Political Risk, Media Framing, and Heuristics in Sovereign Bond Markets

Nicola Nones

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Dissertation Summary

My dissertation project - entitled *Political Risk, Media Framing, and Heuristics in Sovereign Bond Markets* - investigates the critical role of news media as the producers and framers of financial information and its effects on investors' portfolio allocation decisions. Two main questions motivate the project. First, how does the media frame sovereign bond crises and, in particular, the creditworthiness of the debtor countries involved? Second, does the media framing of a sovereign country affect investors' portfolio allocation decisions? If so, how? The first part of the dissertation (Chapter 1 and 2) tackles the first question with respect to the recent eurozone crisis.[1] The second part of the dissertation (Chapter 3 and 4) inverts the causal arrow and explores how media framing can influence, rather than being influenced by, sovereign bond markets.

Collectively, my research contributes to the current literature on financial markets and the media. Regarding the first question under study, I move beyond the previous literature by showing how a specific frame - a moral frame starkly dividing "sinful" debtors and "virtuous" creditors - may arise and how this frame vary across media outlets type. Regarding the second question under study, traditional accounts of the "financial-media nexus" emphasize how market actors incorporate new objective information in their assessments. The rhetorical aspects of journalism are rarely acknowledged. A rational actor is supposed to have strong enough material

[1] Except for Section 7 in Chapter 1, which hints at the second research question.

incentives to separate the "signal" from the "noise." By contrast, my research shows how, under some general circumstances, different frames can provide apparently irrelevant information that, consciously or not, affect investors' allocation decisions.

In Chapter 1, I draw from insights in sociology, anthropology, linguistics, and political economy to emphasize the conditions under which the media utilize moral language to describe creditor-debtor relationships. I describe this rhetorical strategy as a "moral narrative" – a framing strategy through which the media embed objective economic information in a web of subjective moral and emotional meanings. This narrative is composed of two opposite sides, i.e. vice and virtue, associated with debtors and creditors, respectively. As a particularly salient instance of a larger class of events, I focus on the recent European Sovereign bond crisis. Originating from the perspective of creditor countries, this moral narrative stresses the differences in moral character between "virtuous" creditors (Northern European countries) and "spendthrift, lazy" debtors (Southern European countries). To measure moral content in written texts, I rely on a dictionary-based text analytic approach inspired by extant research in linguistics and social psychology. Upon analyzing an original dataset of newspaper articles, I provide two main sets of results. First, I show how the Sovereign bond crisis was accompanied by an increase in moral languages in the media with respect to Southern European countries. Second, I show how moral content helps predicting financial market movements in Southern European countries' sovereign fixed-income securities beyond what economic fundamentals would predict. As my argument suggests, the rhetorical aspects (the "noise") of information should not be viewed as a nuisance to be "filtered out." Their systematicity is informative and should not be ignored if we aim to explain investors' behavior.

In Chapter 2, I investigate how different media outlets - tabloids, broadsheets, and financial newspapers - framed the Sovereign Bond crisis in moral terms, with a particular focus on Greece. I theorize about and suggest the conditions under which a moral negativity bias will be more prominent. In so doing, I extend the previous media literature on the level of negativity to a more specific subset of negative language – moral negative tone – and I suggest a new observable implication regarding the persistence of negativity. I test a number of hypotheses using a sample of articles published between 2009 and 2019 with respect to Greece. I confirm previous results about the heterogeneity of the "negativity bias" in the levels of moral tone across

different outlets. More specifically, I show how tabloids use more negative moral language than quality papers which, in turn, employ more negative moral language than financial outlets. I further extend the concept of negativity to include a ”persistence dimension”, defined as the memory of the negativity bias. Empirically, I rely on the econometrics of fractional integration to show the extent to which moral negative tone persists over time. I find weak and mixed evidence of differentials in negativity persistence across different outlets. Finally, I explore empirically the extent to which changes in tone in tabloids and generalist quality outlets are in a long-term relationships with each other. In contrast with the conventional view about the ”tabloidization” of the quality press, my analysis shows that the long-run equilibrium in tonality between the popular and quality press is due to movements from both sides. In other words, I find evidence of ”dual-convergence”. Overall, the chapter gives a more nuanced picture of how different media described Greece in moral terms since the beginning of the crisis.

The second part of my dissertation further explores the relationship between the media and financial markets, looking at how media framing affect investors. Within the ”moralizing” context described in Chapter 1 and 2, and upon manually inspecting the content of the articles themselves, I detect a further rhetorical strategy in the media: the use of the derogatory grouping acronym ”PIIGS” (Portugal, Italy, Ireland, Greece, Spain). Building on this observation, I introduce a model of country-risk evaluation where boundedly rational investors rely on category-based heuristics disseminated by news media. In Chapter 3, I document how the media’s categorization of Southern European economies as “PIIGS” facilitated financial contagion during the eurocrisis. In Chapter 4, I apply the same theoretical model to the “BRICS” label (Brazil, Russia, India, China, and South Africa), a case of an investment acronym with a clearly positive connotation. The two chapters combined show how the two acronyms can be seen as the two opposite sides of the same reputational coin.

The theoretical underpinning of the model is derived from insights in behavioral finance. The media and investors are the two main actors. They are both assumed to be driven by a desire to maximize their profits. On the one side, to evaluate a country’s creditworthiness, boundedly rational investors assess how much that country fits in a stereotypical “trustworthy” or “untrustworthy” class. This mental shortcut is well-known among psychologists as the representativeness bias. On the other side, the media employs catchy grouping

acronyms such as PIIGS and BRICS to attract the readers' attention. While often based on a kernel of truth, these acronyms' membership criteria are often inconsistent with objective political and economic conditions. The evaluative connotation of the grouping acronyms – positive (BRICS) or negative (PIIGS) – determines the qualitative nature of the class. It is either a "trustworthy" or "untrustworthy" class. Each country is a possible element. The discursive inclusion of a country in the acronym functions as a signaling mechanism about its type. As the label becomes more widespread, its constitutive members are discursively linked together and increasingly interpreted as a homogenous class. Quasi-rational investors will respond to this perceived homogeneity by updating their priors about one class member even if they receive new information about only the other class members.

To measure the extent to which each country is *implicitly* associated with the acronym, I assemble two original datasets of news articles based a novel measurement strategy. I identify newspapers articles that mention the acronym (e.g. BRICS) and at least one other country in the class (e.g. Russia, India, China, or South Africa), but do not contain any reference to the target country (e.g. Brazil). Empirically, I show how the number of articles identified by the above-mentioned criteria affect the sovereign bond yields of the target country beyond what political conditions and economic fundamentals would predict. The direction of the effect is consistent with the view that the PIIGS and BRICS acronyms convey opposite information about the class type. Implicit association with the BRICS class leads to an increase in the target country's perceived creditworthiness, while implicit association with the PIIGS label leads to an increase in its perceived riskiness. Moreover, I show that the effect of grouping acronyms is larger when investors are more uncertain about the country's creditworthiness, when international capital is scarce, and when the country in question is more dependent on external financing.

Chapter 3 and 4 combined enhance our understanding of how investors use publicly available information to assess a country's reputation. Current models of international reputation emphasize the role of repeat-play, issue linkages, and institutional features. Within these frameworks, countries endogenously select the most appropriate strategies according to their own preferences and economic agents efficiently update their prior beliefs about the country's reputational type accordingly. By contrast, my research highlights how boundedly rational

agents rely on category-based heuristics and demonstrates how the media can exert an independent effect on countries' reputation by constructing and disseminating investment categories. As such, my research implies that sovereign risk is less "sovereign" than previously assumed and provides a novel behavioral framework to connect media fads to investors' perceptions of a country's creditworthiness.

Finally, a note to the reader regarding the structure of the dissertation. All chapters can be viewed and read as standalone articles. The measurement strategy and theory underlying Chapter 3 and 4 are the same. The two chapters can be seen as testing the same main hypothesis in two opposite settings, one in which the grouping acronym contains a positive connotation (BRICS) and one in which the grouping acronym contains a negative connotation (PIIGS). Hence, the literature review sections, the theory sections, and the measurement sections in Chapter 3 and 4 differ only in so far as they speak to two different contexts.

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Chapter 1: The Moral Narrative of the European Sovereign Bond Crisis

Abstract

Credit and debt are more than just material exchanges within a market economy. Creditors-debtors' relationships are also social construction embedded in moral judgments about the character of the agents involved. Traditionally, scholars have analyzed the relationship between morality and debt in the context of inter-personal relations, with individuals in the role of economic agents. Nevertheless, a similarly loaded moral discourse can also embrace the collective characterization of entire countries and their populations. Such moral discourse is deeply rooted in a specific cultural social environment that links the idea of debt to immorality. As a specific case of a larger class of events - sovereign bond crises - I focus on the European Sovereign Bond crisis. I propose a novel measure of moral content in written texts that combines extant dictionaries to an ad hoc dictionary. After validating the new dictionary, the article proceeds with the empirical tests of two sets of hypotheses on a original dataset of newspapers articles from 2001 to 2016. First, I show how an appreciable increase in moral language in reference to Southern European economies (Greece, Italy, Spain, Portugal and Ireland) accompanied the European Sovereign Bond crisis. Second, I show that changes in moral tone and in the volume of articles displaying moral language help predicting the Sovereign bond spreads of Southern European countries.

Credit and debt are more than just material exchanges within a market economy. Creditors-debtors' relationships are also social construction embedded in moral judgments about the character - the moral type, in game theoretic language - of the agents involved. This moral characterization is deeply rooted in a cultural and social environment that links the idea of debt to immorality (Dyson, 2014). While the most overtly religious or philosophically-laden interpretations of debt-credit relations have faded away over time, moral language still permeates and frames the public debate on this topics. Traditionally, scholars have analyzed the relationship between morality and debt in the context of inter-personal relations, with individuals in the role of economic agents (Lakoff and Johnson, 2008). Nevertheless, a similarly loaded moral discourse can transcend the characterization of credit-debt relations among individuals to embrace the collective characterization of entire countries (Van Vossole, 2016; Ojala and Harjuniemi, 2016; Mylonas, 2019). As a result, a "morality tale" can ensue, starkly dividing "virtuous" creditors on the one side, and "guilty" debtors on the other side. Typically, the moral charge is that the debtors have lived "beyond their means" in an irresponsible fashion, thus threatening the well-being of themselves as well as that of their creditors (Mazzoni and Barbieri, 2014).

To this day, though, we lack a rigorous large-sample investigation of whether and to what extent such moral rhetoric may be used to frame inter-national credit-debt relations. This is what this paper is designed to accomplish, with a particular focus on the European Sovereign Bond crisis. As a specific case of a larger class of events - sovereign bond crises - the Euro-crisis offer both substantive and practical advantages. First, both debtors (e.g. Italy) and creditors (e.g. Germany) are relatively rich democratic countries and are easy to identify. While imbalances persist within the eurozone, the differences pale in comparison to other sovereign debt crisis, which feature a poor or emerging economy as debtor and myriads of investors from richer countries on the other side. As such, we can more easily set aside other possible moral considerations regarding debt, such as the issue of "odious debt" and/or "debt forgiveness" (Oosterlinck et al., 2022). Second, due to its recency and potential systemic effects for all the European Union and beyond make, there is a wealth of textual evidence I can draw from to test my hypotheses.

Overall, my paper contributes to our substantive understanding of the media-finance nexus on matters of

inter-national credit-debt relations. Theoretically, I provide a framework to understand under which conditions credit-debt relations may be framed in moral terms. Methodologically, I rely on a dictionary-based approach inspired by extent research in social psychology to validate a reliable measure of moral content in written texts. With a few changes, a similar approach may be used in future research to quantitatively analyze other credit-debt relations, such as corporate debt or students' loan debts, that are of particular significance in today economies. Empirically, to the best of my knowledge, this is the first quantitative investigation of whether and to what extent sovereign debt crises are narrated in moral terms. Moreover, this paper goes beyond the current literature on media and finance by showing how a specific subset of sentiment - i.e. moral sentiment - help predicting bond markets movements. The main empirical results can be summarized as follows. I demonstrate how, during the financial crisis, Southern European economies (Greece, Italy, Spain, Portugal, and Ireland) have been described in moral terms. Importantly, I will show how "sticky" such a moral framing has been, lasting much longer than the crisis itself. Moreover, I show that changes in moral tone and in the volume of articles displaying moral language help predicting the Sovereign bond spreads of Southern European countries.

The chapter is structured as follows. First, I will set the stage with a theoretical discussion of the relationship between morality and debt/credit relationships with a particular emphasis on why this moral discourse may emerge. Second, I will situate this broader discussion within the case study to be analyzed - the European Sovereign Bond crisis - and suggest how moral framing may not only reflect but also affect investors' behavior. From this discussion I derive three hypotheses to be tested. Then, after describing the data collection phase, I develop and validate a measure of moral content in written texts. Equipped with such measure, the empirical analysis follows. The Appendix contains the dictionary validation steps, a detailed step-by-step description (and R code) on how to collect, clean, process, and analyze the data.

1 Sovereign Debt and Moral Rhetoric

Historically, discourses of debt-credit relations have been intertwined with a moral narrative that is composed of two opposite sides, vice and virtue, associated with debtors and creditors respectively (Dyson, 2014). The moral

status of debt even pre-dates money in the forms of favors among friends and neighbors creating personal moral obligations (Graeber, 2011). The moral dimension of debt is a recurrent theme in Western culture. The moral basis of credit and debt relations has fascinated diverse thinkers such as Nietzsche, Hume, Marx, Foucault, Smith, Wagner, Shakespeare, Chekhov, Montesquieu and Jefferson, among many others (Dyson, 2014). Some of them despised debt in and of itself on the grounds that it "gives great encouragement to a useless and inactive life" (Hume, 1882) and that there exists no "engine so corruptive of the government and demoralizing of the nation as a public debt" (Jefferson, 1903). Others, instead, turned their gaze to the moral dimension of debt repayment within the larger relationship between creditors and debtors. For instance, in George Eliot's *The Mill on the Floss*, the main character's son considers it his personal duty to bail out his father who is experiencing financial bankruptcy. The guilt of the financial loss would have ruined the moral standing of the whole family in front of the creditors and the entire community (Blake, 2009).

While the most overtly religious or philosophically-laden interpretations - such as Nietzsche's theorizing of the link between debt and guilt in the *Genealogy of Morals* - may have faded away over time, moral connotations still permeate and frame public discussions of debt-credit relations (Fourcade et al., 2013). Why would we expect public discourse about inter-national debt relations to be framed in moral terms? Broadly speaking, I suggest two main channels through which moral rhetoric may emerge. In the next section, I will elaborate in mor edetails on how these two channels play out in the specific case of the eurocrisis.

The first reason - already mentioned - concerns the historical connection between debt and morality. Throughout history, discourses around debt and credit have been intimately tied to judgements about the "moral type" of the actors involved (Dyson, 2014). In this regard, then, debtors are deemed guilty of 'living beyond their means' at the expense of the creditors (Küsters and Garrido, 2020), thus leading to the eventual "economic moral collapse" of the state (Berlingske, 12/07/2015).[1].

The second reason concerns the perceived moral superiority of the creditor states who, unlike their debtors counterpart, manage their economy according to the ethical constraints of balanced budget doctrine (Buchanan, 1976). By ignoring the 'household budget constraint' on state spending, debtors squander the accumulated

[1] Available at https://www.berlingske.dk/internationalt/fakelaki-statens-forfald

heritage of the nation at the expense of future generations, thus turning around the 'natural' inclination of individuals to respect the family wealth in order to transmit it, in fact, to posterity (Buchanan, 1999; Cooper, 2021). Such consideration, in turn, gives creditor a truly ethical character. In demanding debts to be repaid, creditors may claim that they are not engaging in selfish material blackmailing, but are fulfilling a "pedagogical role" which, in turn, will benefit them as well as the future generations of the debtor states. In other words, moral evaluation is one way of producing discursive legitimacy to sustain political decisions (Fairclough et al., 2003).

To sum it up, states in debt are found guilty on two grounds: they fail to give back what is owed and, in the process, the jeopardize the well being of their own future generations. Conversely, creditors can take the moral high ground not only because, as a general rule, "debts must be repaid", but also because they can claim to act to the benefit of the future generations in debtors states.

2 The Case of the European Sovereign Bond crisis

If this is true of debt-credit inter-national relations in general, according to many observers and scholars in different disciplines such a "morality tale" became a common thread in the news media's narrative of the European crisis in particular (Krugman, 2012; Antoniades, 2013; Fourcade et al., 2013; De Grauwe, 2011). Among others, Nobel laureate and NYT columnist Paul Krugman has warned against this Manichean view of economic relations, observing that "[if you talk to German officials] they will portray the euro crisis as a morality play, a tale of countries that lived high and now face the inevitable reckoning" (Krugman, 2012). Such remarks have been echoed by another Economics Nobel Laureate, Joseph Stiglitz, who denounced the "morality tale" concerning Southern European countries mismanagement of the economy as "sheer nonsense" and, somehow ironically, as "immoral" (Stiglitz, 2015). Likewise, the London School of Economics economist and EU expert Paul De Grauwe repeatedly urged creditors to "stop playing a game of morality in the Euro Zone" and accept the fact that "responsibilities are shared by North and South" (De Grauwe, 2011). Some journalists and commentators have also been highly critical of the media (and policymakers') characterization of Southern

European populations, and the Greeks in particular, who have been "systematically morally downgraded" ("The Conversation", 05-24-2016)[2]. Likewise, from the pages of the NYT, Roger Cohen laments the German attitude to see economics as "a branch of moral philosophy" in which "[g]rowth is the reward for good behavior. Such virtue includes frugality and avoidance of debt. It goes without saying that, in this view, promoting growth by increasing fiscal deficits is the height of immorality." (Cohen, 2013). Interestingly, even some proponents of austerity measures in the European context have been critical of the overall framing of the crisis. For example, in their recent book *Austerity*, economists Alesina et al. (2020) notice that "[t]hose who believe in the antideficit view at all costs seem to rely on a somewhat misplaced "superiority complex," a view that those who run deficits are somewhat "morally" inferior to those who never have any debt. This is just bad economics." (p. 194-195). Under this perspective, creditor countries have demonstrated to be able to take care of themselves and should be considered more "moral" than their disobedient counterpart, in a framing reminiscent of what renown linguist George Lakoff has dubbed the "strict father morality" in the context of American politics (Lakoff, 2010). In other words, creditor countries have done their part as Euro members in an institutionalized contest where "the virtuous put moral pressure on backsliders" (McKinnon 1997, p.229). By contrast, debtor countries' moral failing is clear in their refusal to follow through their part of the "social contract", i.e. the implementation of structural reforms needed to follow a sustainable debt-management path.

The two general channels through which moral rhetoric may take place can be further elucidated in the specific context of the European crisis.

Recall that the first reason concerns the historical link between debt and morality. While this historical connection is not specific neither to the European Sovereign Bond crisis nor to any specific country as a debtor country, some scholars have argued that the moral cleavage between creditors and debtors was taken to a new level in the European context. Such cleavage takes on a religious connotation by pitting creditors' Protestant ethics of hard work and conditional solidarity against the Catholic values of compassion, familialist solidarism, and unconditional solidarity (Hien, 2019). The contrast is best exemplified in the words of one of the major protagonists of the Eurocrisis, the German Finance Minister Wolfgang Schäuble (2009-2017). In a 2015 in-

[2]Available at https://theconversation.com/a-false-morality-tale-blocks-the-resolution-of-the-greek-debt-crisis-59754

terview with der Spiegel, he openly and quite explicitly tied religious principles to financial outcomes: '[m]y grandmother, who comes from the Swabian mountains, used to say: benevolence comes close to dissoluteness. There exists a type of catholicity, which very quickly has the opposite effect of what had been intended" (Schäuble, 2015)

The second factor concerns the creditors' ability to take on a "pedagogical" argument against the spendthrift, irresponsible debtors which, left alone, would jeopardize their own future. In the EU in particular, this aspect intersects with the historical and social cleavage between Northern and Southern Europeans. Historically, the notion of the 'Mediterranean' has been contrasted with the 'European' (Herzfeld, 1984), with the former characterized by a certain mix of indiscipline, extravagance, laziness, irresponsibility and corrupting tendencies (Van Vossole, 2016). It is Southern countries' membership in the EU - and in the Euro-zone in particular - to pose a risk to a Union otherwise composed of 'good', 'civilized' and 'trained' Northern European people who "work dutifully up to at least 73 and 74 years old and pay more than their share of taxes for the Greek citizens" (Lapavitsas 2010, p.293). Within this context, the Northern creditors take it upon themselves to fulfill the pedagogical and ethical role of the stern teacher dealing with a "truant child who deserves to be punished not only in order to straighten out his own behaviour but also as an example to other kids" (Stavrakakis 2013, p.316). Being recalcitrant 'students', debtor countries has failed to follow their more responsible "role models", such as Germany, the Netherlands, and Finland (Bickes et al., 2014). In contrast with Southern Europe's, and in particular Greece's, reluctance to acknowledge their responsibility, policymakers in creditor countries have often pointed at Ireland as the 'good pupil' among debtors. Among others, Angela Merkel herself urged the Greeks to follow the Irish example (Adler-Nissen, 2017). According to social psychologists Power and Nussbaum, creditors' good reception of the Irish government's proposals to deal with the crisis partly "lies in the pervasive moral logic of the [Irish] nation. Several people we spoke to [in Ireland] believe that the Irish public acknowledges they are partly responsible for their own misfortune and are prepared to reap what they sowed" (Power and Nussbaum, 2014). Under this perspective, the Irish/Greeks are praised/reprimanded for accepting/denying the shift in sentiment at the heart of the European integration project, i.e. the normalization of the idea that strong peer pressure to achieve collective goals is normatively desirable and that those who

resist it should be held morally responsible (Dyson, 2014).

Finally, my own reading of the previous (mostly sociological and anthropological) literature on Greece in particular revealed a third important consideration. The 'cradle' of Western civilization, and its people the 'descendants' of the classical Hellenes, Greece is known to hold a special place in the common cultural Western imaginary (Goldberg, 1993). Within this context, scholars have denounced how the dominant discourse surrounding the Greek crisis revolves around a subtle Orientalist structure (Carastathis, 2014). The constant parallelism between Ancient and Modern Greeks here signals Europe's veneration of classical Greece - thus implicitly reaffirming Europe's good faith in honoring its moral debt to its ancestors - while, at the same time, drawing our gaze on modern Greeks' failure to live up by the standards set by Ancient Greeks (Gumpert, 2017). As an example, consider the following excerpt from the *Bild*: "When your ancestors did not know what to do anymore, they went to the oracle of Delphi [...] What would the oracle at Delphi say today? It would say: Greeks, you should cheat no longer! Greeks, you should recognize yourself!" (cited in Mylonas 2019, p.121). While analytically distinct, the channels can reinforce each other in a discursive fashion. A perfect example of this mixing appears on the February 2010 issue of the German magazine FOCUS. In there, the magazine's cover presents the reader with a photo of Aphrodite giving the finger, accompanied by the headline "Betrüger in der Euro-Familie" (betrayers in the Euro family).

In brief, Southern European countries are found guilty on multiple fronts and the locus of multiple moral failings: they have failed to live up to 'natural' expectations about honoring one's debt and they have betrayed the "European family" by taking advantage of Northern creditors' trust. In addition, Greece in particular has also failed to uphold the moral standards set by their predecessors. Whether and to what extent this discursive framing was utilized during the crisis is the main empirical question that this paper aims to answer.

As such, upon validating my measure of moral content, I will test the following hypothesis:

H1: After the beginning of the Sovereign Bond Crisis, the average moral tone used in articles concerning Souther European debtors will decrease (i.e. become more negative).

3 A Performative Role of the Moral Narrative?

The main empirical goal of this paper is to evaluate whether and to what extent the Southern European Countries have been described in moral terms. For now, though, I will theorize about the possible consequences of such a framing under the assumption that the media actually depicted the crisis in those terms. In particular, while clearly *reflecting* objective economics relations between creditors and debtors, there are reasons to believe that moral framing may also affect investors' sentiments by causing them to be over-sensitive or under-sensitive to risks as a function of whether the moral narrative stresses the virtues or vices of a given country. I fill focus on the *negative* side of the moral narrative since it is more relevant in the context of the eurocrisis.

Scholars from different disciplines have contributed to a growing literature on the relationship between finance and politics focusing on how, for example, political information affects markets (Bernhard and Leblang, 2006). A rationalist framework has been most useful in revealing *if, when*, and *to what extent* information have an effect on the market. Most of these studies have focused on what we may call *narration* – the act of describing and providing objective information that are then incorporated into consumers' choices, asset prices, or governments' decisions.

Unfortunately, such models are ill-suited to explain *how* that information is conveyed and how it is processed by the relevant audience. Recently, Shiller has called for a renewed scholarly inquiry in what he calls "economic narratives" by suggesting that the "prevalence and vividness of certain stories" - rather than the "purely economic feedback" - may affect economic phenomena (Shiller 2019, p.5). Similarly, the suggestion that "narrative" may have a causal effect on agents is similar in spirit to a long tradition in political communication studies which focuses on the "framing" effects of the media (Scheufele, 2000). I will refer to the two concepts interchangeably. As opposed to narrations, narratives do not simply convey information but are embedded in a web of social meanings, albeit often only implicit.[3]

[3]While the distinction between narration and narrative might seem non-standard in English (while it is clear in other languages), it should make sense to the English-speaking reader as well. After all, the word "anti-narrative" exists, but not the word "anti-narration". Indeed, if we think of narration as the act of objectively and neutrally describing events, there should be no other way to do so - there should be no "anti". By contrast, defining a narrative as the act of narrating events within a framework of meaning implies that there can be as many "anti-narrative(s)" as there are sources of meaning. Thus, the Collins dictionary, for example, shows an entry for "anti-narrative" but not for "anti-narration".

The concepts of narrative and framing quite naturally intersect with developments in behavioral economics as they call into question the fundamental principles of the efficient market hypothesis, i.e. the absence of systematic sub-rational behavior. Indeed, framing effects are a classic violation of the invariance principle in rational choice, which states that rational agents' decisions should be unaffected by how choice options are described. Indeed, studies linking irrational psychological processes to financial decisions abound. Starting from the decades-long work of Kahneman, Tversky, and Thaler among others, the literature on the relationship between these systematic behavioral quirks and economic phenomena has become vast and is still growing (e.g. Tversky and Kahneman (1974); Kahneman and Tversky (1979); Hirshleifer and Shumway (2003); Edmans et al. (2007). Table 1 shows a selection of these studies. While the underlying connection between narratives/framing and behavioral economics seems evident, scholars have only started to scratch the surface of its potential behavioral implications outside of controlled lab settings (Shiller, 2019; Nassirtoussi et al., 2014). In fact, textual data – whether in newspapers, blogs, or firms' accounting earnings – has been mostly used as a source of narration, i.e. as a useful way to proxy the objective information that hit the market.

Against this backdrop, I suggest two possible channels through which a negative moral narrative may affect investors' behavior, namely through *expectations* and *sentiments*. In the first case, a moral frame influences investors' perception about the "moral type" of a given (debtor) country (Dyson, 2014). In so doing, their negative expectations of that country creditworthiness would be reinforced beyond what is justified by economic fundamentals. The second channel involves stoking sentiments of anger and/or fear at the countries (governments) that are jeopardizing the stability of the overall financial system and economic safety of bondholders (Lo, 2017). Notice that this could be particularly prominent in the Eurozone due to the shared normative ideas surrounding the European project and the unparalleled levels of inter-national trust developed in the EU. A breach in trust from a fellow European country is likely to be felt more intensely than it would be usually the case in international relations; this may be even compounded by the fact that most sovereign debt is held within other Eurozone members.

Let's look at the first channel more in depth with the example of Greece. In the Fall 2009, the Greek government admitted that their predecessor had cheated and falsified economic data. How could a moral framing

Table 1: Emotional and psychological biases that affect human decision making

Bias	Description	Implications for Investor Behaviour	Reference
Loss Aversion	People feel losses more than gains	Investors hold onto falling stocks, and sell rising stocks too quickly	Kahneman and Tversky (1979)
Framing Effects	Problems framed in different ways leads to different decisions	Information from different sources could lead to different interpretations	Tversky and Kahneman (1985)
Overcon-fidence	Overconfident beliefs in abilities or knowledge	Could lead to excessive risk-taking	Barber and Odean (2001)
Representative bias	Assuming future performance will resemble the past	Investors may buy rising stocks, expecting them to keep increasing	Kahneman and Tversky (1972)
Conrmation bias	Tendency to find information to validate one's prior beliefs or opinions.	Individual investors could interpret news differently depending on their prior beliefs	Nickerson (1998)
Recency bias	People tend to overweight recent information	Investors may more prominently recall or emphasize more recent events	Pompian (2008)
Anchoring	Become xated on a particular information and using it to make decisions	Investors may anchor to a particular price point of what they think an asset's price should be	Tversky and Kahneman (1985)

affect expectations in this context? In this respect, we need to introduce one of the heuristic of human judgment underlined in the seminal work of Tversky and Kahneman (1974), i.e. the representativeness heuristic. In their definition, "an attribute is representative if it very diagnostic, that is, if the relative frequency of this attribute is much higher in that class than in a relevant reference class." As the moral negative narrative about, say, Greeks increases relative to, for example, the characterization of Germans or French, those negative moral attributes become more representative of Greece as a whole. Due to the representativeness bias, then, investors are likely to *over*estimate the likelihood of a representative attribute (immorality) in a class (Greeks). Since, in this context, immoral behavior is tied to a reckless use of public finances, investors may be more likely to overestimate the probability of default as well. As a result, they are likely to demand a higher premium.

