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"Whatever It Takes!" How Tonality of TV-News Affects Government Bond Yield Spreads During Crises

Patrick Hirsch [*†] Ekkehard A. Köhler[*†‡] Lars P. Feld [*†]

Tobias Thomas [§]

Abstract

Are government bond risk premia affected by TV news in addition to the effect of the original event reported? We analyze 1,209,566 human-coded news items from newscasts aired by leading TV stations in Europe and the US between January 2007 and November 2016. We establish causality using instrumental variables that attract media attention and crowd out media coverage on Eurozone related news. We find FIFA and UEFA tournaments as well as major natural disasters and airplane crashes as valid instruments for the empirical analysis. The results show that an exogenous variation in the share of Eurozone related news affects bond spreads. A one percentage point increase in the share of Eurozone related news leads to -7.6 basis points lower bond spreads. Taking the tonality of the news into account paints a more differentiated picture: A one percent higher share of positive Eurozone related news leads to -69.7 basis points lower bond spreads, whereas a one percentage point higher share of negative country-specific news is related to 2.5 basis points higher bond spreads.

JEL-Codes: E58, G12, L82
Keywords: Media bias, TV Newscasts, Tonality, Eurozone crisis, GIIPS bond yield spreads

[*]Walter Eucken Institut, Goethestr. 10, 79100 Freiburg im Breisgau (Germany)
[†]Albert-Ludwigs-Universität, Freiburg im Breisgau (Germany)
[‡]Universität Siegen, Siegen (Germany)
[§]Düsseldorf Institute for Competition Economics (DICE) at Heinrich-Heine-University Düsseldorf (Germany), and Center for Media, Data and Society (CMDS) at the Central European University (Budapest, Hungary)

1 Introduction

In a celebrated study, Shiller (2017) highlights the importance of narratives for economic policy and economic outcomes. Accordingly, narratives, as such, have an impact beyond the actual economic event. We investigate whether TV news on EU related economic issues, with reference to the crisis countries or the Eurozone in general, affect GIIPS interest rate spreads vis-à-vis Germany beyond the effects of the events as such.[1] Existing studies often use newswire data, such as Reuters and Bloomberg, or media databases, like Factiva, and follow an identification strategy of simple word counts rather than full content analysis. These can cause several problems. On the one hand, these sources can be biased by insufficient indexing, with the consequence that not all relevant news is provided. On the other hand, simple word counting and computer linguistic approaches often lead to shortcomings as they do not comprehend the content precisely, in particular when it comes to topical context and tonality (see Grimmer and Stewart, 2013 or Nelson et al., forthcoming).[2]

In contrast, we draw on 1,209,566 hand-coded news items from a sample of TV evening news programs aired by the leading TV stations in France, Germany, Italy, Spain, Switzerland, the UK, and the US including 25,276 news items on economic issues related to the GIIPS countries and the Eurozone. The media data are unique in several respects: First, all featured news items were coded. Therefore, we have observations of the news about the Eurozone, the Euro, and on economic issues of member states, as well as the number of all other news items in each newscast. Hence, we are able to calculate the share of news dedicated to a specific topic on each day. Second, the news programs were analyzed by human analysts and coded according to a huge set of variables, e.g., protagonist, topic group, topic, source, and tone. In comparison to

[1] The so-called GIIPS are Greece, Italy, Ireland, Portugal and Spain. We select these countries as they experienced a dramatic rise in yield spreads vis-à-vis Germany during the European sovereign debt crisis.

[2] In communication science, the sentiment or tone of coverage is called tonality (see Haselmayer and Jenny, 2017).

word counting or computer linguistic approaches, this approach leads to a much higher accuracy. This allows us to focus specifically on the tonality of news reports. Thereby, our contribution addresses the gap that analyzing media bias by "measuring the tone of articles and editorials, is relatively underutilized in economics" (Puglisi and Snyder, 2015, p. 664).

To identify the effects, we follow a panel estimation approach with fixed effects and a multitude of controls. For instance, we control for a set of variables that we call "hardfacts" controls, which represent bigger measures or decisions by institutions like the ECB, i.e., the events about which the media report. The primary rationale is that the measured effect of our news variables should not proxy or be driven by extreme events. Instead, we are interested in the additional "noise" effect of media coverage on yield spreads following Black (1986). However, despite the multitude of controls included in our panel model, we are aware of several possible endogeneity problems. Both media coverage and bond spreads could be connected to each other because media coverages on the Eurozone and on specific countries affect the bond spreads. However, it cannot be excluded that the development of bond spreads and connected issues are also covered by the newscasts, such that there are biased results due to reverse causality. In addition, both media coverage and bond spreads could depend on a third variable, for instance the factual measures of the ECB. Despite the fact that we control for "hardfact" measures, we cannot fully rule out such an omitted variable bias.

To identify the causal effect of news coverage on the yield spreads, we utilize an instrumental variable framework. In line with Benesch et al. (2019), Dewenter et al. (2019), Durante and Zhuravskaya (2018), Eisensee and Strömberg (2007), and Jetter (2017), we use newsworthy events that are likely to attract media attention, thereby crowding out media coverage on Eurozone and country-specific topics. In particular FIFA and UEFA football (soccer) tournaments as well as major natural disasters and airplane crashes provide for such instruments. As none of the

latter two events are connected to one of the countries of interest, football tournament phases, earthquakes or airplane crashes in third countries will not affect the spread between German and other EMU government bond yields and, therefore, the exclusion restriction holds.

Our findings suggest that positive (negative) Eurozone and country-specific news are associated with decreasing (increasing) yield spreads. Controlling for "hardfacts," we interpret the effect to depend on "noise." Finding FIFA and UEFA tournaments along with major natural disasters and airplane crashes to be valid instruments for Eurozone news, we estimate causal effects. A one percentage point higher share of Eurozone related news leads to -7.6 basis points lower bond spreads. The effect is driven by the tonality of the news. An increase of one percentage point in the share of positive Eurozone related news leads to -69.7 basis points lower bond spreads.

The remainder of this paper is organized as follows. Section 2 summarizes and discusses the main findings of the related literature and highlights the research gap. In section 3, we describe our data as well as the estimation methodology and discuss endogeneity issues. Section 4 presents the empirical results. Section 5 concludes.

2 Related Literature and Research Gap

Media play a vital role in the perception and decisions of individuals in both economic and political contexts, as information is often distributed through media channels. However, the media can never depict reality completely and, thus, are limited to a selective reality. In addition, the portrayed reality is prone to various types of distortions, so-called media bias (Entman, 2007).[3] Consequently, individual perceptions and decisions based on biased political coverage

[3]The most prominent types of media bias are advertising bias, when media change their news coverage in tone or volume to favor their advertising clients (see Dewenter and Heimeshoff, 2014; Dewenter and Heimeshoff, 2015; Gambaro and Puglisi, 2015; or Reuter and Zitzewitz, 2006); newsworthiness bias, when news on certain issues crowd out coverage on other issues because they are seen as more newsworthy (see Durante and Zhuravskaya, 2018 or Eisensee and Strömberg, 2007); distance bias, when media report more on events that take place close to their main market (see Berlemann and Thomas, 2019); the political bias, when media outlets favor one or another

might deviate from perceptions and decisions based on more unbiased information.

In the political context, the deviations can affect both voters and politicians. For instance, Page et al. (1987) show that network television news accounts for a high proportion of changes in U.S. citizens' policy preferences. Benesch et al. (2019) provide econometric evidence that media can affect the worries of the population about policy relevant topics like migration, Eisensee and Strömberg (2007) show that media coverage of natural disasters causally affects US disaster relief, and Snyder and Strömberg (2010) find that media coverage affects both the perception of the voters as well as the work of congressmen.[4] In addition, the deviated perception can also affect voting intentions and election outcomes (see DellaVigna and Kaplan, 2007; Dewenter et al., 2019; Enikolopov et al., 2011 or Prat, 2018).

In the economic context, media coverage can affect perceptions and decisions as well. For instance, Nadeau et al. (2000), Soroka (2006), and Raaij (1989) show that economic expectations depend, at least in part, on media reports.[5] Alsem et al. (2008), Goidel and Langley (1995), and Doms and Morin (2004) analyze the effect of media reporting on the consumer climate. Garz (2013) investigates the impact of distorted media coverage of unemployment on the perception of job insecurity, while Lamla and Maag (2012) analyze the effect of media reporting on inflation forecasts of both households and professional forecasters. Dewenter et al. (2016) find evidence that the number of car sales depends, at least in part, on media coverage of the automotive industry.

Due to the numerous documented influences of media coverage on perception and behavior, it is

side of the political spectrum (see Groseclose and Milyo, 2005; Larcinese et al., 2011 or Puglisi and Snyder, 2015); and negativity bias, when media focus more on catastrophes, crime, and threatening political and economic developments in comparison to more positive news (see Friebel and Heinz, 2014; Garz, 2013; Garz, 2014; Heinz and Swinnen, 2015 or Soroka, 2006).

[4]More evidence on the effect of media coverage in the international political context is provided by Beckmann et al. (2017) and Jetter (2017) with focus on terror activities as well as Durante and Zhuravskaya (2018) in the context of the Israeli-Palestinian conflict.

[5]In this context, Ulbricht et al. (2017) use media data to improve economic forecasts.

hardly surprising that the effects of media coverage on financial markets is also the subject of extensive research. One branch of the literature focuses on the effect of firm-specific news on equity markets. For instance, Busse and Green (2002), Antweiler and Frank (2005) and Tetlock (2014) analyze the impact of corporate news from TV, online, and print media, respectively. Regarding TV news, Busse and Green (2002) investigate the effect of 322 analyst reports aired on CNBC's popular Morning Call and Midday Call segments from June to October of 2000 on individual shares.

Another branch of literature focuses on the impact of news on fixed-income markets, most notably the effect of media coverage on government bond yields during the sovereign debt crisis in the EMU (see Table A.1 in the Appendix). In this context, Büchel (2013), Mohl and Sondermann (2013) and Gade et al. (2013) analyze the impact of news on 10-year government bonds of euro area countries. Beetsma et al. (2013) and Büchel (2013) focus on the GIIPS countries. Falagiarda and Gregori (2015) restrict their study to 10-year Italian government bonds. Beside the 10-year bond yields, Büchel (2013), like Conrad and Zumbach (2016) and Apergis et al. (2016), investigates the CDS of the GIIPS vis-à-vis Germany, whereas Conrad and Zumbach (2016) additionally analyze the effect of communication on the USD/EUR exchange rate in the European financial market.

