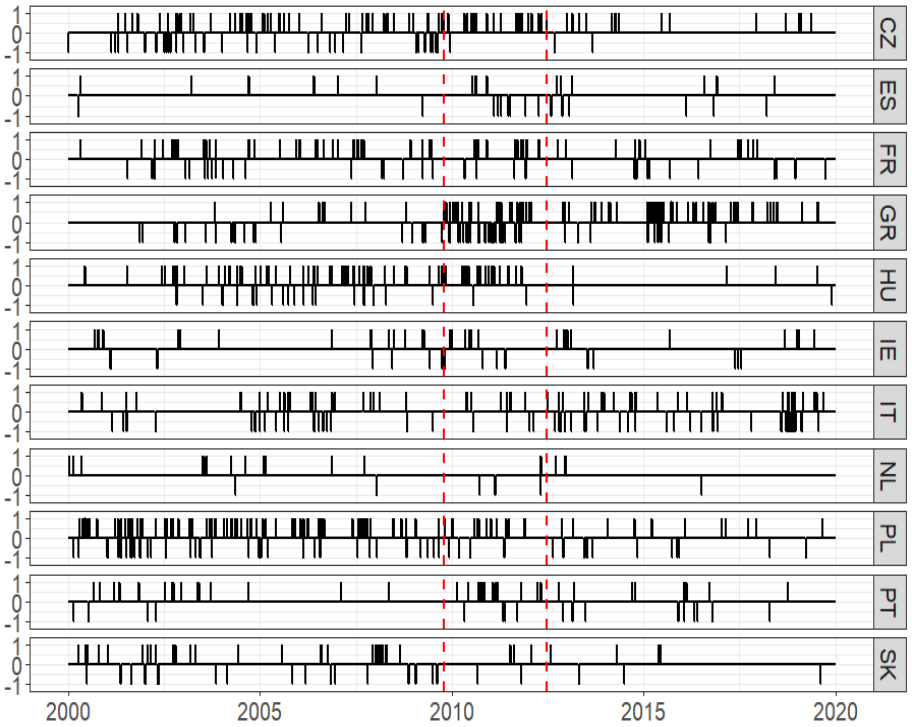
Table 4 Fiscal Communications, 2000-2019, by Country, Tone, and Government Official

	PM			*FINMIN*			*Total*
Country / Communication	***DOVISH***	***NEUTRAL***	***HAWKISH***	***DOVISH***	***NEUTRAL***	***HAWKISH***	
	-1	**0**	**1**	**-1**	**0**	**1**	
PL	12	13	39	45	82	96	287
CZ	7	10	17	31	19	74	158
ES	13	9	16	2		1	41
FR	23	10	35	12	7	33	120
GR	25	6	54	46	10	50	191
HU	11	29	53	16	25	31	165
IE	12	7	15	7	11	17	69
IT	46	42	59	20	16	19	202
NL	1	6	3	5	10	13	38
PT	11	10	24	7	2	15	69
SK	9	2	6	14	22	31	84
Total	**170**	**144**	**321**	**205**	**204**	**380**	**1424**

Source: Factiva, own computations

Figure 1 shows the distribution of communications over time for each country considered. We can see that communication about austerity has been frequent in some countries (such as Poland, Hungary, or Italy) even before the sovereign debt crisis.

Figure 1 Timeline of COMMUNICATION Variable with Respect to Time and Country



Notes: i) Vertical lines depict days in which the COMMUNICATION by prime and finance ministers appeared. Hawkish (neutral, dovish) views towards austerity and fiscal debt receive {1,0,-1} values. ii) Dashed lines depict the split into periods used in the analysis. The first line from the left side refers to the Papakonstantinou's announcement on 20 October 2009 and the second line from the left side to the Draghi's "whatever it takes" announcement on 26 July 2012.

4. Methodology

The stance of government representatives towards fiscal austerity should be reflected in the bond pricing as it affects future government debt evolution and the related sovereign risk. To control for the movements in bond yields we follow the standards of the available literature and measure the effects of announcements on changes of 10-year government bond yield spreads against the "risk-free" German government bond (Bund) yield, expressed in basis points, on daily data. The benchmark bond yields used for the estimation are available in Appendix.

We prefer bonds over credit default swaps (CDS) used e.g. by Büchel (2013) due to the availability across broad set of the European countries and longer historical data series. In addition, CDSs are usually employed in studies on market volatility but we are instead interested of amplifying/reducing effects on cost of debt.

The primary benefit of subtracting national bond yields from Bund lies in the elimination of both risk-neutral and term-risk premia. Consequently, the residual component dominantly captures the credit risk (Kučera et al., 2017). While employing the Bund as a benchmark introduces additional idiosyncratic volatility to

the dependent variable, an analysis of extensive data should significantly reduce potential bias. Selecting the 10-year index mitigates the impact of short-term yield curve movements and offers the advantage of being the most liquid index, ensuring that rates most accurately reflect market signals. Moreover, first-differencing emphasizes high frequency effectively diminishing the importance of other signals, such as news on interest rates, inflation, and to some extent, exchange rate risk. This approach effectively reduces the likelihood that estimates are skewed by extraneous information.

The baseline estimated equation is of the following form:

$$\Delta\, SPREAD_{i,t}^{10y} = \alpha + \beta COMMUNICATION_{i,t} + \delta_z\, X_{z,i,t} + \gamma\, \Delta\, SPREAD_{i,t-1}^{10y} \quad (1)$$

We expect a negative sign of the coefficient for the main variable of our interest (*COMMUNICATION*) since the intentions to decrease the debt burden (a hawkish communication of a value +1) should, generally, decrease the sovereign risk.

The $X_{z,i,t}$ represents a vector of control variables that are used to filter out additional effects affecting the bond yields unrelated to the fiscal communication shocks. Following Afonso, Jalles, and Kazemi (2020), Falagiarda and Gregori (2015), De Jong (2018), and Born, Müller, and Pfeifer (2020), we employ variables that control for a market view of the sovereign risk as captured by ratings, developments in general risk appetite, financial market uncertainty, bond market liquidity, and an indicator of stress in the bond markets.

Rating changes represent market information based on an independent entity's assessment of the individual countries' sovereign risk and thus capture a set of fundamentals related to the overall economic and fiscal situation. We collected data on announced changes, including warnings, by Standard & Poor's credit rating agency which seems to focus more on reputational credibility among market participants (Alsakka et al. 2014). Drago and Gallo (2016) and Ismailescu and Kazemi (2010) inspired the applied transformation of ratings. First, each rating level and rating warning is numerically rated, as shown in Table 5. On the day of a rating or warning change, the variable then receives the difference between the newly assigned value and the previous one. Note that Drago and Gallo (2016) show that the announcement effects of rating changes are not anticipated by the markets as they are significant only in days of their announcement.