Obviously, this is not to say that investors were wrong in updating their expectations about an increased (and increasing) likelihood of default of Greece. In fact, they were undoubtedly correct in doing so. After all, judgment by representativeness often builds on "a kernel of truth" (the perceived untrustworthiness of the Greek government revealed by the Fall 2009 announcement) and allows investors to respond to information in the objectively correct direction (Gennaioli and Shleifer, 2018). Nevertheless, they may have done so excessively because of their subjective reading of that information. To elucidate this point, we need to understand how individual actors move from judgement based on representativeness to beliefs about the world. Scholars have suggested that the linking mechanism is strictly tied to our biological need for "selective recall", which make representative types quickly come to mind when one thinks of the class as a whole (Gennaioli and Shleifer, 2018). In other words, as objectively negative information hit the market, the first thought of those influenced by the moral framing of Southern Europeans as irresponsible will be to link the new information to the previously, and possibly unconsciously, held belief that such borrowers are of the morally untrustworthy type. Being about a character's trait rather than an action, such beliefs are likely to be sticky. In turn, this causes a subjective overreaction to objectively useful information about the state of the economy. As a result, a larger "morality premium" is demanded by investors.

The sceptical reader may observe that the Greek case is quite specific. Even if a moral narrative may have existed, cases of such blatant cheating in public finance are quite rare. In the absence of such a clear moment

when the “true” type is revealed, and the moral stereotype is then activated, the mechanism of selective recall may be subdued. This notwithstanding, we should notice that the pernicious practices of ”fiscal gimmickry” and/or ”creative accounting” have not been confined to the Greek case, but have been common among several other debtor states (Bernoth and Wolff, 2008; Alt et al., 2014). At any rate, a second and more general mechanism may still work via investors’ sentiments rather than expectations. Indeed, thinking in Manichean terms – good vs bad, moral vs immoral, – has been found to affect investors’ emotions and to reduce their ability to think logically (Lo, 2017). Since the efficiency of the market depends on the rational logical thinking of its actors, this suggests that moral frames may reduce the degree of market efficiency. Among others, Andrade and Ariely (2009) have shown how artificially inducing happiness and anger affect players’ behaviour in financial games, such as the Ultimatum Game. In particular, angry participants are more likely to reject “unfair” (but rationally acceptable) offers than happy responders. Importantly, while emotional reaction needs to be about something specific, the target of the reaction may be indeterminate (Elster, 1998). This is where narratives and emotions can be linked together. A given narrative may stoke underlying emotions and direct them against an otherwise indeterminate object. For citizens in creditor countries, who will they blame? The “bad apples” within the Eurozone that keep living beyond their means or an overall international currency system that has failed to live up to its expectations? Setting a narrative is crucial to turn ”emotional indeterminacy” into something specific that everyone can point at and intensely feel. In this case, a moral narrative around the need for internal discipline and responsible behavior directs the anger against those in-debt countries that selfishly broke the ranks and, in so doing, damaged the entire group (the Eurozone or even the EU as a whole). As a result, investors would demand an ”emotional premium” in order to keep financing those responsible for the financial havoc that risked derailing the entire euro project.

To sum it up, the two mechanism described above suggest that a moral framing of the crisis may have affected investors’ expectations and sentiments, resulting in an over-reaction to objectively negative information. This could happen in two ways. First, a moral narrative may lead to moral stereotyping, which in turn affects investors’ prior expectations on the reliability of a given debtor. Second, a moral narrative may stoke underlying emotions, such as anger, that have a distorting effect on rational investors and their decisions. While the

causal effect of moral framing cannot be proven in an observational study, a first step towards this direction is to test whether there is an association between moral language on the one side, and country-specific financial market movements on the other side. In future studies, researchers may want to turn to experimental settings to assess the causal effects of moral framing on debt-credit relations. To this end, the measure of moral content described in the following sections will come useful to construct a suitable treatment vignettes with moral content.

Given the discussion above, I will evaluate the correlation between moral language used in the media and the debtor countries' sovereign bond spreads:

H2a: Regarding Southern European countries, the (negative) moral tone will be positively correlated with sovereign bond risk premia. In other words, as the (negative) moral tone in the media increases, the perception of the country's creditworthiness decreases.

Moreover, previous research on the predictive power of sentiment analysis in financial markets has often found that media pessimism alone does not strongly correlate with sovereign bond spread. Instead, the market seem to respond more strongly to the interaction between media pessimism and the concentration of news, i.e. the interaction between sentiment and volume (e.g. Liu 2014). As such, I will test also the following:

H2b: Regarding Southern European countries, the interaction between the volume of articles and (negative) moral tone will be positively correlated with sovereign bond risk premia. In other words, as the number of articles increases, (negative) more tone becomes more predictive of a country's perceived creditworthiness.

4 Data Collection

To evaluate my hypotheses, I downloaded articles from the Factiva database for the time period 2001-2016[4]. Given the nature of the research it is important to capture a time frame that include both pre- and post-crisis

[4]I collected the data fro Greece up to the end of 2019. Such data is analzyed in more details in Chapter 2

periods. To recall, the goal is to construct a time-series of the "moral narrative" for each country. The criteria for journal selection are the following 1) readership size; 2) data availability on Factiva; 3) language (English). I selected the following financial journals: *Barron's*, *The Economic Times*, *The Economist*, *Forbes*, the *Financial Times*, the *Wall Street Journal*, *Investors' Business*. Regarding generalist tabloids, I selected the following: *the Daily express*, *the Daily Mail*, *the Daily Mirror*, *the Daily Star*, *Evening Standard*, *The Sun*. Regarding quality papers, I selected the following: *The Daily Telegraph*, *The Guardian*, *the Independent*, *The Time*.

The emphasis on written media rather than on other forms of communication (e.g. Television) is mostly due to practical reasons, mostly the extensive availability of textual evidence to be analyzed. While there is no denying that written newspapers circulation has been in historical decline, as of 2013, 40% of British adults indicated newspapers as they preferred source of news, with a further 12% mentioning newspapers websites and apps (Ofcom, 2013). Given their generalist nature, tabloids discuss financial topics less frequently. As such, a higher number of tabloids is needed to create an equivalent time series. For the purpose of validating the dictionary and testing the first set of hypotheses, I work with the full aggregate sample of newspapers. Chapter 2 of the dissertation will further explore the difference between financial papers, broadsheets, and tabloids. Regarding the second set of hypotheses, the analysis of bond spreads will be carried out only on financial papers for all five countries (Greece, Italy, Portugal, Ireland, and Spain) under the assumption that investors are unlikely to read tabloid to obtain valuable information for their investment strategies (Doyle, 2006). By doing so, the test of the second set of hypotheses is particularly conservative since, as demonstrated in Chapter 2 of this dissertation, financial newspapers are less likely to use moral frames relative to generalist papers in general, and tabloids in particular.

The data collection phase faces two main challenges. The first one is to ensure that the articles are about the target country's economy rather than just mentioning it passim. This is known in the natural language processing literature as "the problem of aboutness" (Hutchins, 1977). The second challenge is to retrieve enough coverage to construct a meaningful set of time-series indexes. Clearly, there is a trade-off between the two goals.

Regarding "aboutness", the literature provides little guidance on how to perform the search. After all, it

is hard to imagine a rule of thumb that can be generalized to all searches and all topics. Lacking an optimal strategy, different criteria have been proposed to minimize the probability of mis-classification. Some scholars have opted for casting a fairly wide net - such as Breeze (2014)'s search for one single mention of both "Spain" and "crisis" - while other scholars have used more restrictive criteria. For example, Liu (2014) requires that the headline contains the country name and that the article mentions either "sovereign" or "debt" at least five times. Similarly, in a study on the European sovereign bond crisis, Büchel (2013) searches for politicians' last names and more than one crisis-related key word (e.g. "Tsipras" and "crisis"). Other prominent works in finance also display similar variations in the search query criteria (Tetlock, 2007; Ahmad et al., 2016).

Keeping the above discussion in mind, my first search criteria was as following: 1) at least three mentions of the country or the country's adjective or its population (e.g. Greece, Greek, Greeks); 2) at least three mentions of economics or related words (econom*). After manually inspecting a random sample of 100 articles (or all the articles if they do not reach 100) for each outlet, I concluded that I could relax the search criteria to only two mentions, which results in a more comprehensive time series of moral content. Given the nature of the research it is important to capture a time frame that includes both pre- and post-crisis periods, which is more easily achieved using the less restrictive search query.[5] The result seems to be satisfying for "reputable" journals, although less so for tabloids, which tend to discuss more general news. As an example, the following tables shows the percentage of "aboutness" miss for each search for Greece, i.e. the proportion of articles that mentioned Greece only en passim out of a random sample of 200 articles for each search (for comparison, I also show the proportion of not relevant articles for a simple search requesting only one mention of the country.

Table 2: Search Criteria

Search criteria	% not relevant	N of total articles
(country OR population OR adjective) AND econom*	18%	40438
atleast2(country OR population OR adjective) AND atleast2 econom*	6%	23108
atleast3(country OR population OR adjective) AND atleast3 econom*	4%	16204

The results are substantially similar, albeit more noisy, if I rely on the stricter criterion requiring at least three mentions.

[5]Using Greece as an example, once the scores are aggregated at the monthly level, there is only one missing value, i.e. only one month where there was no article on Greece at all (April, 2006). On the other hand, there are 16 months with no score if I use the more restrictive search string. All missing values are linearly interpolated prior to executing the analysis.

5 Measurement

How to measure moral content in textual data? Before assessing this specific question, it seems worth recalling how sentiment in general is usually measured in textual data. In a nutshell, there are two possible approaches to content analyzing frames in the news: inductive and deductive (Semetko and Valkenburg, 2000). The former involves analyzing a news story with an open view to attempt to reveal the totality of possible frames. The latter involves predefining a certain frame as theoretically important and to verify the extent to which such frame occurs. Deductive approaches are more appropriate for hypothesis testing, while inductive approach are best suited for generating novel insights. Most of the literature reviewed earlier falls into the latter camp. Moreover, we can further divide deductive approaches in two groups: dictionary-based methods, which use a pre-defined lists of sentiment-bearing lexical terms; and machine learning methods (ML), which attempt to extrapolate a set of characteristics that are indicative of different sentiments from the data.

In the first case, the main idea is to take a document as an input and, for each word in the document, search for a match in a predefined dictionary. For long documents (such as news articles), the raw frequency tends to be a poor indicator and the frequency is usually normalized by the total number of words in each document, and then multiplied by 100 for ease of interpretability. A wide number of dictionaries has been developed since the 70s, starting with the General Inquirer IV dictionary (GI from now on) constructed and updated over time by Harvard social psychologists (Stone et al., 1966). In addition to dictionary-based approaches, a number of studies have used ML methods to create quantitative sentiment proxies. In particular, scholars have relied on supervised learning techniques through classification methods, such as Naïve Bayes, Support Vector Machines, decision trees, and conditional random fields (Nassirtoussi et al., 2014). In this case, the main goal of the learning algorithm is to infer a statistical function from labelled examples (the 'training set'). Typically, ML approaches adopt a bag-of-words methodology. The text is represented as an unordered sequence of lemmas and each individual word is characterized as a 'feature' in a n-dimensional space. Importantly, the extracted words need not to be linguistically evaluative, in stark contrast with dictionary-based approaches that are usually inspired by some psychological and/or linguistic theory (Cook, 2017)

Machine learning approaches are more flexible and often lead to better predictive performances. While dictionary-based approaches may not retain the same predictive ability, they are better tied to theoretical constructs. Given the hypothesis-testing nature of the research question that this paper addresses, I opt for a dictionary-based approach. The extant literature provides two dictionaries to measure moral content in writtent texts: the General Harvard Inquirer (GI) and the Moral Foundation Dictionary (MFD). I discuss each in turn.

In particular, I propose to combine two extant dictionaries - the sub-dictionary of the General Harvard Inquirer (GI) dictionary that concerns vices vs virtues, and the Moral Foundation Theory (MFT) dictionary (to be discussed shortly) - to a simple ad hoc dictionary developed for the specific issue and context at hand. I further propose a double weighting scheme, based on theoretical and empirical grounds. Here I describing the two extant dictionaries in more details as well as the construction of the combined dictionary. The Appendix contains the measure validation. First, I use the new resulting dictionary on a small sample of articles which can be expected a priori to contain either very low or very high moral content. Second, I validate the dictionary on a set of articles whose moral content was manually coded in a previous study (Feinberg and Willer, 2013).

5.1 The General Harvad Inquirer Dictionary (GI)

The General Harvard Inquirer was the culmination of one of the earliest attempts at mapping (the English) language onto affective dimensions following the theoretical linguistic work of (Osgood et al., 1957). In particular, Osgood and his colleagues were among the first to suggest that the word connotation could be represented by a vector in n-dimensional space. Their research opened up the possibility to empirically study polarized language by quantifying words and phrases along evaluative dimensions, i.e. sentiment analysis (Cook, 2017). Its current form consists of 11,788 word senses and 183 semantic categories derived from research in social psychology. The assignment of words to category is binary in nature: a word is either mapped to a particular category or it is not. The categories are not mutually exclusive, thus reflecting the polysemantic character of language.

Importantly, following one of the revisions, two moral categories were added. These vice and virtue categories are defined by (Dunphy et al., 1974) as ”characteristics of persons, processes or objects generally

regarded by society (a white middle-class American society) as vices (virtues) or misfortunes (good fortunes)". Composing the two sides of the semantic dimension of morality, the 'vice' and 'virtue' categories denote word of unethical/immoral and ethical/moral nature, respectively. It is important to notice how these categories are by and large sub-categories of the overall positive/negative dictionary. Indeed, 92.55% of the GI's vice terms are also tagged as negative, and 84.14% of the GI's virtue terms are tagged as positive.

The GI dictionary provides a natural starting point for the methodological goal at hand. The main advantage of this dictionary is its coverage (n=1017; vice=498; virtue=519) and the main disadvantage is its precision. While the whole dictionary was designed with rigorous linguistic and psychological theories in mind, its purpose was extremely broad, i.e. to measure the overall tone in texts. The addition of the moral categories came only later, when researchers decided to break down the overall positive and negative tags in more fine-grained categories (Dunphy et al., 1974). Hence, the focus was not on how to measure morality, but on how to represent affective tone in general, with ethical language being only a subset of it.

5.2 The Moral Foundation Dictionary (MFD)

Another more recent stream of research in social psychology has explored the psychological and linguistic aspects of morality in more details, i.e. Moral Foundation Theory (Haidt, 2001). The project aimed to identify the psychological foundations of moral systems. The researchers identified five moral foundations, supposedly common across time and space (albeit in different degrees):

1. Harm/care: basic concerns for the suffering of others, including virtues of caring and compassion.

2. Fairness/reciprocity: concerns about unfair treatment, inequality, and more abstract notions of justice.

3. Ingroup/loyalty: concerns related to obligations of group membership, such as loyalty, self-sacrifice and vigilance against betrayal.

4. Authority/respect: concerns related to social order and the obligations of hierarchical relationships, such as obedience, respect, and proper role fulfillment.

5. Purity/sanctity: concerns about physical and spiritual contagion, including virtues of chastity, whole-

someness and control of desires.

Importantly, the authors also designed a dictionary to map lemmas to each domain for the purpose of detecting moral content in written texts (Graham et al., 2009). Each of these domains is divided into positive and negative aspects (hence ten sub-categories in total). A lengthy discussion of the theory underlying its construction is unnecessary since I do not make use of the different categories. Instead, I will combine them into one general category (vice vs virtue). Such approach has been previously utilized to study political and moral differences on a range of issues such as the death penalty, abortion, gun control, immigration, flag burning, euthanasia, and ideology (Ditto and Koleva, 2011; Graham et al., 2009; Kraft, 2018).

The main advantage of the MFD is its precision, given that it was explicitly designed to measure fine-grained moral dimensions in textual data. Nevertheless, even after combining all the foundations in one overall dictionary, the coverage remains low (see Table 3). The dictionary is likely to be well equipped to capture intense moral content, but might be too specific to capture the moral loading in contexts that are not intrinsically moral (e.g. financial texts).

Table 3: The Moral Foundation Dictionary (MFD)

Foundation	Virtue	Vice	Total
Authority	45	37	82
Fairness	26	18	44
Harm	16	35	51
Loyalty	29	23	52
Purity	35	54	89
Total	151	167	318

5.3 Webster-Marriage dictionary (WM)

Finally, it should be noted that the moral content that we are trying to capture is specific to the context of the North-South relationship within the European Union. As discussed before, such moral frame revolves around not only the concept of morality per se, but also around the dichotomy of the ”lazy” South vs the ”hard-working” North. As such, I propose to augment the previous dictionaries with another list of words tailored around these more specific concepts. In order to develop this more contextualized list of words, I search for

the word ”laziness” and ”hard-working” in the Merriam Webster Thesaurus dictionary online (MW from now on) and choose all words under the “synonym” and “word related to” categories. The list of words is in the appendix. A comparison of the three dictionaries shows that this final addition has some value. In particular, an additional 87 words (37 for vice, 50 for virtue) are selected. These include lemmas that are arguably important for the context of this study, such as ”spendthrift”.

Table 4: The Merriam Webster dictionary (MW)

MW	Not in GI	Not in MFD	Not in GI or Not in MFD
Vice	29	62	37
Virtue	50	74	50

5.4 Weighting scheme

Not all moral words are created equal nor carry the same amount of moral connotation. To account for this, I propose to combine the three dictionaries and weight each lemma according to a double weighting scheme that I justify on both theoretical and empirical grounds. I conceptualize morality as a latent continuous concept that is manifested linguistically not only by the sheer number of words with moral connotation, but also by the moral intensity of each lemma. There is little reason to believe that any two morally relevant word, be them in the same dictionary or in different dictionaries, should necessarily have the same moral loading.

The first weighting scheme is theoretical in nature. I suggest that the three sub-dictionaries - GI, MFT, and WM - represent three layers capturing different degrees of morality. The GI is the more general layer and will thus be treated as the benchmark. The MFT is the second layer and captures lemmas containing a more explicit moral dimension. Finally, the MW-based dictionary moves even closer to the idea of a moral narrative in the specific context of the European Union with its emphasis on the ”hard-working”/”laziness” dichotomy. An implication of this conceptual movement from general to specific is that there is an inverse relationship between coverage (the number of words in each dictionary) and precision (the degree to which words capture the concept). This is indeed the case. The GI dictionary contains more words than the MFT dictionary which, in turn, includes more tokens than the MW dictionary. As such, words contained in the MW should be weighted more than words contained in the MFT which, in turn, are more relevant than words contained in the GI. While

the ranking of the weights is theoretically based, the specific weights cannot be inferred by theory. Since a decision must be made, I opt for a relatively straightforward and transparent weighting scheme. I multiply the contribution of each MFT word towards the overall moral score by 2 and the contribution of each WM word by 3. Thus, the GI is used as a benchmark and is not weighted. At any rate, results are robust to different weighting schemes provided that the same ranking is maintained.[6] As the dictionaries partially overlap, there needs to be a criterion to avoid double counting. In the case of overlapping, I keep the lemmas in the higher-order dictionary (that is, WM > MFT > GI). After deleting the shared words from lower-order dictionaries, the final dictionary is structured and weighted as show in Table 5. As we can see, there is an inverse relationship between precision and coverage.

Table 5: Components and Weights

Dictionary	Vice	Virtue	Weight
General Inquirer	498	519	1.0
Moral Foundation Theory	112	131	2.0
Merriam-Webster	37	50	3.0

The second weighting scheme is empirical in nature and based on a vast literature on information retrieval and natural language processing. It is empirically based in the sense that it is derived uniquely from the specific texts to analyze (Silge and Robinson, 2019). As noted before, conventional dictionary-based methods usually consist of the proportion of signal word occurrences in each document. However, in different contexts some dictionary terms might be too ubiquitous to be regarded as an unambiguous indicator for specific moral considerations (Kraft, 2018). For example, ”leader” is a signal word for the authority dimension in the MFT. However, articles discussing country-specific political issues may describe the qualities (or lack thereof) of presidential candidates as ”leaders” regardless of moral considerations related to authority. Likewise, the term ”bankruptcy” in discussions about public finance is likely to have a merely descriptive/factual connotation. One way to address this problem would be to revise the dictionary and eliminate ambiguous words. While I did that in the development of the WM dictionary, such revisions could be arbitrary and leave too much discretion to the researcher. Instead, I rely on an alternative approach. If a specific dictionary term like “leader(s)” is commonly

[6] I experimented with the following weights: 1, 1.2, 1.5 / 1, 1.1, 1.2 / 1, 1.5, 2.

used to describe a country's economy, it is likely that the term can be used in multiple contexts. As such, it is not necessarily unique to the moral domain. Terms that are found in almost all articles therefore provide less information about differences in their (moral) loading than terms that only occur in a few articles.

As such, I compute moral scores by weighting each term in the dictionary according to its frequency across documents, which serves as a proxy for the term's "discriminative content". The result is what is referred to in the literature as the term frequency-inverse document frequency (TF-IDF) score. More formally:

$$\text{MD}_i = \frac{1}{W_i} \sum_{t \in D} [w_{it} \log_{10}(\frac{N}{n_t})]$$

where MD_i denotes the score of document i, W is the total number of words in document i, t indicates a term in the set of signal terms in the dictionary (D), w_it denotes the number of occurrences of term t in document i, N represents the total number of documents, and n_t is the number of documents in which the term appears. The weight represents the inverse of the proportion of documents in which the target term appears. Moral terms that are ubiquitous across the entire corpus receive a lower weight, and terms that appear in only a few documents receive a higher weight. Overall, the term frequency-inverse document frequency score provides a correction for potential distortions due to sub-optimal terms in the dictionary (Silge and Robinson, 2019).

In conclusion, an article's raw moral content (positive and negative, separately) is given by the (double) weighted proportion of words in the article that signal a moral connotation. The raw score has a lower bound of 0 (document does not contain any dictionary terms) and is independent of document length (since it is based on relative occurrences). Higher scores imply larger proportions of dictionary terms in a document. Everything else being equal, words that appear in nearly all articles affect the scores less than words that appear only in a few articles because ubiquitous terms convey less information about differences across individuals. At the same time, everything else being equal, words contained in higher order dictionaries are weighted more to account for the greater precision and less coverage of the dictionaries themselves.

Before moving to the empirical analysis, a few words on the exact procedure seem in order. The empirical weights derived from the above formula are calculated on the whole corpus, i.e. all words (except common stopwords). Calculating the tf-idf score only on the moral terms would give incorrect results as all lemmas

are needed to assess the relative discriminatory power of each. As such, after cleaning, pre-processing and tokenizing the texts, I calculate the tf-idf for each word in the body of texts. The procedure to calculate the tf-idf already accounts for text length as it divides the number of occurrences of each word by the length of the document (i.e. the tf part of it) before calculating the weights (i.e. the "idf" part of "tf-idf"). Then, I keep only the tf-idf scores for the lemmas contained in my dictionary and multiply them by 2 or 3 if they belong to the MFD or WM, respectively.

Equipped with a reliable measure of positive and negative moral tone, I calculate the moral sentiment score for each article as follows:

Moral Sentiment Score = 100*(Virtue-Vice)/Total

Lower scores indicate an increase in negative moral content. A potential drawback of this measure is that it is also a function of the article total length. Hence, a lower score might indicate either a genuine increase in the number of negative moral words or a shortening of the articles themselves. As a robustness check, then, I run the analysis using an alternative measure. I follow Sadique et al. (2013) and compute the following score:

Moral Sentiment Score (2) = (Virtue-Vice)/(Virtue+Vice)

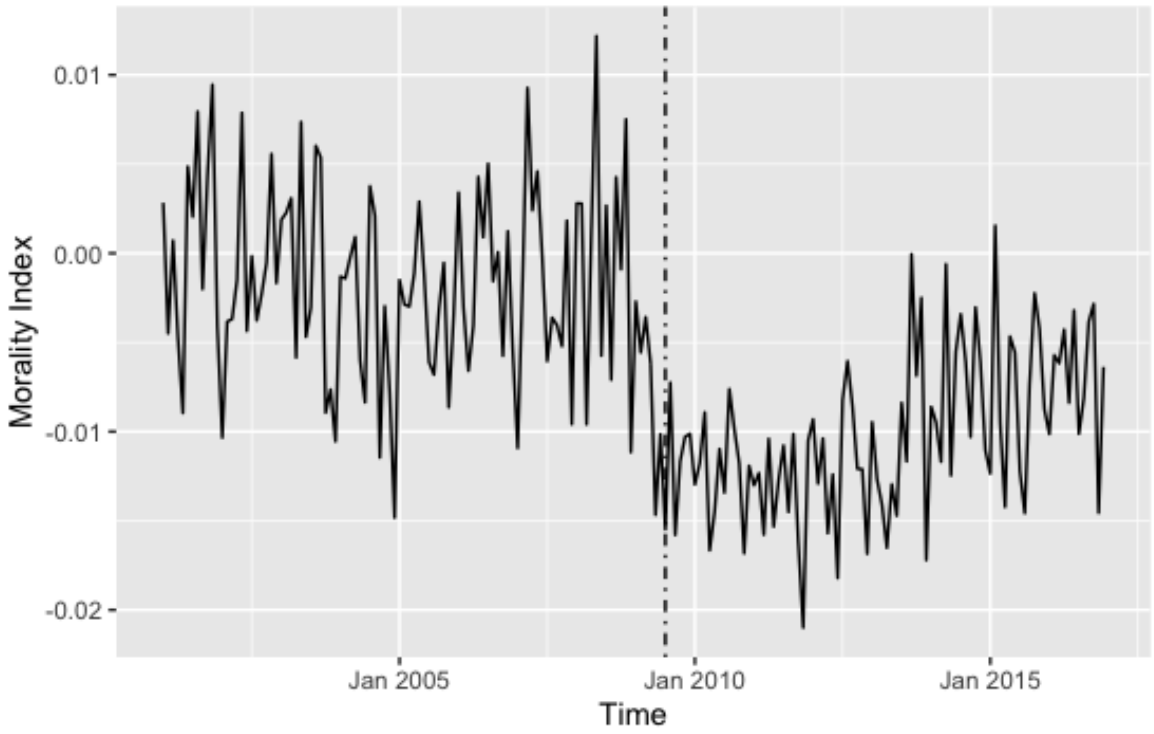
The pairwise correlation of the two measures is r=0.91. To construct the final time series, I take the average moral sentiment scores for each month between January 2001 and December 2016.

6 Empirical results: The Sovereign Bond Crisis as a Morality Tale

If Southern European countries were framed in negative moral terms, we should see an appreciable drop in the average moral score following the beginning of the crisis in the Fall 2009. Figure 1 shows the results for all countries combined. Figure 2-6 shows each country's graph.