All these studies find a significant effect of media coverage or communication on the respective dependent variable. However, the detailed findings differ across existing studies. Conrad and Zumbach (2016) present evidence that statements regarding periphery countries cause stronger market responses than statements focused on the Eurozone as a whole between August 2011 and December 2011. Regarding the tone of the political statements, negative statements trigger the strongest response of the exchange rate. Büchel (2013) analyses news data for the period between January 2009 and August 2011. According to his main findings, communication by

representatives of Germany, France, and the EU, as well as ECB Governing Council members, have an immediate impact on GIIPS credit default swaps (CDS) and bond yield spreads, whereas communication representatives of the smaller Eurozone member countries have no effect. The analysis differentiates between policy signals and finds that 'dovish' statements significantly lowered CDS as well as bond yield spreads, compared to 'hawkish' statements.

The period analyzed by Beetsma et al. (2013) runs from July 2007 to February 2012. The authors find that, on average, more news raises the domestic interest rate spreads of the GIIPS countries. Apergis et al. (2016), with news data for the period from October 2009 to June 2012, report a significant positive impact of newswire reports of local news across the major newspapers in the GIIPS on CDS spread spillovers during the European sovereign debt crisis. Mohl and Sondermann (2013), conducting a study of news data between May 2010 and June 2011, find a positive effect of the number of Eurozone government statements on government bond spreads in EMU when statements are related to 'restructuring' or 'bailout.' Based on their empirical study of news data between January 2009 and October 2011, Gade et al. (2013) conclude that positive communication can lead to a compression of spreads, whereas negative communication dedicated to fiscal policy can cause a widening of spreads. Falagiarda and Gregori (2015) find a significant difference in the impact of the distinct Italian administrations. According to the results by Dergiades et al. (2015), Greek sovereign yield spreads were especially prone to social media discussion of negative news between 2011 and 2013.

Despite the fact that the aforementioned contributions provide interesting insights in the connection between media coverage and communication with bond yields, a second view might be fruitful as the existing studies face two sources of potential bias. First, most existing studies obtain their news data from news releases of agencies like Bloomberg, Reuters, Dow Jones Newswire, and Market News International (Conrad and Zumbach, 2016; Falagiarda and Gregori,

2015; Gade et al., 2013; Mohl and Sondermann, 2013). Beetsma et al. (2013) use Eurointelligence, Apergis et al. (2016) and Büchel (2013) obtain the news data from Factiva, an online database of newspapers that categorizes its articles by subject and provides a code that identifies articles discussing sovereign debt issues. Other studies focus on simple Google search queries or social media like Twitter as a medium (e.g., Dergiades et al., 2015). Hence, most existing studies apply simple word counts or computer linguistic approaches (e.g., Apergis et al., 2016; Gade et al., 2013). This is especially critical if only a keyword is used to inform the algorithm on whether a report is relevant or not. Therefore, relevant reports and statements might be filtered out if the wording is different from the search string. In addition, simple algorithms are not able to get the contextualized information about the word and, therefore, the full news content.

Furthermore, most existing studies use newswire services, whereby another misspecification could occur. "Newswire services are selective in their reporting" and may wrongly report or misinterpret a statement by policy-makers as Ehrmann and Fratzscher (2007, p. 515) criticize. Furthermore, most existing literature is explicitly or implicitly based on the assumption that specific keywords are associated with 'good' or 'bad' outcomes for bond pricing (e.g., Büchel, 2013; Dergiades et al., 2015). However, it can be questioned whether word count methods or computer linguistics are able to get the content sufficiently right, especially when it comes to the topical context of the news and its tonality. The potential problems of computer linguistics in social science are well known in the literature. Grimmer and Stewart (2013) find that computer linguistic approaches achieve accuracy no greater than 0.65. Consequently, the authors conclude that, in text analysis, there is (at least so far) no adequate substitute for human coding.[6]

Secondly, and even more importantly, most of the existing contributions cannot fully rule out the

[6]Similarly, Puglisi and Snyder (2015, p. 656) conclude that "compared to human-based coding, automated coding is less accurate in detecting the tone of each specific text analyzed." More recently, in their comparative study of hand-coding and computer-assisted text analysis methods Nelson et al. (forthcoming, p. 25) come to the result that "none of the methods replace the human researcher."

problems of endogeneity when analyzing the effects of media coverage on bond yield prices. Media coverage and bond spreads could be connected to each other because the media coverage affects the bond spreads, but bond spreads also affect media reporting such that reverse causality exists. In addition, both media coverage and bond spreads could react to a third variable, for instance the factual measures of the ECB, which would lead to omitted variable bias. For example Beetsma et al. (2013) and Apergis et al. (2016) do not discuss endogeneity issues in their work at all. Büchel (2013) and Mohl and Sondermann (2013) assume that, by data construction, news are contemporaneously exogenous and, thereby, endogeneity problems are conclusively solved. Their financial market data are end-of-the-day data, whereby the news occur before markets close. They further assume that financial markets immediately react to an event, i.e., a public statement, and that events can be determined precisely (on a daily basis) such that confounding effects are minimized. Falagiarda and Gregori (2015), Gade et al. (2013), as well as Lopez and Weber (2017) have a similar strategy and additionally conduct Granger causality tests in order to determine in which direction the effect runs.

However, although these contributions provide interesting insights in the possible link between the two variables, this approach may not resolve the endogeneity problems. The explanatory power of the Granger causality test is limited, especially if the time series are contaminated with expectations, which play an especially important role for bond markets. Conrad and Zumbach (2016) argue that related studies may suffer from endogeneity, claiming that they overcome the problem by using high-frequency data. With intra-day data, the authors identify the effect of news on financial markets 15 minutes after its release. However, even if this approach is able to reduce the problems of endogeneity, it is worth investigating the causal effects of media coverage on bond spreads with a more robust identification strategy.

In our contribution, we investigate whether TV news covering EU related economic issues with

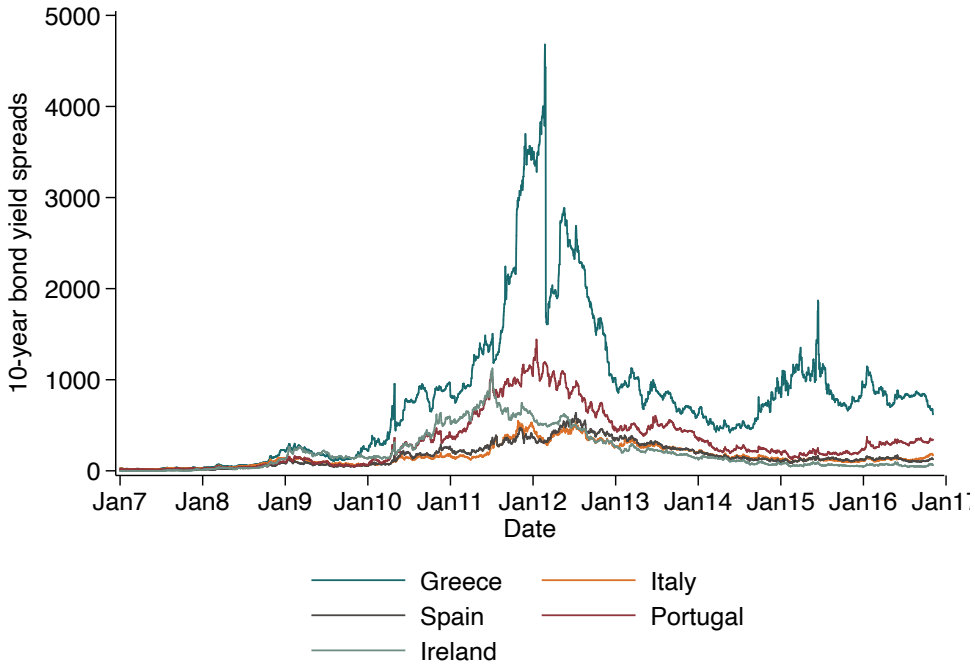
reference to the crisis countries or the Eurozone affect GIIPS bond spreads vis-à-vis Germany. In contrast to the existing studies, our contribution is based on 1,209,566 human-coded news items from a sample of TV evening news aired by leading TV stations in France, Germany, Italy, Spain, Switzerland, the UK, and the US, covering news from 2007 through November 2016. In comparison to word counts or computer linguistic approaches, human coding leads to greater accuracy. This allows us to focus specifically on the tonality of news reports. By doing so, our contribution addresses the problems of computer linguistics noted by Grimmer and Stewart (2013), Nelson et al. (forthcoming, p. 25), and Puglisi and Snyder (2015, p. 656). Finally, we conduct an instrumental variable estimation to investigate the causal effects of TV news on bond spreads.

3 Data and Empricial Strategy

3.1 Data and Descriptives

Our contribution is based on panel data of six EMU member states, i.e., Germany and a selection of member states hit hard by the Euro crisis: Greece, Italy, Ireland, Portugal and Spain (GIIPS). For each variable introduced below, we use daily data from January 2007 through November 2016 covering both phases, with rising and declining spreads throughout the European sovereign debt crisis. In the estimation and in the descriptive statistics, weekends are excluded from the sample as no trading takes place then (see Table B.1 in the Appendix for summary statistics). In the following sections, we describe the dependent variable, our main explanatory media variables as well as the controls. In addition, we explain our instrumental variable approach and highlight its relevance.

Figure 1: GOVERNMENT BOND YIELD SPREADS OF THE GIIPS VIS-À-VIS GERMANY



Dependent Variable

Daily government bond yields are provided by Thomson Reuters Datastream. We focus only on secondary market yields of 10-year maturity bonds. The dependent variable in our model is the daily government bond yield spread of the GIIPS vis-à-vis Germany (see Figure 1). We use the $spreads$ in first differences throughout the estimations, measured in basis points.

Explanatory Variables

The main explanatory variables in our contribution are media data based on the media content analysis by Media Tenor International.[7] Our sample of media outlets comprises thirteen major TV news programs from seven countries (see Table 1). News shows are analyzed over the period from January 2007 through November 2016. The selection of the news shows was driven by

[7] See www.mediatenor.com.

Table 1: MEDIA DATASET

TV news shows	Country	Time-frame	Total news	Relevant News
ARD Tagesschau	Germany	01/07-11/16	72,624	2,249
ARD Tagesthemen	Germany	01/07-11/16	89,425	3,229
ZDF heute	Germany	01/07-11/16	82,876	1,857
ZDF heute journal	Germany	01/07-11/16	84,224	3,247
BBC 1 Ten O'Clock News	UK	01/07-11/16	72,932	1,078
BBC 2 Newsnight	UK	01/07-11/16	37,821	1,067
NBC Nightly News	US	01/07-11/16	65,429	135
CBS Evening News	US	01/07-11/16	63,970	118
FOX Special Report	US	01/07-11/16	77,544	313
TF1 Le Journal 20.00	France	04/07-11/16	98,684	492
RAI 1 TG1	Italy	01/07-11/16	132,175	4,396
TVE 1 Telediario	Spain	06/07-11/16	178,502	5,201
SRF Tagesschau	Switzerland	01/07-11/16	90,913	1,894
Total			1,209,566	25,276

NOTES: Each news item creates one observation in the table above. Relevant news is ECB-related, focuses on specific parts of the economy of the GIIPS countries, or focuses on the Eurozone economy as a whole. The explanatory variables that are used in the regressions are fewer due to the calculation as shares of relevant news on total news on each day.

the availability of media analyzed over the time frame of our study. However, this time period is particularly interesting as it covers the entire financial and sovereign debt crises and was characterized by periods of increasing and decreasing bond spreads for the countries of interest. In addition, data covering both European as well as US news broadcasts allow for interesting insights regarding the effects of newscasts on bond spreads.