Stock market indices carry important information about the general risk appetite. As stock markets fall, with risk aversion increasing, investors typically move from stocks to "safe" sovereign bonds, implying a negative correlation between stock market indices and government bond prices (and thus a positive correlation between stock market indices and bond yields). However, given that we focus on European countries with various levels of sovereign risk (considering that most of them are in the euro area), the role of safe bonds is played by the German Bund. Thus, in times of rising risk aversion, investors sell both stocks and (risky countries') sovereign bonds, implying a negative correlation between stock market indices and bond spreads. Following Conrad and Zumbach (2016), we include the

national blue-chip stock indices in the regressions (for a list of national stock indices, see Appendix). In the regression results section, we label the variable as *NATSTOCK*.

Table 5 Numerical Values Assigned to S&P's Ratings

Numerical value	*Rating typology*	*Numerical value*	*Rating typology*	*Numerical value*	*Rating typology*
17	AAA	10	BBB+	1	CCC+
16	AA+	9	BBB	1	CCC
15	AA	8	BBB-	1	CCC-
14	AA-	7	BB+	0	CC
13	A+	6	BB	-1	SD
12	A	5	BB-	0	n/a
11	A-	4	B+		
		3	B		
		2	B-		

Rating warnings		
	Numerical Value	**Outlook**
	0.5	Positive
	0.25	Positive watch
	0	Stable
	-0.25	Negative watch
	-0.5	Negative

To capture market uncertainty, we use the overall euro area implied volatility index *VSTOXX* (Longstaff et al., 2011), since the indicator is unavailable at the national level. To control for bond market liquidity, we use a bid-ask spread from each of the country's government bond market.

Finally, to control for a stress level in which the market trades the sovereign bonds, we included a recursively calculated empirical cumulative distribution function (ECDF) of bond spreads inspired by Born, Müller, and Pfeifer (2020). In periods of high stress, spread changes are more prone to larger adjustments, which may not be caused by the announcement itself but purely due to the uncertainty. We control for this behavior by calculating the percentile for each day and each country based on ECDF, which is updated each day for new bond yield. Formally, we calculate for each time t of country j and yield spread S the percentile given by $F_t(S_{j,t})$, where

$$F_t(S_{j,t}) = \frac{1}{t}\sum_{i=1}^{t} \mathbb{1}_{S_{j,i} \leq S_{j,t}} \tag{1}$$

$S_{j,i}$ is a set of observations for country j where $S_{j,i}, \ldots, S_{j,t}$ and $\mathbb{1}$ is an indicator function.

The effects of austerity communication on credit risk premiums can be further influenced by other signals we do not filter out. This may include credibility of the politician or the government as whole or their capability to project power. Falagiarda

and Gregori (2015) is the only comparable study incorporating those into their analysis, yet, they focused on one country only and for short period of time. In contrast, we are interested into general behavior of markets across a long time span and countries which consequently disables the use of their methodology. Studies focusing on government credibility with respect to bond market are generally scarce highlighting the complexity of such an analysis. Many marketing teams try to measure public sentiment towards governments; however, it does not need to be vital for the bond market. In our case, we, therefore, implicitly assume that governments are credible because they inherently have sufficient power to make change in Europe. We also do not consider communication of other statesmen and influential personas including institutions from other countries such as European Commission. In contrast to Gertler and Horvath (2018), we do not control for communication occurring on consecutive days (43 cases for the *COMMUNICATION* variable) as we employ only one source of news on daily frequency.

In addition to the main specification of Eq. 1, we run two alternative specifications of our analysis. First, we look into whether the effects of public statements by prime ministers (or the president) differ from those of finance ministers since they hold higher government positions. Both positions may also have different views and roles in the government. Thus, we also run a specification where communication by prime ministers (*PM COMMUNICATION*) and finance ministers (*FINMIN COMMUNICATION*) is separated as presented in Eq. 3.

$$\begin{aligned}\Delta\, SPREAD_{i,t}^{10y} = {} & \alpha + \beta_1 PM\ COMMUNICATION_{i,t} \\ & + \beta_2 FINMIN\ COMMUNICATION_{i,t} + \delta_z X_{z,i,t} \\ & + \gamma\, \Delta\, SPREAD_{i,t-1}^{10y}\end{aligned} \tag{3}$$

Second, we test the differences between hawkish and dovish signals in the communication (regardless of whether the prime minister or the finance minister made the statements). To do so, we construct separate dummy variables for hawkish and dovish statements, where news (regardless of whether hawkish or dovish) is assigned a value of 1. The neutral news is included in the constant term together with days without news occurring (Eq. 4).

$$\begin{aligned}\Delta\, SPREAD_{i,t}^{10y} = {} & \alpha + \beta_1 HAWKISH_{i,t} + \beta_2 DOVISH_{i,t} + \delta_z X_{z,i,t} \\ & + \gamma\, \Delta\, SPREAD_{i,t-1}^{10y}\end{aligned} \tag{4}$$

In all regressions, we also control for the possible autocorrelation by including a lagged value of the dependent variable (spread) and individual weekday effects using dummy variables. We run the regressions for the whole pooled set of countries and by individual countries.

Motivated by a series of evidence suggesting fluctuation of bond yield determinants across long time horizons (Smolik, Vacha, and Baxa, 2019) and varying

credibility of communication by representatives (Falagiarda and Gregori, 2015), we are also interested in whether the reaction of bond spreads to fiscal communication differs across various periods. We therefore split our sample into three periods – a pre-crisis period (up to 20 Oct 2009), the crisis period (between 21 Oct 2009 and 26 July 2012), and the post-crisis period (from 27 July 2012 on).

For the first break we chose the day of Greek finance minister Papakonstantinou announcement regarding "higher budget deficit than expected" (20 October 2009). The second break is chosen for the famous "whatever it takes" announcement by Mario Draghi (26 July 2012). The decision for this date consists of two arguments: i) the announcement led to a decrease of bond market uncertainty which led to a slow but persistent decrease of yield spreads, and ii) the immediate positive effect was found in some analyses (e.g. Jäger and Grigoriadis, 2017). Using this breakdown, we also get a relatively acceptable number of events for the last post-crisis period.

5. Results

We first present the results of all three regressions following Eq. 1, 3, and 4 using the full sample of all countries in the dataset and all periods (pooled regression).[2] In all regressions, the Newey-West procedure for covariance matrix estimation was used. Thus, presented covariance matrices are also fully robust to serial correlation (Henningsen and Henningsen 2019), although we were able to control it out with used variables and their respective lags.[3]

5.1 Pooled Sample

Results of the baseline regression in three alternative specifications (depending on the control variables used) are provided in Table 6. The dummy variable *COMMUNICATION*, which captures the news of government representatives (without differentiating whether they come from *FINMIN* or *PM*), is negative and significant. In general, markets find public statements by governmental representatives as credible easing the funding strain for the government, although the impact of one public statement is, on average, quantitatively small, around 1.4 basis points in spreads.