A few features are worth noticing. First of all, prior to the beginning of the crisis, the series is characterized by higher volatility and wanders in a white-noise fashion. These univariate properties of the series are consistent

Figure 1: Morality Index (Monthly Average - All Countries)



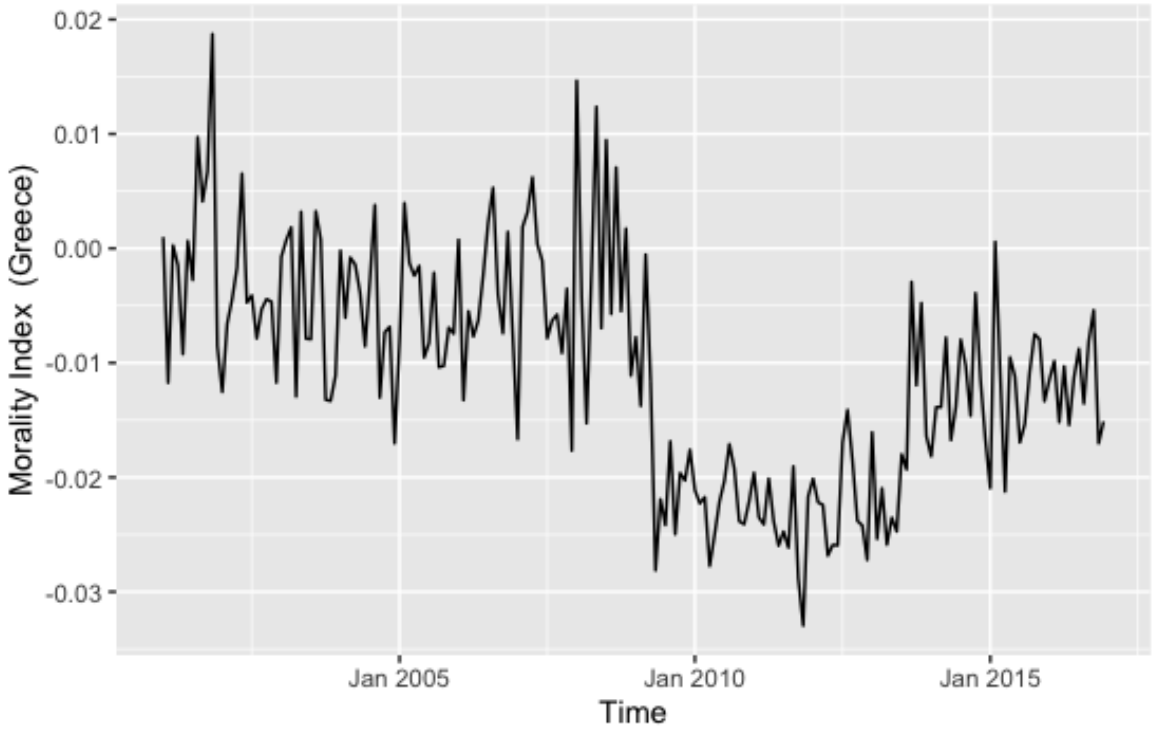
with what we know from the literature in political communication. Absent consistently bad (or good) news, i.e. during "normal" times, issues regarding these countries are not particularly salient. Being salience one of the strongest determinants of newsworthiness (Hamilton, 2011), the number of articles per month for the 2001-2009 period is lower. With fewer articles to aggregate, those with more extreme (negative or positive) values have a greater effect on the overall score. Second, the absolute scores have little interpretation. To begin with, we have no prior expectations about what the "benchmark" moral content in written texts should be during "normal" times. On the one side, news media display a tendency towards the publication of negative news. This is a well-known phenomenon in the media literature, the so-called negativity bias (Soroka, 2014). On the other side, while the 'vice' and 'virtue' dictionaries are similar in size, the list of words is by no means equal. Even if the two lists were perfectly balanced, there is no guarantee that natural languages are neutrally bias. For example, the English language seems to be positively biased (Kloumann et al., 2012). Which effect would be greater is hard to say a priori. Nevertheless, what the moral sentiment scores allow us to detect is

the longitudinal relative change in the level of moral tone. Second, at some point in the Summer/Fall 2009, the monthly average morality index drops, thus signaling an increase in negative moral framing. The index wanders below -0.01 until the end of 2012, the most intense period of the crisis for all the countries involved. After that, the average negative moral content decreases, although it never comes back to the previous level (at least until the end of 2017).

Moving on to each individual country's results (Fig. 2-6), the graphs for individual countries are similar overall, although some interesting differences emerge. Unsurprisingly, Greece is the one discussed in moral terms most often. Except for Ireland, all graphs seem to have a very similar shape, although different scale.

From these graphs, we can see how the index score for the period post 2012 in Fig.1 is due mostly to Greece (see Figure 2). While the other European countries had recovered, Greece would experience a second phase of the crisis on its own. Nevertheless, the analysis reveals one surprising finding concerning moral framing in 2015 more specifically. Throughout that year Greece experienced a second phase of the crisis on its own, eventually culminating in the January 2015 elections and the establishment of the Tsipras government, the Athens-Brussels bargaining over the terms of a new bail-out, the Greek referendum on the agreed upon deal, and the final backing down of the Greek government to the creditors in the Fall 2015. Nevertheless, this second phase was *not* accompanied by a similar increase in negative moral tone. This result is surprising if one considers that, by early 2015, the Greek economy had apparently resumed and successfully marketed new bond to private investors. In a sense, then, the Greek government's repudiation of the new bailout may have jeopardized the beginning of the very economic turnaround that the country had been waiting for (Wolf, 2018). Under this perspective, one may have expected a surge in moral language to the describe the Greek government's 'irresponsible' behavior. At the same time, though, the lack of increase in moral rhetoric in this later stage of the crisis echoes previous findings in the literature. For example, Bickes et al. (2014) analyze the financial crisis in the English and German press and concludes that the harshest phase of "Greek bashing" was gradually replaced after 2012 with a more sympathetic, moderate, and less offending view of the sufferings of those in the crisis-hit country.

Figure 2: Morality Index (Monthly Average - Greece)



The moral scores for Portugal and Spain (Fig. 3-4) are very similar. This is to be expected given the similarity and interdependence between the two countries. Moreover, a cursory look at the the articles content reveal that Spain and Portugal are often discussed in tandem, thus sharing similar moral loadings in several articles, above all after Fall 2009.

Figure 3: Morality Index (Monthly Average - Portugal)

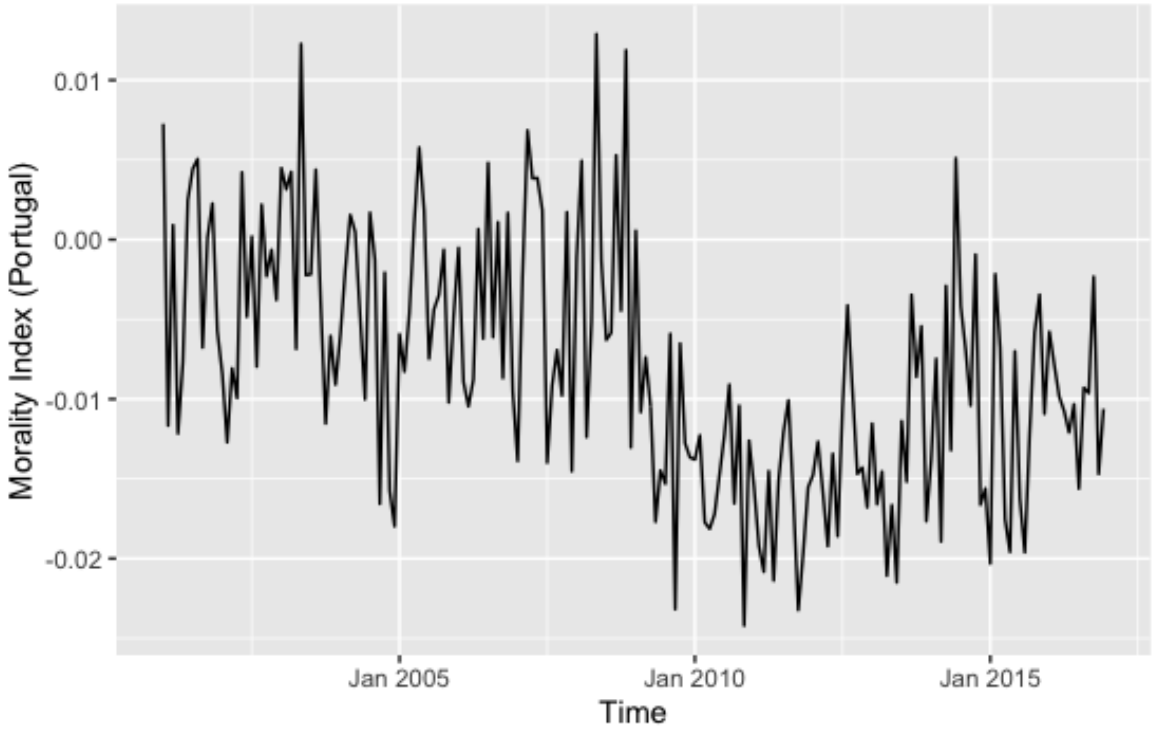
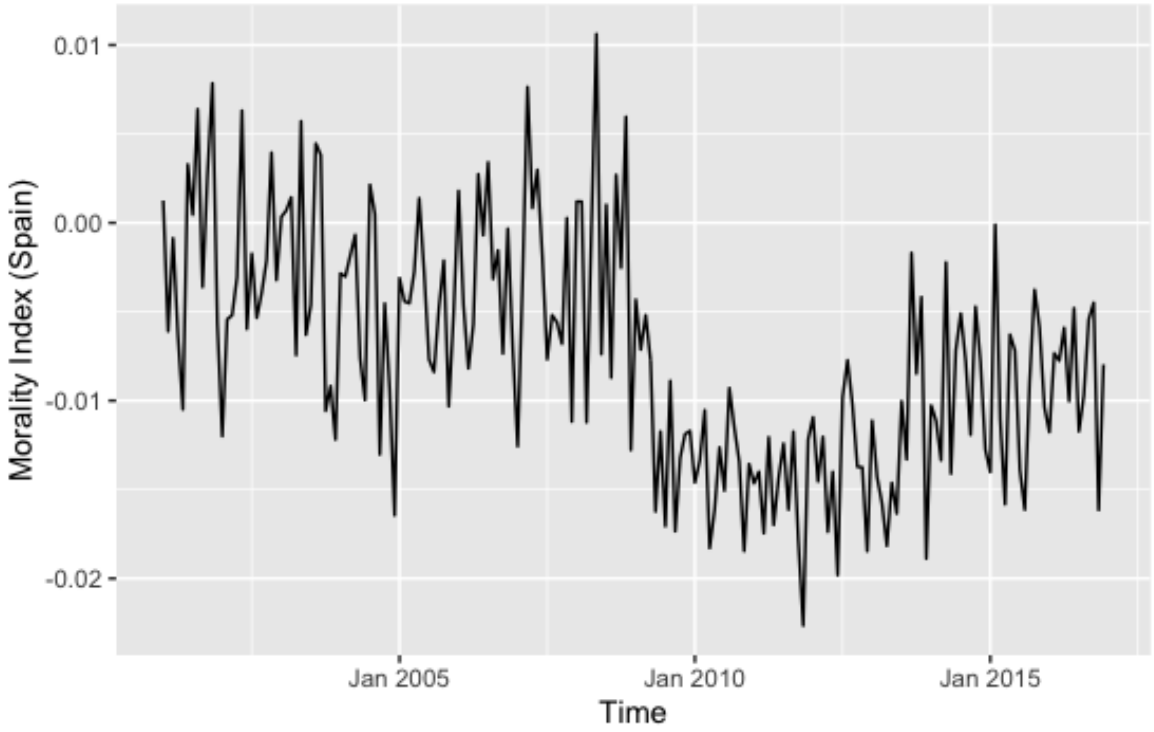
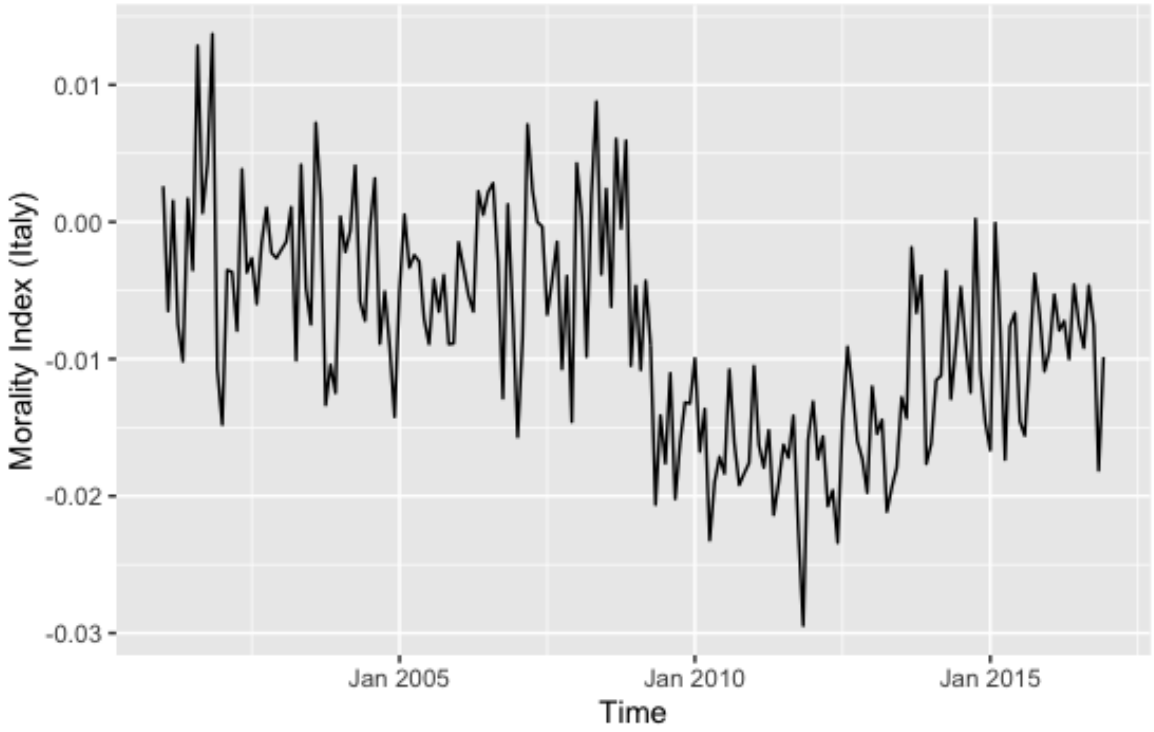


Figure 4: Morality Index (Monthly Average - Spain)



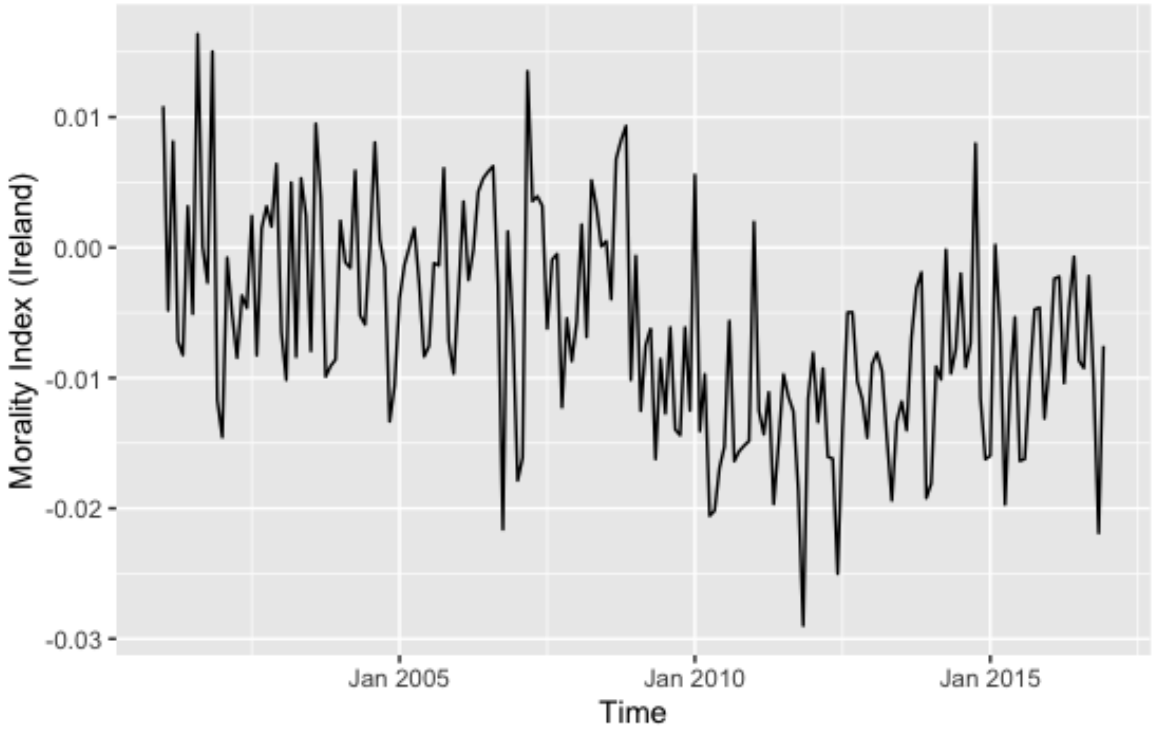
The moral score for Italy (Fig. 5) is similar in shape to that of Greece, although the lower plateau lasts for a shorter period. Moreover, unlike Greece, it bounces back to (almost) its pre-2009 level by the end of 2013. The timing roughly coicide with the end of Mario Monti's technocratic government, an emergency executive, and the return to "normal" democratic politics with the 2013 elections. By that time, the Italian 10-year Government Bond interest rate spread was approaching its pre-crisis level.

Figure 5: Morality Index (Monthly Average - Italy)



Unsurprisingly, Ireland (Fig. 6) is the debtor country discussed in the least negative moral terms. Such representation is consistent with the previous discussion on how Ireland was viewed as the ”good pupil”, and thus somehow distinct from the other debtor Southern European countries. Clearly on a upward trajectory, in December 2014 the Irish score even shows the 4th highest (i.e. positive) moral score in the sample.

Figure 6: Morality Index (Monthly Average - Ireland)



Overall, visual inspection of the above graphs validates my first hypothesis. We can test whether the statistical properties of the series change over time in a more rigorous fashion. To do so, I rely on the econometric literature on structural break and changepoint detection. While other estimation procedures are possible (e.g. Bayesian estimation), I rely on a well-established likelihood-based framework for changepoint detection (Hinkley, 1970). Since the hypothesis is concerned with a pre/after comparison, the goal is to automatically identify the location of a single changepoint. Let's define τ as the unknown changepoint time we are interested in. For an ordered sequence of data $y_{1:n} = (y_1, ..., y_n)$, the null hypothesis corresponds to no changepoint ($m = 0$) and the alternative hypothesis is a single changepoint ($m = 1$). More formally:

$$H_0 : \theta_1 = \theta_2 = ... = \theta_{n-1} = \theta_n$$

$$H_1 : \theta_1 = \theta_2 = ... = \theta_{\tau-1} = \theta_\tau \neq \theta_{\tau+1} = \theta_{\tau+2} = ... = \theta_{n-1} = \theta_n$$

In other words, we test to see whether at some point between τ and $\tau+1$ the parameters of the underlying distribution change. The test statistics is constructed as the log-likelihood ratio H_1/H_0. For the null hypothesis the maximum log-likelihood is simply $\log p(y_{1:n}|\hat{\theta})$. Under the alternative hypothesis, the maximum log likelihood for a given changepoint location is $\log p(y_{1:\tau_1}|\hat{\theta}_1) + \log p(y_{(\tau_1+1):n}|\hat{\theta}_2)$. Since the changepoint location is unknown, the maximum is searched for over all possible time points $\tau = 1,2,...,n-1$. The null hypothesis is then rejected for a sufficiently large value of the log-likelihood ratio (Killick and Eckley, 2014). I rely on the Bayesian Information Criterion (BIC) to define the critical value. The results are robust to alternative penalty factors (AIC, SIC and Hannan-Quinn). I search for changepoint in both variance and mean, although the results are almost identical if one models each parameter separately.

The single changepoint locations according to this procedure occur: between October and November 2009 for the aggregated series as well as for Greece, Italy, and Portugal individually; between December and January 2010 for Spain; and between February and March 2010 for Ireland. As expected, this is approximately around the time when, in late October 2009, the new Greek government disclosed the 2009 budget deficit to be 12.7 percent of GDP, twice higher than the previously announced figure. Soon after those revelations, Greek, Irish and Portuguese spreads started skyrocketing. A few months later, Spanish and Italian long term interest rates followed suits.

7 Empirical results: Moral Rhetoric and Sovereign Spreads

The previous section shows how the Sovereign bond crisis has been accompanied by an increase in (negative) moral tone. Could this Manichean characterization of Southern European economies have affected investors' perceptions and, as a consequence, their investment decisions? While one cannot infer causality with observational data, we can formally test the hypothesis that such increases in moral tone are systematically correlated with changes in Sovereign bond interest rates after controlling for well-known economic fundamentals. In what follows, I rely on Liu (2014)'s econometric specification.[7] The dependent variable of interest is the difference between a country's 10 year sovereign bond interest rate and the equivalent interest rate of Germany. This is a

[7]This is the first published study using textual sentiment measures to predict Southern European countries bond spreads.

widely used measure in the political economy literature (e.g. Mosley 2003; Bernhard and Leblang 2016). The dependent variable is expressed in basis points (1/100th of 1%). Its main advantage is that - unlike a country's yield by itself - it eases concerns about common supranational factors, such as monetary policy in the EU, that may be affecting all countries contemporaneously. The two independent variables of interest are the mean moral content per unit of time (i.e. the average moral score among financial newspapers) and the total volume of articles with moral content. The latter is, essentially, the interaction between the number of articles (volume) and each article's morality index score. Hence, I include both constituent terms in the specification. Consistent with the previous literature, I control for the following variables.

First, I am accounting for Credit Default Swap (CDS) rates. CDS is a type of financial agreement where the seller pays the buyer in the event of a debt default or credit-related event. The premium charged by the seller increases with the buyer's likelihood of defaulting, making it a reasonable indicator of credit risk. In this study, the CDS premium serves as a proxy for credit risk and is denoted as CDS. The measure used subtracts Germany's corresponding CDS premium from each country's sovereign 10-year bond CDS premium.

Second, to synchronize with other variables, I have chosen to include only those credit-related macroeconomic and fiscal variables that are available in the Economists Intelligence Unit or Eurostat databases on a quarterly basis, which is the highest frequency available. The two selected variables are the current account balance (as a percentage of GDP), referred to as CAB, and industrial production (as a percentage change per year), referred to as IND. To make these quarterly variables compatible with daily variables, I have assumed that their values remain constant within each quarter and have transformed them accordingly. Additionally, I have expressed these variables as differences relative to Germany.

Third, I account for global liquidity Similar to Sgherri and Zoli (2009), the measure used to proxy for liquidity (LIQ) in this research is the market value of long-term sovereign bonds. More precisely, it is the difference between the market value (in US dollars) of each country's sub-indices of the Bank of America Merrill Lynch (BOFA ML) Government 10+Y Bond Index and that of Germany's sub-index.

Lastly, I account for overall risk aversion, which is measured as the difference between the yield of US corporate bonds and the yield of Treasury bonds. To be specific, it is the difference between the yield of the

BOFA ML US High-Yield 1-10Y corporate bond index and that of the BOFA ML US 1-10Y Treasury bond index, and it is denoted as RISK. Panel unit-root tests are conducted on each data series to determine their stationarity. In instances where a variable is not stationary, it is included in the equation in its first difference.

The chosen method of estimation is the two-step feasible Generalized Method of Moments (GMM) (Hayashi (2011), Ch. 3). Robust standard errors that account for heteroskedasticity and autocorrelation are used. GMM is preferred over General Least Squares (GLS) due to the presence of the lagged dependent variable on the right-hand side of the equation, which leads to autocorrelation, and the potential for yield spreads to predict negative sentiment in news stories, which can create endogeneity problems. GLS estimators are not appropriate in such situations, as highlighted in a previous study by Liu (2014).

Table 6 below shows the results for the monthly dataset covering 2009-2015 (hence, the analysis is conducted on a sub-sample of the monthly morality index scores). For ease of interpretation, I reverse code the the morality index. I use only the articles from financial journals, under the assumption that investors would not read tabloids to gather useful information about their investments. Except for the CAB variable, all variables in the model are significant. As we can see from the second and third row, we reject the null than an increase in moral tone is unrelated to changes in spread, albeit only at the 10% level in the case of the average moral tone. The results are relatively small in size. One standard-deviation increase in the moral score leads to an increase in risk premia by roughly 0.2 basis points (Model 1 and Model 2). As suggested by the literature, the sheer number of articles - regardless of their content - is also a good predictor of financial movements. As Model 3 and 4 show, one extra article is associated with an average increase in risk premia by between roughly 0.2 and 0.3 basis points (Model 3 and 4). Finally, the effect of moral language is exacerbated by the number of articles. A one unit increase in the number of articles with moralized tone is associated with between roughly 0.3 and 0.4 basis points increase in a country's spread (Model 5 and 6). In other words, the effect of moral language is stronger when the issue is salient, i.e. when the the number of articles increase. Overall, Hypothesis 2a and 2b seem to be supported by the data. The rhetorical aspects of financial journalism helps predicting movements in sovereign bond markets.

Table 6: Dynamic Panel Data Models - System GMM

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Δ Lagged Spread	0.78***	0.75***	0.71***	0.80***	0.78***	0.73**
	(0.271)	(0.259)	(0.237)	(0.207)	(0.209)	(0.225)
Δ Moral tone (average)	0.21*	0.17*			0.22***	0.23**
	(0.007)	(0.009)			(0.001)	(0.003)
Δ Volume			0.22***	0.32***	0.19***	0.31**
			(0.237)	(0.207)	(0.209)	(0.225)
Δ Moral tone x Δ Volume					0.41***	0.35***
					(0.001)	(0.002)
Δ CDS (lag)	2.266***	2.178***	1.950***	1.474***	1.450***	1.478**
	(0.372)	(0.259)	(0.237)	(0.207)	(0.209)	(0.225)
CAB	0.01	0.01	0.01	0.01	0.02	0.01
	(0.134)	(0.259)	(0.237)	(0.207)	(0.209)	(0.225)
LIQ	-0.12***	-0.14***	-0.13***	-0.12***	-0.12***	-0.11**
	(0.055)	(0.059)	(0.037)	(0.027)	(0.029)	(0.025)
RISK	0.26***	0.21***	0.25***	0.22***	0.25***	0.27**
	(0.012)	(0.014)	(0.012)	(0.013)	(0.013)	(0.015)
Country FE	✓	✓	✓	✓	✓	✓
Year FE		✓		✓		✓
N	432	432	432	432	432	432

Clustered Standard Errors in parenthesis.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

8 Conclusion and Future Research

In this chapter, I adopted a dictionary-based approach to study textual moral content in the context of the European Union. This is the first large-N quantitative test of the "morality tale" starkly dividing Southern debtors and Northern creditors countries. The new dictionary is a combination of two previously validated dictionaries - the General Inquirer and the Moral Foundation Dictionary - and an ad hoc dictionary to account for the specificity of the European "morality tale". Beside combining the dictionaries, I also proposed and implemented a double weighting scheme that is defensible on both theoretical and empirical grounds and that allows researchers to account for the different degrees of moral content associated with each word. The empirical results are supportive of the view that the European Sovereign Bond crisis has been accompanied by an increase in moral terms. The empirical results show a sensible increase in (negative) moralized tone in the media after the Fall 2009. Moreover, I showed how an increase in the average and total moral tone in the media is a strong predictor of changes in a country's spread. Thurs, the empirical findings vindicate the view held by

many regarding the moral framing of the Sovereign Bond crisis.

The current paper does not tackle the larger question concerning the *causal* effects of moral framing on attitudes and behavior. Nevertheless, the results from this paper provide a solid first step to tackle these questions in future research. As some scholars have suggested, moral language may arouse base emotions such as resentment, grievance, and rage (Dyson, 2014) which, in turn, may fuel populist rhetoric in both creditor and debtor countries (Tzogopoulos, 2020). Indeed, there is some evidence that moral judgements play a role in defining a individual's preferences towards bail out (Rathbun et al., 2019) and that they can clash and attenuate altruistic motives regarding debt repayments (Del Ponte and DeScioli, 2022). Moreover, the moral framing of Southern European countries might have, somehow paradoxically, worsened the creditors' confidence in their governments beyond what economic fundamentals would justify. Indeed, a vast literature on the media effects on public opinion has shown how relentlessly negative reporting on economic performance negatively affects voters' perceptions of the economy even after controlling for business cycles indicators (Hetherington, 1996; Hollanders and Vliegenthart, 2011).

A further extension of this line of research would investigate the opposite narrative, that originating from creditor countries, which some scholar has dubbed the "big bad wolf" narrative (Dooley, 2019). A diametrically opposed moral characterization has also gained currency in Southern European countries. In this case, in a nod to the familiar discourses on center-periphery relations, the moral discourse revolves around the role of Northern European countries in "forcing" the periphery to accept austerity measure. It is a narrative of oppression in which Northern countries are characterized as merciless and unfair in their treatment of the periphery.

These venues are left to future research. For now, I will further investigate how debt crises affect media framing at a more dis-aggregated level. While Chapter 1 has analyzed moral framing in the full sample of articles, there are good theoretical reasons to expect such framing to vary across different media types. This is the main research question in Chapter 2.