The TV news programs were evaluated by human analysts based on a wide range of characteristics, as defined in a binding coding manual ("codebook"). Each news program was coded and categorized by topic (e.g., currency, public debt, unemployment, inflation), participating persons (e.g., entrepreneurs, managers, politicians), and institutions (e.g., central banks, companies, governments, political parties), region of reference (e.g., Europe, Germany, US, world), time

reference (future, past, present), the source of information (e.g., expert, journalist, politician etc.), and other categories. In addition, the analysts captured whether the relevant protagonists and/or institutions receive "positive," "negative," or "neutral" coverage. If "no clear tone" was attributed, we refer to the news as neutral. News programs are analyzed news item by news item, i.e., each time when a new topic, person, institution, region, time reference or source is mentioned, an additional news item is coded. Overall, 1,209,566 news items are included in the analysis.

As described above, the advantage of hand-coded data in the current analysis is that "compared to human-based coding, automated coding is less accurate in detecting the tone of each specific text analyzed" (Puglisi and Snyder, 2015, p. 656). For the human coded data in the current study, Media Tenor guarantees a minimum accuracy of 0.85 in comparison to a coding that is fully in line with the codebook. The high accuracy of the media data allows us to focus specifically on the effect of the tonality of the news on bond spreads.[8]

Out of the whole universe of 1,209,566 news items included in our analysis, we determine relevant news items by content. By doing so, we only focus on news that is either Eurozone-related or focuses on the economy of the individual GIIPS countries. Regarding economic news on a specific country, only news on the topic groups 'Budget,' 'Currency/Euro/Monetary policy,' 'EU,' 'International Economy,' or 'State of the economy' are considered. Skipping all items that are not related to the content mentioned results in a total of 25,276 items. Throughout the paper, we use a primal distinction between two types of news, those focusing on the Eurozone (16.6%) and those focusing on a specific country (83.4%).[9] A similar separation of news is assumed by

[8]To achieve a high accuracy and to avoid systematic bias in the coding, the validity and reliability of the coding is checked by Media Tenor on a monthly basis both with standard tests and random spot checks, based on the codebook.

[9]In the Appendix, we provide insights regarding which topics are most often covered by the Eurozone-focused news as well as by the specific country new respectively (see Figure B.1 and Figure B.2 in the Appendix, which depict wordclouds of the frequency of topics across both types of news.)

Conrad and Zumbach (2016).

For the subsequent analysis, three different types of daily media variables are generated to serve as explanatory variables. Each is calculated as share of relevant news (e.g. on country i) of all news on a given day expressed in percent:

$$Media_{i,t} = \frac{\text{No. of relevant news}_{i,t}}{\text{No. of total news}_t} \times 100$$

(1) First, the two most straightforward variables are the share of $Eurozone$ news that is invariant across countries and the share of $country{-}specific$ news.

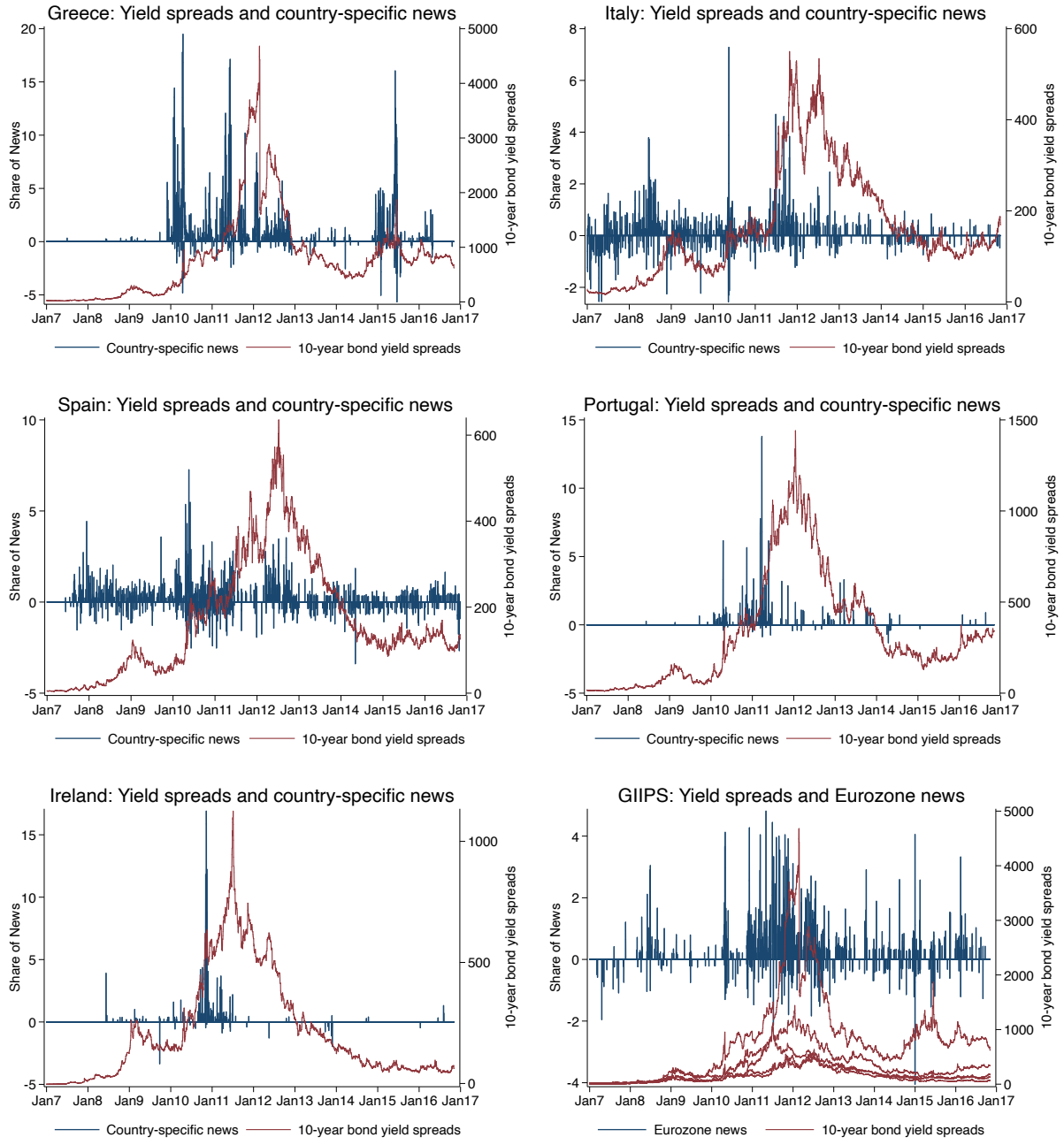
(2) Second, the first two variables are further distinguished on the basis of the tonality of the news. We group $positive$, $neutral$, and $negative$ news, resulting in six variables, the share of $positive$, $neutral$, and $negative\ Eurozone$ as well as $positive$, $neutral$, and $negative$ $country{-}specific$ news. Descriptive graphs of the variables are depicted in Figure 2. Note that in in Figure 2, the share of positive news is figuratively presented negatively on the y-axis while the share of negative news are shown positively. Thus, increasing bond spreads are often connected with negative news and decreasing bond spreads with positive news. The share of neutral news is not depicted in the figures.

(3) Third, we calculate the shares of news broadcast in an EMU or $non{-}EMU$ country. Our media set includes TV news shows from the four biggest EMU countries, namely France, Germany, Italy, and Spain, as well as from the three non-EMU countries Switzerland, the UK, and the US. The latter three are considered to be globally important financial centers.

Control variables

In the selection of our control variables, we dispense with including controls at lower frequency (e.g. quarterly), such as GDP growth, debt to GDP ratios, or fiscal space measures in our

Figure 2: 10-YEAR BOND YIELD SPREADS PLUS COUNTRY-SPECIFIC AND EUROZONE NEWS



NOTES: The share of news is displayed as percent of total news on a given day. Positive news has a negative sign, negative news has a positive sign on the left-hand y-axis in each figure. Neutral news are excluded even though they account for almost 50% of reports (see Appendix Table B.1).

model. By doing so, our approach differs, for instance, from Attinasi et al. (2009) or Gerlach et al. (2010). The reason is two-fold: First, for models estimated in levels, it can make sense statistically to include such variables. However, our model will be estimated in first differences. Second, evidence suggests that during the time of the surge of bond spreads in the Eurozone, fundamental fiscal indicators became less relevant. Instead, De Grauwe and Ji (2013, p. 27) find that "[markets] tended to exaggerate the default risks." Ultimately investors' risk aversion turn out to be a major driver of yield spreads (Codogno et al., 2003). Accordingly, our selected fundamental control variables are largely determined by the associated risk. In our contribution, the change in the $EUROSTOXX\ volatility\ index$ is used as a proxy for risk across European markets (Arghyrou and Kontonikas, 2012; Falagiarda and Gregori, 2015; Glick and Leduc, 2012). Data are taken from Thomson Reuters Datastream. According to asset pricing theory, an increase in risk needs to be compensated by a higher yield.

The perceived credit risk in the global economy is another standard control for our model (e.g., Afonso et al., 2015; Gerlach et al., 2010). As a general indicator of common international risk, the change in the spread between the yield of US corporate bonds with AAA rating and the yield of 10-year US government bonds $AAA10Y$ is used. Among others, Codogno et al. (2003) and Attinasi et al. (2009) also rely on this daily measure for international risk aversion in the financial sector, provided by the FRED database.

To control for the role of changes in the individual default risk of the sovereigns, we use the $credit\ ratings\ spreads$ and follow Afonso et al. (2015) including a daily variable that ranges from 1 to 24 depicting the daily ratings. The score is determined through a linear transformation of the common investment grades. The lowest value is equal to a AAA rating. A country's credit rating is obtained from Thomson Reuters Datastream and calculated as the average rating of the three agencies, S&P, Moody's, and Fitch. Since the dependent variable in our contribution

is the difference between the GIIPS yields and Germany, the credit ratings are also calculated as the spread between the respective GIIPS country rating and Germany in first differences. As Germany is rated best throughout the entire period, the greater the value of the total rating difference, the higher the credit risk assumed by the rating agencies.