Other control variables also show the expected behavior: lower liquidity increases the yield spread, as well as the decreases of stock market indices, and the increased implied volatility capturing uncertainty. Next, the variable *STRESS* constructed as the recursive empirical cumulative distribution function for each yield spread in the dataset shows correct patterns. If the market dives the yields up relative to their historical values, spreads tend to increase significantly.

[2] Pooled regression is an appropriate tool in our case since our data are differenced (high-pass filter) and individual effects are thus filtered out.

[3] Regressions were estimated using R *plm* package by (Croissant and Millo 2008). Outputs were created with a help of the package *stargazer* by (Hlavac 2018).

Table 6 Regression Results for Period 2000-2019

Dependent variable: Δ YIELD SPREAD 10Y (in bps.)						
	1	***2***	***3***	***4***	***5***	***6***
COMMUNICATION	-1.422**	-1.497**	-1.401**			
	(0.017)	(0.016)	(0.037)			
PM COMMUNICATION				-2.633**	-2.400*	-2.289*
				(0.025)	(0.059)	(0.082)
FINMIN COMMUNICATION				-0.373	-0.707	-0.56
				(0.457)	(0.139)	(0.256)
RATING	-1.479	-2.106	-1.985	-1.47	-2.099	-1.978
	(0.276)	(0.224)	(0.259)	(0.279)	(0.225)	(0.261)
Δ YIELD SPREAD 10Y (T-1)	0.027	0.049**	0.051***	0.027	0.049**	0.051***
	(0.270)	(0.011)	(0.010)	(0.271)	(0.012)	(0.01)
BIDASK		0.804***	0.829***		0.804***	0.828***
		(0.002)	(0.002)		(0.002)	(0.002)
STRESS			0.604***			0.605***
			(0.001)			(0.001)
VSTOXX	0.130***	0.107***	0.103***	0.130***	0.107***	0.104***
	(0.000)	(0.000)	(0.000)			
NATSTOCK	-1.316***	-1.363***	-1.490***	-1.315***	-1.363***	-1.489***
	(0.000)	(0.000)	(0.000)			
Constant	-0.207	-0.178	-0.471***	-0.208	-0.179	-0.472***
	(0.360)	(0.351)	(0.005)	(0.359)	(0.35)	(0.005)
Weekday dummy	YES	YES	YES	YES	YES	YES
Observations	56,256	53,895	49,811	56,256	53,895	49,811
R^2	0.028	0.221	0.228	0.028	0.221	0.228
Adjusted R^2	0.028	0.220	0.228	0.028	0.22	0.228
F Statistic	178.92***	1,524.78***	1,337.27***	161.720***	1,386.656***	1,226.254***

Notes: (i) The table shows the estimated coefficients for each variable and the respective p-values (in parentheses); * p < 10%, ** p < 5%, *** p <1%. (ii) A negative coefficient for the "communication" variables indicate a decrease of spread after a hawkish (committing) comment or an increase of spread after a dovish (reluctant) communication. (iii) The estimations (1), (2) and (3) do not differentiate who made the communication, while estimations (4), (5) and (6) estimate the effects separately for prime ministers and ministers of finance. Within these blocks, the estimations differ by the set of control variables used.

Table 6 also provides the results for the case where communication is divided based on the person sourced in the article. The prime minister's statements are generally followed by the market, with expected effects, and so is the communication by finance ministers, although the letter one is not found significant.

To address potential endogeneity between the state of the economy and the communication of governmental officials, we follow Gertler and Horvath (2018) and reestimate regression setup (3) with a two-step approach. In the first step, the dependent variable is regressed on control variables. The resulting first-step residuals represent the surprise shocks to the credit premia of individual countries. In the second step, we regress the *COMMUNICATION* and *RATING* variables on these

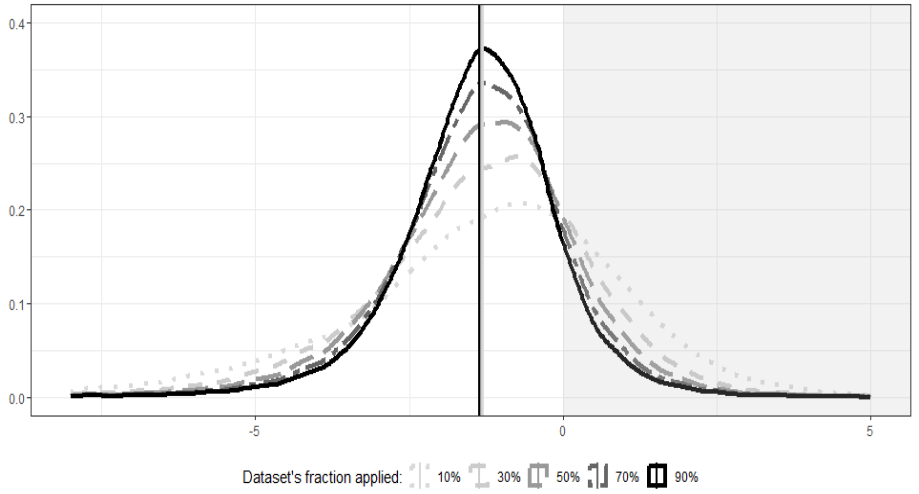
first-step residuals, confirming significant negative relationship for both variables (Table 7).

Table 7 Regression Results for Two-Step Approach

Dependent variable: Surprise shock to credit premia (in bps.)	
	1
COMMUNICATION	-1.400**
	(0.001)
RATING	-1.983*
	(0.091)
Constant	0.007
	(0.901)
Weekday dummy	YES
Observations	49,808
R^2	0.001
Adjusted R^2	0.001
F Statistic	6.779***

We further investigate the role of potential outliers, i.e., communications with a large impact on bond spreads via bootstrapping, drawing random samples 10 000 times with replacement for multiple fractions of the dataset. Figure 2 shows that the mean regression coefficients are negative irrespective of applied fractions, although the betas of small fractions are much more dispersed. For randomly selecting just 10% of data for bootstrap replications, the p-value reaches 0.29 but with larger portions of data included, it decreases to 0.105.

Figure 2 Bootstrapped COMMUNICATION Variable on 10 000 Draws for Various Data Fractions



Notes: The figure shows density plot of communication variable beta on 10 000 draws for various data fractions (10%, 30%, 50%, 70%, 90%) with replacement. The regression setup corresponds to the Table 6, column 3. Our results show robust negative mean beta for COMMUNICATION variable and reduced bias with increasing data sample considered.