9 Appendix

9.1 List of Words (Webster-Marriage Dictionary)

Immoral Lemmas

”lazy”,”laziness”,”spendthrift”, ”vice”, ”vicious”, ”improper”, ”incorrect”, ”indecorous”, ”naughty”, ”unbecoming”, ”unseemly”,”debased”, ”debauched”, ”degenerate”, ”depraved”, ”dissolute”, ”libertine”, ”unprincipled”, ”perverted”, ”reprobate”, ”unscrupulous”, ”indecorous”, ”atrocious”, ”vile”, ”nefarious”, ”arrant”,”evil-minded”,”immoral”, ”erring”, ”dishonorable”, ”indecent”,”villainous”,”objectionable”, ”blameworthy”, ”dishonest”, ”sinful”, ”unethical”, ”unrighteous”, ”wicked”, ”unreliable”, ”untrustworthy”, ”sin”, ”unconscionable”, ”ruthless”, ”unsavory”, ”unsavoury”, ”dishonourable”, ”careless”, ”lax”, ”derelict”, ”disregardful”, ”neglectful”, ”neglecting”, ”negligent”, ”infamous”, ”remiss”, ”dawdle”, ”dillydally”,”goof”,”idle”,”idleness”, ”indolent”, ”slothful”, ”sluggish”, ”addict”,”profligate”,”deceit”, ”deception”,”deceptive”,”fraudulent”,”helpless”, ”helplessness”, ”irresponsible”,”irresponsibility”,”loser”,”manipulate”,”manipulation”,”ordeal”,”indecent”, ”corrupted”,”feckless”,”reckless”

Moral Lemmas

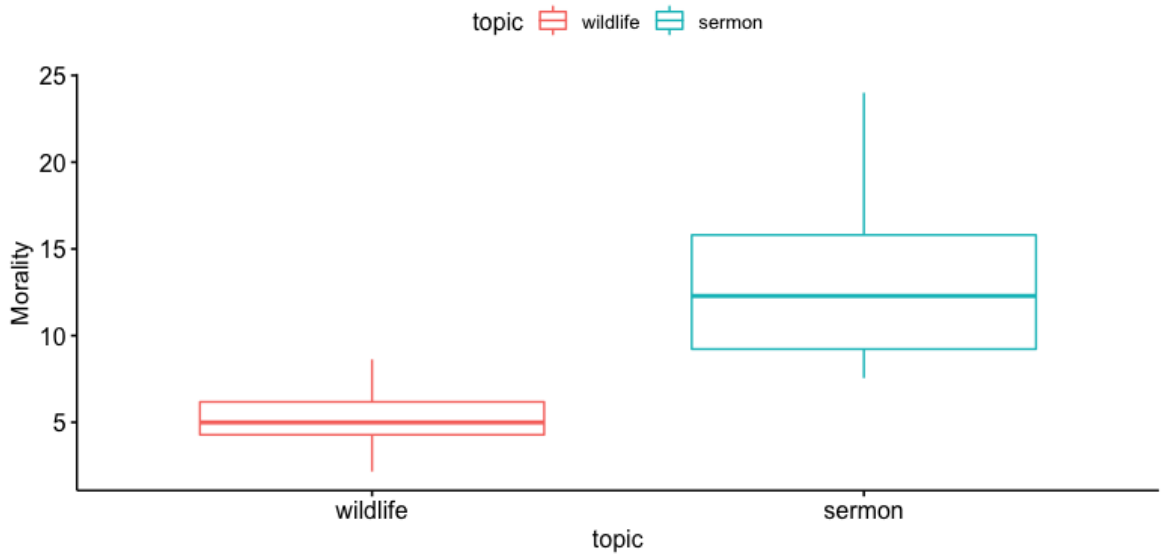
”all right”,”decent”,”ethical”, ”good”, ”honest”, ”honorable”, ”just”, ”nice”, ”right”, ”right-minded”, ”righteous”,”straight”, ”upright”, ”virtuous”, ”correct”, ”decorous”, ”proper”, ”seemly”, ” high-minded”, ”noble”, ”principled”, ”commendable”, ”exemplary”, ”legitimate”, ”creditable”,”evil-minded”,”esteemed”, ”law-abiding”, ”menschy”, ”reputable”,”respected”,”upstanding”, ”blameless”, ”clean”, ”guiltless”, ”immaculate”, ”incorrupt”, ”innocent”, ”inoffensive”, ”irreproachable”, ”unobjectionable”, ”angelic”, ”lily-white”, ”pure”, ”scrupulous”, ”spotless”, ”uncorrupted”, ”unerring”, ”goody-goody”, ”moralistic”, ”pharisaical”, ”rectitudinous”, ”sanctimonious”, ”self-righteous”, ”assiduous”, ”bustling”,”diligent”,”hopping”,”laborious”, ”sedulous”, ”tied-up”, ”knee-deep”, ”swamped”,”animated”,”astir”, ”buzzing”,”flourishing”, ”humming”,”thriving”,”vibrant”, ”absorbed”,”irresponsibility”,”engrossed”,”energetic”,”hardworking”,”vigorous”, ”indefatigable”, ”tireless”,”untiring”

9.2 Validation

I validate my dictionary in two ways. First, I collect and analyze 10 religious sermons from American churches (texts available at http://www.sermonindex.net/modules/articles/) and 10 articles on wildlife nature from National Geographic (Fall 2019 issue). While certainly not a hard test, this first validation step is necessary. If my dictionary-based score was unable to distinguish between articles about porcupine mating life and religious preaching, we would not be capturing the concept of interest. Second, I validate my measure on a data set of manually coded articles. I rely on a study by Feinberg and Willer (2013), in which the authors manually coded a selection of 232 newspaper articles on environmental issues to capture the presence of the five moral domains underlined in the Moral Foundation Theory framework. I compute a general moral content variable by summing up the five scores used in Feinberg and Willer (2013). Then, I compare the overall manual score with the moral loading computed with my own dictionary.

Regarding the first validation step, as we can see from the box-plot and the descriptive statistics table below, my measure is clearly able to distinguish between texts when there are theoretically strong expectations about the presence or lack of moral content.

Figure 7: Sermons vs National Geographic



The average and median moral content in sermons is more than 150% higher than on national geographic articles. Moreover, the minimum score for sermon (7.55) is only slightly lower than the maximum score for national geographic (8.63). Incidentally, the national geographic article with the highest moral content is about the effect of human-made climate change on birds migration. A direct reading of the article reveals that it is systematically different from the other ones due to the obvious moral issues pertaining anthropogenic environmental damages. More formally, I run a non-parametric Wilcox test. With a p-value lower than 0.001, we clearly reject the null hypothesis that the two samples come from the same distribution with the same median.

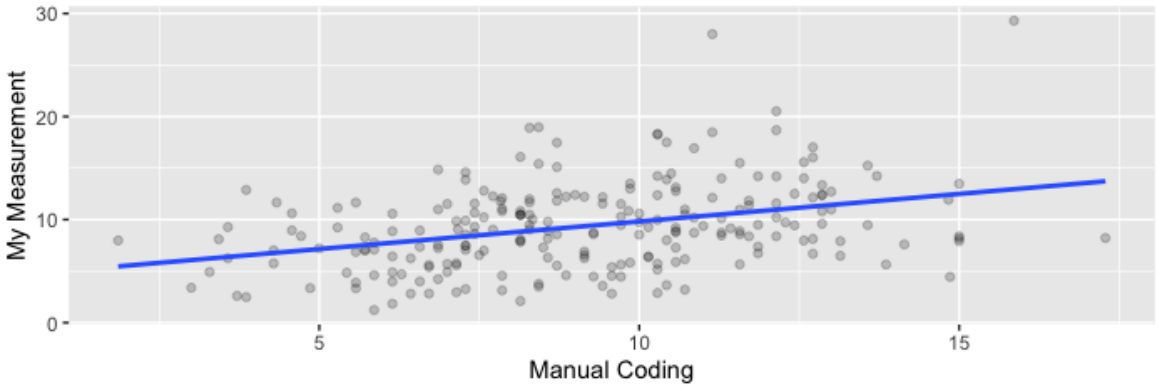
Table 7: Sermons vs National Geographic

Text	Average	Max	Min	Median
Sermon	13.01	24.00	7.55	12.29
Nat. Geographic.	5.26	8.63	2.17	5.00

Moving on to the next step, the first decision regards how the validation dataset from Feinberg and Willer (2013) was constructed. In particular, the authors analyzed 232 articles and assigned a respective score for each moral foundation (five in total). For validation purposes, I am interested in the score for the overall moral tone in each article rather than in the distinct moral foundations. As such, I add the scores for each dimension to get an overall moral score. A second issue needs to be addressed. It would be incorrect to apply the empirical weights to the subset of articles from Feinberg and Willer (2013). Indeed, the sample of articles that the authors collected is not representative of the universe of articles about the environment in general as evidenced by the fact that they imposed words such as ”pollution” in the search criteria. The logic of the tf-idf is to increase the discriminatory power of the scores, i.e. to increase the precision in distinguishing between heterogeneous texts (as in the case of sermons vs national geographic). Using it on a sample of texts that we already know a priori to have a specific connotation would unduly penalize words that are present across all texts in the sample but would not be present if the sample was representative of the universe of cases. In other words, it would be equivalent to analyzing only articles that already contain the words ”Greece” and ”lazy”, instead of the universe of articles about Greece. By construction, this would result in the word ”lazy” making no contribution to the overall moral score since it is always present. As such, I do not use the tf-idf for this validation step.

The figure below presents the Pearson correlation between the manually coded moral content and the dictionary-based score for all the articles in Feinberg and Willer (2013).

Figure 8: All articles

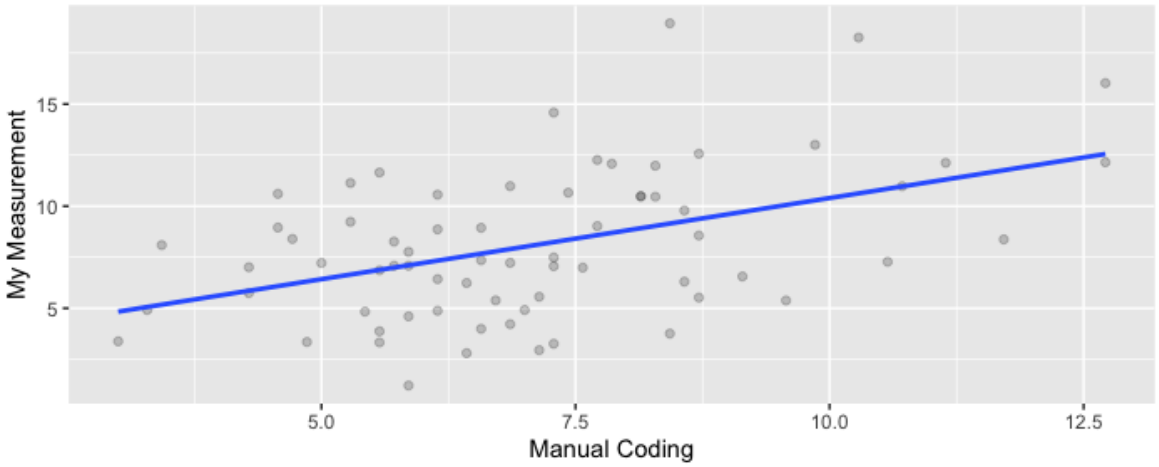


While the correlation is far from being perfect, the dictionary method clearly captures some of the variation in manually coded moral content. First, the strength of the Pearson correlation between my measure and the manually coded score is in line with other publications. To the best of my knowledge, Kraft (2018) is the only paper using this same dataset to validate a dictionary based measure of morality (in particular, the author uses only the MFT dictionary). The author's correlation is actually lower (r=0.27) than mine (r=0.35). Second, the sample of articles from Feinberg and Willer (2013) happens to contain a sub-sample (n=69) of articles from the Wall Street Journal. As this is one of the financial newspapers that I am interested in analyzing, it makes sense to look at the Pearson correlation between my measure and the manually coded score for this subset of the validation dataset. Reassuringly, as the figure below shows, the correlation is substantially higher for the articles published in the Wall Street Journal (r=0.46).

9.3 Replication Procedure

In the next three sections, I provide full details on how to replicate the results. Section 9.3.1 describes how to search, download, and save the articles from Factiva. While there are several possible ways to accomplish this task, only the procedure described in this section guarantees a smooth operation of the algorithm. Section

Figure 9: Wall Street Journal



9.3.2 is a step-by-step description of how the raw textual data is processed and analyzed. Section 9.3.3 provides the full R code to accomplish the steps detailed in the previous section. Once again, it is essential to follow each any step as described in Section 9.3.1 for the code to work. The R code should be sufficiently annotated so that any researcher can modify it according to their goals.

9.3.1 Downloading the articles

The instructions need to be followed strictly in the order in which they appear. Some options might be slightly different on Windows operating systems.

1. Open Factiva. Click ”Search”.
2. Apply the appropriate search string, e.g. (atleast2 Greece or atleast2 Greek or atleast2 Greeks) and atleast2 econom*
3. Click on the ”Duplicates” window. Select ”Similar”.
4. Click on the ”Sort by” window. Select ”Oldest First”.
5. Click ”Display options” and select ”Full articles, reports plus indexing”.
6. Tick the ”Select all” box (next to ”headlines”).

7. Click on ”Format for saving” and select ”Article format”.

8. A new window page will open showing the first 100 articles. Right click anywhere on the file where there is no text and select ”Save as a page source”. Save it in a folder. It will have to be saved as ”html” (the default option on Mac), although it does not need to end with an explicit .html extension.

9. Deselect all articles. Click on ”next 100”. Repeat step 6-7-8-9 until finished.

Here are a few practical suggestions when it comes to download articles from the Factiva database. I encourage anyone interested in using Factiva to take them seriously as they are likely to save them serious headaches.

1. After around 1500 and 2000 articles, Factiva does not let one move to the ”next 100” anymore. The problem can be easily overcome by breaking down the search by shorter time window so that the total number of articles are below 1500/2000. To avoid any issue, always do step 4. That way, even if Factiva stops showing the new articles, you can see the last 100 articles and the dates of publication. Then you can re-start the search from the last day of publication of the last 100th article.

2. The ”duplicate” option works recursively as you move from one set to 100 articles to the next. Hence, do not rely on the initial estimate of the ”duplicate” articles. Only once the last 100 articles are reached, it becomes clear how many articles are truly duplicates.

3. When saving the articles, it is good practice to a) Save them in separate folders (e.g. the Financial Times vs The Economist); b) Try the code (see next sections) on small groups of articles. The rationale for a) is that the code does not record the articles' newspapers sources (although it can be easily changed to do that). Hence, if all articles are saved in the same folder, one may not be able to easily sort out which newspaper they belong to. The rationale for b) is that, while the code works in the overwhelming majority of cases, it fails on a small number of articles that are formatted in an unconventional form in the Factiva database. I have encountered this problem in a dozen cases or so out of ten thousands of articles. Nevertheless, it can be extremely time consuming to find out where the problem lies. As of now,

the code does not display where the problem arises in the folder. i.e. which of the .html files is formatted unconventionally and cannot be read. By running the code repeatedly on small groups of 100 articles, it becomes immediately evident which folder is problematic.

9.3.2 From Raw Test to a Moral Content

The first step is to read and preprocess the textual data. I define a function (”corpusprocessing”) that reads and pre-process the text. Standards steps in preprocessing include removing stopwords (a.g. ”and”, ”the”), numbers, punctuation, white spaces, to stem each word, and to transform all words to lower case. I do not exclude ”negation” stopwords (e.g. ”not”) as they will be used later in the analysis as ”negation qualifiers”. Failing to do so would classify the sentence ”not moral actions” as having a positive moral connotation, while it is actually the opposite. The function also automatically assigns a random unique ID number to each article. Factiva articles already come with their own identifiers. Nevertheless, i have found cases of different articles having the same identifier.

The second step involves the actual calculation of moral tone. This is done via a function defined as ”corpusanalysis”. I describe its main features here. See the next section for the annotated R code. The code is deliberately redundant so that any researcher can hashtag in/out the parts of interest.

First, the function reads the output of the previous function and extracts the metadata for each article (e.g. date and wordcount). Then, it loads the two extant dictionaries and create the ad hoc dictionary (see Section 9.1 for the full list of words). The tokens in the dictionaries are stemmed. This step has to be done since the previous function stemmed the tokens in the articles themselves as well. If one chooses not to stem the articles (by modifying the first function), the second function should be modified as well so that the dictionary tokens are kept unstemmed. To avoid double-counting, each word that appears on more than one dictionary is assigned to the highest dictionary level (e.g. a word contained in both the GI and MFD is assigned to the latter). After the above steps are accomplished, the tf-idf score is calculated for each word. Recall that the tf-idf score is a function of a word’s frequency in the article itself as well as in all other articles. Hence, the values will change (usually slightly) if all articles are in one folder or if they are in separate folders. The function calculates the

tf-idf score for *each* word, regardless of whether it is in the dictionary or not. After this, the dictionary look-up is performed. The words included in the dictionaries are kept, and everything else discarded. The next step is to exclude words preceded by negations (e.g. ”not moral” should not contribute to the virtue score). I do so by unnesting the original tokens in consecutive trigrams. All trigrams containing a moral word as the final (third) token are kept. Everything else is discarded. If any of the two preceding words is a negation, the score is flipped. There is no need to repeat the procedures with bigrams since they are nested within trigrams. At this point, the three dictionaries are combined in one long list of words. Nevertheless, we want to assign different weights to tokens according to which dictionary they belong to. This is easily done in the subsequent chunk of code. If one does *not* want to use any theoretical weight, the easiest way to do so is to delete the ”2” and ”3” in lines 331, 339, 362, and 364. While such modification would make the code redundant and inefficient - all it does is to extract the scores and multiply them by 1 - , it is the easiest way to do so. Instead, deleting the entire chunk of code would require further modifications later in the loop. The final step is to aggregate the word scores by document and merge the dataset with the metadata of interest. The function ”corpusanalysis” takes the output of ”corpusprocessing” as its input. The final output is a dataset with the vice and virtue scores (separately) for each article, the article ID number, and the date. By modifying the final chunk of ”corpusanalysis”, one can also include other metadata variables. The two scores are already normalized by length (the normalization occurred when the function calculated the tf-idf score). Hence, the final step is simply to subtract the vice score from the virtue score (and multiply by 100 to ease interpretability). To replicate the figures in the paper, one would then need to aggregate each scores by month.

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Chapter 2: The Dynamics of Moral Negativity in Media Outlets: the Case of the Greek Sovereign Bond Crisis

Abstract

Chapter 2 further investigates how different media outlets - tabloids, broadsheets, and financial newspapers - framed the Sovereign Bond crisis in moral terms, with a particular focus on Greece. I test a number of hypotheses derived from the literature on economic news using a sample of articles between 2009 and 2019. I confirm previous results about the heterogeneity of the ”negativity bias” in the levels of moral tone across different outlets. More specifically, I show how the tabloids use more negative moral language than quality papers which, in turn, relied on more negative moral language than financial outlets. I further extend the concept of negativity to include a ”persistence dimension”, defined as the memory of the negativity bias. Empirically, I rely on the econometrics of fractional integration to show the extent to which moral negative tone persists over time. I find weak and mixed evidence of differentials in negativity persistence across different outlets. Finally, I explore the extent to which changes in tone in tabloids and generalist quality outlets are in a long-term relationships with each other. In contrast with the conventional view about the ”tabloidization” of the quality press, my analysis shows that the long-run equilibrium in tonality between the popular and quality press is due to movements from both sides. In other words, I find evidence of ”dual-convergence”. Overall, the chapter gives a more nuanced picture of how different media described Greece in moral terms since the beginning of the crisis.

Chapter 1 provided a general view of how inter-national credit-debt relations are described in moral terms at the aggregate level. In this chapter, I investigate how this moral discourse may differ across media types. As such, Chapter 1 and Chapter 2 complete the first part of the dissertation on how debt crises affect the media framing of the debtor countries involved. Overall, Chapter 2 contributes to our substantive understanding of how the framing of financial crises change across media types subject to different economic incentives. In doing so, it sheds new light on how media bias and media type interacts in the production of economic news. This is a particularly important topic at a time of ever growing competition in increasingly globalized media markets, which might pressure media outlets' slant to appeal rather than challenge their readers' priors (Mullainathan and Shleifer, 2005; Davis, 2019). After all, mass media are supposed to play a critical role by bridging the informational gap between the electorate and the elected. From a normative standpoint, citizens need to know enough to effectively exercise their political rights and duties (Eberl et al., 2017a). Historically, the media have been the main arena for public discourse and citizens' main source of information (Norris et al., 2000). Supplying citizens (and, thus, voters) with balanced and objective information is a central responsibility of the media (Strömbäck, 2008). As a vast and growing literature has shown, though, the media often fall short of these expectations: ideological bias (Hackett, 1984), media bias (Reeves, 1997), visibility bias (Eberl et al., 2017b), partisan bias (D'Alessio and Allen, 2000), agenda setting bias (Eberl et al., 2017a) are just some example in which scholars have conceptualized the systematic distortion of information by supposedly neutral media. Against this backdrop, in this article I explore how three types of media outlets - tabloids, generalist quality papers, and specialist financial papers - differ in terms of one specific kind of bias, i.e. negativity (or tonality) bias. While the media's tendency to report negative economic news (selection) and to report negatively about the economy (tone) is a robust finding in the literature, still much is to be learned about the qualitative differences between heterogeneous media types, and the dynamics of tonality bias over time. More specifically, I focus on how different media outlets framed Greece in moral terms. I do so via the dictionary-based approach inspired by extant research in linguistics and social psychology, which I described and validated in Chapter 1.

The contributions of this paper can be summarized as follows. My theoretical framework offers an explanation for the different degrees of negativity across media types, focusing on the different economic incentives

they are subject to. Empirically, I confirm previous findings about the level of the negativity/tonality bias in different outlets and I extend this finding to a specific subset of negative content, i.e. negative moral tone. I show how tabloids reported on the Greek crisis in more negative moral language than quality papers which, in turn, relied on more negative moral language than specialized financial outlets. Moreover, I highlight an often-overlooked aspect of negativity, i.e. its persistence over time. I borrow concepts and techniques from the econometric literature to suggest that the very concept of negativity bias coupled with the logic of continuity in media production suggests the existence of a specific univariate property in the long time series typically employed in political communication. Hence, I contribute to the literature by testing not only the level of negativity bias, but also its persistence (memory) over time across different media types. The empirical results comport with the view that tonality in the media has long-term properties underappreciated in current scholarship. While the empirical tests suggest that there might be a difference in the persistence of negativity between financial papers and generalist papers (but not between quality papers and tabloids), the evidence is mixed at best. Moreover, I investigate the dynamic co-movements of economic news tonality between quality papers and tabloids. I discuss and provide evidence for so-called "dual-convergence" between the tonality of tabloids and generalist quality papers. Finally, consistent with the results in Chapter 1, this chapter also provides further evidence that the Sovereign Bond crisis was systematically framed in moral terms. As such, it contributes to a growing literature on the media-financial nexus during the Greek sovereign bond crisis. Nevertheless, the empirical results are not confined to moral language. In fact, all empirical findings hold when I rerun the analysis using conventional measures of tonality.

1 Negativity Bias in Economic News

Much research in media studies focuses on the relationship between economic news coverage and economic conditions (Vliegenthart et al., 2021). One key concept of this literature is the so-called "negativity bias", i.e. the findings that media are asymmetrically responsive to economic conditions: they tend to overemphasize negative stories and under-emphasize positive developments (Soroka et al., 2015; Damstra et al., 2018;

Vliegenthart et al., 2021). This is a particularly strong and consistent finding. This negativity biases has been found in newspaper reporting on a range of economic issues: recession news (Wu et al., 2002), employment and inflation (Soroka, 2012), and macroeconomic news generally (Soroka et al., 2015). This is the case for both print media as well as television news broadcasts (Hester and Gibson, 2003).

Various explanations have been put forward to explain this phenomenon. First, the media is often conceptualized as the fourth estate, leading some scholars to argue that "the healthy functioning of modern democratic regimes depends on the crucial role of a free press to hold governments accountable" (Whitten-Woodring, 2009). From this perspective, negative coverage serves to check governments by uncovering its policy failures to the public, while the coverage of positive developments does not meet such needs (Damstra and Boukes, 2021). Second, negativity is a well-documented news factor in the economics of media. As originally suggested by (Galtung and Ruge, 1965), references to something negative are broadly perceived to make a news story more likely to be read in a cultural environment that sees progress as the "normal and trivial thing that can pass unreported" (Galtung and Ruge 1965, p. 69-70). As a consequence, negative news would be more likely to be selected by journalists because of their inherent "surprisingness" (Boukes and Vliegenthart, 2020). Finally, the psychological literature also points at differential individual-level cognitive processes in response to negative stimuli (Tversky and Kahneman, 1985). Such process leads people to respond more strongly to negative information that to positive information (Rozin and Royzman, 2001). As journalists write with their audience in mind (while, at the same time, being individuals subject to psychological biases themselves), they tend to emphasize negative news at the expense of positive coverage (Vliegenthart et al., 2021).

Importantly, scholars have also explored the qualitative differences in negativity across media types (Lischka, 2014; Soroka et al., 2018; Boukes and Vliegenthart, 2020; Boukes et al., 2022). Two main cleavages have been found to be important: 1) Popular/Tabloids vs Quality/Broadsheets; 2) Generalist vs Specialist.[1]

In what follows, I will describe in more details two distinct aspects of negativity in the media - its level and its persistence - and discuss how we might expect them to vary across different outlets according to the

[1] I will use the terms Popular/Tabloids and Quality/Broadsheets interchangeably for stylistic purposes, although we should notice that the term broadsheet is becoming obsolete and is being replaced by "quality". Moreover, the quality/broadsheet labels encompasses generalists (e.g. The Guardian) and specialist (e.g. The Financial Times) papers. We can think of the classification as a 2x2 table with generalist and specialist on the one side, and quality and tabloid on the other side. Since there is no financial tabloid in the UK, the tabloid-specialist cell is empty.

above-mentioned cleavages.

1.1 Negativity bias: Levels

The decision to publish or not an article as well as the ways in which to stylistically engage with the story are a function of two main factors: first, the inherent characteristic of a story; second, expectations about its commercial values, i.e. expectations about its target audience (O'Neill and Harcup, 2016). Clearly, the inherent characteristics of a story does not change across media types. Outlet types may differ, though, on how they value a story's commercial values and their strategies to improve its commercial value.

On one side of the spectrum, popular newspapers (tabloids) are strongly market-driven and aim to reach the largest possible audience (Strömbäck et al., 2012; Vliegenthart et al., 2021). They are more likely to appeal to the commercial values of a story rather than its inherent characteristic (Boukes and Vliegenthart, 2020). For example, based on a comprehensive survey of the population of professional journalists, Skovsgaard (2014) finds that tabloid journalists hold different professional values and experience different organizational pressures relative to their counterpart in quality outlets, possibly because of a heightened sensitivity to profit motives. In turn, these values and influences leads to a reporting style that emphasizes personalization, sensationalism, and negativity and strives for hewing more closely to its audience's expectations (Tulloch et al., 2000). Such behavior is rational since negativity has been repeatedly demonstrated to trigger attention in both experimental and observational studies (Soroka, 2006; Davis, 2019). This, in turn, makes negativity a favorite profit-making tool and may explain why outlets with weaker commercial incentives - such as those under public ownership - display lower levels of negative tone (Esser et al., 2016).

By contrast, the quality paper approach to journalism has been traditionally regarded as the opposite of tabloid journalism. By and large, broadsheets enjoy a better reputation, target a more selective and better educated readership, put a premium on objectivity and verification of facts, and place a priority on "hard news" (Boukes and Vliegenthart, 2020). Linguistically, they usually refrain from "sensationalist tactics" in favor of a more sober style (Vizuete and Marcet 2003). In other words, quality papers are less likely to put a premium on negativity as a news factor and to emphasize negative elements to reach a broader audience (Curran et al.,

1980; Boukes et al., 2022). Indeed, several empirical studies have detected differences across popular and quality papers in terms of negativity across different economic topics, both domestic and international, and countries (De Vreese et al., 2006; Boukes and Vliegenthart, 2020; Teschendorf and Otto, 2022).

moreover, within the quality paper category, we can identify a further cleavage between generalist and financial newspapers. In stark contract with generalist papers, the target audience of specialist news outlets differs greatly from the general population and often extends beyond national borders (Hallin and Mancini, 2004). In particular, consumers of financial media's main goal is to be informed about news upon which they will base their financial decision (Davis, 2006). Indeed, financial newspapers have been found to write from a more international perspective (Allern, 2002) and to emphasize different news factors (Boukes and Vliegenthart, 2020). Financial outlets' economic incentive is to engage with, rather than shy away from, complex topics that a more general audience would consider "dull" (Manning 2013, p.179). Targeting a relatively sophisticated and already interested audience, the same factors that would guarantee newsworthiness in mainstream medias are perceived as unnecessary and redundant. Moreover, even more than in the case of generalist quality papers, these outlets' fortune depends on being perceived as objective as possible, thus resulting in a less overtly emotional and sensationalist reporting style (Doyle, 2006). Hence, financial quality papers are likely to exhibit less negativity relative to their generalist quality counterpart.

To sum it up, different media types do not respond to economic incentives in the same way. They appeal to different readers who, in turn, are interested in different types of news. Negative framing is a useful strategy to entice some readers, but not others. As such, we may expect a cleavage between popular and quality papers in terms of negativity bias. Moreover, a further distinction can be drawn within the quality press category, with financial papers less likely to displaying negativity relative to generalist broadsheets. Hence, we can rank the three categories of news media from the most to the least likely to display negativity bias: tabloids, generalist quality papers, and financial (quality) papers. As such, I will test the following hypothesis concerning the level of (moral) negativity across different outlet types:

H1: *On average, tabloids' coverage of Greece will display more negative moral language than quality*

papers which, in turn, will use more negative moral language than financial quality papers.

1.2 Negativity bias: Persistence

"For fine ideas vanish fast / While all the gross and filthy last." [2]

Since the seminal work of Galtung and Ruge (1965), scholars have emphasized the importance of negativity as a news value for commercial purposes. Another news value from the original typology concerns *continuity*, the idea that "news is news, [partly] because it was news yesterday" (Hollanders and Vliegenthart 2008, p. 48). Indeed, it is common for journalists to follow up on topics in a similar fashion as they did previously, also because it implicitly justifies the journalist's prior decision (Harcup and O'Neill, 2001). Over time, while several scholars have proposed their own modifications to the original list, both negativity and continuity (more recently referred to as "follow-up" factor) have featured prominently as news values (Harcup and O'Neill, 2001; Dick, 2014; Harcup and O'Neill, 2017). For example, in a recent empirical replication of Harcup and O'Neill (2001), Harcup and O'Neill (2017) analyze 711 British newspaper stories published in 2014 to explore the relative frequency of fifteen news values. They find that negativity and continuity (follow-up) are the 1st and 4th most frequent news values in the sample, featuring in roughly 60% and 30% of the articles in the sample.