To control for the countries' short-term change in the business climates, we utilize the $national\ stock\ market\ index$ as a proxy for investment tendencies in the GIIPS economies. Data series taken from Thomson Reuters Datastream are indexed and normalized.

Furthermore, we use the change in the main refinancing operations rate ($MRO\ rate$) as a control to capture conventional monetary policy actions of the ECB (Afonso et al., 2018; Beetsma et al., 2013). Finally, during the European sovereign debt crisis yield spreads and volatility were structurally higher than in other times (e.g. Costantini et al. (2014)). Hence, we include a $eurocrisis$ dummy for each respective period.[10]

"Hardfacts" controls

To increase the fit of our model, we additionally control for a set of variables that we call "hardfacts" controls. The rationale is primarily that the measured effect of our media variables should not be driven by extreme events in the context of the Eurocrisis. Instead, we are particularly interested in a more general "noise" effect of media coverage on yield spreads.[11] To account for this, we control for a number of well identified measures and decisions taken by -

[10] The crisis dummy ranges from November 5, 2009 to July 27, 2012. Like most others in this field, we pick the start date of November 5, 2009, when the new Greek Prime Minister, Giorgos Papandreou, announced that Greece's annual budget deficit would be 12.7 percent of GDP — more than twice the previously announced figure. This event led to a cascade of events that culminated into Mario Draghi's famous words on July 26, 2012 when the ECB president gave an account of the eurozone economy at a conference in London. By that time, bond yields of weak Euro-member governments were soaring, and traders doubted that national, Euro-, or EU-level institutions could get their act together in time to avert disaster. Draghi sought to convince international investors that the region's economy was not as bad as it seemed. He then made the momentous remark, "Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough."

[11] According to Black (1986, p. 529) people tend to treat "noise" as information; he argues that "a large number of small events is often a causal factor much more powerful than a small number of large events can be."

among others - the ECB, the IMF, ESM and its predecessors, and the European Council.[12] The control vector, consisting of 77 measures and decisions, was taken from a novel dataset compiled by us.[13]

The setup is somewhat similar to De Santis (2014), who refers to his data as key economic news. Yet, our dataset is more extensive not only in time but also in scope. The dataset includes dummies for the announcement of unconventional monetary policy measures (e.g., Draghi's speech or the announcement of SMP), the signing of treaties (e.g., fiscal compact), and the ECB's daily bond purchases or the allotment of rescue funds for struggling countries in volumes, to name a few. As one of their prime variables of interest, Attinasi et al. (2009) also use dummies on the announcements of bank rescue packages, while Büchel (2013) includes a control vector of binary variables with value one on days of important policy decisions or macro releases. Gade et al. (2013, p. 13) control for "events related to political meetings or agreements." We assume, when controlling for such events, that our media variables represent news and developments that affect market participants' expectations apart from more structural and factual developments.

Data Employed in the Instrumental Variable Approach

In order to address the endogeneity problems and to identify the effects of newscasts on the bond spreads, an instrumental variable approach is applied. In this approach, we use newsworthy events that are not connected to the Eurocrisis. When such a newsworthy event takes place, news shows tend to report on it, leaving less airtime for other topics, such as the Eurocrisis. Hence, we utilize such events as exogenous variation in our explanatory media variables to isolate the effects to be interpreted as causal.

[12] This can be illustrated by an example: On March 12, 2012, when the second economic adjustment program for Greece was announced, the Greek government bond yield dropped by more than 2700 basis points (see Figure 2). As such dramatic events, both the announcement as well as the bond yield drop, are newsworthy events. In addition, the effects of the factual crisis measures are not in our primary interest. Hence, we control for these.

[13] More information on the dataset is available upon request.

As an instrument, the use of newsworthy events and the connected news pressure is not new. For instance, Eisensee and Strömberg (2007) use Olympic Games as an instrument, Benesch et al. (2019) as well as Dewenter et al. (2019) utilize media spill-overs from one country to another, Durante and Zhuravskaya (2018) use political and sports events, and Jetter (2017) uses natural disasters.

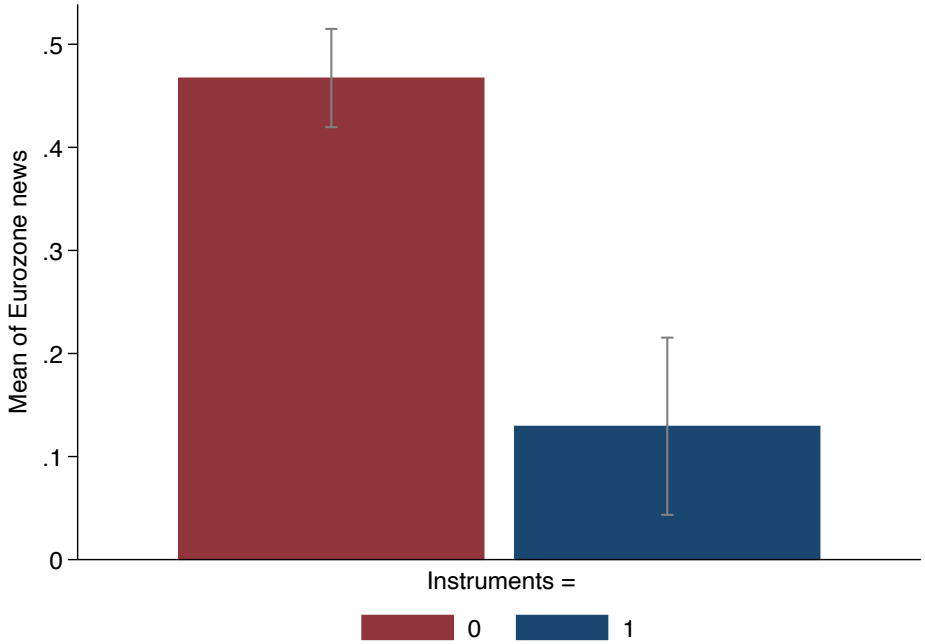
All in all, the following four binary variables serve as instruments for the media coverage. First, in line with Eisensee and Strömberg (2007), we use dummies for the major sports events (1) $FIFA$ and (2) $UEFA$ tournaments phases. Additionally, data on natural disasters are shown to be valid instruments when it comes to media data (e.g., Jetter, 2017). In this line, we derive two instruments from the EM-DAT database (Guha-Sapir et al., 2016). (3) The variable $major\ disasters$ equals one if the number of total fatalities in an environmental or technical disaster is at least 1,000. (4) Finally, we use $Plane\ crashes$ around the world if 50 persons or more have died in the accident. None of these events are directly related to the countries in our sample.

The intuition behind the usage of these variables is that these events are likely to attract media attention, thus increasing the news pressure at the cost of other, so to say, less relevant news. We expect those we selected to be amongst them. It is important to note that the set of instruments in the panel is invariant across countries. In total, we use 112 event-days representing 4.3% of the sample.[14] Figure 3 confirms the relevance and validity of our instruments for Eurozone related news. We find that, on days with other newsworthy events, the average number of Eurozone related news items is significantly lower than on the remaining days.[15] As the coefficients of

[14]The overlap between event-days and days with Eurozone or country-specific related news stretches from only 6 incidences to 64.

[15]However, our instruments turn out to be statistically weak for the country-specific case, as Figure B.3 in the Appendix suggests. We also refer to the Kleibergen Paap rk LM test statistic for the test of excluded instruments and the Kleibergen-Paap Wald rk F statistic testing for weak instruments (Bound et al., 1995).

Figure 3: MEANS OF COVERAGE OF EUROZONE RELATED NEWS ON DAYS WITH AND WITHOUT OTHER NEWSWORTHY EVENTS



NOTES: The instruments are FIFA and UEFA tournament phases as well as lagged major disasters and plane crashes around the world (here shown as a composite). The error bars reflect 95% confidence intervals. A standard t-test confirms the crowding out hypothesis on days with other newsworthy events. The p-value that the means are statistically different from each other is 0.0032. Bayesian analysis using a MH-chain with 200,000 iterations and uninformative priors confirms the result. The according 95% confidence intervals are [0.420, 0.515] and [0, 0.348].

the first stage regressions in our estimations later confirms (see Table 3). Still, the additionally required exclusion restriction cannot be tested. However, we feel confident that football tournament phases, earthquakes, or plane crashes in third countries do not affect the spread between German and other EMU government bond yields.

3.2 Empirical Strategy

Panel Estimation with Fixed Effects

As described above, we use daily panel data covering five GIIPS countries and Germany over a period of more than nine years. Government bond yield spreads of country i at time t vis-à-vis Germany is the dependent variable throughout our estimations. As these time series are highly

persistent, a unit root process cannot be rejected. Therefore, we define a model using variables in first differences that is similar to Beetsma et al. (2013).[16] We estimate variations of the following panel model:

$$\Delta spreads_{i,t} = \beta X_{i,t} + \lambda Media_t^E + \gamma Media_{i,t} + \epsilon_{i,t} \tag{1}$$

with $i = 1, ..., 5$ denoting the GIIPS countries; and $t = 1, ..., 2.589$ indexes the daily time dimension.[17] The Δ-operator denotes the change of the variables from $t-1$ to t. Equation 1 and extensions thereof are estimated using feasible generalized least squares (FGLS). In the presence of groupwise heteroscedasticity, cross-sectional dependence (CD) between the panels and panel-specific AR(1) serial correlation of the error term, features often present with financial data-series, the Parks-Kmenta estimator yields consistent estimates, especially as the time dimension is sufficiently large (Hoechle, 2007).[18] Using panel estimation techniques allows for controlling for time-invariant unobserved differences within the panel dimension. Hence, we include country fixed effects. In addition, we include time fixed effects on a weekday-basis.

X_t depicts the set of control variables described in section 3.1. Some of the variables are invariant across countries, others relate to the individual economies. In detail, these variables are the $\Delta EUROSTOXX\ volatility\ index$, the $\Delta credit\ rating\ spread$, the $\Delta MRO\ rate$ the $\Delta national\ stock\ market\ index$, the measure for international risk averseness $\Delta AAA10Y$, and a dummy for the period of the sovereign debt $eurocrisis$. Besides the above-named fixed effects, in some specifications we additionally control for a "hardfacts" vector (see section 3.1).

[16] Alternatively, we estimate the models in levels, including the first lag of the dependent variable ($spreads_{i,t-1}$). Thereby, the model becomes a dynamic panel data model as used by, e.g., Mohl and Sondermann (2013). Qualitatively, we obtain very similar results (see Appendix Table D.1). Additionally, in order to account for the fact that German yields may also be influenced by the selected news, we estimate the effect of news on the GIIPS yields instead of the spreads. The results do not differ in a meaningful manner from those of the yield spreads regression. Further robustness checks that have been performed include dropping observations on the cross-section as well as on the time dimension. All output tables are available upon request.