Furthermore, Table 8 shows the regressions using the hawkish and dovish signals separately. We find significant effects only in the case of hawkish statements. The dovish signals have the expected positive sign, however, the size of the effect is about one third in comparison to the hawkish communications, and the standard errors are relatively large, turning the variable insignificant.

Table 8 Regression Results Hawkish and Dovish Divisions

Dependent variable: Δ YIELD SPREAD 10Y (in bps.)			
	1	***2***	***3***
HAWKISH	-1.817**	-1.921**	-1.858*
	(0.035)	(0.030)	(0.052)
DOVISH	0.689	0.712	0.547
	(0.275)	(0.292)	(0.450)
RATING	-1.484	-2.110	-1.989
	(0.275)	(0.223)	(0.259)
Δ YIELD SPREAD 10Y (T-1)	0.027	0.049**	0.051***
	(0.271)	(0.012)	(0.010)
BIDASK		0.804***	0.829***
		(0.002)	(0.002)
STRESS			0.610***
			(0.001)
VSTOXX	0.130***	0.107***	0.103***
	(0.000)	(0.000)	(0.000)
NATSTOCK	-1.317***	-1.364***	-1.490***
	(0.000)	(0.000)	(0.000)
Constant	-0.195	-0.165	-0.461***
	(0.391)	(0.385)	(0.006)
Weekday dummy	YES	YES	YES
Observations	56,256	53,895	49,811
R^2	0.028	0.221	0.228
Adjusted R^2	0.028	0.220	0.228
F Statistic	161.183***	1,386.375***	1,226.039***

Notes: (i) The table shows the estimated coefficients for each variable and the respective p-values (in parentheses); * p < 10%, ** p < 5%, *** p <1%. (ii) Hawkish variable represents a committing position of finance and prime ministers regarding austerity and fiscal consolidations and Dovish the reluctant one. A negative (positive) coefficient indicates a decrease (increase) of spread after a signal. (iii) The estimations (1), (2) and (3) differ by the set of control variables used.

Next, we focus on changes in the effects of communication over time. Therefore, Table 9 shows the results for the three sub-periods: before the European debt crisis, during the crisis until the decision to launch the Outright Monetary Transactions, and the post-crisis period. The coefficient for the *COMMUNICATION* variable has a negative sign in all subperiods, but it differs among the three sub-periods in terms of size and statistical significance.

More specifically, the effects of fiscal communication are close to zero in the pre-crisis period, characterized by the convergence of bond yields within the euro zone, and their limited sensitivity on fundamentals documented in Bhatt, Kishor and Ma (2017), Smolik, Vacha, and Baxa (2019) or von Hagen, Schuknecht, and Wolswijk (2011). Also, the significantly negative effect of prime ministers'

communications disappears once we control for all financial stress (Table 9, column 6).

Table 9 Regression Results for the Selected Periods, All Countries

		Dependent variable: Δ YIELD SPREAD 10Y (in bps.)					
		1	***2***	***3***	***4***	***5***	***6***
PRE-CRIS	*COMMUNICATION*	-0.045	-0.167	-0.158			
		(0.873)	(0.557)	(0.556)			
	PM COMMUNICATION				-0.743*	-0.913**	-0.510
					(0.072)	(0.036)	(0.213)
	FINMIN COMMUNICATION				0.361	0.269	0.071
					(0.330)	(0.473)	(0.843)
CRISIS	*COMMUNICATION*	-2.576	-1.380	-1.263			
		(0.281)	(0.583)	(0.616)			
	PM COMMUNICATION				-5.095	-2.077	-2.105
					(0.268)	(0.691)	(0.688)
	FINMIN COMMUNICATION				-0.413	-0.782	-0.538
					(0.829)	(0.594)	(0.715)
POST-CRISIS	*COMMUNICATION*	-2.652**	-2.684**	-2.679**			
		(0.011)	(0.011)	(0.011)			
	PM COMMUNICATION				-2.782*	-2.852*	-2.847*
					(0.068)	(0.066)	(0.066)
	FINMIN COMMUNICATION				-2.418*	-2.379*	-2.374*
					(0.075)	(0.073)	(0.074)

Notes: (i) The table shows the estimated coefficients for each variable and the respective p-values (in parentheses); * p < 10%, ** p < 5%, *** p <1%. (ii) A negative coefficient for the "communication" variables indicate a decrease of spread after a hawkish (committing) comment or an increase of spread after a dovish (reluctant) communication. (iii) The estimations (1), (2) and (3) do not differentiate who made the communication, while estimations (4), (5) and (6) estimate the effects separately for prime ministers and ministers of finance. Within these blocks, the estimations do not differ by the set of control variables used. Full results with all control variables are presented in the Appendix.

During the crisis period, the size of the estimated coefficients increases, but they remain insignificant in all specifications. This may be caused by considerable uncertainty and heterogeneous beliefs of the markets towards individual government actions, as documented by Falagiarda and Gregori (2015) in the case of the Italian government.

Only in the post-crisis period, the communication done by PM and FINMIN is found to be negative and statistically significant. They are also robust against the equation specification. It seems thus that the OMT announcement lined up the credibility of communications across individual countries and found austerity as a positive action to enhance the soundness of budgets across the countries.

The estimated coefficients for the communications of PMs and FINMINs individually are both significant and differ only very slightly in the post-crisis period, with PM communication having a somewhat larger impact. To test whether the communication by PMs has a statistically different effect than FINMINs, we re-run the equations with a modified specification in the post-crisis period where the

COMMUNICATION variable is used together with PM COMMUNICATION as explanatory variables. In this case, however, the latter variable is defined as a dummy with {0,1} values indicating whether the communication was done by PM or not. Using robust standard errors, PMs have additional decreasing effect only at p-values of 20%. Thus, the effect of communication by the PMs is not statistically different to the effect of announcements by finance ministers.

5.2 Results by Country

To tackle the poolability problem in the cross-country analysis and show possible variation in the impact of fiscal communication on the spreads at a country level, we also estimate the models for each country of our sample. Given the steep increase in the dimension of the analysis, we only provide results for Eq. 1 and 3 (i.e. without the hawkish/dovish breakdown of news) in the specification with all control variables (i.e. including the liquidity and stress indicators). We provide three tables. Table 10 summarizes the effects with the *COMMUNICATION* variable, and Table 11 the division between PM and FINMIN signals. Then, in the last step, we also show how the coefficients vary across the three periods chosen (Figure 2 and Table A6).

Table 10 shows the results for the overall *COMMUNICATION* variable individually for all 11 countries. The estimated coefficients for our variable of interest are mostly negative during the whole timespan used, although only in the Greek case is it statistically significant.