While continuity and negativity are often discussed together (and along other news values), scholars have devoted little attention to how the two may interact. Empirically, the standard approach to model continuity is to estimate a single- or multiple-equation autoregressive model (usually ARIMA or VAR). Such econometric models require (weak) stationarity in the time series, but allow for short-term memory via autoregressive parameters and/or moving average error terms. The standard practice is to test for stationarity, and first-difference the series if it contains a unit root. While technically correct, reliance on such models prevents researchers from thoroughly investigating the longer-term dynamics of typical time series used in political communication.

[2] W. I. Miller, 1997, p. 70 [Strephon and Chloe vv 233–234, Poetical Works, 525].

The point raised here is not merely methodological, but also substantive. Indeed, as long as both negativity and continuity are of significant news value, a resulting series capturing newsmedia's tone (or volume) is likely to derive from a distinct data generating process that features interesting long-term memory properties. Such stochastic process is known in the econometric literature as fractional integration. Fractionally integrated series possess two main characteristics (Box-Steffensmeier and Smith, 1996). First, they have less than complete persistence. Second, they result from the aggregation of underlying heterogeneous processes. I will discuss each characteristic in turn and relate them to the news values of negativity and continuity in reference to the 'Greek crisis' topic.

The memory - or persistence - of a time series can be defined as the rate at which a process moves towards equilibrium after being perturbed by a shock (Box-Steffensmeier and Smith, 1998). Hence, persistence can be either short-term, infinite, or long-term. Most studies in political communication have implicitly or explicitly assumed that a typical media time series can be characterized as having either short-term or infinite memory. few scholars have investigated the possibility of long-term memory.[3] On the one hand, if a time series is integrated of order 1, denoted $I(1)$, it describes a *non-stationary* (or unit root) process. In this case, the persistence of the series is complete, i.e. its memory is infinite. In our case, such process seems unlikely as it would imply that the negative real-world shocks that characterized the Greek financial crisis led to a new (lower) plateau of (moral) negativity that would continue indefinitely (or at least until an equally sizeable set of opposite shocks takes place). Indeed, provided that the time series to be analyzed is extended enough to allow for a return to its long-term equilibrium, it seems unlikely that any media time series would exhibit such behavior.[4] On the other hand, if a time series is integrated of order 0, denoted $I(0)$, it describes a *stationary* process. Any shock dissipates immediately (memory-less) or quickly (short-term memory) as the series returns to its mean equilibrium over time. A stationary time series with only static (immediate) changes as a function of real-world events may arise if journalists (and/or newspapers) interpreted new information about the topic in isolation relative to past coverage of the same topic. This also seems unlikely, given what we know about continuity as a news factor

[3]The most common way to model long-term memory processes is via a modification of well known ARIMA models into ARFIMA models (autoregressive fractionally integrated moving average). Querying for articles containing the word "ARFIMA" in the *Political Communication* journal results in only one article, Lukito (2020).

[4]Whether such conjecture is correct should be determined on a case-by-case basis, though. For example, even long series capturing the volume and tone of articles on climate change might contain a unit roots, consistent with the increasingly concerning nature of the topic.

in political communication. Indeed, if continuity is an important factor in news selection and news coverage, we would expect any resulting series to exhibit *some* kind of temporal dependence. The process *might* result in a stationary time-series characterized by short-term memory. This is the (sometimes implicit) assumption in much scholarship relying on ARIMA and VAR models (e.g. Ju (2014); Van der Meer et al. (2019); Solis and Sagarzazu (2020)). Nevertheless, if the degree of continuity/persistence in news coverage is high enough, short-term dynamics may not suffice in describing the stochastic properties of the resulting series. In other words, continuity per se gives rise to less than complete persistence (the first necessary but not sufficient condition for fractional integration), but does not guarantee whether it will be in the form of either short- or long-term memory.

In the latter case, the series is still mean reverting (unlike the non-stationary case), but shocks fade away more slowly than in the short-memory case (Lebo et al., 2000).[5] If a series exhibits such long-term dependence, it is described as fractionally integrated, denoted $I(d)$, where d lies between the two extreme cases of perfect stationarity ($d = 0$) and infinite memory ($d = 1$). As such, fractional models relax the constraint that the univariate stochastic property of a series must fall into the dichotomous d=1 or d=0 categories and allow for a continuum of possibilities between 0 and 1.

While determining the degree of dependence is an empirical matter that can be tested (more on this later), one also needs good theoretical reasons to expect a times series to exhibit long-term memory.[6] Indeed, the second defining characteristic of fractionally integrated stochastic processes is that they typically derive from aggregating heterogeneous processes (Granger, 1980). The best-known data generating process underlying fractional integration is the aggregation of heterogeneous individual units with different levels of stability in the characteristics under study. Indeed, fractionally integrated processes have been repeatedly found in public opinion times series, which aggregate over time the opinion of many different individuals with varying degrees of prior convictions on the topic and/or propensity to update their priors upon receiving new evidence (Box-Steffensmeier and Smith, 1998; Box-Steffensmeier and Tomlinson, 2000; Lebo et al., 2000). A less-known

[5]There is a further distinction within fractionally integrated processes depending on whether the estimated d parameter is less than or bigger than 0.5. In the former case, its variance is finite, while in the latter case infinite. In both cases, the process is eventually mean reverting (Box-Steffensmeier and Smith, 1998).

[6]This is because it might be empirically difficult to distinguish between strongly auotoregressive processes possible combined with structural breaks and fractionally integrated processes (Young and Lebo, 2009)

way in which long-term memory processes may arise, though, is by aggregating a series of shocks that *persist for varying lengths of times*. At any given period, the realized value of a series is the sum of those shocks that survive up to that point, and the *distribution of the duration* of each shock determines whether, and the degree to which, a series is fractionally integrated (Parke, 1999). Whatever the reason for the underlying differences in decay after different types of shocks, this is in stark contrast with ARIMA models, which assume that all shocks decay at a comparable rate.

The previous discussion of negativity and continuity as news values offers an intuitive explanation for why shocks may decay at *varying* rates, thus resulting in a fractionally integrated series. Indeed, the negativity news value suggests that media report more, and more negatively, on negative real-world economic events relative to positive ones. In other words, negative shocks are stronger in absolute value than opposite and equivalent positive shocks. Hence, even under a conservative assumption such that continuity applies equally to both positive and negative shocks, the relative prevalence of one over the other (implied by the negativity bias) suggests that negative shocks will have longer duration than positive ones. This is because, even if the shocks decay at the same rate (i.e. continuity applies to both shocks equally), one type of shock is stronger than the other, thus moving the series further away from its equilibrium. Having moved further away from its mean as a result of a negative shock relative to an equivalent real-word positive shock, the series will take longer to revert to its long-term mean in the former case, even if the rate at which they move *towards* equilibrium is the same. Clearly, if continuity is stronger after a negative shock than it is after a positive shock (i.e. continuity does *not* apply to both shock equally), the resulting process - combined with the initial tendency towards negativity - would be even *more* persistent.[7] In the Greek financial crisis context, this view is consistent with previous studies that found how the media were quick to report negative judgements in their discussion of negative events, while they reported more slowly on the (positive) Greek reforms (Teschendorf and Otto, 2022).

Overall, since the literature suggests that negativity and continuity news factors are relevant across all media types, I hypothesize the following:

[7]Of course, a third option is possible in theory, although implausible. If continuity is stronger after a *positive* shock than it is after a negative shock, there must be a a combination of values that characterize the return to equilibrium after each shock such that the greater persistence of positive shocks completely offsets the initial bias towards negativity. I am not aware of any theoretical argument to defend such a claim, which would also be at odds with much of the previous literature on negativity. At any rate, such a process can be excluded empirically since it leads to the null hypothesis of no fractional integration, which I will strongly reject in the empirical section.

H2: *On average, all series will exhibit long-term memory. In other words, they are fractionally integrated.*

Nevertheless, and mirroring our previous discussion on the levels of negativity, different media types may differ also in terms of continuity. Indeed, Boukes and Vliegenthart (2020) suggest that continuity is less important for financial newspapers relative to other types. Such specialized outlets do not have to demonstrate how the news of the day builds on to yesterdays' news. Indeed, such outlets speak to a more interested audience who consciously demand information for investment purposes. As such, financial journalists are more likely to select what to read based on the topic's inherent values and also to expect the story to convey precise, objective, and economically useful information (Eilders, 2006). In other words, economic news will be valuable to their audience anyway, and journalists' need to "construct" its perceived newsworthiness is diminished (Davis, 2006). These outlets' audience is more likely to read the news in an instrumental fashion, i.e. to gain information that would then specifically inform their investments' decisions. An unnecessarily long negative spin, i.e. excessive "continuity" notwithstanding changing economic factors, may be inefficient and even counter-productive as it might fail to inform its audience about positive developments that would have otherwise affected their financial decisions. The sophisticated and interested reader of financial news is more likely to be a "Bayesian reader" (Mullainathan and Shleifer, 2002) who, driven by material-self interest, is looking for information to update their priors rather than to reinforce them.

While this line of reasoning applies across the generalist/specialist cleavage, one might expect some of these factors to play a role even across the popular/broadsheets cleavage within the generalist camp. For example, Kepplinger and Bastian (2000) study the news value of news factor in generalist and tabloid papers and find that the extent to which past coverage predicts future coverage differs across media type. Moreover, more recently, continuity might have grown in importance for tabloids more than for quality outlets. Indeed, as media markets have become more and more competitive, journalists have enjoyed fewer and fewer resources in terms of time and money (Hamilton, 2011). In turn, such competition may increase the media slant towards its readers' preferences (Mullainathan and Shleifer, 2005). As the scramble for resources seems to have affected tabloids

more than quality papers, it might have become more and more economical for the former type to rely on past coverage (Broersma and Graham, 2013). In that case, we would expect longer-memoried (moral) negativity bias in tabloids relative to generalist broadsheet papers.

Overall, the literature suggests a potential cleavage between generalist and specialist media, with the latter likely to display a less persistent negativity bias. Moreover, a further distinction might be drawn within the generalist camp, with tabloids possibly displaying longer memory than their quality counterpart. As such, I will test the following hypothesis concerning the persistence of (moral) negativity across different outlets type.

H3: *On average, tabloids' coverage of Greece will display more persistent negative moral language than quality papers which, in turn, will be more persistent in the use of negative moral language than financial quality papers.*

In other words, we can rank the three types of news media according to both the level and the persistence of negativity: on one side of the spectrum, not only tabloids are the most likely to display a negative tone than other media types, but such negative tone will also be the most durable; on the other side of the spectrum, financial papers are the least likely to exhibit negativity bias in levels and, when they do report in negative terms, the negative tone is less likely to stick over time; generalist papers are likely to sit in the middle between these two extremes along both dimensions, i.e. the level of negativity as well as its persistence over time. While previous research has focused on the levels of negativity bias, a major contribution of this paper is to shift the emphasis on the persistence of (moral) negativity over time.

1.3 Negativity bias: Tabloidization

A final important question regards the relationship between popular newspapers and generalist quality press. Traditionally, such relationship has been characterized in two main ways (Franklin, 1997; Connell, 1998; Tulloch et al., 2000; Magin, 2019):

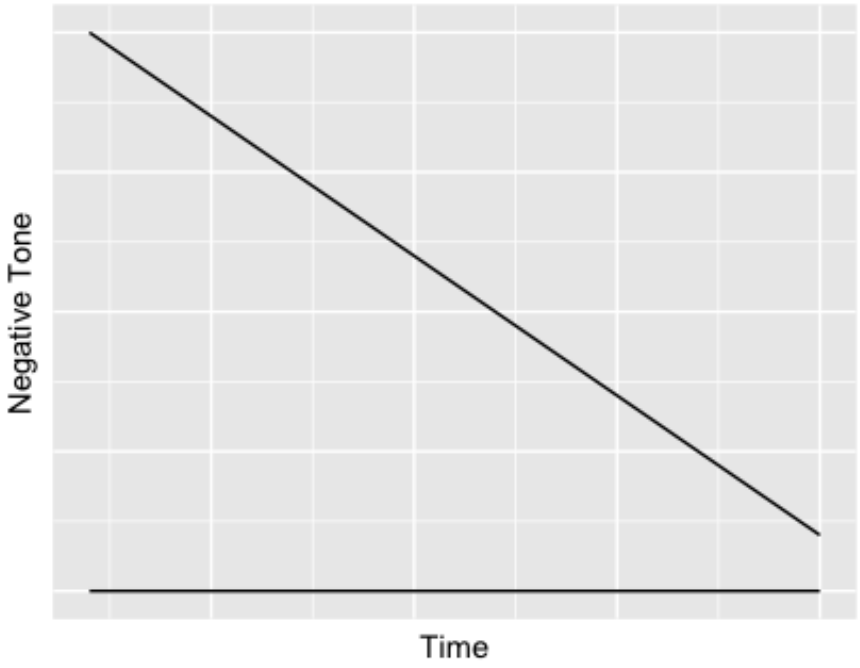
1. Homogeneity

2. Polarization

In the former perspective - often referred to as ”tabloidization” -, sensational, populist journalism has escaped the confines of tabloid journalism and has now spread and contaminated all news media (Conboy, 2010). As a result, once reputable broadsheets have embraced the ”tabloid agenda”, characterized by an ”insensitive conjoining of the sentimental and the sensational, the prurient, and the populist (Franklin 1997, p.3). The main reason adduced for such phenomenon is the heightened competition for markets share in a more globalized and digitized world. With that increased commercialization comes the need to increase “saleability”, find more advertisers and, more generally, a stable and large audience. As a result, “journalists are more concerned to report stories which interest the public than stories which are in the public interest”(Franklin 1997, p.4). And, as previously mentioned, to select and frame the news in a particularly negative fashion is a prominent device to increase an outlet's potential readership (Soroka, 2006). Indeed, survey data for multiple countries shows how journalists themselves agree that pressure to sensationalize the news is getting stronger (Davis, 2019). Several studies on tabloidization have explored several features such as divergence or convergence in topics selection, the relative frequency of soft vs hard news, or even the evolution of graphical and physical characteristics, such as the layout and the design (Esser, 1999; Schonbach, 2000). While negativity is only one possible aspect to explore, it is an important characteristic of tabloids and is often mentioned in the literature on tablodization (Barnett and Seymour, 1999; Conboy, 2010; Boukes et al., 2022). The theoretical as well as methodological framework that I advance here may be used to study other aspects of tabloidization in future research.

Figure 1 below shows a stylized hypothetical version of tabloidization. Over time, tabloids' negativity remains the same, while the tone of quality papers becomes more negative, thus moving towards the level of tabloids' negativity.

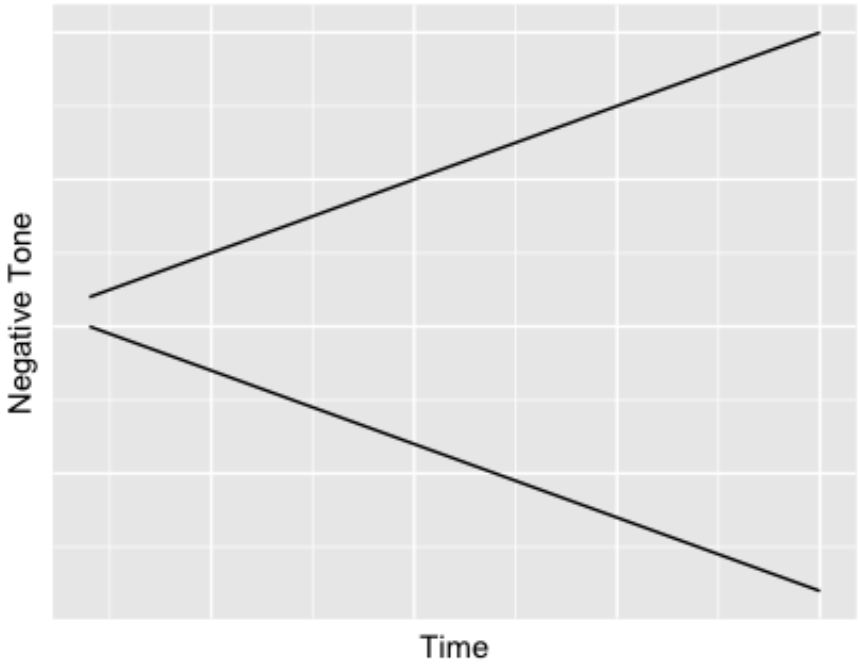
Figure 1: Tabloidization



While many commentators have lamented that the "frontier between qualities and popular papers has virtually disappeared" (Sampson, 1996), not everyone agrees with the "tabloidization" view. Indeed, not only the extent of tabloidization is disputed, but also whether it is actually occurring (Skovsgaard, 2014). According to the critics, an increase in market competition does not necessarily create the economic incentives that underline the tabloidization hypothesis. In fact, it is possible that an increase in market competition has accompanied a simultaneous increase in market fragmentation (Hamilton, 2011). In that case, while market pressures may have pushed tabloids to accentuate their distinguishing characteristics, it may have increased other outlets' incentives to differentiate themselves to preserve their market niches (Tulloch et al., 2000). In these scholars' view, competition has been mainly within types rather than across types, thus accentuating inter-type polarization as well as intra-type homogenization Uribe and Gunter (2004). Figure 2 below shows a stylized hypothetical version of polarization. Over time, tabloids' tone becomes more negative. In search of other niche markets, quality papers distinguish themselves by reporting more positively on economic news.[8]

[8]While Figure 2 suggests a symmetric movement over time, the polarization perspective is also consistent with asymmetric movements, i.e. the two media types may diverge at different rates.

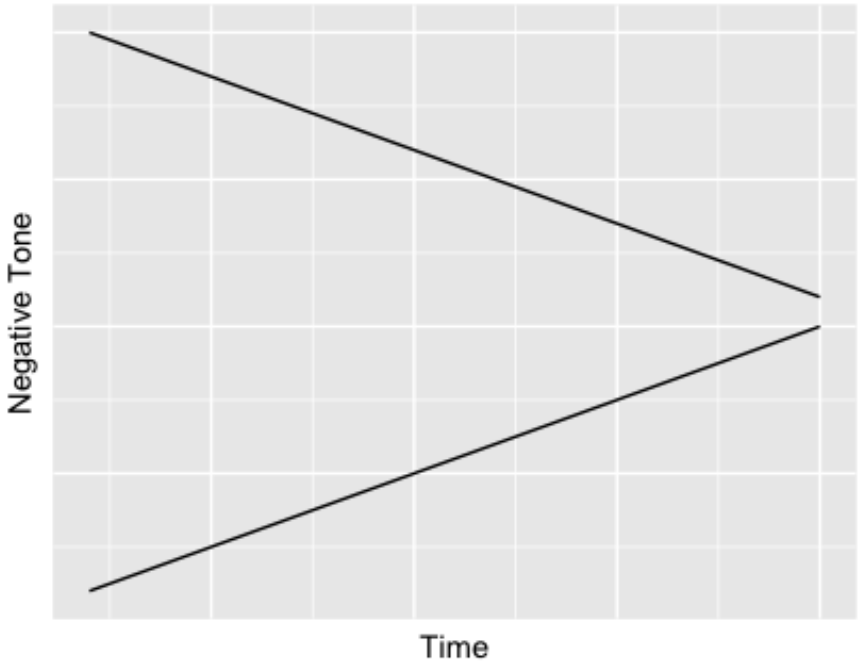
Figure 2: Polarization



Finally, and more recently, some scholars have suggested a more nuanced bi-directional process. Under this perspective, quality papers increasingly adopt the style once distinctive of tabloids, while "tabloids increasingly display[ing] the language and values once distinctive of their quality newspaper counterparts" (Lefkowitz, 2018). Figure 3 below shows a stylized hypothetical version of dual-convergence. Over time, each media outlet's tonality moves towards the other type's tonality, thus converging towards a similar level.[9]

[9]While Figure 3 suggests a symmetric movement over time, the dual-convergence view is also consistent with asymmetric movements as long as they take place, to some extent, in the tonality of both media outlets.

Figure 3: Dual-Covergence



The abundance of analyses on tabloidization notwithstanding, studying the relationship between quality papers and tabloids' tonality is harder than it might seem. The main reason is that different media types tend to select different stories to begin with. As previously mentioned, agenda setting bias refers to whether and how much a given topic is covered, while tonality bias deals with how it is covered (Eberl et al., 2017a). By analyzing texts on the same topic throughout a period of both low and high salience (before and after the beginning the crisis), we can analyze and quantify tonality bias while minimizing the effects of other forms of bias, such as agenda setting bias.

While much has been written on the topic of tabloidization, most of these studies have been qualitative in nature and/or restricted to a fairly small number of manually coded articles. Indeed, a recent study concludes that there have been "few systematic empirical analyses [of tabloidization] based on large textual datasets" (Lefkowitz 2018, p.7). This study aims to provide an initial quantitative assessment of these claims, at least with respect to tonality in economic news.

Then, the relevant question is whether tabloidization, polarization, or dual-convergence has occurred and

the degree to which it has done so. As such, I test the following three hypotheses:

H4a: *on average, there is no long-term equilibrium between the tonality of quality papers and tabloids' coverage of Greece (polarization).*

H4b: *on average, the long-term equilibrium between the tonality of quality papers and tabloids is restored mostly by movements in the tonality of quality papers. In other words, the tonality of tabloids pulls the tonality of quality papers (tabloidization).*

H4c: *on average, the long-term equilibrium between the tonality of quality papers and tabloids is restored by both quality papers and tabloids at comparable speeds (dual convergence).*

2 Research Design

I focus on the written media's characterization of the Greek economy since its entry in the Euro area. This choice has both methodological and substantive reasons. First, by focusing on a highly salient issue that prominently figured in the press for many years, I minimize the effect of agenda-setting bias (Boukes et al., 2022). In other words, we know that - at least after the crisis beginning - , the issue was highly salient even for tabloids, which usually shy away from serious economic and financial matters. Second, as Chapter 1 of this dissertation has shown, the Sovereign Bond Crisis offers the possibility to test the negativity bias hypotheses not only in general, but for a particularly interesting subset of negativity, i.e. moral negativity.

As such, I will test my hypotheses using the measure of moral content described and validated in the previous chapter. As a robustness check, I also repeated the analysis using three standard dictionaries in sentiment analysis (i.e. not about morality): the General Harvard Inquirer (Stone et al., 1966), the Loughran-MacDonald financial dictionary (Loughran and McDonald, 2011), and the Bing Dictionary (Hu and Liu, 2004). The results

are consistent with those shown in the paper and available upon request.

2.1 Data Collection

The data collection phase was described in the previous chapter. Here, I analyze both financial and generalist papers separately, with the latter being further divided into broadsheets and tabloids. I selected the following financial journals: *Barron's*, *The Economic Times*, *The Economist*, *Forbes*, the *Financial Times*, the *Wall Street Journal*, *Investors' Business*. Regarding generalist tabloids, I selected the following: *the Daily express*, *the Daily Mail*, *the Daily Mirror*, *the Daily Star*, *Evening Standard*, *The Sun*. Regarding quality papers, I selected the following: *The Daily Telegraph*, *The Guardian*, *the Independent*, *The Time*. The selection of newspapers ithin each category is broadly in line with prior studies on news media (e.g. Bastos and Zago 2013). Finally, in the multi-equation models presented in the paper I will control for two variables: first, the spread between the interest rate on 10-year Greek bonds and the equivalent German bonds; second, I include a variable to capture the total number of articles regarding a given country (volume). The former controls for the underlying economic conditions, while the latter also implicitly controls for the degree of salience in news media. Both variables are non-stationary. Hence, they are first differenced in all models.

2.2 Measurement

The measurement strategy is the same as in the previous chapter. After estimating the positive and negative moral loadings of each article, the moral sentiment score is calculated as the difference between the two. Higher scores indicate positive moral sentiment, and negative scores indicate negative moral sentiment. I aggregate the sentiment scores at the monthly level for each media type. Unfortunately, tabloid newspapers did not publish enough articles in some periods (basically, before 2009) to construct a meaningful monthly series for the entire sample period. Hence, Figure 4 combines tabloids and quality papers together (non-finance outlets). To facilitate interpretation, I smooth the two series with a 3-month rolling average. All subsequent analyses will be done for the period between July 2009 and May 2019. This is the longest possible sample that does not

contain any missing value.[10]

Figure 4: Morality Index Across Financial and Non Financial Outlets (Monthly Average)

Figure 4 is not exactly the same as Figure 1 in Chapter 1 because the moral loadings are estimated over a different period. Moreover, here the moral loadings are estimated separately for the two series, while in the previous chapter they were estimated on the full sample. All these changes imply a somehow different set of articles which, in turn, affects the weights in the TF-IDF calculation. At any rate, the broad pattern remains the same. Consistent with the aggregate findings in Chapter 1, both series wander around a higher level before the Fall 2009, i.e. when the crisis started. Before that date, the tone of financial papers seems indistinguishable from that of their non-financial counterpart. Once the crisis starts and the issue becomes salient, though, both series fall precipitously and from that moment on the non-finance series remain consistently lower than the financial outlets series. By early 2019, it has not yet come back to its original value in neither outlet types (although it is trending towards the original level), even if the crisis has long ended and a pro-EU and pro free-market government took power in Greece.

[10]Prior to July 2009 and after May 2019, tabloids did not publish any article on Greece - at least articles retrieved according to my search criteria - for some month-year observations. While this is not necessarily problematic for testing hypothesis 1, it does not allow us to test the remaining hypotheses which require a complete sample. Imputing missing observations would be even more problematic as it would artificially affect the dynamic properties of the series. By and large, the few tabloid articles for Greece in the prior period display similar characteristics to those published in the quality and financial press (the moral index is more positive than in the post crisis period, and more volatile).

3 Analysis

3.1 Levels of Negativity

Here, I explore the relationship between moral sentiment and media types in two ways.

First, I calculate the difference in moral sentiment scores between financial papers and quality papers (Figure 5) and between quality papers and tabloids (Figure 6). I overlay the figures with a horizontal line at zero, the neutrality point. As we can see in Figure 5, most observations are above the zero line, thus indicating that financial papers tend to display less negative moral tone most of the time. Indeed, generalist quality outlets display a more negative tone in 81 months (70% of the time).

Figure 5: Difference in Morality Index between Financial and Generalist Quality Outlets (Monthly Average)

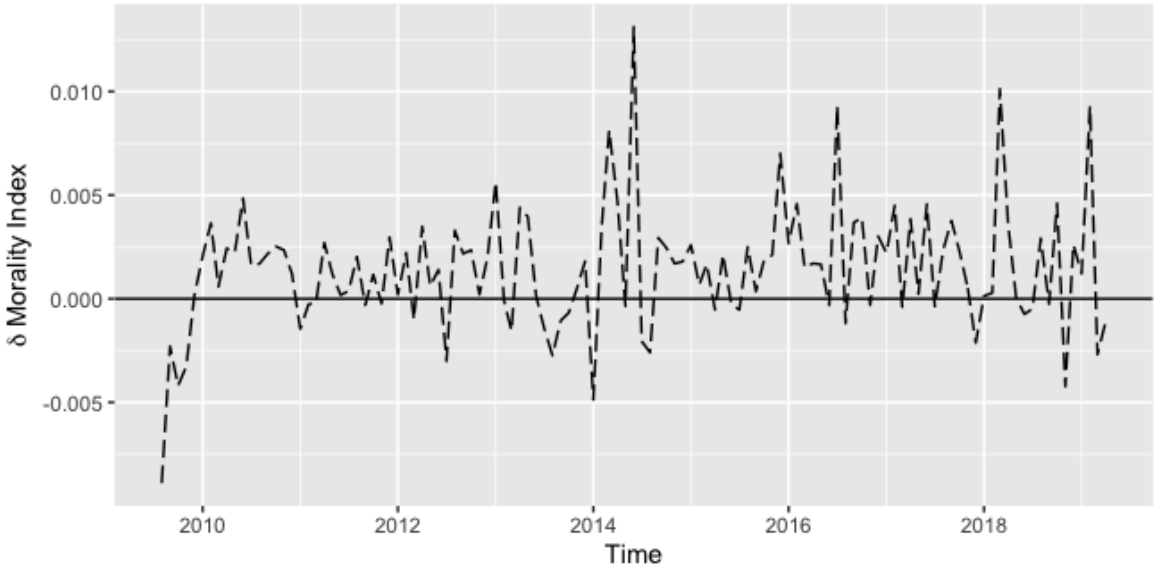
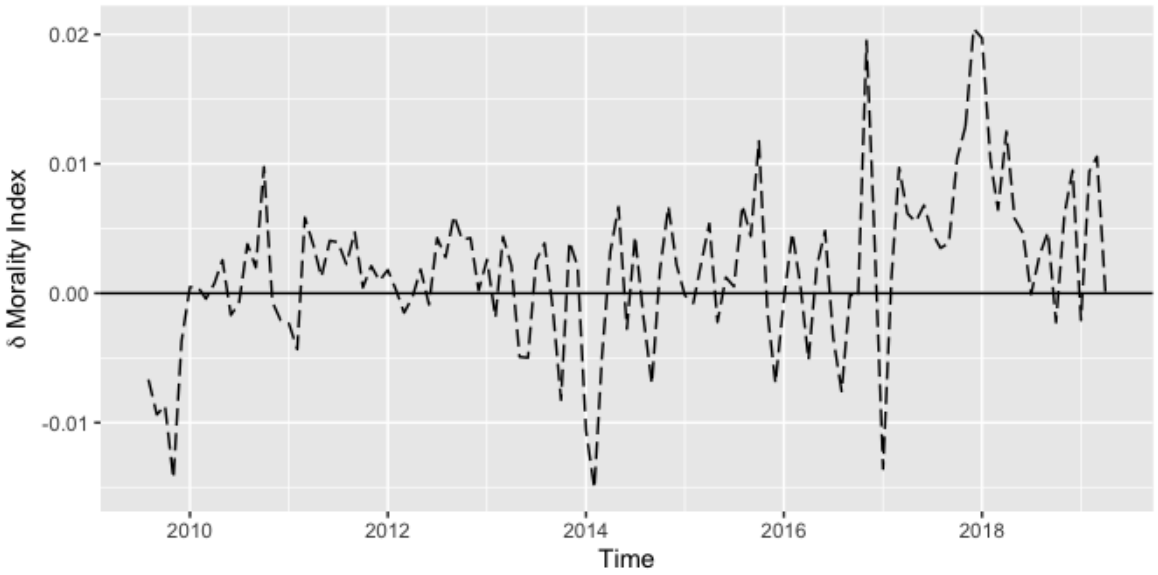


Figure 3 shows a similar dynamic at play, with generalist quality papers displaying a less negative moral tone overall, albeit less frequently than in the previous case. Tabloids' moral score is lower than that of other non financial papers in 67 months (65% of the time). The two graphs combined also imply that financial newspapers are less frequently negative in moral tone than tabloids.