[17] Instead of holding prices constant during non-trading days, we exclude non-trading days from the regression, which reduces the number of days from 3,623 to 2,589.

[18] See Appendix C for the test results of the residual analysis.

$Media$ relates to the set of media variables that are described in detail in section 3.1. Each is measured as a share of total news on a given day in percent. Since throughout all our estimations two different types of media news are included, $\gamma Media_{i,t}$ capture country-specific news, while $\lambda Media_t^E$ capture news covering the Eurozone as a whole, as Eurozone news do not vary in the cross-sectional dimension. Our model allows us to further differentiate between $postive$, $neutral$, and $negative$ news in both types of variables.

Instrumental Variable Approach

In order to identify the causal effect of news coverage on the yield spreads, we utilize an instrumental variable framework, by using newsworthy events that are likely to attract media attention, thereby crowding out media coverage on Eurozone and country-specific topics.[19] As described in section 3.1, FIFA and UEFA tournaments as well as major natural disasters and airplane crashes are the four instruments. As none of the latter two events is connected to one of the countries of interest, we are confident that football tournament phases, earthquakes, or plane crashes in third countries do not affect the spread between German and other EMU government bond yields and, therefore, the exclusion restriction holds.

While FIFA and UEFA tournaments enter for the full period they took place, we use lagged time-dummies on major disasters and plane crashes. We argue that these events are large enough to be covered the following day, thereby overcoming timing issues and allowing the media to take notice of the event. Initial tests show that the obvious composite instrument of taking one on every event date does not qualify as a reliable instrument. Hence, following Eisensee and

[19] In contrast, Falagiarda and Gregori (2015), Gade et al. (2013), as well as Lopez and Weber (2017) run Granger Causality tests to investigate the effects of news on bond spreads. Despite the fact that these contributions provide interesting insights in the possible link between the two variables, we do not believe that this approach resolves the endogeneity problems. The explanatory power of the Granger causality test is limited, in particular when the time series are contaminated with expectations that are particularly important for bond markets. Nonetheless, we run Granger causality tests for panel data as well and find some hints on bidirectional causality between news and sovereign bond yield spreads. The results are reported in Table C.2 in the Appendix.

Strömberg (2007), we rely on the set of instruments in the first stage regression and perform overidentification restriction tests to rule out correlation of the instruments with the error term of the structural equation (Hansen and Singleton, 1982). As emphasized in the description of the data, we must rely on the combination of these instruments. While, for most specifications, conclusions from 2SLS regressions cannot be drawn due to the presence of weak instruments, we turn to limited-information maximum likelihood estimation (LIML) for weak-IV robust inference (Baum et al., 2007; Stock, 1997). Kleibergen-Paap rk Wald F tests with critical values provided by Stock and Yogo (2005) reflect the superior performance of the LIML estimator in our case. This is reassured by theoretical research (e.g., Anderson et al., 2010; Anderson et al., 2011) and repeatedly exploited in empirical studies (e.g., Ayyagari et al., 2010; De Paola and Scoppa, 2014; Faria et al., 2016). Thus, if the overall model is correctly specified, the LIML estimates should be consistent, efficient, and median unbiased. [20]

As noted, initial tests indicate the presence of heteroscedasticity, autcorrelation, and cross-sectional dependence in the panel. Therefore, the selection of FGLS is appropriate as a benchmark estimator for our analysis having large T and small N. Yet, to the best of our knowledge, there is no FGLS estimator that makes instrumentation in a two stage setup possible. The standard errors provided by Driscoll and Kraay (1998) allow us to overcome the deficiencies of our panel when using a fixed effects estimator. Accordingly, we rely on standard 2SLS and LIML panel estimators and estimate Driscoll-Kraay standard errors. Robustness checks employing alternative specifications of the model show that various models yield comparable results and that Driscoll-Kraay standard errors are a rather conservative choice for our setup (see Table D.1 in the Appendix).

[20]Note that while the discussion on Instrumental Variable Approach questions its inference and poor F-statistic documentation (Lee et al., 2020), we report the F-statistics and apply not only one but four conjoint instruments at a time and utilize LIML for instrument robust inference.

Further Specifications

To investigate the link between media coverage and bond spreads in more detail, we extend our analysis and subdivide our media variables, as described in section 3.1. The further specifications do not follow an instrumental variable approach and, therefore, cannot be interpreted causally. The results are nevertheless interesting, as they can be seen as empirical hints of the context within which the link between newscast and bond spreads are of certain relevance. However, the coefficients cannot reliably be interpreted as they can be biased due to the aforementioned endogeneity problems.

Further specifications include interactions with the eurocrisis dummy variable and a dummy that divides the sample into times of higher and lower uncertainty. Both approaches should shed some light on whether broadcast news were of particular importance in times of crisis and high uncertainty or not. Finally we subdivide the news coverage variable by differentiating whether the news was broadcast in EMU countries (France, Germany, Italy, and Spain) or in non-EMU countries (Switzerland, the UK, and the US). The latter countries can be labeled as global financial centers with exposure to the Eurozone.

4 Empirical Results

4.1 Panel Estimation with Fixed Effects Results

Table 2 shows the FGLS estimation results.[21] Columns 1 and 3 refer to the specification of Equation 1 without taking the tonality of the news into account. Hence, these specifications show

[21] The estimator corrects for cross-sectional dependence, heteroscedasticity, and the autocorrelation of the error term. As a robustness test, we employ a selection of alternative econometric models that other studies related to this field of research have applied. In the Appendix, we provide estimation results using a general FE estimator with clustered as well as Driscoll-Kraay standard errors and a GARCH(1,1) model. All of these various estimation techniques yield comparable results.

Table 2: LINK BETWEEN MEDIA COVERAGE AND GIIPS BOND YIELD SPREADS

	(1)	(2)			(3)	(4)		
Tonality		*pos.*	*neut.*	*neg.*		*pos.*	*neut.*	*neg.*
Eurozone news	-0.460***	-6.061***	-0.284	0.790***	-0.556***	-7.019***	-0.284	0.471
	(0.111)	(0.700)	(0.199)	(0.304)	(0.124)	(0.799)	(0.211)	(0.320)
Country-specific news	0.259***	-0.518*	-0.324**	1.051***	0.277***	-0.538**	-0.360**	1.123***
	(0.0758)	(0.275)	(0.147)	(0.143)	(0.0752)	(0.271)	(0.145)	(0.138)
Eurocrisis	1.068***		0.732**		0.524		0.466	
	(0.329)		(0.330)		(1.009)		(1.001)	
ΔCredit rating spread	-1.435		-1.953		-1.127		-1.652	
	(1.245)		(1.303)		(1.233)		(1.273)	
ΔMRO rate	-3.698		-3.933		-3.103		-3.509	
	(3.973)		(3.894)		(4.467)		(4.380)	
ΔNational stock market index	-0.679***		-0.707***		-0.662***		-0.683***	
	(0.0517)		(0.0530)		(0.0513)		(0.0520)	
ΔEUROSTOXX Volatility index	0.685***		0.612***		0.682***		0.616***	
	(0.0717)		(0.0713)		(0.0727)		(0.0722)	
ΔAAA10Y	-4.844		-4.423		-5.932		-5.518	
	(3.767)		(3.692)		(3.830)		(3.753)	
Country and Weekday FE	Yes		Yes		Yes		Yes	
Hardfacts					Yes		Yes	
No. of Observations	12,940		12,940		12,940		12,940	
Wald test on joint significance	580.2***		725.2***		6965.1***		7198.7***	

NOTES: The dependent variable is the Δ10-year bond yield spread of the GIIPS vis-à-vis Germany. The table reports coefficients estimated using FGLS correcting for cross-sectional dependence, heteroscedasticity and panel-specific autocorrelation of the error term. Standard errors in parentheses. Weekend days are excluded from the regression.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

the link between the share of $Eurozone$ or $country{-}specific$ coverage and the bond spreads. Estimations depicted in columns (2) and (4) differentiate in the tonality of the news. Hence, these specifications show the link between the share of $positive$, $neutral$, and $negative$ news and the bond spreads. Thereby, in contrast to specifications (1) and (2), specifications (3) and (4) control for the "hardfacts," such as bigger measures of decisions for instance by the ECB.

The control variables of our baseline specifications depicted in columns 1 and 2 in Table 2 show the expected signs and are in line with previous empirical studies (e.g., Afonso et al., 2018;

Gerlach et al., 2010). During the European sovereign debt crisis, the change of the government bond yield spreads of the GIIPS vis-à-vis Germany were about 0.73 - 1.07 basis points higher as compared to the periods before and after the crisis. However, this link vanishes when controlling for "hardfacts." The other fundamental controls are very stable across the estimated specifications. The $EUROSTOXX\ volatility\ index$, as the proxy for investors' risk aversion in the Eurozone, is positively linked to bond yield spreads. In all specifications, the coefficient of the $national\ stock\ market\ index$ indicates that an improvement of the economic situation in the countries is negatively connected to bond yield spreads, which is in line with theory. The individual credit risk of the GIIPS countries and the overall risk aversion do not seem to play an important role given the statistically insignificant coefficients of the $credit\ rating\ spreads$ and the international risk aversion proxy $AAA10y$. Changes in the rate of the main refinancing operations ($MRO\ rate$) also do not show significant results.

Regarding our main explanatory variable, we find that during the period analyzed, a higher share of Eurozone news is negatively connected with GIIPS yield spreads. As depicted in column 1, a one percent higher share of Eurozone news is linked to -0.46 basis points lower GIIPS bond yields spreads. When controlling for "hardfacts," the link is even stronger, at -0.56 basis points. However, taking the tonality of the news into account, we obtain a more differentiated picture (see Table 2 columns 2 and 4). In specification (2), the share of positive Eurozone news is negatively connected with the GIIPS yield spreads, whereas the share of negative Eurozone news is linked to bigger spreads. However, the latter link vanishes when controlling for "hardfacts" (column 4). In contrast, country-specific news is significantly linked to bond spreads throughout all specifications. While both positive and neutral news are linked to lower bond spreads, negative country-specific news is connected with higher spreads. This follows the intuition. That most results even hold when controlling for the "hardfacts" can be seen as empirical evidence that our findings are not only driven by certain measures and decisions of institutions like the ECB but

are affected by ongoing coverage – "noise" – that affects investor expectations in line with Black (1986).