Table 10 Results with Communication Variable for the Period 2000-2019 by Individual Country

	Dependent variable: Δ YIELD SPREAD 10Y (in bps.)										
	GR	IT	IE	PT	ES	FR	NL	SK	HU	CZ	PL
	1	2	3	4	5	6	7	8	9	10	11
COMMUNICATION	-6.249*	-0.182	-0.524	0.372	0.109	0.048	-1.101	2.568	-1.498	-0.209	0.038
	(0.066)	(0.735)	(0.548)	(0.863)	(0.950)	(0.854)	(0.193)	(0.131)	(0.195)	(0.682)	(0.942)
RATING	-1.132	-3.023***	-5.652	-2.859	-3.530*	-5.690*	-0.205	5.173	3.495	-3.101***	-0.414
	(0.808)	(0.002)	(0.274)	(0.109)	(0.085)	(0.084)	(0.629)	(0.298)	(0.103)	(0.0003)	(0.818)
Δ YIELD SPREAD 10Y (T-1)	0.058**	0.064***	0.125***	0.103***	0.063**	-0.109***	-0.205***	-0.300***	0.064**	-0.093***	-0.092**
	(0.030)	(0.005)	(0.004)	(0.003)	(0.017)	(0.002)	(0.000)	(0.000)	(0.045)	(0.00002)	(0.018)
BIDASK	0.936***	0.030	0.427***	0.741***	0.176	-0.046	0.017	0.055	-0.010	0.193***	0.323***
	(0.002)	(0.587)	(0.00000)	(0.000)	(0.180)	(0.104)	(0.512)	(0.182)	(0.944)	(0.00000)	(0.00000)
STRESS	0.832	0.355	0.570	0.476	0.299	0.437***	0.406***	0.833***	1.160**	0.803***	1.413***
	(0.579)	(0.124)	(0.187)	(0.357)	(0.227)	(0.001)	(0.0002)	(0.0005)	(0.026)	(0.002)	(0.0002)
VSTOXX	0.302***	-0.007	0.162***	0.077**	0.022	0.042***	0.033***	0.204***	0.241***	0.105***	0.186***
	(0.005)	(0.821)	(0.00000)	(0.047)	(0.475)	(0.002)	(0.0002)	(0.000)	(0.000)	(0.00000)	(0.000)
NATSTOCK	-3.051***	-2.059***	-0.525***	-2.623***	-1.673***	-0.240***	-0.003	0.061	-1.951***	-0.681***	-1.268***
	(0.00000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.004)	(0.946)	(0.582)	(0.000)	(0.000)	(0.000)
Constant	-3.046**	-0.050	-0.469	-0.095	-0.081	-0.149	-0.127*	-0.219	-0.990**	-0.087	-0.825***
	(0.036)	(0.815)	(0.158)	(0.826)	(0.711)	(0.143)	(0.091)	(0.393)	(0.011)	(0.623)	(0.002)
Weekday dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	4.696	4.696	4.696	4.696	4.696	4.696	4.696	3.283	4.264	4.696	4.696
R^2	0.300	0.215	0.107	0.238	0.145	0.057	0.059	0.130	0.111	0.085	0.139
Adjusted R^2	0.298	0.214	0.105	0.237	0.143	0.054	0.057	0.127	0.109	0.083	0.137
F Statistic	182.556***	116.950***	50.994***	133.277***	72.477***	25.541***	26.938***	44.405***	48.322***	39.525***	68.487***

Notes: (i) The table shows the estimated coefficients for each variable and the respective p-values (in parentheses); * p < 10%, ** p < 5%, *** p <1%. (ii) A negative coefficient for the "communication" variable indicates a decrease of spread after a hawkish (committing) comment or an increase of spread after a dovish (reluctant) communication.

Table 11 Results with PM and FINMIN Communication Variables for the Period 2000-2019 by Individual Country

Dependent variable: Δ YIELD SPREAD 10Y (in bps.)	GR	IT	IE	PT	ES	FR	NL	SK	HU	CZ	PL
	1	2	3	4	5	6	7	8	9	10	11
PM COMMUNICATION	-10.549	-0.207	-0.694	2.821	0.053	0.042	0.640	0.198	-2.482	-0.158	1.070
	(0.145)	(0.754)	(0.589)	(0.319)	(0.978)	(0.927)	(0.474)	(0.923)	(0.144)	(0.910)	(0.295)
FINMIN COMMUNICATION	-2.741	-0.115	-0.302	-3.985	0.613	0.057	-1.427	4.303*	-0.028	-0.221	-0.408
	(0.139)	(0.889)	(0.773)	(0.179)	(0.465)	(0.897)	(0.136)	(0.077)	(0.982)	(0.679)	(0.519)
RATING	-1.089	-3.022***	-5.651	-2.858	-3.530*	-5.690*	-0.204	5.168	3.497	-3.101***	-0.413
	(0.815)	(0.002)	(0.274)	(0.109)	(0.085)	(0.084)	(0.629)	(0.299)	(0.103)	(0.0003)	(0.819)
Δ YIELD SPREAD 10Y (T-1)	0.058**	0.064***	0.125***	0.103***	0.063**	-0.109***	-0.204***	-0.299***	0.064**	-0.093***	-0.091**
	(0.030)	(0.005)	(0.004)	(0.003)	(0.017)	(0.002)	(0.000)	(0.000)	(0.046)	(0.00002)	(0.019)
BIDASK	0.935***	0.030	0.427***	0.742***	0.176	-0.046	0.018	0.053	-0.010	0.193***	0.323***
	(0.002)	(0.586)	(0.00000)	(0.000)	(0.181)	(0.104)	(0.494)	(0.190)	(0.946)	(0.00000)	(0.00000)
STRESS	0.836	0.354	0.572	0.482	0.300	0.437***	0.406***	0.836***	1.163**	0.803***	1.423***
	(0.578)	(0.124)	(0.186)	(0.352)	(0.225)	(0.001)	(0.0002)	(0.0005)	(0.026)	(0.002)	(0.0001)
VSTOXX	0.303***	-0.007	0.162***	0.076*	0.022	0.042***	0.033***	0.205***	0.241***	0.105***	0.187***
	(0.005)	(0.821)	(0.00000)	(0.051)	(0.475)	(0.002)	(0.0002)	(0.000)	(0.000)	(0.00000)	(0.000)
NATSTOCK	-3.036***	-2.059***	-0.525***	-2.622***	-1.673***	-0.240***	-0.003	0.061	-1.950***	-0.681***	-1.267***
	(0.00000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.004)	(0.952)	(0.577)	(0.000)	(0.000)	(0.000)
Constant	-3.002**	-0.050	-0.471	-0.094	-0.081	-0.149	-0.128*	-0.228	-0.979**	-0.087	-0.830***
	(0.037)	(0.816)	(0.156)	(0.827)	(0.709)	(0.143)	(0.089)	(0.372)	(0.012)	(0.625)	(0.002)
Weekday dummy	.	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	4.696	4.696	4.696	4.696	4.696	4.696	4.696	3.283	4.264	4.696	4.696
R^2	0.300	0.215	0.107	0.239	0.145	0.057	0.060	0.130	0.111	0.085	0.139
Adjusted R^2	0.299	0.213	0.105	0.237	0.143	0.054	0.058	0.127	0.109	0.083	0.137
F Statistic	167.546***	107.182***	46.738***	122.674***	66.425***	23.407***	24.921***	40.882***	44.397***	36.224***	62.940***