Figure 6: Difference in Morality Index between Generalist Quality Outlets and Tabloids (Monthly Average)



Second, I test the hypothesis more rigorously in a regression framework. The sample period is the same as in the previous graphs (2009-2019). I estimate the following straightforward model:

$$Y_{it} = \alpha_0 + \beta_1 X_i + \gamma_t + \varepsilon_{i,t}$$

In other words, I regress the media type on the morality score controlling for year-month fixed effects. Unlike in the previous graphs, the unit of analysis here is the article. The media type baseline is financial outlets. Hence, we would expect the coefficients on quality generalist and tabloids to be negative, thus indicating greater negative moral tone. For ease of interpretation, I multiply the morality score by 100. Table 1 displays the results for the three media types separately as well as for financial and non-financial papers (pooling together tabloids and generalist quality papers).

Table 1: OLS Regression - Difference in Moral Tone across Media Types

	(1) Morality Index	(2) Morality Index
Quality General	-0.120***	
	(0.016)	
Tabloids	-0.180***	
	(0.029)	
Non Financial together		-0.133***
		(0.016)
Year-Month FE	Yes	Yes
Constant	0.283	-2.350***
	(0.355)	(0.395)
Obs.	22261	22261
Adj R Squared	0.029	0.029
F statistics	6.693***	6.483***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

As we can see, non-financial outlets (pooled together) are associated with a 0.133 statistically significant increase in negative moral tone relative to financial outlets (Column 2). Consistent with expectations, relative to financial outlets, tabloids are associated with a greater increase in negative moral tone (-0.180) than broadsheets (-0.120). A linear test of coefficient equality shows that the two coefficients are statistically different at the 5% threshold.

To sum it up, H1 is by and large confirmed. As the issue becomes salient in 2009, tabloids' exhibit a greater negative moral tone than quality outlets which, in turn, are more negative than financial newspapers. The moral negativity bias is visible in terms of both frequencies (the number of months when one media type is more negative than the others) as well as in a regression framework with the article as the unit of analysis. These simple tests are largely consistent with the vast empirical literature discussed in the review section (e.g. Boukes and Vliegenthart 2020).

3.2 Persistence of Negativity

As discussed previously, the interaction between negativity and continuity - two prevalent news values suggested in the literature - may give rise to an additional observable implication regarding the persistence of

tonality. As negative and positive shocks may be of varying duration, the resulting series is likely to be fractionally integrated. Moreover, the system of incentives of different media outlets suggests that financial newspapers should function as more "neutral" conveyors of information than generalist papers. In other words, they should update their tone more quickly and resist the temptation to stick with the previous negative narrative (if economic conditions do not warrant such negativity anymore). In theory, within the category of generalist outlets, we may expect a similar phenomenon at play, albeit possibly more attenuated. In particular, tabloids are more likely to experience market pressure and to appeal to a less sophisticated audience relative to quality papers . As such, they might be more likely to stick with a negative sensationalist narrative for longer periods for the purpose of attracting (or not losing) their audience's attention.

I assess the persistence of negative tone across media types in two ways. First, I explore the pair-wise correlations between a series value at time *t* and its own lags (back to *t-6*). Second, and more importantly, I analyze the univariate properties of the series. To explore the memory of the series (i.e. the persistence), I estimate and report a large number of unit root, stationarity, and long-range dependence tests. Then, I proceed with the formal estimation of the degree of fractional integration, i.e. the memory of the series.

As Table 2 shows, quality and tabloid (individually and combined) newspapers' tone in the past is more strongly correlated with its present value across all six lags for the 2009-2019 period. While not a rigorous test, these preliminary results lend credence to H2a, i.e. that financial news have less persistence in tonality than non-financial newsmedia. By contrast, the differences in cross-lag correlations between quality papers and tabloids seem minimal at best.

Table 2: Pairwise Correlation with own lags

Type of Media	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 6
Finance	0.418	0.330	0.352	0.417	0.472	0.325
Quality	0.585	0.583	0.450	0.467	0.507	0.329
Tabloids	0.609	0.608	0.432	0.477	0.496	0.352
Non-finance combined	0.599	0.588	0.442	0.470	0.476	0.332

While these simple correlations are suggestive, they are limited insofar as they do not allow us to neatly discriminate between short- and long-term memory processes. For that purpose, we need a more formal way to

assess the memory of the series. To begin with, though, I need to analyze and report the univariate properties of the variables. Indeed, any statement about the "memory" of the series would be meaningless if the two series were unequivocally stationary (memoryless) or non-stationary (infinite memory). Table 3 shows the results of multiple unit root, stationarity, and long range dependence tests.[11] By investigating the patterns of rejection that results from using tests with different null hypotheses, we can obtain information about whether a series is likely to be fractionally integrated. In particular, rejection of both null of stationarity and of a unit root are consistent with the hypothesis that the process under investigation is fractionally integrated (Baillie et al., 1996). The results in Table 3 are remarkably inconclusive and in clear contradiction. All tests with the null of a unit root are rejected, but so are all the tests with the null of stationarity, in all specifications and under different assumptions (trends, no trends, and up to two structural breaks). Moreover, both Range-over-Scale tests of no long range dependence are rejected. An alternative way to gather evidence in favor of fractional integration is to inspect the autocorrelation function of the first-differenced series (Young and Lebo, 2009). The intuition for why this is the case is simple. Assume that the series is fractionally integrated such that d = 0.3. Upon first-differencing the variable, the resulting series becomes of order $d = 0.3 - 1 = -0.7$. Such series will have an anti-persistent component that did not exist prior to taking the first difference. Then the autocorrelation function of the transformed series will display a large negative autocorrelation in the first lag, whereby none existed in the original series. As Figure 7, 8, and 9 in the Appendix show, this is indeed the case. Overall, the combined evidence is strongly suggestive of fractional integration and suggests that we should directly estimate the d fractional parameter to diagnose the level of integration, i.e. the memory, of each series (Box-Steffensmeier and Tomlinson, 2000; Clarke and Lebo, 2003).

[11] For a rigorous review on the strength and weaknesses of different stationarity and unit root tests see Baillie (1996).

Table 3: Tests of Univariate Property

Test	Null Hypothesis	Finance	Quality	Tabloids	Non-finance combined
ADF	d=1	Reject	Reject	Reject	Reject
ADF, trend	d=1	Reject	Reject	Reject	Reject
DF-GLS	d=1	Reject	Reject	Reject	Reject
DF-GLS, trend	d=1	Reject	Reject	Reject	Reject
Philipps-Perron	d=1	Reject	Reject	Reject	Reject
Philipps-Perron, trend	d=1	Reject	Reject	Reject	Reject
Variance Ratio[1]	d=1	Reject	Reject	Reject	Reject
KPSS	d=0	Reject	Reject	Reject	Reject
KPSS, trend	d=0	Reject	Reject[2]	Reject	Reject[2]
Geweke/Porter-Hudak test[3]	d=0	Reject[2]	Reject	Reject	Reject
Zivot-Andrew test	d=1 with one structural break	Reject	Reject	Reject	Reject
Clemente-Montanes-Reyes test	d=1 with one structural break[4]	Reject	Reject	Reject	Reject
Rescaled R/S	d= No long range dependence	Reject	Reject	Reject	Reject
Lo's Modified R/S	d= No long range dependence	Reject	Reject	Reject	Reject

[1] VR tests for q = 2,4,8,16.
[2] Reject at 10% level.
[3] Power value p = 0.5.
[4] Same conclusions allowing for two structural breaks.

Quite a few fractional integration estimators have been proposed in the literature. While an in-depth review of all the available estimators is beyond the scope of this paper, it will suffice to say that there exist both parametric and non-parametric estimators across both the frequency and time domain. There is still much debate in the literature regarding which estimators perform best and under which circumstances.[12]

Table 4 shows the fractional parameter values derived from a variety of estimators. The series are detrended prior to estimation. An interesting pattern emerges. Consistent with H2, all series are fractionally integrated. This is true across all estimators and all bandwidth parameters between 0.55 and 0.75 as suggested in Grant (2015).[13]

Nevertheless, the evidence in favor of H3 - regarding the differences in negativity persistence across media types - is mixed at best. To be sure, the point estimates of the memory of (moral) negativity is consistently lower for financial papers than for quality and tabloid papers (both individually and combined) regardless of the estimator. Nevertheless, the difference between point estimates never reaches statistical significance. Moreover, the memory of the series of quality papers and tabloids are remarkably similar, contrary to expectations.

[12] For a rigorous survey on long memory process estimators see Baillie (1996). For a less technical and more accessible review see Grant (2015).
[13] The results shown in the table are for bandwidth = 0.6. Results using alternative bandwidt are available upon request.

Table 4: Differential Parameter Estimation

Estimator	Finance	Quality	Tabloids	Non-Finance
Log Periodogram[2]	0.48 (0.12)	0.71 (0.09)	0.70 (0.09)	0.72 (0.08)
Log Periodogram[3]	0.49 (0.12)	0.72 (0.08)	0.72 (0.09)	0.71 (0.08)
Local Whittle[4]	0.24 (0.11)	0.33 (0.13)	0.37 (0.15)	0.34 (0.13)
Exact Whittle[5]	0.29 (0.11)	0.44 (0.13)	0.42 (0.12)	0.42 (0.12)
ARFIMA[6]	0.26 (0.06)	0.35 (0.07)	0.34 (0.06)	0.34 (0.05)
Sperio Estimate[8]	0.43 (0.12)	0.53 (0.11)	0.50 (0.10)	0.52 (0.11)
Hurst Exponent[7]	0.56	0.69	0.70	0.70

[1] Standard Error in Parenthesis.
[2] Semi-parametric estimator as in Robinson (1995b).
[3] Semi-parametric frequency domain estimator as in Geweke and Porter-Hudak (1983).
[4] Semi-parametric frequency domain estimator as in Robinson (1995a).
[5] Semi-parametric frequency domain estimator as in Shimotsu and Phillips (2005).
[6] Parametric time domain estimator as in Sowell (1992). Estimates for an ARFIMA (0,d,0) model based on AIC and BIC. Results robust to adding AR(1) and/or MA(1) parameters as well as including Greece' bond spread and/or the volume of articles as exogenous variables.
[7] Semi-parametric estimator as in Reisen (1994).
[8] No standard errors available. Parameter estimated as in Hurst (1951).

To sum it up, the available evidence by and large confirms H2, i.e. the tonality of newspapers is characterized by long-term memory. This is an important and novel finding that sheds new light on the dynamics of negativity in economic news. Moreover, these findings suggest that future studies should at least consider and test whether the series are fractionally integrated, given the possible pitfalls of misdiagnosing the univariate properties of a time series (Newbold and Granger, 1974; Dickinson and Lebo, 2007). Instead, H3 is not confirmed. While simple pairwise correlations with the variable's own lags may suggest differences in negativity persistence across media types, a more rigorous estimation of fractional integration casts doubt on whether the three media types can be differentiated according to the persistence of negative bias. At the same time, though, the financial paper series seem to exhibit somehow stronger dependence relative to the other types, as suggested in H3. The consistency of the results across the generalist/specialist cleavage across several different estimators and specifications is encouraging, considering that all the available fractional estimators are known for their low power and high standard errors in small samples (Keele et al., 2016). In future work, scholars may want to explore whether longer samples yield systematically different persistence parameters across media types.

3.3 Long-Run Relationship

So far, we have shown that the persistence of negativity in non-financial papers (individually and combined) is somehow higher than that of financial journals, although the difference is not statistically significant at any conventional level. By contrast, it seems unambiguously clear that generalist quality papers and tabloids do not differ in terms of negativity persistence. The strong rejection of H3 concerning the differences between generalist quality papers and tabloids also points toward a rejection of H4a, i.e. that the two series are diverging over time (polarization). If two series are similarly persistent after the same shocks, they are unlikely to diverge over time.[14] Hence, if two series are fractionally integrated of the same order (as it is clearly the case for generalist quality and tabloids), we can move the analysis one step further and explore whether the series are in a long-term equilibrium relationship and, if that is the case, what process guides the underlying rate of re-equilibration.

Given what we have found about the univariate properties of the series, I rely on fractional error correction models (Clarke and Lebo, 2003). This class of model allows the researcher to investigate how two variables are related to each other in the long run, while accounting for the fractional property of the data. Hence, it provides a convenient test of the tabloidization and dual convergence hypotheses, the two remaining hypotheses concerning the relationship between generalist quality papers and tabloids.

The logic underlying fractional error correction models (FECM) is a simple extension of Engle and Granger (1987) pioneeristic approach to co-integration. The original approach starts with two integrated variables and tests whether their linear combination creates a series of stationary residuals. By contrast, fractional co-integration relaxes the assumptions that the co-integrating series need be I(1) and that the residuals of their combination need to be I(0) (Baillie and Bollerslev, 1994; Box-Steffensmeier and Tomlinson, 2000).

To find fractional cointegration, we must first establish that the parent series are of the same order of fractional integration, which we have already accomplished in the previous section. As shown in Table 4 above,

[14] As a robustness check, I use the bounds method recently proposed by Webb et al. (2019, 2020) and confirm that the series are in a Long Run Relationship (LRR). Unfortunately, though, such method suffers from a key limitation insofar as it cannot identify which kind of equilibrium relationship is at work. The LRR could be conditional or unconditional, i.e. the long run relationship might be determined by combining the two variables or simply by the univariate properties of the series, independent of each other. I do not present the results since the empirical results that I present in this section imply the existence of a LRR. At any rate, this is an obligatory step since, absent a general LRR, there cannot be a more specific type of LRR, such as fractional co-integration.

the orders of integration of tabloids and generalist quality paper are very similar, thus indicating the possibility of fractional co-integration. Moreover, the literature on tablodization and other types of long-term relationship is concerned with the differences between quality and popular outlets within the generalist category. Hence, I estimate Fractional Error Correction models for two series: tabloids and generalist quality papers (i.e. broadsheets).

The next step is to fractionally difference the series by the estimated d value. To do so, I follow Lebo et al. (2000) and rely on the fractional parameters estimated via Sowell's (1992) Maximum Likelihood estimator, which is less biased in small samples (this is the fifth row in Table 4). By transforming every component of the model to be (0,0,0) via fractional differencing, we preserve equation balance and we can proceed with the formal test of the hypotheses. Then, we can explicitly test H4b and H4c and see which type of media re-equilibrates the most in terms of tonality. The tabloidization hypothesis would be confirmed if the generalist quality series was the one closing the gap the most, while a roughly equal rate of convergence would be evidence of dual-convergence.

After fitting the model, one needs to verify that the Error Correction parameter is of a lower order of integration relative to the co-integrating parent series. If the d parameter of the residuals is less than the estimated d for both parent values, we can conclude that fractional error correction is occurring. As in the case of standard co-integration, not finding any evidence of error correction should be enough evidence to drop an ECM specification (Grant and Lebo, 2016).[15] I test for the order of integration in the residuals once again using the Sowell's d value. The fractional parameter of the residuals does not overlap with the 90% confidence interval of the two parent series. For good measure, I also run a KPSS test on the residuals. Reassuringly, we cannot reject the null of stationarity (which instead is rejected for the parents' series, see Table 3). Taken together, this is strong evidence that fractional co-integration is at play and that a FECM can be used and interpreted as long run re-equilibration.[16]. Clearly, we cannot hypothesize a causal relationship going from one series to the other. What we are interested in is how the gap in tonality evolves over time. Ideally,

[15]One can still estimate an Error Correction model anyway, but the error correction parameter can no longer be interpreted as the re-equilibration rate of the two series (De Boef and Keele, 2008)

[16]Hence, as hinted at before, we can reject H4a, i.e. that the two series are diverging over time (polarization)

then, one would use a Fractional Vector Error Correction model (FVCEM), which is agnostic about causality. Unfortunately, I am not aware of any package to fit FVCEM in R or Stata. As a second best solution, I fit each single-equation model twice, inverting the generalist quality and tabloids' series as the dependent and independent variables. All models also include the Greek long-term spread as well as the total number of monthly articles on Greece in each outlet type. These variables should capture real-world events and the level of attention dedicated to the topic. They enter the equations in first difference since they both contain a unit root (but are not fractionally integrated).

Table 5 shows the results from the Fractional Error Correction models, with tabloids (Model 1) and broadsheets (Model 3) as the dependent variable. The main parameters of interest are the (fractionally differenced) error correction parameter (ECM), i.e. the rate at which tabloids (in model 1) and broadsheets (in model 3) come back to a long term equilibrium with each other. Both parameters are correctly signed (the error correction rate must lie between -1 and 0 by construction) and statistically significant. Substantively, they indicate that tabloids' tonality closes roughly 18% of the present gap at t+1 and 18% of the gap at t+2 and so on. By the same token, Model 3 indicates that the broadsheets series closes 11% of the present gap at t+1, 11% of the gap at t+2 and so on. The effect size is modest but not negligible considering that we are working on fractionally differenced data.[17] As we cannot reject the null hypothesis that the two error correction parameters equal each other, we can conclude that both tabloids and broadsheet converge towards a long run equilibrium in terms of tonality. In other words, we can reject H4b of unidirectional tabloidization in favor of H4c, i.e. dual-convergence.

[17] It is well-known in the literature that fractional ECM tend to yield smaller ECM parameters relative to standard ECMs. Indeed, if one was willing to assume non-stationarity and fit a standard Error Correction Model, we would find an error correction rate of 43% and 28% for tabloids and quality papers, respectively.

Table 5: Fractional ECMs and Fractional Threshold ECMs

	(1) Tabloids(fd)	(2) Tabloids(fd)	(3) Broadsheets(fd)	(4) Broadsheets(fd)
Broadsheets (fd)	0.513***	0.401***		
	(0.232)	(0.199)		
Tabloids (fd)			0.465***	0.345***
			(0.201)	(0.133)
Spread (d)	-0.011*	-0.001	-0.005*	-0.005
	(0.007)	(0.001)	(-0.003)	(0.001)
Volume (d)	-0.001	-0.001	-0.001	-0.001
	(0.005)	(0.004)	(0.005)	(0.004)
ECM (fd)	-0.183***		-0.110*	
	(0.006)		(0.007)	
ECM+ (fd)		-0.270***		-0.063*
		(0.032)		(0.036)
ECM- (fd)		-0.131**		-0.239**
		(0.034)		(0.040)
Constant	-0.026	0.087***	-0.014	0.079***
	(0.019)	(0.017)	(0.017)	(0.018)
Obs.	120	120	120	120
Adj R Squared	0.158	0.156	0.138	0.149

Robust Standard Error in parentheses. Transformations: fd = fractionally differenced; d = differenced.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The modeling strategy does not need to end here, though. Given what we know about the propensity towards negativity for both tabloids and quality papers, we may expect that the strength of the cointegrating relationship — i.e. the "pull" that brings the two variables back into sync — may not be constant across the two outlets. In particular, we would expect tabloids to move back in equilibrium with quality paper more quickly when their tonality has been *too positive* relative to what we would expect (given the covariates, thus including its outlet-specific lagged value). Likewise, we would expect quality papers to come back to equilibrium more quickly when they are *too negative* relative to what we would expect.[18] In other words, the differences in negativity across media types imply that the long run relationship will depend on: 1) the value and direction of the movements from equilibrium; and 2) on whether and the extent to which that movement out of equilibrium

[18]"Too positive" and "Too negative" here refers to one type of news media's tone relative to the other type of media's tone. It does not refer to the univariate series.

is made by quality papers or tabloids. In order to test for the non-linear relationship between tonality and media type, I rely on Threshold FECM models (Paul and Philips, 2022). This specification allows us to test two hypotheses at once. First, it is a further, and more rigorous, test of the differences in negativity bias across media types. Second, it allows us to test the hypotheses concerning the relationship between tonality in tabloids and quality papers (tabloidization vs dual convergence) while also accounting for both the fractional property of the data and the the differences in negativity bias across the two media types.

The defining feature of Threshold models is that the hypothesized relation is a non-linear function of movements above or below the threshold. While it might be tempting to constrain the threshold to be at zero under the assumption that strictly positive and strictly negative values in the morality index should reflect positive (and negative) moral tone in the articles, doing so would be incorrect on both substantive and methodological grounds. First, as mentioned in Chapter 1, the vast literature on negativity bias suggests a good degree of uncertainty in identifying how much negative tone in a written text is needed to classify it as "negative". Absolute scores have little interpretation since we have no prior expectations about what the "benchmark" moral content in written texts should be during "normal" times. Indeed, as Figure 1 in Chapter 1 as well as Figure 4 in this chapter show, the morality index before the crisis is not exactly zero. A threshold at zero would be no less arbitrary than one at -0.02 or at 0.01. Hence, I opt for a fully automatic procedure to detect the threshold that yields the best fitting model Chan (1993).

We can now interpret the Threshold FECM modes (Model 2 and Model 4 in Table 5). The parameters of main interest are ECM+ and ECM-. The former is the re-equilibration rate at or below the estimated threshold, while the latter is the re-equilibration rate estimate when the series is above the threshold. When the lagged cointegrating residual is at or below the threshold (ECM-), the rate of re-equilibration is -0.131 in Model 2 and -0.239 in Model 4. When it is above the threshold, it is -0.270 in Model 2 or -0.063 in Model 4 (albeit not statistically significant at 5%). Using the critical values from Enders and Siklos (2001), the null hypothesis of the equivalence between the ECM- and ECM+ parameters is rejected in both models. Hence, we can conclude that a threshold relationship in the cointegrating residuals exists (Paul and Philips, 2022). In other words, the two outlets re-equilibrate at different rates depending on whether they are above or below their long run

co-equilibrium.

In Model 2, we see that when the cointegrating residual is below the threshold the rate of re-equilibration is slower (ECM- = -0.131) than when it is above the threshold (ECM+ = -0.270). In Model 4, we can see that the opposite is true. Indeed, most of the re-equilibration takes place when the cointegrating residual is below the threshold. In substantive terms, Model 2 implies that when tabloids' moral tone is more positive than we would expect (i.e., the residual is positive and above the threshold), this dis-equilibrium is corrected more quickly relative to the situation when tabloids' tone is more negative than we would expect. In other words, tabloids cannot remain in the "positive zone" for too much. Whenever that happens, tabloids' moral tone quickly goes back to its long run equilibrium with broadsheets' tonality. On the other hand, Model 4 shows that when broadsheets tonality is more negative than we would expect (i.e. the residual is negative and below the threshold), the dis-equilibrium is corrected more quickly relative to the situation when quality papers' moral tone is more positive than we would expect. In other words, broadsheets cannot remain in the "negative zone" for too long. Whenever that happens, quality papers' moral tone quickly goes back to equilibrium with tabloids' tonality.[19] Finally, a cross-model test of coefficient equality (comparing ECM+ in one model with ECM- in the other model) does not reject the null of equality in the parameters. In other words, while tabloids tend to re-equilibrate more when they are too positive, and broadsheets re-equilibrate more when they are too negative, the rate of re-equilibration across (not within) media type are comparable. This is further evidence in favor of dual-convergence while accounting at the same type for the differences in negativity across media types.

To sum it up, the available evidence concerning the long run relationship between tabloids and broadsheets' tonality suggests that dual-convergence (H4c), rather than tabloidization (H4b), has been at play during the Sovereign Bond Crisis. This finding is in line with that of Lefkowitz (2018) and other scholars who have criticized the conceptualization of tabloidization as a uni-directional phenomenon. Moreover, the threshold FECMs have confirmed, in a more rigorous fashion, that the negativity bias is not constant across media types.

[19]This is not in contradiction with the previous finding of negativity bias in both levels and persistence for broadsheets. Here the series revolve around an equilibrium that is a linear combination of the two series. In other words, to say that broadsheets cannot remain in negative zone for too long simply means that the series cannot remain too low *relative to tabloids' tonality* for too long. For example, both series could be in negative zone for a long time (and they are), but one of the two will be more positive than the other.

Tabloids and broadsheets' tonality re-adjusts to equilibrium at different speeds, depending on where each series lies relative to the other one.

3.4 Conclusion

In conclusion, this study has provided new empirical evidence for old and new claims on negativity bias in economic news.

To begin with, I proposed a set of theoretical arguments based on news media's differential sensitivity to economic incentives to explain how negativity may differ across media types and change over time. In doing so, I have drawn attention to an often-overlooked dimension of negativity, its persistence. I argued that the commercial news factor of negativity and continuity are likely to generate a fractionally integrated tonality process.

Empirically, I confirmed previous findings about differences in levels of negativity between tabloids and quality papers and between quality generalist papers and quality financial papers. Moreover, the empirical evidence strongly supports the hypothesis concerning the persistence of negativity in economic news. Nevertheless, the three media types - and in particular tabloids and generalist papers - do not seem to differ in terms of negativity persistence. Finally, the findings of this paper may also help reconcile the received wisdom about the relationship between tabloids and generalist quality papers by offering a more nuanced view of their long-term equilibrium. In the longer term, the evidence - at least regarding the negativity bias in news media covering the Sovereign Bond Crisis - suggests that dual convergence has taken place. Overall, while the results are robust to standard measures of tonality (not shown here), I have shown that it is possible to extend the study of negativity bias in news media to a theoretically-driven subset of negative tone, such as a moral negativity. With this chapter, the first part of the dissertation ends. The next two chapters invert the causal arrow and explore how media framing can influence, rather than being influenced by, Sovereign bond markets.