4.2 Instrumental Variable Estimation Results

To investigate the causal relation between the media coverage and the bond spreads, we utilize an instrumental variable approach as described in section 3.2. Our instrumentation works in the intended way. The instruments are, in most specifications, significantly correlated with the relevant news variables in the first stage regressions (see Table 3). Signs of the coefficients of the instrumental variables are negative. When other newsworthy events take place, the share of $Eurozone$ of $country-specific$ news in the newscasts is lower. The Kleibergen Paap rk LM test statistics for the test of excluded instruments holds throughout the regressions. However, the main issue of our 2SLS approach relies on weak instruments (see columns 1-4). The Kleibergen-Paap Wald rk F statistic does not always signal robustness in terms of the demanded cut-off values provided by Stock and Yogo (2005). Yet, we use a LIML estimator to account for this issue (see columns 5-8).[22]

The results obtained from the instrumental variable estimations support causality between the coverage of Eurozone news and the changes in government bond yield spreads. The results of interest are presented in columns (7) and (8) taking "hardfact" measures and decisions by institutions like the ECB into account. Specification (7) shows that an exogenous variation in the share of Eurozone related news clearly affects the bond spreads. A one percentage point higher share of Eurozone related news leads to -7.6 basis points lower bond spreads. However, no significant effect appears when focusing on the country-specific news. A one percentage point

[22]The 2SLS and LIML estimators we employ provide identification using Driscoll-Kraay standard errors that account for cross-sectional dependence as well as for heteroscedasticity and autocorrelation. As a reminder: We use this model because instrumental variables cannot be used in a FGLS setting. A model comparison validates this choice (see Table D.1 in the Appendix for alternative specifications). We find that the use of Driscoll-Kraay standard errors is even more conservative than a FGLS specification.

higher share of positive Eurozone related news leads to -69.71 basis points lower bond spreads.[23]

One explanation for the greater importance of (positive) Eurozone news in comparison to (negative) country-specific news, which was also determined in the FGLS model, might be as follows: As investors cast doubt on their pre-crisis expectation that the governing institutions of the euro area would buy up their bonds during financial distress (Eichengreen et al., 1998), central bank communication and news on the Eurozone calmed down their sentiments that were tempered by uncertainty. Regardless of whether one sees this as a useful function of a monetary union or not, from the financial market's perspective, the Eurozone can be seen as insurance for the countries' bonds. As long as the Eurozone exists, the risk of a total default of the bonds is seen as rather limited and positive news on the Eurozone might be seen as a trustworthy indicator for such a limited default risk and an implicit burden sharing agreement. Further, while Eurozone news is dominated by topics like "Euro stability funds',' the "EURO" in general, and the "role of central banks," country-specific news frequently covers news related to "budget policy, debt of nation or region" and "Budget deficit" (see Figures B.1 and B.2 in the Appendix).

[23] Note that only one explanatory variable can be instrumented at a time. The statistical power of our instruments and dataset is not strong enough to make such a claim between, e.g., the negative Euronews variable or country-specific news variables and spreads.

Table 3: INSTRUMENTAL VARIABLE REGRESSIONS

	(1) 2SLS	(2) 2SLS			(3) 2SLS	(4) 2SLS			(5) LIML	(6) LIML			(7) LIML	(8) LIML		
Tonality		*pos.*	*neut.*	*neg.*		*pos.*	*neut.*	*neg.*		*pos.*	*neut.*	*neg.*		*pos.*	*neut.*	*neg.*
Eurozone news	**-3.505***	**-95.35**	7.740	3.122	**-6.222****	**-58.13****	3.724	-0.002	**-3.420***	**-107.1**	8.845	3.366	**-7.599***	**-69.71****	4.750	-0.100
	(1.893)	(74.39)	(7.138)	(3.401)	(3.046)	(27.00)	(2.405)	(1.316)	(1.941)	(91.88)	(8.783)	(3.885)	(4.252)	(35.35)	(3.171)	(1.440)
Country-specific news	0.824	1.473	-2.669	2.723***	0.889	-1.353	-2.128	2.562***	0.828	2.022	-2.560	2.646**	0.955	-0.858	-2.018	2.495***
	(0.773)	(4.458)	(2.264)	(0.986)	(0.786)	(2.816)	(1.958)	(0.662)	(0.773)	(5.145)	(2.319)	(1.059)	(0.795)	(2.995)	(1.963)	(0.681)
Country and Weekday FE	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Fundamental Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Hardfacts					Yes		Yes						Yes		Yes	
First stage results																
FIFA	-0.542***		-0.016**		-0.409***		-0.050***		-0.542***		-0.016**		-0.409***		-0.050***	
	(0.096)		(0.007)		(0.147)		(0.014)		(0.096)		(0.007)		(0.147)		(0.014)	
UEFA	-0.091		-0.006		-0.086		-0.009		-0.091		-0.006		-0.086		-0.009	
	(0.115)		(0.010)		(0.089)		(0.009)		(0.115)		(0.010)		(0.089)		(0.009)	
Major disasters$_{t-1}$	-0.493***		-0.024**		-0.182**		-0.022***		-0.493***		-0.024**		-0.182**		-0.022***	
	(0.140)		(0.008)		(0.071)		(0.008)		(0.140)		(0.008)		(0.071)		(0.008)	
Plane crashes$_{t-1}$	-0.298***		0.027		-0.141		0.0255		-0.298***		0.027		-0.141		0.0255	
	(0.115)		(0.033)		(0.097)		(0.030)		(0.115)		(0.033)		(0.097)		(0.030)	
No. of Observations	12,940		12,940		12,940		12,940		12,940		12,940		12,940		12,940	
Kleibergen-Paap rk LM	23.80***		8.615*		13.18**		16.21***		23.80***		8.615*		13.18**		16.21***	
Kleibergen-Paap rk Wald F	11.24$^{\circ\circ}$		3.348		4.340		5.969		11.24$^{\circ\circ\circ\circ}$		3.348$^{\circ\circ}$		4.340$^{\circ\circ}$		5.969$^{\circ\circ\circ\circ}$	

NOTES: The dependent variable is the Δ10-year bond yield spread of the GIIPS vis-à-vis Germany. The table reports 2SLS and LIML regression coefficients estimated using xtivreg2 provided by Baum et al. (2007) and Schaffer (2015). Driscoll-Kraay standard errors in parentheses. Weekend days are excluded from the regression. Bolded numbers depict the coefficient on the instrumented variable. Instruments are dummy variables for days of FIFA and UEFA tournament phases, lagged major disasters and lagged plane crashes. First stage regressions are reported. The *Kleibergen-Paap rk LM* F-statistic tests for underidentification of the excluded instruments in the first stage regression. The *Kleibergen-Paap rk Wald F* statistic allows for determining weak identification when standard errors are not i.i.d. Corresponding critical values are compiled by Stock and Yogo (2005). Weak identification can be tolerated at 25%, 20%, 15% or 10% maximal IV and LIML size; denoted with $^{\circ}$,$^{\circ\circ}$, $^{\circ\circ\circ}$, $^{\circ\circ\circ\circ}$, respectively.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4.3 Further Specifications

In further specifications, we extend our analysis and subdivide our media variables, as described in section 3.1, to investigate the link between media coverage and bond spreads in more detail. In particular, we (1) test for time-varying effects and investigate whether the link between news coverage and bond spreads differ, (2) during the period of the ongoing eurocrisis, (3) at times of high uncertainty, and (4) by different media markets. Thereby, the further specifications follow FGLS, not an instrumental variable approach, and therefore cannot be interpreted causally. Thus, the results provide empirical hints as to which context the link between newscast and bond spreads are of certain relevance.

To test for time-varying effects in specification (1), we include a lagged media variable in our regression that depicts the news on the prior day (see column 1 in Table 4). By doing so, we relax the restrictive assumption that news is immediately priced in by market participants when it is released. As we argue above, some news may affect financial markets for a longer period of time and, more importantly, may need more time and information to be priced in. In particular, the results show that the share of coverage of the Eurozone on the prior day is significantly linked to crisis countries' yield spreads. This can be seen as a hint on the existence of persistent news effects, which affect financial markets for more than a single trading day. This contradicts the assumption by Büchel (2013), Gade et al. (2013), Falagiarda and Gregori (2015), and Mohl and Sondermann (2013).

In specification (2), we integrate an interaction with the $eurocrisis$ dummy variable in our regression, which turns 1 during the period of the European sovereign debt crisis, as described in section 3.1. The coefficients signal that during the Eurocrisis, the share of Eurozone news was significantly higher than in normal times (0.82% against 0.20%). In addition, during the crisis a one percentage point higher share of Eurozone news is connected to -0.78 basis points

lower GIIPS yield spreads, while there seems to be no significant link before and after the crisis. Similarly, country-specific news is linked to the bond spreads only during the crisis. A one percentage point higher share of country-specific news is connected to 0.4 basis points higher GIIPS yield spreads.

Times of high uncertainty seem to have an effect on the connection between media coverage and bond spreads as well. The $uncertainty$ variable in specification (3) is a country-specific dummy variable that is informed by the variance of country-specific news over the prior 5 days. We define a cutoff value of 10 (remember the news variables are shares measured in percent). Signs of the news variables are unchanged compared to the baseline scenario; however, the magnitude of the link is significantly larger in times of high uncertainty, hinting at a stronger connection between media coverage and bond spreads in uncertain times. In times of high uncertainty, a one percentage point higher share of Eurozone news is connected to 1.59 basis points lower bond spreads in comparison to 0.4 basis point in more certain times. Similarly, country-specific news is linked to the bond spreads both in uncertain and certain times. A one percent higher share of country-specific news is connected to 0.51 basis points higher GIIPS yield spreads in uncertain and to 0.23 basis points in certain times.

Furthermore, in specification (4) we investigate whether the link between media coverage and bond spreads differs, depending on where the news show is broadcast. Hence, we distinguish between the EMU media market, including TV news from France, Germany, Italy, and Spain, and $non{-}EMU$ markets with news from Switzerland, the UK, and the US. The results in column 4 show that the general link of the different news with the GIIPS yield spreads differs among the analyzed media markets. Interestingly, Eurozone news seems to be linked to government bond yield spreads only when aired in the EMU media market. A one percentage point higher share of Eurozone news aired in the Eurozone is connected with -0.54 basis points lower bond spreads,

whereas the connection vanishes when the news is aired in non-EMU countries. In addition, only country-specific news aired in third country media markets seem to be connected with the spreads. A one percentage point higher share of country-specific news that is aired in non-EMU media markets in linked to 1.18 basis points higher GIIPS sovereign yield spreads, whereas no statistically significant connection can be determined in the EMU media market. The significant link between news that is released in third country media markets might be explained by the hypothesis that only very big and newsworthy news about the GIIPS economies is aired in these media markets. Descriptive statistics of the news variables by different media markets shows that the mean of the country-specific news aired on non-EMU media market (0.046%) is – as one would expect – much lower than the mean of the country-specific news that is aired on the European media market (0.36%).