Notes: (i) The table shows the estimated coefficients for each variable and the respective p-values (in parentheses); * p < 10%, ** p < 5%, *** p <1%. (ii) A negative coefficient for the "communication" variables indicate a decrease of spread after a hawkish (committing) comment or an increase of spread after a dovish (reluctant) communication.

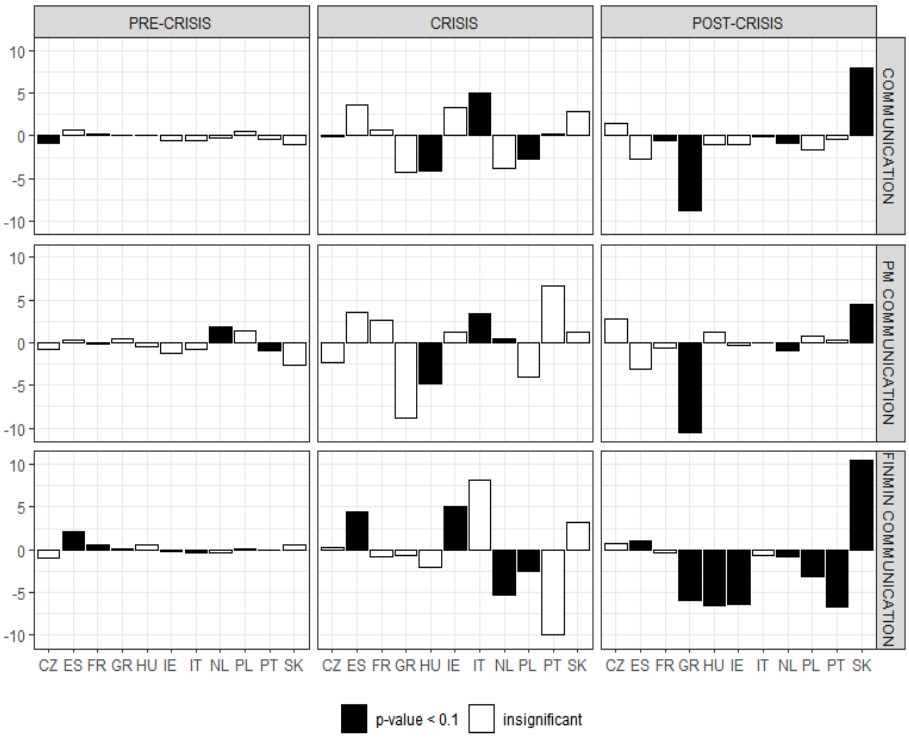
Table 11 shows the results for the case when the *COMMUNICATION* variable is split based on who made the announcement. Here, almost all effects are not statistically significant.

Because we found differences in the effects across different time periods, we now perform the same analysis at the country level. The results are shown graphically in Figure 3 (for the detailed results, see Table A6 in the Appendix). It shows that in the pre-crisis period, the markets have not reacted strongly to austerity announcements in all the countries, while the following periods show a different picture. In the crisis period, bond spreads in Hungary reacted to the announcements by the prime minister (but not the finance minister), while in the Netherlands and Poland, it was mostly the finance minister communication that had the calming effect on the markets. Some countries, such as Ireland, Italy or Spain, show a positive estimated coefficient for the fiscal communication. Given that these are the countries that, after Greece, suffered the largest increases in spread amid the sovereign solvency concerns, this result is best explained by limited credibility of commitments towards fiscal consolidation during the acute phase of the crisis. There have been two main causes of the limited credibility. First, the additional commitments came after a series of other statements of policy makers and numerous announcements of fiscal consolidation programs that proved insufficient in restoring the sustainability of public finances. Second, the future of common currency was questioned frequently and the markets did not considered fiscal consolidation as a proper response to the incomplete nature of the monetary union without effective lender of last resort. This sentiment changed after the measures taken by the ECB in the summer of 2012.

After the Draghi's speech, the coefficients align with expectations, with the estimated coefficients being negative and statistically significant for a number of countries. An exception remains Slovakia, which shows positive statistically significant effect of austerity announcements on bond spreads.[4]

[4] This estimate is based on few occurencies of fiscal communications, therefore this result shall be considered with a grain of salt.

Figure 3 Estimated Coefficients in Selected Periods by Individual Country



Notes: i) The figure shows the estimated coefficients for each variable across the three sub-periods. ii) The communication variable represents the views of prime and finance ministers regarding austerity and fiscal consolidations, PM communication for prime ministers and FINMIN communication for finance ministers. A negative coefficient for the "Communication" variables indicates a decrease of spread after a hawkish (committing) comment or an increase of spread after a dovish (reluctant). communication.. iii) The pre-crisis period ends with Papakonstantinou's announcement on 20 October 2009, and the crisis period with Draghi's "whatever it takes" announcement on 26 July 2012. iv) Values presented are also provided in Table A6 of the Appendix, where the respective p-values are at disposal.

6. Conclusion

The aim of this paper was to analyze whether communication about fiscal austerity by prime and finance ministers affect credit risk premium via sovereign bonds yields. We used daily data for a long period 2000-2019, covering three distinct sub-periods – the calm times before the Global Financial Crisis and the European Sovereign Debt crisis (2000-2009), the European Debt Crisis period (2009-2012), and the post-crisis recovery (2012-2019).

Our results suggest that, in general, markets view the fiscal communication expressing the government stance towards balanced budgets as an important factor influencing the perceived sovereign risk and thus government bond spreads. We found that hawkish signals are driving this effect, with announcements towards improving the public finance decreasing the bond spreads, while dovish statements were not found to have any statistically significant effects.

Moreover, the effects of such signals are time-varying. In the pre-crisis period, market reactions were sporadic as the yield spreads did not change largely. During the crisis, however, signals were followed more closely leading to larger effects for some countries with heterogeneous outcomes. For the last period of our analysis, after introduction of the ECB's Outright Monetary Transactions on August 2, 2012, we find that markets found the communication of government officials relevant, with statistically significant effect on yield spreads both in the overall cross-country sample and also in many (albeit not all) countries.