3.5 Appendix

Figure 7: ACF First-Difference Morality Index (Financial Papers)

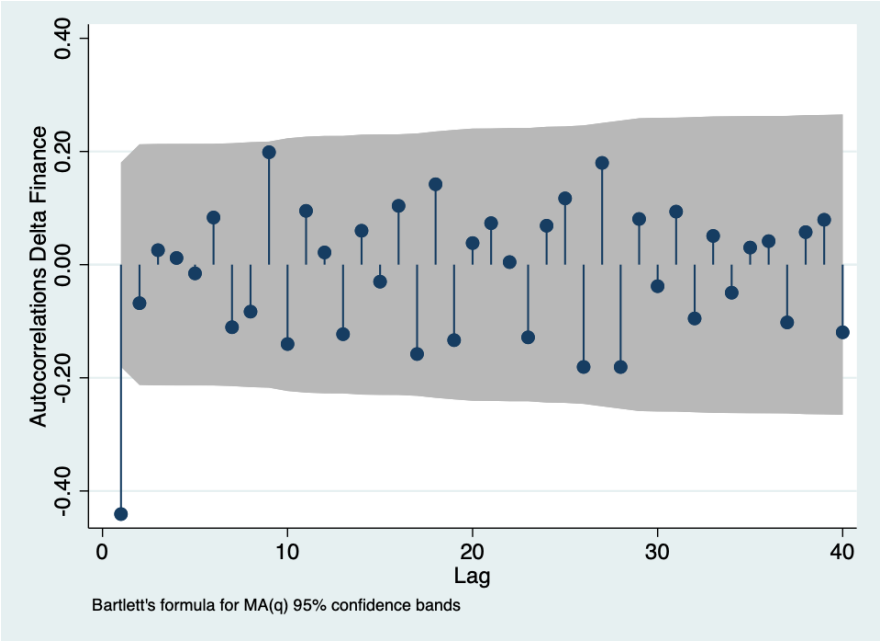


Figure 8: ACF First-Difference Morality Index (Quality Papers)

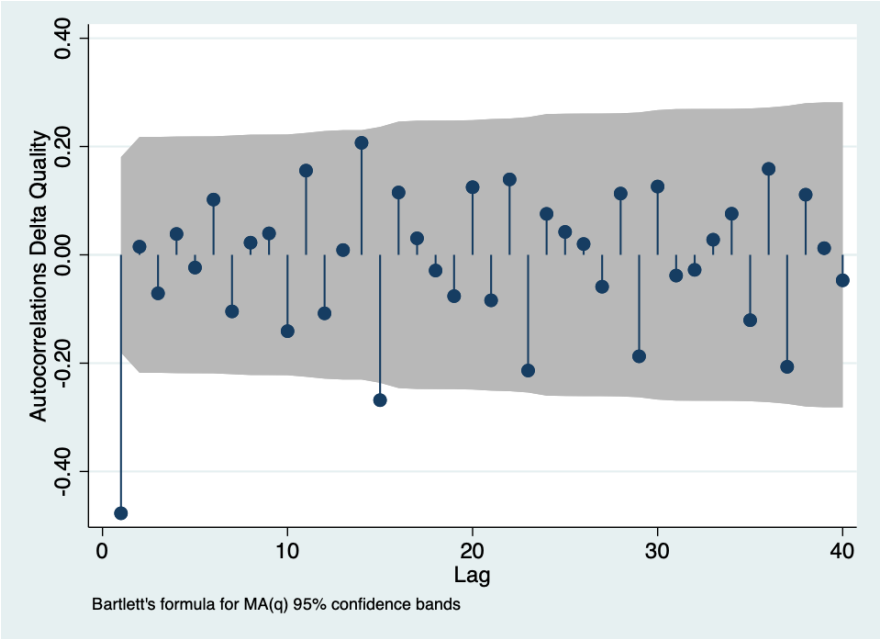
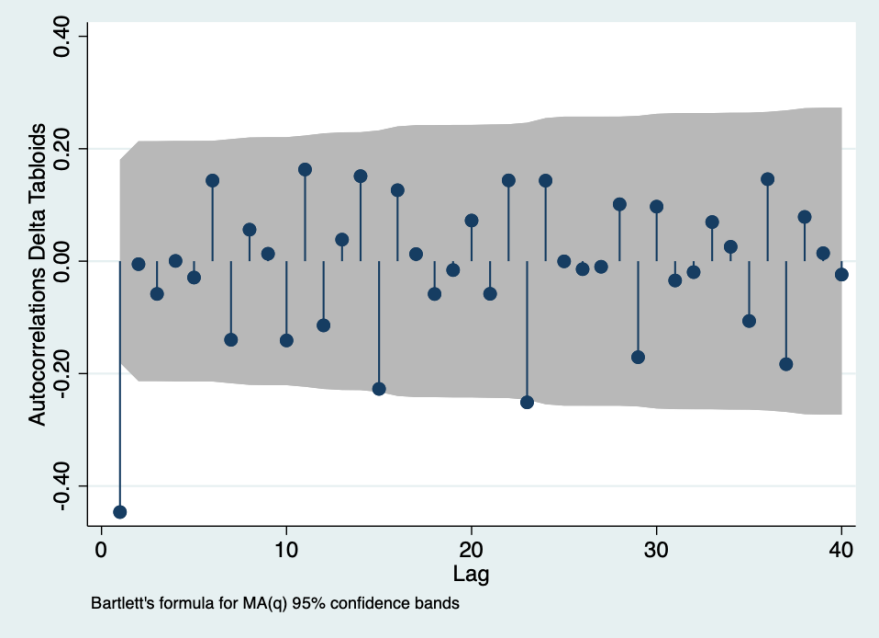


Figure 9: ACF First-Difference Morality Index (Tabloids)



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Chapter 3: The PIIGS Acronym as a Heuristic Device during the European Sovereign Bond Crisis

Abstract

How does media framing affect financial investors in sovereign bond markets? This chapter analyzes the consequences of the narratively constructed categorization of Southern European economies into the PIIGS group (Portugal, Ireland, Italy, Greece, and Spain). I suggest and test the hypothesis that investors use categories as a heuristic shorthand which, in turn, may result in a self-fulfilling prophecy. While acronyms and categories can provide useful devices to capture similarities, they can also be misleading insofar as they obscure otherwise important differences in economic fundamentals and other political factors. I argue that this is due to two main behavioral tendencies on the part of investors: the representativeness bias and the availability bias. Empirically, I test my hypotheses on Southern European countries during the eurocrisis (2009-2015). Using panel vector autoregression, Bayesian vector autoregression, and Granger causality, I show how the number of articles containing the acronym PIIGS in reference only to the other countries in the group increases the bond spreads of a given country beyond what political conditions and economic fundamentals would predict. The results show that Spain, Ireland and, to a lesser extent, Italy have paid a substantial economic price from being labeled as PIIGS (and from being associated, in particular, with Greece). The analysis highlights the relevance of investors' perceptions and discourse in interpreting (and misinterpreting) the role of economic fundamentals and underlines how the use of acronyms as heuristic tools affects financial contagion.

The first part of this dissertation (Chapter 1 and 2) used automated text analysis to investigate how media framing responds to Sovereign Bond crises with a specific focus on the eurocrisis. Within this "moralizing" context, and upon manually inspecting the content of the articles themselves, I detected a further rhetorical strategy in the media: the use of the derogatory grouping acronym PIIGS (Portugal, Italy, Ireland, Greece, Spain). Could such media framing affect how financial investors assess a country's default risk? Chapter 3 and Chapter 4 introduce a model of country risk evaluation based on investors' reaction to the media's use of grouping acronyms such as PIIGS (Portugal, Italy, Ireland, Greece, and Spain) and BRICS (Brazil, Russia, India, China, South Africa).

Once relegated to the political economy of emerging markets, the European Sovereign Bond crisis has reinvigorated scholarly interest in investigating which factors affect financial investors' assessment of a country's default risk, even in the context of relatively rich economies. A plethora of economic and political factors, both country-specific and global, have been proposed and empirically tested as determinants of sovereign bond yields (e.g. Bechtel 2009, Mosley 2003, Bernhard and Leblang 2006). At the same time, scholars have been investigating how investors weight the risk factors about a given sovereign to infer the default risk of *other* related countries. Alongside a renewed interest in standard models of "contagion effects" in financial markets (e.g. Pragidis et al. 2015), a more recent wave of scholarship has focused on the "peer effects" of socially constructed categories (Fourcade 2013; Brooks et al. 2015). Conceptualizing categorizations and classifications as cognitive decision-making shortcuts opens up the possibility that these heuristic devices may not be just neutral representations of economic fundamentals, but may exert an independent effect on investors' asset allocation decisions (Brazys and Hardiman 2015).

In this chapter, I investigate whether and to what extent the use of the PIIGS acronym (Portugal, Italy, Ireland, Greece and Spain) in the media acted as a mechanism of contagion and explains sovereign interest variations during the European Sovereign Bond crisis. In doing so, the chapter offers two major contributions. First of all, the chapter contributes to the literature on peer effects and diffusion in international financial markets providing new evidence for "peer group" effects beyond the context of emerging economies (e.g.

Brooks et al. 2015, Linsi and Schaffner 2019). Second, I provide evidence of one specific mechanism through which "peer group" effects take place, i.e. the use of group acronyms in the media. In so doing, the chapter contributes to the broad literature on financial contagion by identifying an additional transmission channel that complements the often-explored trade and financial mechanisms (Pentecost et al. 2019, Neri and Ropele 2015).

The chapter is organized as follows. First, I will review the literature on cognitive shortcuts in political science - with a particular focus on the political economy of finance - as well as the literature on financial contagion and the role of the media. Second, I will give a brief overview of how the acronym PIIGS became popular in the media. Then, I will introduce a theoretical framework inspired by the behavioral finance literature. I will underline two broad mechanisms through which the continued use of grouping acronyms may affect investors' behavior - the representativeness bias and the availability bias. I will also set expectations about heterogeneous effects across the countries under study (distinguishing between Greece, on the one side, and the the rest of the group). The following section will detail the research design, with a particular emphasis on the measurement strategy, the sample and variable selection, and the statistical methodology. Finally, I will discuss the results and conclude.

1 Literature Review

1.1 Cognitive Shortcuts

The study of categories and classifications is by no means a novel topic in the social sciences (Fourcade and Healy 2017). The ways in which categories embody vocabularies, nomenclatures, and meanings that enable and sustain social life and help individuals grasp the world around them has been a central theme in the social sciences since Durkheim (Schmaus 2004). Recent years have witnessed a revival in this long scholarly tradition and a renewed interest in the role of of classifications and categorizations in micro-economic settings, such as the wine market (Diaz-Bone 2017), the US subprime credit sector (Rona-Tas 2017), social investments (Nagel et al. 2017) and the fashion world (Schiller-Merkens 2017). At the same time, scholars in political economy in particular have started exploring this perspective in broader macro contexts, usually focusing on capital markets

(Brazys and Hardiman 2015, Brooks et al. 2015, Wansleben 2013), but also on foreign direct investments (Linsi and Schaffner 2019)

What these studies often have in common is the view that categorizations/classifications transcend their prima facie descriptive character to produce (and reproduce) value judgements about the categorized/classified. These judgements, in turn, may have tangible material consequences (Fourcade 2016). But why should simple acronyms work as a mechanism of market sentiment diffusion? After all, one may argue that group acronyms simply reflect underlying similarities in economic and/or political fundamentals. While this might explain why a given acronym (e.g. BRICs, LDCs, PIGS, PIIGS) came into being in the first place, scholars and practitioners have often found a good degree of arbitrariness in these categorizations (O'neill 2011, Wansleben 2013). Moreover, the possibly objective origin of these classificatory regimes does not exclude the possibility that its continued use in the public sphere might have real consequences for the countries in questions by shaping the way we talk about - and thus think of - them (Brazys and Hardiman 2015). As Fourcade aptly puts it: "Who would you rather put your money on – the BRICs or the PIGS? The terms (which evocate, respectively, a sturdy material and a filthy porcine) are not irrelevant here: we think and feel through language" (Fourcade 2013, p.262). In this sense, and not unlike the BRICs acronym, the PIIGS heuristic can be seen as a tool in the "classificatory regime of international finance" that may shape, and not only reflect, investment patterns (Wansleben 2013). While acronyms are only one of many possible heuristics economic agents rely on (e.g. Gray 2013), they can be interpreted as an example of how political-economic orders become intertwined with economic-related knowledge and information.

From this perspective, agents' reliance on heuristic devices is related to the need to overcome problems of incomplete information by translating unmeasurable "Knightian" uncertainty into quantifiable risk in a conveniently quick fashion (LeRoy and Singell Jr 1987). This way, economic agents obviate the costs of collecting complete information and of solving complex decision making processes (Simon 1990, Kahneman and Tversky 2013). In other words, these heuristics offer the promise of being "good enough" (Brooks et al. 2015) or, to use Simon's famous terminology, "satisficing". Moreover, as it is well known in the asset price literature, the importance of heuristic devices increases during economic/financial turmoil (e.g. Stracca 2004; Rigotti

and Shannon 2005). During these periods - characterized by heightened uncertainty - rational optimization becomes more complex and time-consuming (Büchel 2013).

Within these frameworks, political economists have shown particular interest in investigating the use of heuristics in financial markets. In an early study, Mosley (2003) showed that sovereign bond investors utilize distinct indicators to assess the creditworthiness of developed and developing countries. In particular, investors tend to focus on a "narrow" range of government policies in the former case, and a "broad" set of indicators in the case of developing countries. More recently, Gray (2013) has shed light on how a country's membership in international organizations functions as a heuristic device to infer its economic prospects. Likewise, Brazys and Hardiman (2015) investigate how Ireland's discursive inclusion in the PIIGS acronym affected financial market's perception of the country's creditworthiness, while Brooks et al. (2015) have found similar results looking at different country groupings in the case of emerging markets. Finally, Linsi and Schaffner (2019) emphasize the scope conditions of investment heuristics showing that they are more likely to affect short-term equity investments rather than long term foreign direct investments.

What have we learned from the extant literature? Scholars from a variety of disciplines have convincingly shown how and when social categories can have a performative role. Nevertheless, most of these studies have focused on micro-economic market settings (mostly in the sociological literature) or, when concerned with broader macro-contexts, on emerging economies (e.g. Brooks et al. 2015, Gray 2013). Since poorer, non-Western countries are most often the target of categorizations (e.g. Third World, emerging economies, frontier economies, LDCs, BRICs etc) (Mosley 2003), we still lack an empirical application to rich(er) countries.[1] The recent European Sovereign debt crisis - with its stark North-South, creditor-debtor cleavages - offers fertile ground for an empirical application. Moreover, and notwithstanding the methodological richness of previous studies, relevant questions pertaining misspecification and reverse causality in single-equation models loom large. For example, Linsi and Schaffner (2019) explicitly qualify their results against a causal interpretation on the ground that their single equation model does not account for reverse relationships.

[1] The major exception here is Brazys and Hardiman 2015 who focus only on one country, though (Ireland).

1.2 Financial Contagion and the Role of the Media

Clearly, the literature on financial contagion as well as that on the role of the media in financial markets are too vast to be reviewed here. As such, I will focus mostly on the applications to the recent European financial crisis. Moreover, in this chapter, I wish not to enter into the details of the (largely) theoretical debate in financial economics about the differences between contagion and spillover effects. The distinction is tenuous at best, and model-dependent at worst (Rigobon 2019). As such, I will use the words "contagion" and "spillover" interchangeably to describe the phenomenon of transmitting a shock from one country to another.

First, a long-standing literature in economics has studied contagion as a degenerate form of interdependence (Cronin et al. 2016). In these studies, scholars usually assess contagion by looking at the degree of correlation between different assets (or similar assets originating from different entities) and, possibly, how they change over time (Bird et al. 2017). Empirically, the contagion variable is often operationalized as a (spatial) weighted average of the other countries in a given category Brooks et al. (2015). Working with this approach in the EU context, Missio and Watzka (2011) find evidence of increased correlation between Greek risk premia and those of other European countries at the beginning of the crisis and Muratori (2015) presents similar evidence for the entire period. Not everyone agrees, though. For example, Pragidis et al. (2015) find that the correlation between Greek interest risk premia and those of other countries even decreased after 2009, while Philippas and Siriopoulos (2013) also find no evidence of contagion among peripheral European countries. Other scholars have tried to differentiate between types of financial contagion. In a influential study published at the peak of the European crisis Giordano et al. (2013) find evidence of so-called "wake up" contagion, the situation when an unexpected event in one country (Greek crisis outbreak, in this case) heightens investors' attention about other countries' fundamentals, thus leading to a revision of their previous default risk assessment.

All in all, while there is no consensus on the presence (and above all the size) of financial contagion during the European crisis (e.g. Aizenman et al. 2013), most studies do find evidence of some patterns of contagion. At the same time, they often differ when it comes to the specific channels through which contagion takes place (Pentecost et al. 2019). third broader (regional or global) factor.

Another strand of the literature has emphasized the need to look at exogenous events to infer genuine contagion. These studies often look at the financial markets effects of discrete events such as scheduled-ahead EU summits (Smeets and Zimmermann 2013) or foreign country-specific news (Bahaj 2020) that are plausibly orthogonal to the target country's economy.[2] By and large, scholars adopting this strategy have also found evidence of contagion mostly, but not exclusively, among peripheral European countries. For example, in a highly influential study, Mink and De Haan (2013) show that news about a bailout of Greece had an effect on the sovereign bond prices of other Southern economies. Likewise, Corbet (2014) shows how rating agencies' downgrading announcements had a contagion effects on other EU countries. While these studies provide valuable insights about the causal nature of contagion, they are limited to discrete and well recognizable events and thus may not be generalizable to the day-to-day operations of financial markets.

Finally, a few scholars have explicitly linked contagion effects to the role of the media. Intuitively, news releases represent a change in the agents' information set and, if not foreseen, should affect investors (Caporale et al. 2018). For example, Beetsma et al. (2013) find that the amount and tone of news related to a PIIGS country raises the spread of the other group members and even, albeit to a lesser extent, that of other European countries. Similarly, Caporale et al. (2018) find similar evidence for a longer period and show the correlation to be stronger during high volatility periods and especially in the EU periphery.

Overall, what have we learned from these insights? By and large, most (but not all) studies have detected contagion effects, at least to some extent. As Pentecost et al. (2019) note, though, less is known about the factors underlying financial contagion beyond the financial and trade transmission mechanisms. Indeed, a major contribution of the present study is not only to provide further evidence of financial spillover among PIIGS countries, but also to investigate the importance of a novel channel through which it takes place, i.e. investors' reliance on grouping acronyms in the media as a heuristic device to infer a country's future. Before elaborating on the theoretical expectations, though, a brief digression on the origin of the PIIGS acronym is necessary.

[2] As it will become clear later, I will use the terminology "target" country throughout the chapter to refer to the country about which investors make their evaluation/assessment.

2 A brief story of the PIIGS acronym

The original acronym "PIGS" raised to prominence in the mid-90s during the negotiations over the conditions to enter the European Monetary Union.[3] The idea of Southern European economies representing a well defined socio-economic cluster with a pejorative connotation had already been around for some time (Brazys and Hardiman 2015). Apparently, the first use of the term in print was a *Wall Street Journal* article in 1996. With the beginning of the euro-crisis, Ireland was added to the group, which became known as "PIIGS". Interestingly, applying text analytical and topic modeling techniques to German news media, Küsters and Garrido (2020) find that the heuristic was initially shaped by socio-cultural attributes that mainly reflected the experiences of (Northern European) tourists, and was only subsequently attached to an economic dimension. This descriptive finding is in line with the previously reviewed literature on classifications/categorizations as cultural templates that convey stereotypical value judgements (Fourcade 2013). According to some, the acronym has transcended its economic meaning and arguably played a role in reviving *essentialist topoi* that degraded peripheral EU states as backward, lazy, irrational, corrupt, inefficient, and wasteful (Küsters and Garrido 2020). As such, the acronym PIIGS transforms the dividing line between debtors and creditors into a morally charged one of "saints" and "sinners" (Dyson 2014).[4]

3 Theory and Hypotheses

Standard economic models assume that agents possess computational capabilities that are at odds with empirical psychological findings (Conlisk 1996). By contrast, behavioral scholars argue that agents often employ mental shortcuts and "rules of thumb" to optimize deliberation costs. These specific shortcuts are often referred to as decision heuristics (Kahneman and Tversky 2013). Such heuristics, while individually rational, may lead to poor aggregate decision-making as they involve "blunders" that would otherwise be avoided if agents were to engage in a full cost-benefit analysis (Stracca 2004). Within the decision heuristics identified in the liter-

[3] According to some, though, the first use of the acronym dates back to 1978.
[4] A similar, but opposite, essentialist narrative was also present in debtor countries against Northern creditors (Adler-Nissen 2017).

ature (for an overview see Stracca 2004), two are particularly relevant in this context: the representativeness bias and the availability bias. Originally proposed in the classic study by Tversky and Kahneman (1974), the representativeness and availability heuristics help us understand how people reason under conditions of uncertainty. In what follows, I sketch a model of country risk evaluation based on investors' activation of the representativeness and availability heuristic due to the media's usage of grouping acronyms.

The two main actors are the media and quasi-rational investors.[5] They are both assumed to be driven by a desire to maximize their profits. On the one side, under conditions of uncertainty and imperfect information, boundedly rational investors often lack the time and resources for collecting the amount of information required for a full cost-benefit analysis. As such, they evaluate the probability that an element A belongs to a class B by examining the degree to which A is *representative* of B, i.e. how much A *resembles* B. Then, agents simply assign high (low) probability of A belonging to B if A is similar (dissimilar) to (from) B. In our case, to quickly assess a country's creditworthiness, investors compare that country with a stereotypical "trustworthy" or "untrustworthy" type. On the other side, the media employs catchy grouping acronyms, such as PIIGS, to attract the readers' attention. They act as "fundamental propagators [...] through their efforts to make news interesting to their audience" (**?**, p. 95). While often based on a kernel of truth, these acronyms' membership criteria need not to be consistent with objective political and economic conditions. The evaluative connotation of the grouping acronyms – positive (e.g. BRICS) or negative (e.g. PIIGS) – determines the qualitative nature of the class. It is either a "trustworthy" or "untrustworthy" class. In our case, since the PIIGS acronym has an unambiguously negative connotation, we can think of the class as "untrustworthy type" and each country as a (possible) element. The contention here is that the discursive inclusion of a country in the acronym PIIGS functions as a signaling mechanism about its type. The more the PIIGS acronym is being used, the more its constitutive members are discursively linked together. In turn, such discursive proximity will result in economic agents perceiving the countries as an increasingly homogeneous class. The more a country is discursively associated to the PIIGS group (i.e. the more the PIIGS acronym is being used in the media), the more quasi-rational investors will be sensitive to developments in that country to infer the future policies and performances

[5] I use the words "boundedly rational" and "quasi-rational" interchangeably.

of the remaining members of the group. In other words, quasi-rational investors will respond to this perceived homogeneity by updating their priors about one class member even if they receive new information about only the other class members (and vice versa).

While relying on such stereotypical reasoning is not without value at times (to state otherwise would be equivalent to assume that investors can never learn anything about a country unless it comes solely from that country), it may also lead to sub-optimal outcomes. The main reason is that, while somehow informative, representativeness is independent of (thus, unaffected by) other factors that *should* influence our assessment of the probability of interest. One prominent factor is the baseline probability of the event of interest (its prior porbability). Indeed, there is little value in assessing the extent to which A is representative of B unless we know how likely B is to begin with. As the goal for an investor is to avoid losing money by investing in a country that may default, they should weight the probability of a country being similar to a default-type country by the baseline probability of default actually taking place. In other words, the representativeness heuristic is a classic violation of Bayes' theorem, as it leads agents to equate inverse probabilities without accounting for the baseline prior probability. Such neglect is potentially important in our case as we know that - prior to the crisis - investors, practitioners, and scholars alike assigned an extremely low baseline probability of sovereign default in an OECD countries (Mosley 2003). A related factor that should affect a fully Bayesian actor's assessment of probabilities is sample size. Indeed, while the prior probability of a rich country's default was viewed as extremely low at the start of the crisis, investors should have rationally updated their prior upwards as the crisis unfolded. Undoubtedly, the experience of Greece - a relatively rich, Western, OECD country - in the first year of the crisis showed the prior baseline assessment to be off the mark. Nevertheless, the real question is: *by how much* should investors have updated their prior beliefs that an OECD country could default on its sovereign debt? Even if we accept that the Greek experience was highly salient of what *could* happen to an OECD country that mismanages its public finance, it represents only one event of the broader "rich country's default" class of events. With a statistical analogy, the Greek experience variable has a high coefficient (strong size effect), but also a high standard error (low statistical significance) due to a limited sample size.

As previous studies have shown, the neglect of prior baseline probabilities and insensitivity to sample size

lead agents to over-rely on representativenss in their decision making process (Tversky and Kahneman, 1974; Griffin and Tversky, 1992).

A second heuristic originally suggested in Tversky and Kahneman (1974) is also relevant to explain the continued use of heuristics as the crisis unfolded. This is the availability heuristic. Simply put, human beings tend to assess the probability of an event by the easiness with which examples of its occurrence can be brought to mind, i.e. are available. Mutatis mutandis, the implication to our case is straightforward. As element A becomes more and more associated to group B, the easiness with which, and hence the likelihood that, actors will think of B when they are exposed to A increases. Since the remaining countries (alongside country A) are also members of B, actors will update their priors about the whole group, albeit to different degrees. The contention here is that, as the crisis unfolded, the sheer repetition of the acronym PIIGS in relation to the five countries increases the likelihood that actors would think of a default type once they are prompted to think of any individual member.

The theory sketched above, while novel in its application to sovereign entities, is consistent with well-known formal models constructed to explain stock market developments that are apparently at odds with the prediction of the Efficient Market Hypothesis (EMH). For example, Griffin and Tversky (1992) construct and test a model to explain the pattern of under- and over-reaction.[6] In their framework, agents update their beliefs based on both the *strength* and the *weight* of the evidence. Strength refers to aspects of the evidence such as its salience and extremeness, while weight refers to its statistical informativeness. The latter is clearly related to the previous discussion of small sample bias underlying the representativeness heuristic. In particular, Griffin and Tversky (1992) show how people tend to focus too little on the weight of the evidence, and too much on its strength, thus violating Bayes' theorem. More specifically, under-reaction (conservatism) tends to arise when actors face evidence that has high weight but low strength. Unimpressed by the low salience of the evidence, actors react only mildly. By contrast, when the evidence is of the high-strength/low-weight variety, actors over-react in a manner consistent with representativeness. In both cases, the reaction is present - and in the right direction, given the evidence - but is either exaggerated or attenuated relative to that of a fully Bayesian actor.

[6]Technically, they are concerned with under and over-confidence more generally. Nevertheless, Barberis et al. (2005) - to be discussed shortly - show that it can be applied to under and over-reaction in financial markets more specifically.

Moreover, such psychological sub-rational outcome is not minimized by expertise, experience, sophistication and, more generally, any of the traits associated with human capital. Indeed, experimental studies have found not only that such behavior is also present among experts, but that over-reaction is actually *more* likely among experts than novices as the overall uncertainty of an event increases. As Griffin and Tversky (1992) succinctly summarize it: "If [...] the stock market cannot be predicted from present data, then experts who have rich models of the system in question are *more* likely to exhibit overconfidence than lay people who have a very limited understanding of these systems." (p. 430, emphasis mine)

Building explicitly on the intuitions sketched above, Barberis et al. (2005) develop a model of the stock market where agents overreact to new information due to representativeness bias (and under-react due to conservatism bias).[7] Once again, under the assumption that a consistent series of good (or bad) earning announcements represent high-strength/low-weight information, the model predicts over-reaction in the correct direction. The connection to the European sovereign bond crisis should be evident. At the start, developments in a given country (say, Greece) is surely highly salient, but should have relatively low informativeness about another country (say, Ireland), above all in a context where the prior baseline probability of an event (default) is low. Of course, as Griffin and Tversky (1992) aptly notice, the difficulty in testing these hypotheses is that, in practice, it is not always clear what the empirical equivalent of various combinations of strength and weight would look like. In the "Measurement strategy" section, I will delineate a simple procedure to select informational evidence that is relatively high (and varying) in strength and low (and fixed) in weight, thus allowing us to test the over-reaction part of the model.

Overall, the above discussion suggests the main hypothesis of this chapter:

- **Hypothesis 1**: An increase in the *implicit association* to the *negative* PIIGS label will lead to an increase in the country's perceived riskiness.

Moreover, while the countries under study share some similarities in terms of economic and political characteristics - hence why they were grouped together in the first place - the argument proposed here suggests that

[7] I focus on Barberis et al. 2005 as they explicitly refer to represnetativeness. Also, I focus only on the over-reaction part of the model, as it is the most relevant to the present paper

this acronym has also obfuscated systematic intra-group differences. As Gray (2013) has shown, the ”company that states keep” matters differently depending on each member country’s prior trustworthiness. In other words, lumping together ”good” and ”bad” country types will result in the former’s loss and the latter’s gain in reputation. By definition, in the present context there is no ”good” type; hence, it seems unlikely that any member of the group could have benefited from being associated to the rest. Nevertheless, it seems natural to expect Greece and, to a lesser extent, Italy to be the prototypical ”bad” type in the groups due to their high-level of pre-crisis indebtedness. As such, the empirical analysis will focus on all countries pooled together as well as on each individual country separately. In line with the reasoning underlined above, in the single country case we would expect Spain and Ireland (relatively ”good” type) to be the most affected by being associate in a ”bad type” acronym, while Greece and, to a lesser extend, Italy to be the least affected.

4 Research Design

4.1 Measurement

Scholars working in finance and communication have usually employed one of two measurement strategies, which we could label as ”general” and ”targeted” (for a discussion of this distinction in a similar context see Büchel 2013). At times, authors have simply looked at the frequency with which the tokens of interest are used without differentiating between the target country and the other members of the group. For example, this was the approach in Brazys and Hardiman (2015) and Linsi and Schaffner (2019)’ studies of PIIGS and BRIC acronyms, respectively. The weakness of this ”general” approach is that it results in a mix of information about the target country and the other members, thus making it difficult, if not impossible, to distinguish between genuine ”peer group” effects from standard informational effect of news media (i.e. the effect of articles about Spain on Spanish bonds). The second approach is to restrict the focus on the target entity by imposing an explicit set of search criteria. For example, Büchel (2013) search for politicians’ last names and at least one crisis-related key word (e.g. ”Tsipras” and ”crisis”). While it is obviously desirable to restrict news information to a specified and easily recognized entity, this approach also comes at a cost. In particular, while

the ”general” approach runs the risk of inadvertently incorporating information about the target country, the ”targeted” strategy - at least as usually implemented - suffers from the opposite risk, i.e. that of incorporating information about the other countries. Clearly, while an article including the words ”Tsipras” and ”crisis” is *also* about Greece, it might not be *mostly* about Greece. The main focus of the article might be on Spain, while Greece is only mentioned en passim. While the two approaches can be combined to assess the effect of both ”targeted” and ”general” news (as in Büchel (2013)), this does not solve the underlying uncertainty about what is being excluded and/or included and, hence, what exactly is being measured.