Table 4: FURTHER SPECIFICATIONS

	(1) Lagged news	(2) Eurocrisis		(3) Uncertainty		(4) Media market	
		=1	*=0*	*high*	*low*	*EMU*	*Non-EMU*
Eurozone news	-0.487***	-0.782***	-0.138	-1.593***	-0.409***	-0.543***	-0.608
	(0.127)	(0.152)	(0.207)	(0.336)	(0.132)	(0.150)	(0.397)
Country-specific news	0.320***	0.404***	0.0373	0.512**	0.230***	0.127	1.186***
	(0.0798)	(0.093)	(0.127)	(0.182)	(0.082)	(0.088)	(0.298)
Eurozone news$_{t-1}$	-0.317**						
	(0.126)						
Country-specific news$_{t-1}$	-0.125						
	(0.0791)						
Eurocrisis	0.480	0.458		0.451		0.518	
	(1.020)	(1.009)		(1.014)		(1.015)	
High uncertainty				0.836			
				(0.935)			
Country and Weekday FE	Yes	Yes		Yes		Yes	
Fundamental Controls	Yes	Yes		Yes		Yes	
Hardfacts	Yes	Yes		Yes		Yes	
No. of Observations	12,940	12,940		12,940		12,940	
Wald test on joint significance	6962.6***	6978.0***		6973.4***		6978.0***	
Joint significance of the interaction		26.67***		23.63***			
Joint significance of the interaction		19.13***		9.41***			

NOTES: The dependent variable is the Δ10-year bond yield spread of the GIIPS vis-à-vis Germany. The table reports coefficients estimated using FGLS correcting for cross-sectional dependence, heteroscedasticity and panel-specific autocorrelation of the error term. Standard errors in parentheses. Weekend days are excluded from the regression. The high uncertainty dummy relates to days on which the variance (prior 5 days) of country-specific news is high (larger than 10). News from EMU media markets come from TV news shows in France, Germany, Italy and Spain. Non-EMU media markets include Switerland, the UK and the US.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5 Conclusions

In our contribution, we investigate whether TV news on economic events with reference to the crisis countries or the Eurozone in general affect GIIPS interest rate spreads vis-à-vis Germany in addition to the events themselves, using a sample of 1,209,566 human-coded news items from newscasts aired by leading TV stations in France, Germany, Italy, Spain, Switzerland, the UK, and the US, including 25,276 news items on economic issues related to the Eurozone and the

GIIPS countries on a daily basis between January 2007 and November 2016. Hence, our study covers both phases with rising and declining spreads throughout the European sovereign debt crisis.

To investigate the link between the media coverage and bond spreads, we first utilize a panel estimation with fixed effects and a multitude of controls. We find that, during the period analyzed, a higher share of Eurozone news is negatively connected with GIIPS yield spreads. A one percentage point higher share of Eurozone news is linked to -0.56 basis points lower GIIPS bond yields spreads. However, accounting for the tonality of the news, we obtain a more differentiated picture: The share of positive Eurozone news is negatively connected with the GIIPS yield spreads, whereas the share of negative Eurozone news is not significantly connected to the spreads. In contrast, country-specific news is significantly linked to the bond spreads throughout all specification. While both positive and neutral news are linked to lower bond spreads, negative country-specific news is connected with higher spreads, as expected. Further, we find the magnitude of positive news to be larger for Eurozone news in comparison to country-specific news. That most results even hold when controlling for "hardfacts," e.g., decisions taken by institutions like the ECB, can be seen as empirical evidence that our findings reflect a noise effect of media coverage on bond yield spreads.

However, we are aware of several endogeneity problems: The media coverage and the bond spreads could be connected to each other because media coverage of the Eurozone and of specific countries affects the bond spreads. However, the development of bond spreads and connected issues will be covered by the newscasts as well, such that reverse causality occurs. In addition, both media coverage and bond spreads could depend on a third variable, for instance the factual measures of the ECB. Although we control for "hardfacts" measures and decisions, for instance by the ECB, we cannot rule out the problem of biased results due to omitted variables. Hence, to

identify the causal effect of newscasts on the yield spreads, we utilize an instrumental variable framework by using newsworthy events as instruments that are likely to attract media attention, thereby crowding out media coverage on the Eurozone and country-specific topics, i.e., FIFA and UEFA tournaments as well as major natural disasters and airplane crashes as instruments.

The results of the instrumental variable estimation show that an exogenous variation in the share of Eurozone related news clearly affects the bond spreads. A one percentage point higher share of Eurozone related news leads to -7.6 basis points lower bond spreads. Taking the tonality of the news into account, a more differentiated picture is painted. A one percentage point higher share of positive Eurozone related news leads to -69.71 basis points lower bond spreads. At the same time, a one percentage point higher share of negative country-specific news is associated with 2.5 basis points higher bond spreads.

Finding a greater importance of (positive) Eurozone news in comparison to (negative) country-specific news, we propose the following explanation: As investors cast doubt on their pre-crisis expectation that the governing institutions of the euro area would buy up their bonds during financial distress, central bank communication and news on the Eurozone calmed down their sentiments, which were tempered by uncertainty. Regardless of whether one sees this as a useful function of a monetary union or not, from a financial market's perspective, the Eurozone can be seen as insurance for the respective country's bonds.

In further specifications, which do not allow for causal interpretation, we find that the share of coverage of the Eurozone on the prior day is significantly linked to crisis countries' yield spreads. This hints at the existence of persistent news effects, affecting financial markets for more than a single trading day. This contradicts the assumption by Büchel (2013), Falagiarda and Gregori (2015), Gade et al. (2013) and Mohl and Sondermann (2013). In addition, especially during the Eurocrisis, the share of Eurozone news is significantly higher than in normal times (0.82%

against 0.20%) and a one percentage point higher share of Eurozone news is connected to -0.78 basis points lower GIIPS yield spreads, while there seems to be no significant connection before and after the crisis. Similarly, country-specific news is linked to the bond spreads only during the crisis. Furthermore, times of high uncertainty seem to affect the connection between media coverage and bond spreads as well, as the magnitude of the link is significantly larger in times of high uncertainty. Finally, Eurozone news seems only to be linked to government bond yield spreads only when aired in the EMU media market, whereas the connection vanishes when the news is aired in non-EMU countries. However, when it comes to country-specific news, it only seems to be connected with the spreads when aired in third country media markets. A selection of important news is likely.

Future research could, among other issues, focus on the identification of stronger instruments as well as on the effects of more media sources, not just from more countries but also a broader spectrum of types, including, in addition to TV, radio, print, online, and "social" media. Further, more attention should be paid to the questions that identify the topics and sources that affect the bond spreads the most. The authors have some hope that in the (near) future, computer linguistic approaches will overcome the existing shortcomings when it comes to selection of relevant news, coding in terms of topical context, and coding in terms of tonality as this would open a much broader range of research opportunities.

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Appendix

A Literature

Table A.1: LITERATURE OVERVIEW

Author	Dependent variable	News source	Classification
Apergis et al. (2016)	GIIPS 5y sovereign CDS	Factiva (articles that discuss sovereign debt issues)	Word counting of postive and negative words associated with the Eurocrisis. A word is considered negative if it was preceded within five words by one of several negation terms. It was possible within an article to track both negative and positive words, although in the case of a negative article, positive words could hardly be tracked.
Beetsma et al. (2013)	GIIPS 5y and 10y gov. bonds	Eurointelligence (briefings on euro-area news based on European media)	Classification into bad, good and unclassified news by the author. "By 'bad news,' ('good news') we mean news that we expect to lead to a tightening (relaxation) of the government's inter-temporal budget constraint or news that we expect to lead to a rise (fall) in the interest rate." (Beetsma et al., 2013, p. 89)
Büchel (2013)	GIIPS gov. bond spreads and sovereign CDS	Factiva (Reuters, Dow Jones Newswires, Agence France-Press, Associated Press Newswires, and Market News International)	Classification of reports on seven distinct topics into both 'dovish' and 'hawkish' statements by decision makers using signalling words. Binary variables; Counts per date.
Conrad and Zumbach (2016)	Eurozone 10y gov. bonds and USD-EUR exchange rate	Reuters; Statements of European politicians	If statements imply a positive outlook for countries, new austerity measures or suggest joint liability they are coded with +1, and as -1 otherwise
Dergiades et al. (2015)	Eurozone 10y gov. bond spreads	Google searches as well as Twitter, Facebook and Google blogs	Two indices are constructed. They are determined by (1) search queries, that are conected to the Greek crisis such as 'Greece crisis' or 'Greek debt crisis,' and (2) Grexit mentions in Social Media. Due to their setup, Dergiades et al. (2015, p. 411) claim, that having chosen variables that are "linked to rising spreads, it is important to select a sample period where released news ... disclose predominantly negative information."
Falagiarda and Gregori (2015)	Italian 10y gov. bond spreads	ECB Real Time Information System; News media releases from Bloomberg, Dow Jones News Wire, Market News International and Reuters	Public finance and fiscal policy announcements from Italian government members: +1 if the announcement signals a future deterioration (budget improvements), 0 if the announcement is budget-neutral, -1 if the announcement signals a future budget consolidation.
Gade et al. (2013)	10y gov. bonds (Greece, Ireland, Portugal)	ECB real-time information system; News media releases from Bloomberg, Dow Jones News Wire, Market News International and Reuters	An algorithm searches in politicians' statements for predetermined words regarding public finance in combination with words that have either a positive or negative connotation.
Mohl and Sondermann (2013)	GIIPS 10y gov. bonds	ECB real-time information system; News media releases from Bloomberg, Dow Jones News Wire, Market News International and Reuters	No classification into positive or negative statements. Focus on the keywords 'restructuring', 'bailout' and 'EFSF'.