APPENDIX

Table A1 List of Used Government Bonds

Country	*Data source: Datastream*		*Data source: Thomson Reuters Eikon*	
	First available date	*Mnemonic*	*First available date*	*RIC*
CZ	10.04.2000	TRCZ10T	10.05.2000	CZ10YT=RR
DE	31.12.1999	TRBD10T	31.12.1999	DE10YT=RR
ES	31.12.1999	TRES10T	31.12.1999	ES10YT=RR
FR	31.12.1999	TRFR10T	31.12.1999	FR10YT=RR
GR	31.12.1999	TRGR10T	31.12.1999	GR10YT=RR
HU	31.12.1999	TRHN10T	26.08.2003	HU10YT=RR
IE	31.12.1999	TRIE10T	02.01.2003	IE10YT=RR
IT	31.12.1999	TRIT10T	04.12.2001	IT10YT=RR
NL	31.12.1999	TRNL10T	31.12.1999	NL10YT=RR
PL	31.12.1999	TRPO10T	31.12.1999	PL10YT=RR
PT	31.12.1999	TRPT10T	31.12.1999	PT10YT=RR
SK	06.01.2004	TRSK10T	31.05.2007	SK10YT=RR

Source: Datastream, Thomson Reuters Eikon

Table A2 List of Used Equity Stock Market Indices and Implied Volatility Index

Country	*Name*	*First available date*	*Data source*	*Mnemonic / RIC*
FR	FRANCE CAC 40	31.12.1999	Datastream	FRCAC40
IT	FTSE MIB INDEX	31.12.1999	Datastream	FTSEMIB
GR	FTSE/ATHEX LARGE CAP	31.12.1999	Datastream	FTASE20
ES	IBEX 35	31.12.1999	Datastream	IBEX35I
IE	ISEQ ALL SHARE INDEX	31.12.1999	Datastream	ISEQUIT
NL	AEX INDEX (AEX)	31.12.1999	Datastream	AMSTEOE
HU	BUDAPEST (BUX)	31.12.1999	Datastream	BUXINDX
PT	PORTUGAL PSI-20	31.12.1999	Datastream	POPSI20
CZ	PRAGUE SE PX	31.12.1999	Datastream	CZPXID
SK	SLOVAKIA SAX 16	31.12.1999	Datastream	SXSAX16
PL	WARSAW GENERAL INDEX	31.12.1999	Datastream	POLWIGI
	V2TX	03.01.2000	Thomson Reuters Eikon	V2TX
	STOXXE	03.01.2000	Thomson Reuters Eikon	STOXXE

Source: Datastream, Thomson Reuters Eikon

Table A3 Regression Results for Pre-Crisis Period for All Countries

	Dependent variable: Δ YIELD SPREAD 10Y					
	1	***2***	***3***	***4***	***5***	***6***
COMMUNICATION	-0.045	-0.167	-0.158			
	(0.873)	(0.557)	(0.556)			
PM COMMUNICATION				-0.743*	-0.913**	-0.510
				(0.072)	(0.036)	(0.213)
FINMIN COMMUNICATION				0.361	0.269	0.071
				(0.330)	(0.473)	(0.843)
RATING	0.351	1.019	1.413	0.369	1.044	1.425
	(0.840)	(0.596)	(0.465)	(0.832)	(0.587)	(0.461)
Δ YIELD SPREAD 10Y (T-1)	-0.077***	-0.070***	-0.053*	-0.078***	-0.071***	-0.053*
	(0.002)	(0.010)	(0.089)	(0.002)	(0.010)	(0.089)
BIDASK		0.091	-0.077		0.091	-0.076
		(0.107)	(0.302)		(0.107)	(0.304)
STRESS			0.782***			0.782***
			(0.00000)			(0.00000)
VSTOXX	0.060***	0.056***	0.056***	0.060***	0.056***	0.056***
	(0.00000)	(0.00001)	(0.00002)	(0.00000)	(0.00001)	(0.00002)
NATSTOCK	-0.380***	-0.373***	-0.405***	-0.380***	-0.373***	-0.405***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.073	-0.077	-0.348***	-0.072	-0.075	-0.347***
	(0.322)	(0.311)	(0.0002)	(0.330)	(0.321)	(0.0002)
Weekday dummy	YES	YES	YES	YES	YES	YES
Observations	26,986	24,625	20,541	26,986	24,625	20,541
R^2	0.024	0.026	0.026	0.024	0.027	0.026
Adjusted R^2	0.024	0.026	0.026	0.024	0.026	0.026
F Statistic	73.491***	66.867***	50.422***	66.601***	61.260***	46.311***

Notes: (i) The table shows the estimated coefficients for each variable and the respective p-values (in parentheses); * p < 10%, ** p < 5%, *** p <1%. (ii) A negative coefficient for the "Announcement" variables indicates a decrease of spread after a hawkish (committing) comment or an increase of spread after a dovish (reluctant) announcement.

Table A4 Regression Results for Crisis Period for All Countries

	Dependent variable: Δ YIELD SPREAD 10Y					
	1	***2***	***3***	***4***	***5***	***6***
COMMUNICATION	-2.576	-1.380	-1.263			
	(0.281)	(0.583)	(0.616)			
PM COMMUNICATION				-5.095	-2.077	-2.105
				(0.268)	(0.691)	(0.688)
FINMIN COMMUNICATION				-0.413	-0.782	-0.538
				(0.829)	(0.594)	(0.715)
RATING	-0.208	-1.137	-0.946	-0.208	-1.137	-0.944
	(0.910)	(0.605)	(0.669)	(0.910)	(0.605)	(0.669)
Δ YIELD SPREAD 10Y (T-1)	0.020	0.052*	0.052*	0.020	0.052*	0.052*
	(0.528)	(0.052)	(0.054)	(0.526)	(0.052)	(0.053)
BIDASK		0.961***	0.961***		0.961***	0.961***
		(0.002)	(0.002)		(0.002)	(0.002)
STRESS			4.855***			4.903***
			(0.003)			(0.003)
VSTOXX	0.437***	0.312***	0.314***	0.437***	0.312***	0.314***
	(0.0002)	(0.00002)	(0.00002)	(0.0002)	(0.00003)	(0.00002)
NATSTOCK	-2.218***	-2.545***	-2.528***	-2.213***	-2.543***	-2.526***
	(0.003)	(0.00001)	(0.00001)	(0.003)	(0.00001)	(0.00001)
Constant	-0.463	-0.503	-4.926***	-0.474	-0.506	-4.973***
	(0.762)	(0.677)	(0.0002)	(0.757)	(0.675)	(0.0003)
Weekday dummy	YES	YES	YES	YES	YES	YES
Observations	7,689	7,689	7,689	7,689	7,689	7,689
R^2	0.032	0.333	0.333	0.032	0.333	0.333
Adjusted R^2	0.030	0.332	0.332	0.030	0.332	0.332
F Statistic	27.780***	382.473***	348.082***	25.114***	347.675***	319.056***

Notes: (i) The table shows the estimated coefficients for each variable and the respective p-values (in parentheses); * p < 10%, ** p < 5%, *** p <1%. (ii) A negative coefficient for the "Announcement" variables indicates a decrease of spread after a hawkish (committing) comment or an increase of spread after a dovish (reluctant) announcement.

Table A5 Regression Results for After-Crisis Period for All Countries

	Dependent variable: Δ YIELD SPREAD 10Y					
	1	***2***	***3***	***4***	***5***	***6***
COMMUNICATION	-2.652**	-2.684**	-2.679**			
	(0.011)	(0.011)	(0.011)			
PM COMMUNICATION				-2.782*	-2.852*	-2.847*
				(0.068)	(0.066)	(0.066)
FINMIN COMMUNICATION				-2.418*	-2.379*	-2.374*
				(0.075)	(0.073)	(0.074)
RATING	-3.240	-3.399	-3.406	-3.238	-3.397	-3.404
	(0.186)	(0.220)	(0.218)	(0.186)	(0.220)	(0.219)
Δ YIELD SPREAD 10Y (T-1)	0.082**	0.082**	0.082**	0.082**	0.082**	0.082**
	(0.011)	(0.012)	(0.012)	(0.011)	(0.012)	(0.012)
BIDASK		0.288***	0.288***		0.288***	0.288***
		(0.003)	(0.003)		(0.003)	(0.003)
STRESS			-0.124			-0.124
			(0.641)			(0.641)
VSTOXX	0.049**	0.047**	0.047**	0.049**	0.047**	0.047**
	(0.015)	(0.020)	(0.020)	(0.015)	(0.020)	(0.020)
NATSTOCK	-2.542***	-2.513***	-2.513***	-2.542***	-2.513***	-2.514***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.123	-0.125	-0.053	-0.123	-0.125	-0.054
	(0.484)	(0.473)	(0.745)	(0.484)	(0.473)	(0.743)
Weekday dummy	YES	YES	YES	YES	YES	YES
Observations	21,559	21,559	21,559	21,559	21,559	21,559
R^2	0.103	0.117	0.117	0.103	0.117	0.117
Adjusted R^2	0.103	0.117	0.117	0.103	0.117	0.117
F Statistic	275.287***	286.065***	260.072***	247.757***	260.064***	238.403***

Notes: (i) The table shows the estimated coefficients for each variable and the respective p-values (in parentheses); * p < 10%, ** p < 5%, *** p <1%. (ii) A negative coefficient for the "Announcement" variables indicates a decrease of spread after a hawkish (committing) comment or an increase of spread after a dovish (reluctant) announcement.

Table A6 Regression Results for the Selected Periods, Country Separated

		Dependent variable: Δ YIELD SPREAD 10Y (in bps.)										
		GR	IT	IE	PT	ES	FR	NL	SK	HU	CZ	PL
		1	2	3	4	5	6	7	8	9	10	11
PRE-CRIS	COMMUNICATION	0.117	-0.615	-0.611	-0.390	0.645	0.194	-0.177	-1.060	0.018	-0.898*	0.563
		(0.833)	(0.225)	(0.488)	(0.264)	(0.436)	(0.359)	(0.656)	(0.585)	(0.985)	(0.099)	(0.400)
	PM COMMUNICATION	0.468	-0.700	-1.239	-0.992**	0.390	-0.073	1.913***	-2.673	-0.408	-0.787	1.407
		(0.334)	(0.323)	(0.552)	(0.021)	(0.668)	(0.774)	(0.000)	(0.127)	(0.759)	(0.279)	(0.215)
	FINMIN COMMUNICATION	0.069	-0.424*	-0.270	-0.056	2.180***	0.630*	-0.387	0.550	0.493	-0.922	0.174
		(0.913)	(0.075)	(0.711)	(0.902)	(0.000)	(0.075)	(0.306)	(0.870)	(0.690)	(0.151)	(0.837)
CRISIS	COMMUNICATION	-4.292	5.019**	3.261	0.182	3.610	0.754	-3.836	2.869	-4.183**	-0.070	-2.722*
		(0.595)	(0.026)	(0.220)	(0.968)	(0.286)	(0.535)	(0.155)	(0.209)	(0.021)	(0.945)	(0.061)
	PM COMMUNICATION	-8.762	3.435**	1.221	6.684	3.527	2.623	0.435*	1.223	-4.854**	-2.301	-4.079
		(0.607)	(0.028)	(0.750)	(0.174)	(0.344)	(0.299)	(0.092)	(0.437)	(0.011)	(0.146)	(0.640)
	FINMIN COMMUNICATION	-0.735	8.217	5.000*	-9.973	4.448***	-0.903	-5.262*	3.263	-2.042	0.251	-2.551**
		(0.862)	(0.141)	(0.084)	(0.160)	(0.0001)	(0.576)	(0.090)	(0.241)	(0.618)	(0.822)	(0.036)
POST-CRISIS	COMMUNICATION	-8.703**	-0.147	-1.047	-0.462	-2.683	-0.556*	-0.842***	7.925***	-1.009	1.433	-1.646
		(0.017)	(0.832)	(0.424)	(0.884)	(0.182)	(0.084)	(0.00002)	(0.005)	(0.787)	(0.410)	(0.158)
	PM COMMUNICATION	-10.574*	0.029	-0.292	0.312	-3.027	-0.678	-0.858***	4.567**	1.187	2.785	0.791
		(0.069)	(0.972)	(0.829)	(0.930)	(0.164)	(0.178)	(0.0005)	(0.034)	(0.771)	(0.551)	(0.745)
	FINMIN COMMUNICATION	-5.870*	-0.688	-6.463***	-6.678***	1.101**	-0.414	-0.837***	10.453**	-6.484***	0.696	-3.082***
		(0.094)	(0.514)	(0.000)	(0.00000)	(0.015)	(0.257)	(0.0003)	(0.014)	(0.000)	(0.329)	(0.003)

Notes: (i) The table shows the estimated coefficients for each variable and the respective p-values (in parentheses); * p < 10%, ** p < 5%, *** p <1%. (ii) A negative coefficient for the "Announcement" variables indicates a decrease of spread after a hawkish (committing) comment or an increase of spread after a dovish (reluctant) announcement. (iii) Full results are available from the authors upon request.

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