B Data Characteristics

Table B.1: SUMMARY STATISTICS MAIN NEWS VARIABLES

News Variable	No. of Observations (of 2,589)	Mean	SD	Min	Max
Eurozone	803	1.459	1.758	0.151	12.16
positive	188	0.553	0.443	0.150	4.054
neutral	604	1.122	1.261	0.153	7.265
negative	437	0.892	0.812	0.151	4.444
Greece	657	2.924	4.065	0.169	25.37
positive	135	0.841	0.862	0.149	5.660
neutral	420	1.515	1.727	0.150	11.31
negative	533	2.198	3.002	0.169	19.48
Italy	1,115	0.865	0.872	0.152	10.54
positive	251	0.555	0.423	0.149	2.545
neutral	858	0.698	0.607	0.152	5.286
negative	355	0.639	0.717	0.148	7.280
Spain	1,115	0.979	0.969	0.152	9.437
positive	382	0.560	0.428	0.151	3.385
neutral	641	0.661	0.542	0.152	4.624
negative	612	0.742	0.711	0.146	7.263
Portugal	196	1.308	2.123	0.148	15.17
positive	22	0.403	0.283	0.158	1.316
neutral	88	0.794	1.058	0.151	8.026
negative	145	1.226	2.008	0.148	13.79
Ireland	173	1.401	2.549	0.169	20.66
positive	16	0.524	0.278	0.153	1.278
neutral	74	0.965	1.123	0.177	4.904
negative	127	1.280	2.216	0.169	15.87

NOTES: Each observation relates to a (trading) date where the corresponding variable is unequal to zero. Euronews as well as country-specific news are calculated as a share of total news on that day and quoted in percent. Eurozone news is invariant across countries in the panel and, therefore, only denoted once. The sum of news by tonality does not necessarily have to add up to the total number of observations some might relate to the same date. Eurozone news: 15.3% positive, 49.1% neutral, 35.6% negative. Country-specific news: 19.1% positive, 44.4% neutral, 36.6% negative

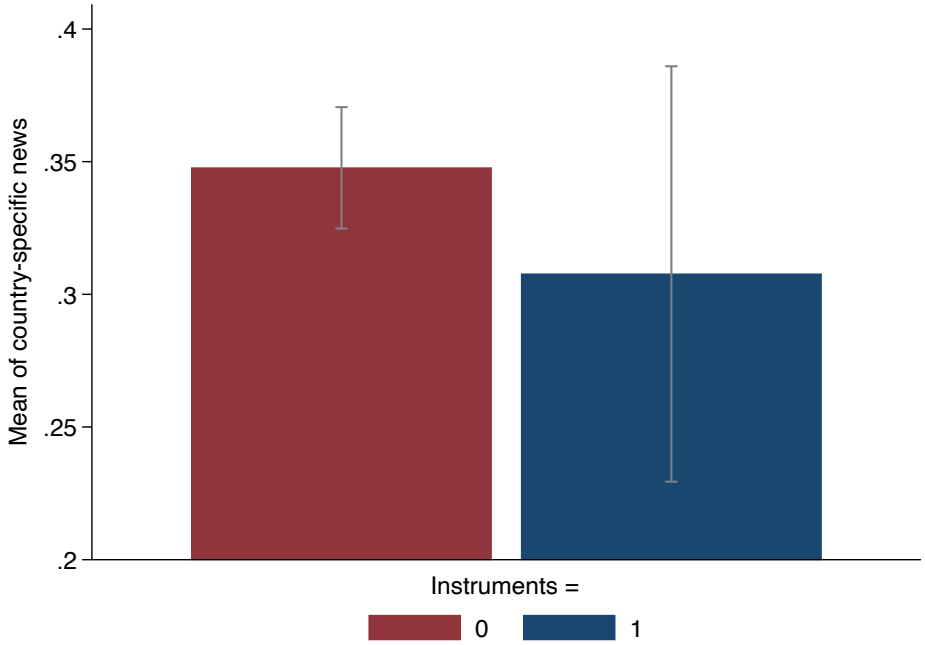
Figure B.1: TOPICS COVERED BY EUROZONE NEWS

NOTES: The figure depicts the subjects of topics covered by Eurozone news. The size highlights the frequency of occurrence within the news-type. Topics that occur less than ten times are omitted.

Figure B.2: TOPICS COVERED BY COUNTRY-SPECIFIC NEWS

NOTES: The figure depicts the subjects of topics covered by country-specific news. The size highlights the frequency of occurrence within the news-type. Topics that occur less than ten times are omitted.

Figure B.3: MEANS OF COVERAGE ON DAYS WITH AND WITHOUT OTHER NEWSWORTHY EVENTS



NOTES: The instruments are FIFA and UEFA tournament phases as well as lagged major disasters and plane crashes around the world. The error bars reflect 95% confidence intervals. A standard t-test fails to confirm the crowding out hypothesis on days with other newsworthy events at standard significance levels.

C Data and Residual Analysis

Testing for Unit Roots, Cross-sectional Dependence, Heteroscedasticity, and Autocorrelation

Before testing for the existence of a unit root process of the individual time series, the optimal lag length for each panel cross-section is determined using Akaike's information criterion. Next, an Augmented Dickey-Fuller-test is conducted. The null-hypothesis of non-stationarity cannot be rejected for the government bond spreads and most financial controls in levels. Hence, to avoid spurious regression problems, a model in first differences is selected. Regarding the media data, tests reject the presence of a unit root for all (sub-)samples.

To specify a correct and consistent model using an efficient estimator, we test for panel specific issues in the following regression model:

$$\Delta spreads_{i,t} = \beta X_t + \epsilon_{i,t} \tag{C.1}$$

with $i = 1, ..., 5$ denoting the GIIPS countries and $t = 1, ..., 2,589$ denoting the daily time dimension. The control vector X_t is equal to our baseline model depicted in equation 1.

First, a Breusch-Pagan Lagrange Multiplier test for cross-sectional independence in the residuals of equation C.1 is conducted, following Baum (2001) and Breusch and Pagan (1980). The test is valid for large t and small i. The null hypothesis of no cross-sectional dependence is rejected for the 10-year government bond yield spreads at the 1% significance level (see Table C.1, column 1). This implies cross-sectional dependence of the residuals. Second, a modified Wald statistic for groupwise heteroscedasticity in the residuals of equation C.1 is calculated, following Baum (2001). Homoscedasticity is the null hypothesis of this test, which is rejected at the 1% significance level for the dependent variable (see Table C.1, column 2). Third, a Wald test for serial correlation in the idiosyncratic errors, discussed by Drukker (2003), is conducted.

Table C.1: TEST RESULTS RESIDUAL ANALYSIS

	Cross-Sectional Dependence *	Groupwise Heteroskedasticity**	Serial Correlation***
Δ10-year bond yield spreads	4083.87	27080.69	13.13
	(0.0000)	(0.0000)	(0.0223)

NOTES: Values for the individual test statistics are displayed, p-values are reported in parentheses.
* CD is tested with the Breusch and Pagan (1980) LM test. The resulting test statistic is $\chi^2(d)$ distributed, where: $d = N_g * (N_g - 1)/2)$, under the null hypothesis of cross-sectional independence.
** Groupwise heteroscedasticity in the residual of a fixed-effects regression model is tested with a Modified Wald test. It tests that $\sigma^2(i) = \sigma$ for $i = 1, ..., N_g$, where N_g is the number of cross-sectional units. The resulting test statistic is distributed $\chi^2(N_g)$ under the null hypothesis of homoscedasticity.
*** Wooldridge Wald F tests the null hypothesis of no first-order serial correlation.

The null hypothesis of no serial correlation is rejected for the 10-year bond yield spreads at 5% (see Table C.1, column 3).

Testing for the causal direction of the effect of media coverage on bond yields

To shed light on the causal relationship between news coverage and changes in government bond yield spreads, we conduct the causality tests for stationary panel data as proposed by Lopez and Weber (2017). Granger causality tests using individual countries remained inconclusive in the paper by Gade et al. (2013), while Falagiarda and Gregori (2015) rule out Granger causality from sovereign spreads to fiscal policy announcements. According to our results, we cannot rule out bidirectional causality at reasonable significance levels. Still, the existence of causality from news to changes in bond yield spreads is particularly well documented for both Eurozone and country-specific news. A causal link in the opposite direction, between spreads and news, cannot be rejected. Yet, it appears to be much weaker. Causality between spreads and some subsamples (e.g., positive country-specific news) can be ruled out. We are aware that Granger causality analysis is not without controversy if rational expectations prevail (Sargent and Wallace, 1976 or Buiter, 1984).

Table C.2: TEST RESULTS GRANGER CAUSALITY TEST

Dependent variable	Explanatory variable	Granger non-causality test results*			
			pos.	*neut.*	*neg.*
Δ10-year bond yield spread	Eurozone news	16.4795	3.5883	16.5919	9.0685
		(0.0000)	(0.0003)	(0.0000)	(0.0000)
Δ10-year bond yield spread	country-specific news	9.0707	-1.1311	8.9357	4.3844
		(0.0000)	(0.2580)	(0.0000)	(0.0000)
Eurozone news	Δ10-year bond yield spread	0.9594	4.1271	1.0222	1.4520
		(0.3374)	(0.0000)	(0.3067)	(0.1465)
country-specific news	Δ10-year bond yield spread	2.6873	0.8941	5.1879	1.6649
		(0.0072)	(0.3713)	(0.0000)	(0.0959)

NOTES: Values obtained for the Z-bar statistic are displayed, p-values are reported in parentheses.
* The test procedure is based on the work by Dumitrescu and Hurlin (2012). To test for Granger-causality in panel data the procedure by Lopez and Weber (2017) is applied. The null-hypothesis of the test is that the explanatory variable does not Granger-cause the dependent variable. We include one lag in the tests.

D Model Robustness

Table D.1: ALTERNATIVE SPECIFICATIONS

	(1) FE with clustered SE	(2) FE with Driscoll-Kraay SE	(3) GARCH(1,1)	(4) FGLS (baseline)	(5) FGLS (dynamic)
Eurozone news	-0.870***	-0.870	-1.550***	-0.556***	-0.660***
	(0.141)	(0.567)	(0.0886)	(0.124)	(0.133)
Country-specific news	0.631***	0.631	1.442***	0.277***	0.294***
	(0.067)	(0.809)	(0.041)	(0.075)	(0.076)
Eurocrisis	0.916**	0.916	0.703	0.524	1.010
	(0.301)	(0.794)	(1.643)	(1.009)	(1.149)
ΔCredit rating spread	5.736*	5.736	11.33***	-1.127	0.265***
	(2.297)	(5.033)	(0.881)	(1.233)	(0.090)
ΔMRO rate	4.989	4.989	24.98***	-3.103	-0.389
	(6.035)	(6.633)	(6.939)	(4.467)	(0.736)
ΔNational stock market index	-1.161***	-1.161***	-1.129***	-0.662***	-0.012***
	(0.137)	(0.184)	(0.0532)	(0.0513)	(0.003)
ΔEUROSTOXX Volatility index	0.868*	0.868**	0.696***	0.682***	0.138***
	(0.365)	(0.294)	(0.0739)	(0.0727)	(0.037)
ΔAAA10Y	2.382	2.382	0.121	-5.932	-2.196***
	(4.846)	(6.362)	(5.258)	(3.830)	(0.805)
ARCH_{t-1}			0.00850***		
			(0.000100)		
GARCH_{t-1}			3.210***		
			(0.0506)		
Lagged dependent variable					0.996***
					(0.001)
Country and Weekday FE	Yes	Yes	Yes	Yes	Yes
Hardfacts	Yes	Yes	Yes	Yes	Yes
No. of Observations	12,940	12,940	12,940	12,940	12,940

NOTES: The table reports coefficients estimated using the models indicated in the header. For columns (1)-(4), the dependent variable is the Δ10-year bond yield spread of the GIIPS vis-à-vis Germany. The estimated model in column (5) utilizes all variables in levels instead of taking first differences (Δ); the dependent variable is the 10-year bond yield spread in levels. Standard errors in parentheses. Weekend days are excluded from the regression. Regression results which take the tonality of news into account are not presented, however, show the expected sign and are statistically significant, including the model with Driscoll-Kraay SE.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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