Keeping the above discussion in mind, I propose an alternative simple strategy, which may be labelled as ”negative”. In order to capture a country's *implicit* association with the PIIGS group in the media, I search for news articles on the Factiva (and LexisNexis as a robustness check. Results available upon request) database that are *not* about the target country. I do so by querying the following search string:

(”PIIGS” or ”PIGS”[8]) not ”Target Country Noun” not ”Target Country Adjective” not ”Target Country Population” and(”Other Country 1” or ”Other Country 2” or ”Other Country 3” or ”Other Country 4”)

The articles retrieved are, by construction, *not* about the target country.[9] It should be noted that this is arguably the most conservative search criterion one could use, as it even excludes all articles that use the acronym PIIGS followed by the parenthetical ”Portugal, Italy, Ireland, Greece, and Spain”. While a country mentioned only in parenthesis would be unlikely to be the main topic of the article, counting these articles would cast doubt on the assumption that the news articles affect investors' perception of that country's creditworthiness only by *implicit* association with the other members via the PIIGS heuristics. I further restrict the search to articles written in English to make sure that the acronym is correctly searched for. Moreover, this avoids possible selection

[8] I manually exclude articles on the pork market.

[9] One could imagine a situation where the country is solely described in terms of its capital. I randomly selected 100 articles for each target country and manually searched for the capital. In only one case (out of 400) my search string failed by including an article that mentioned Athens en passim

issues since the Factiva database contains a comparatively smaller number of non-English written newspapers, which might be systematically different from the ones left out. I do not distinguish between financial and non-financial sources as the former represents a small fraction of total papers. Nevertheless, I select the following subject options: "Commodity/Financial Market News", "Corporate/Industrial News", "Economic News" and "Political General News".[10] I request the acronym to be present at least twice. I repeat the search strategy for Greece, Italy, Spain and Ireland. I exclude Portugal because it is almost always discussed in tandem with Spain, thus making it very difficult to establish the proper criteria to select the articles.

To relate this strategy to the previous theoretical discussion, the "negative" search string guarantees a fixed low informativeness (weight) about the target country since it is never mentioned in the text. At the same time, this strategy allows for varying degrees of strength of the signal captured by the volume of articles using the acronym per unit of time. In other words, articles discussing and describing Spain/Italy/Portugal/Greece as a member of the PIIGS are likely to be salient to investors as they provide information about the Spanish/Italian/Portuguese/Greek political-economic situation. Nevertheless, since Ireland is never mentioned in the texts, the articles should have low informativeness about the prospects of the Irish economy.[11]

To summarize, the proposed measurement strategy is novel and different from that used in other studies (e.g. Brazys and Hardiman 2015 or Linsi and Schaffner 2019) as it allows us to investigate the acronym's "peer effect" using sources that are by construction not directly related to the target country. This way, the empirical results can be interpreted as evidence that the target country is paying the price of being "guilty by association", so to speak. This strategy also clearly differs from standard contagion studies looking at assets' correlations between the target country and the other group members (Brooks et al. 2015).

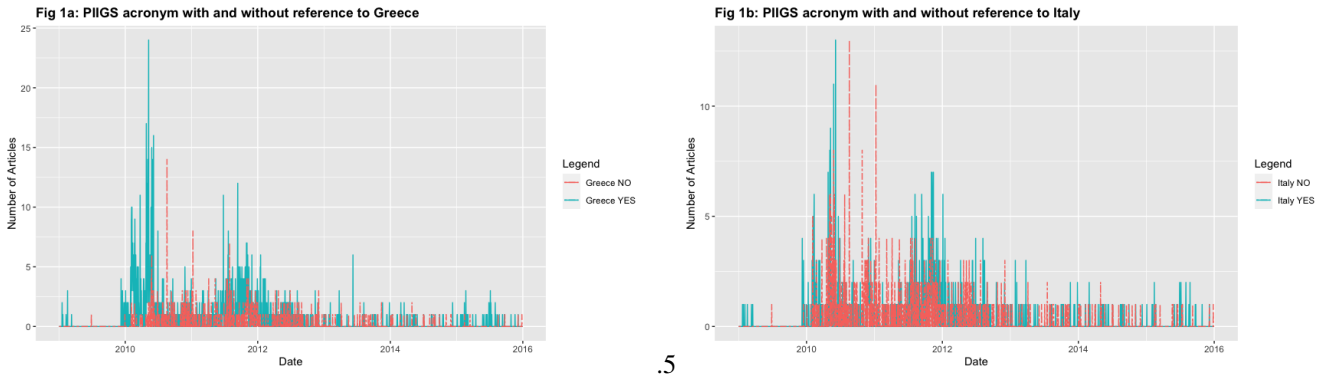
Figure 1 displays the end result of this process, i.e. the daily distribution of articles that mention the acronym PIIGS without mentioning the reference country from October 2009 to the end of 2015. To ease comparisons with previous studies, I also graph the number of articles containing the acronym PIIGS and that also mention the target country at least 2 times (the blue bars).[12] For ease of exposition, henceforth I will

[10] I also exclude duplicate texts, as identified by Factiva itself under the "similar duplicates" option.

[11] The underlying assumption is that the numbers of articles using the acronym PIIGS about a country is a function of the strength of the set of information being reported in the article. The assumption is justified in light of the empirical literature on media and economics. Indeed, one of the most robust findings is that economic developments affect the volume of news articles. See, for example, Liu 2014.

[12] Searching for articles that mention the target country at least thrice results in similar graphs.

use the term ”YES articles” to describe the articles that contain the acronym as well as the target country and ”NO articles” in reference to the articles that contain the acronym but do not contain any mention of the target country. The latter articles are the focus of my analysis. Three points are worth noticing. First, as one would expect, the case of Greece is different from the rest as evidenced by the higher number of articles mentioning the country (the blue bars) relative to the articles not mentioning it (red bars). Second, the histograms do have the familiar hump-shaped form characteristic of the bond spreads of Southern European countries during the crisis. The last phase of the Greek sovereign bond crisis (Summer 2015) is an exception to this trend as there is no increase in the number of articles using the acronym. At that point, the crisis was confined to Greece and the remaining countries were on a path to recovery. Moreover, the relative infrequency of its use might also be due to the fact that the acronym became less socially accepted over time. Third, while the two series clearly track each other, there is a great deal of variation. Indeed, the Pearson correlation coefficients for the two series is between a minimum of 0.24 for Greece to a maximum of 0.33 in the case of Italy.



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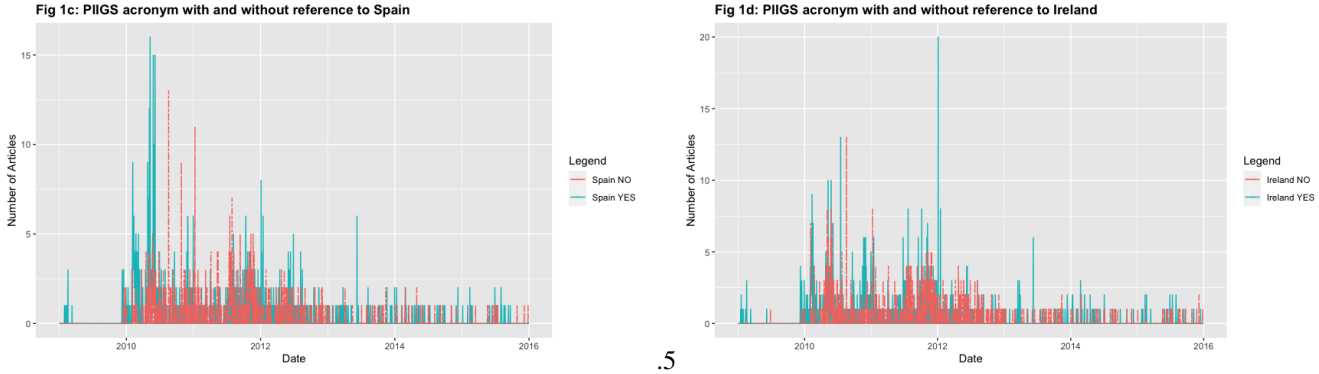

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4.2 Sample and Variables selections

The literature distinguishes between four potential determinants of sovereign bonds interest rates: exchange rate risk, liquidity risk, credit risk, and general risk aversion (D'Agostino and Ehrmann 2014). Clearly, **exchange rate** risk is less relevant in a monetary union (although the euro/dollar exchange rate is used as a regressor to control for EU-wide shocks). To control for liquidity risk, I include the overall outstanding amount of **public debt** (e.g. Gomez-Puig 2006).[13] Likewise, I proxy for general risk aversion via the corporate bond yield spread in the US. In particular, I follow the standard convention in the literature and use the **spread between Moody's Seasoned Baa and Aaa corporate bond yield** (Codogno et al. 2003; Liu 2014). As a second proxy, I use the **VIX**, a measure of global volatility risk premium (Longstaff et al. 2011). Some authors have suggested that the size the EU market justifies the use of regional (rather than global) risk aversion. As such, I use the EU-wide CPI index to proxy for regional market risk (Spyrou 2013).[14] Finally, I include several macroeconomic variables to proxy for country-specific credit risk: **inflation rate**, **real GDP growth**, **unemployment rate**, **current account balance**, and **budget balance** (e.g. Beirne and Fratzscher 2013). Given the different time frequency of the variables, I follow the literature and use standard interpolation techniques when needed (e.g. Hauner et al. 2010).

As a robustness check, I also augment the model with a measure of central bank communication. In particular, I rely on the **KOF measure of monetary policy**, which translates ECB President's forward-looking statements on price stability into a quantitative index that contains information about the future course of monetary policy (De Haan 2008). The main reason to use the KOF measure - rather than a more standard measure of monetary policy - is that it allows for a clearer temporal ordering in the Cholesky decomposition (see later section). Indeed, consistent with its forward-looking nature, the KOF measure has been shown to anticipate interest rate movements by two months (KOF, 2007). At the same time, it affects expected and actual inflation in a way similar to that of the actual main refinancing rate (Neuenkirch 2013). These properties suggest a convenient ordering for the Cholesky decomposition (more on this later).

[13] An alternative proxy for liquidity risk is the bid-ask spread of the 10 years sovereign bond themselves (Afonso et al., 2014).

[14] An alternative would be to use the difference between the ECB reference rate and the 3 month Euribor. Such measure, though, may also capture liquidity risk, which is already accounted for.

Furthermore, all models using the daily dataset also include an exogenous dummy for **Friday** to account for the "Friday effect" detected in the finance literature (Shleifer, 2000). Following the literature, articles published in the weekends are averaged and are assumed to affect financial markets the following trading day (Büchel 2013). The models also include the number of articles that do mention both the acronym and the target country (the **YES articles**). Excluding them does not substantively change the results.

Finally, we need to pay particular attention to including a variable that captures financial **contagion**. Indeed, as noted in Kaminsky and Reinhart (2000)'s classic study on financial contagion, true contagion "arises when common shocks and channels of potential interconnection are either not present or have been controlled for" (p. 146). There are several ways to go about it. Given that confidence in my empirical results rests on how well I control for other channels of contagion, I explore several of them.

First, I take the standard approach of controlling for the unweighted average of the price of sovereign risk in the other member of the group (after excluding the country of interest) (Edwards 1983, Beirne and Fratzscher 2013).

Second, we know that credit ratings are a likely source of contagion effects (Longstaff 2010). As such, I control for Credit Rating Agency's announcements for the other countries in the group. I follow standard practice in the literature and turn the letter grades into a numerical score (1-25). To avoid over-parameterizing an already rich model, I run a Principal Components Analysis of the credit rating announcements of the other PIIGS country (after excluding the target country) and include the first principal component.[15] Following the literature, this measure enters the system of equation exogenously (Brazys and Hardiman 2015)

Third, to account for more specific mechanisms of contagion I proxy the linkages between sovereign bond markets by economic distance measures (Claeys et al. 2012). Following the literature, there are two main channels of contagion transmission, i.e. trade and the finance/banking sector (Pentecost et al. 2019). To begin with, I weight interest rates by the target country's trade exposure to each other country's in the group (e.g. Greece's imports plus exports as a percentage of GDP towards Italy divided by overall exports and import towards Southern European economies).[16] Likewise, sovereign contagion may happen via integrated banking

[15]The first PC is deemed sufficient as it captures more than 80 per cent of variation in all cases.

[16]This is done for the daily dataset. As trade exposure data starts only with the first quarter of 2010, there are not enough observations

systems. As banks diversify their holdings of sovereign debt to minimize the expected cost of individual country's default (ex ante diversification), this is likely to act as a contagion mechanism once a crisis starts (ex post contagion) (Muratori 2015). As such, I explore the possibility of contagion via the bank sector by weighting each country's 10 year bond interest rate by the consolidated claims on immediate borrower basis by the nationality of reporting banks as a proportion of total peripheral EU countries claims on each country.This is a commonly used measure of bank exposure (Gómez-Puig and Sosvilla-Rivero 2013).

Fourth, I summarize the information contained in the other countries' bond yields via PCA to capture any group-wide co-movement. Following the literature, the first PC is then included endogenously in the VAR system (Altınbaş et al. 2021).[17] The extracted financial shocks are commonly used to investigate and/or control for the presence and size of regional spillover effects in a VAR framework (Fukuda and Tanaka 2020, Altınbaş et al. 2021).

Finally, in the most conservative specification, I include both the first PC of credit rating announcements as an exogenous variable as well as the first PC of sovereign bond interest rates as endogenous.

A methodological note on the contagion measures seems in order. Authors sometimes include the contagion variable exogenously in the system of equation. Nevertheless, to do so would imply that a the target country's bond yields cannot affect the other countries bond yields in the aggregate, while the reversed is allowed. This is clearly at odds with the premises of my theory. Thus, that contagion variable - weighted or unweighted, raw or summarized via PCA - always enters the system endogenously, although temporally prior to the target country's yield (Claeys and Vašíček 2014). By contrast, credit rating announcements regarding different countries' creditworthiness are virtually always modeled as (cross-sectionally) independent of each other once sovereign bond spreads are included in the equation (Corbet 2014, Brazys and Hardiman 2015, Aizenman et al. 2013, Afonso and Martins 2012, Longstaff et al. 2011). As such, they enter the system of equation exogenously.

To recap, the main variables of interest are the target country's **10-year sovereign bond spread** and the **NO articles** variable, i.e. the number of articles containing the acronym but making no mention at all of the target country. As it is standard in the literature, I use the 10-year German government bonds as the benchmark

to use the weighted-by-trade contagion variable in the monthly dataset.

[17] As in Altınbaş et al. (2021), the first PC explains around 80% of variation.

yields. By subtracting it from each country's yields, common developments in monetary policy and inflation expectations are removed and the resulting variable captures the country-specific risk premium (Mosley 2003).

4.3 Methodology

As briefly mentioned before, previous studies may suffer from model misspecification insofar as they do not account for the the possibility of reverse causality. For example, Linsi and Schaffner (2019) explicitly qualify their results against a causal interpretation on the ground that their single equation model (following Brooks et al. 2015) does not account for reverse relationships. By contrast, in this chapter I model the heuristic peer effect in a system of equation. This is in line with numerous studies in the finance and macroeconomic literature (Neri and Ropele 2015, Yang 2005) as well as that in political science and political economy (Brazys and Hardiman 2015, Webb 2018).

4.3.1 Panel Vector AutoRegression and Panel Granger causality.

Since its introduction by Holtz-Eakin et al. (1988), panel VAR (pVAR henceforth) models have entered the toolkit of both economists and, to a lesser extent, political scientists (Galariotis et al. 2016, Tang 2008). Panel VAR is particularly well-suited for analyzing the transmission of shocks over time and across units (Canova and Ciccarelli 2013). In particular, a pVAR approach allows the researcher to model static and dynamic inter-dependencies as well as cross sectional heterogeneity. In essence, a pVAR is a combination of single equation dynamic panels and vector autoregression (Sigmund and Ferstl 2019).

Following Abrigo and Love (2016), consider a k-variate homogeneous pVAR of order p with panel-specific fixed effects represented by the following system of linear equations (deterministic variables are suppressed for ease of notation):

$$Y_{it} = Y_{it-1}A_1 + Y_{it-2}A_2 + ... + Y_{it-p+1}A_{p-1} + Y_{it-p}A_p + X_{it}B + u_i + e_{it} \tag{1}$$

Where $i \in [1,2,...,N]$, $t \in [1,2,...,T]$, Y_{it} is the vector of endogenous variables (1 x k), X_{it} is a (1 x l) vector of (possible) exogenous variables, and u_i and e_{it} are (1 x k) vectors of panel fixed effects and idiosyncratic

errors, respectively. The $A_1, A_2, ..., A_{p-1}, A_p$ and the matrix B are parameters to be estimated. The innovations e_{it} are assumed to be stationary around zero, independent and normally distributed. While cross sectional units are assumed to share the same data generating process (i.e. the A and B matrix are common to all sections), the introduction of unit fixed effects accounts for systematic cross-sectional heterogeneity. As it is the case with standard panel data models, the parameters can be estimated jointly with the fixed effects or after removing the unit specific effects. With the presence of lagged dependent variables by construction the usual concerns about Nickell's bias apply (Nickell 1981), although the bias diminishes as the time dimension increases. To avoid bias in the estimates, various estimators based on Generalized Method of Moment (GMM) framework have been proposed. One possibility is to estimate the variable in first difference (FD) by instrumenting lagged differences with levels and/or differences from previous periods (Anderson and Hsiao 1982). Alternatively, one can subtract the average of all available future observations instead of using deviations from past realizations. This way, past realizations remain valid instruments as they are not included in the transformation. The forward orthogonal deviation (FOD) approach, first proposed by Arellano and Bover (1995), is more efficient, although the differences diminish as the time dimension increases. While these estimators were originally designed for "small T, big N" datasets - i.e. those situations where Nickel's bias is most severe - they have been shown to behave well even as the time dimension increases (Judson and Owen 1999, Alvarez and Arellano 2003) and are routinely used in applied research. As it is the case in standard VAR, the moment conditions become irrelevant when unit roots are present. As such, integrated variables need to be transformed to ensure stationarity. I test the univariate properties of the variables using panel unit root tests and first difference those that contain a unit root.

From the reduced-form pVAR models it is also possible to test for Granger non-causality. Panel Granger causality (pGC) is a common methodological tool in the sovereign bond economic literature (Gómez-Puig and Sosvilla-Rivero 2013) as well as in the broader political science literature (Hood et al. 2008). Moreover, such approach is particularly well-suited for the hypotheses under study as it provides a convenient way to formally tests the extent to which the "NO articles" provide information about the target country even if they do not contain any reference to it. The central notion underlying Granger causality is one of predictability.

One variable Granger-causes another if, given an information set, past information about the former improves the forecast of the latter beyond its own past information (and that of other variables, in the multivariate case) (Gómez-Puig and Sosvilla-Rivero 2013). As such, via pGC we can test if the number of articles containing the acronym PIIGS (but do not mention the target country) contain useful information to predict the target country's government bond yields beyond its past history and the past history of other variables. While a number of Grenger (non)-causality tests have been proposed in the pVAR literature, I choose the one recently proposed by Juodis et al. (2021) for two reasons. First of all, unlike the original pGC test proposed by Holtz-Eakin et al. 1988, it is not restricted to homogeneous panels and "large N, small T" situations. Second, unlike that of Dumitrescu and Hurlin 2012, it allows for the inclusion of other covariates. As a robustness check, I also use the pGC test by Dumitrescu and Hurlin 2012 on the bivariate relationship between sovereign bond spreads and "NO articles".

Clearly, the use of pVAR and pGC entails advantages as well as disadvantages (Hood et al. 2008, Canova and Ciccarelli 2013). On the one side, pooling all observations together results in remarkable efficiency gains. On the other side, it imposes the dubious assumption of causal homogeneity. Indeed, as underlined in the theory section on the differences between source and target countries, there are good reasons to expect some scope condition for the hypotheses. As such, I now turn to single-country models.

4.3.2 Bayesian VAR and Granger causality.

As the concept of Granger causality in individual time series has been well known to political scientists for some time, and its description is a simplified version of pGC, I do not further elaborate on it. For an introduction from a political scientist see Freeman (1983). By contrast, I rely on Bayesian estimation of the single-country VARs.

The rationale for relying on Bayesian estimation is that it avoids over-parameterizing an already rich model (as it is in our case) while avoiding the known pitfall of classical estimation, such as over-fit and overestimation of coefficients of distant lags (Brandt and Freeman 2006). This is particularly important in the single-country monthly-level estimation, which contains few observations. More generally, Bayesian estimation is a valuable

option for problems where model scale, endogeneity, persistence, and specification uncertainty are all present at the same time (Sattler et al. 2008).

In a nutshell, I follow Giannone et al. 2015 and treat prior informativeness in the spirit of hierarchical models. In other words, the priors are treated as additional parameters to be estimated, which they receive their own priors (hyper-priors) with hyper-parameters. As a result, maximizing their posterior becomes equivalent to maximizing the marginal likelihood with respect to them. The chosen hyper-priors are a combination of three widely used priors in the literature: the Minnesota (Litterman) prior, the sum-of-coefficient prior, and the single unit-root prior. The Minnesota prior postulates that the random walk with drift is the limiting form of each VAR equation. It is well-known that BVAR based on the Minnesota prior risk over-fitting the data and to place undue weight to the deterministic component of the model. The inclusion of both the sum-of-coefficients prior and the dummy-initial-observation prior accounts for then possibility of cointegration and unit root and reduces the importance of the deterministic component of the model (hence the variables enter the equation in level). The tightness of the hyper-priors is set as in Giannone et al. (2015) and Sims and Zha (1998).[18] As the posterior cannot be analytically characterized, even when the likelihood function is Gaussian, an MCMC (Markov Chain Monte Carlo) algorithm is employed for inference. This algorithm entails using a Metropolis step to draw the hyper-parameters vector and a standard Gibbs sampler to draw the model parameters conditionally on the hyper-parameters. To perform inference on the structural shocks, 15,000 draws are extracted from the conditional posterior distribution, with the first 5,000 being discarded and the last 10,000 used for inference. [19] Additional information on the estimation procedure and prior specification can be found in Giannone et al. (2015). The estimation is carried out using the BVAR package in R (Kuschnig and Vashold, 2021).

The usual diagnostic tests were performed in both panel and standard VAR.[20][21] In most models, residuals appeared to be non normally distributed. As such, the confidence intervals are constructed using bootstrap re-

[18] There is one gamma density hyper-prior for each prior: $\lambda = 0.2$ (Minnesota), $\mu = 1$ (sum-of-coefficient), $\delta = 1$ (dummy-initial-observation) and standard deviations equal to 0.4, 1, and 1, respectively.

[19] As a robustness check, I re-run the main models with different hyper-priors. As the hyper-priors grow larger they become less informative - the approximate equivalent of a frequentist VAR. Since I am interested in making sure that the results are not driven by the priors, I re-run the models increasing the three hyper-parameters by 0.2 up to $\mu = 2, \delta = 2, \lambda = 1.2$. *Results are substantively similar and available upon request*.

[20] I do not literally run all diagnostic for all models (there are hundreds). I do so for the main models.

[21] Since the pVAR model is interpreted only via the Cholesky decomposition (thus resulting in a just-identified model), the Hansen's J statistic of overidentifying restriction is not reported.

sampling methods. Regarding the Bayesian models, I use the Geweke statistics to assess MCMC convergence.

4.3.3 Identification strategy

While the simple Impulse Response Functions (IRF) can be estimated by rewriting the model as an infinite Vector Moving Average (VMA), these IRFs do not have a structural interpretation due to the contemporaneous cross-correlation between innovations (the residuals in each equation). In practice, one has to impose further restrictions in order to proceed with a structural interpretation (Lütkepohl (2005)).

To impose a recursive structure to the contemporaneous relationships via Cholesky decomposition is arguably the most common approach to structural analysis in a VAR framework, and the one I take in this chapter. In a nutshell, it amounts to ordering the variables from the most exogenous to the least exogenous. The variables ordered first can affect all the subsequent variables contemporaneously, but can be affected by the other variables only with a lag.

A useful first step to decide on the order of contemporaneous relationship is to divide the variables in three blocks (Galariotis et al. 2016). First, the global (or regional) variables (e.g. the VIX); second the domestic variables (e.g. GDP growth); finally, financial market variables of interest (in our case, the sovereign bond interest rate and the count of PIIGS articles). This broad first-level ordering is widely accepted in the literature as it is assumed that financial markets react quickly to changes in the real economy at both domestic and global level, while changes in the domestic economy react with a lag to changes in the global (or regional) economy.[22] Likewise, ordering the major variable of interest ("NO article") last is the most conservative approach (as it eases concerns about contemporaneous reverse causality from sovereign bonds to "NO article") and is standard practice in the literature. What is more contentious, though, is the specific ordering within the blocks. For example, should one impose a contemporaneous restriction of unemployment shocks on inflation or the other way around? In what follows I will detail the specific ordering of the favored specification.

The baseline specification[23] has the following ordering (parentheses indicate the three blocks. The variables outside of the parentheses never change orders):

[22] This holds as long as the country under study are not economically big enough (e.g. the US) to influence global variables instantaneously.

[23] all figures in the main text will come from this ordering, excluding the KOF which enters only as robustness check

(VIX, ER) (i, GDP, u, cab, debt, deficit) rating, KOF (contagion, target spread, NO, and YES articles) [24]

The VIX measure is the most exogenous one as it is the only global variable, followed by the dollar/euro exchange rate. This implies that global uncertainty in financial markets affects all variables contemporaneously, but is affected only with a lag. Likewise, the exchange rate variable affects all variables contemporaneously except for global financial market uncertainty. The ordering within the second bloc is complicated by the presence of multiple variables. I follow (Afonso and Martins, 2012) and order inflation first, followed by GDP growth and unemployment, the fiscal variables (debt-to-gdp and deficit), and the financial variables. Among strictly economic variables, the financial variables (contagion and target country's spread) are ordered last, which means that they can be affected contemporaneously by all other economic variables but cannot affect them contemporaneously. This is consistent with the idea that financial markets react quickly to policy developments. In other words, financial stress is a reaction to shocks originated in the real sector (Apostolakis and Papadopoulos 2019). Fiscal variables are placed in the last position within the second block. They cannot have a contemporaneous effect on macroeconomic factors - due to policy lags - while output and inflation shocks are allowed to impact fiscal variables immediately due to the presence of automatic stabilizers (Alesina et al., 2020). Then, I follow Neri and Ropele (2015) and order the remaining macroeconomic indicators (unemployment and cab), prior to the fiscal and financial variables, but after GDP growth. This is consistent with the idea that GDP growth affects unemployment and the current account balance immediately, while the feedback loop takes place only with a lag.[25]

Moving on to the third bloc, I assume that the contemporaneous causal relationship between financial markets and the media flows from the former to the latter, thus placing the "YES article" and "NO article" in the last position. This assumption is consistent with most studies on political communication and financial

[24] Complete names: VIX, ER, inflation, GDP growth, unemployment, current account balance, debt-to-GDP, deficit, credit rating of target country, monetary policy indicator, contagion variables (e.g. unweighted average of other PIIGS' spread), target country's spread, NO articles, YES articles.

[25] Notice that the different frequencies of the measure also help with the ordering: given that unemployment is measured at a monthly frequency and GDP growth at a quarterly frequency, it is more sensible not to allow the former to contemporaneously affect the latter as this would be unlikely to be detected in the data anyway.

markets (e.g. Vliegenthart and Mena Montes 2014). Moreover, the contagion variable is allowed to affect the target country's immediately, while it is affected only with a lag. This ordering captures the intuition that the developments in four fixed-security markets combined is more likely to affect the remaining market than the other way around, at least contemporaneously. The same logic may suggest to order the "NO articles" (i.e. the articles about the remaining four countries) prior to the YES articles.

In between the second and third bloc, I place the target country's own credit rating as well as the monetary policy indicator.[26] Monetary policy may react immediately to shocks to inflation, aggregate output, and the fiscal variables but, due to the well-understood monetary policy lags, will not affect any of those variables contemporaneously (Afonso and Martins, 2012). Notice that the ordering of the monetary policy indicator is facilitated by the use of the KOF rather than a more standard measure of monetary policy. The forward-looking properties of the KOF indicator (see De Haan 2008) allow us to include this measure of (implicit) monetary policy in between macroeconomic domestic factors (second block) and the main variables of interest (third bloc). In other words, central bank's communication about monetary policy is allowed to affect financial markets and the media immediately - which is consistent with previous studies about ECB communication (Baranowski et al., 2021) - while it affects the real economy only later, i.e. once the announced monetary policy is adopted. Likewise, changes in the country's credit rating are expected to affect financial and media variables immediately, but the real economy only with a lag. The literature offer no guidance on the ordering between KOF and credit rating. As such, I simply rely on the different time frequencies. Being a discrete and slowly changing measure, the country's credit rating is ordered first, meaning that it cannot be affected immediately by the KOF measure.

While theory should guide the variable ordering as much as possible, that is not always possible. This is relevant because the Cholesky decomposition depends on the ordering of the variables, thus making any structural interpretation conditional on the "correct" recursive structure (Kilian and Lütkepohl 2017). As Antonakakis and Vergos (2013) notice, it is particularly hard to justify any specific ordering in a government bond yields equation. Indeed, some of the contemporaneous restrictions underlined above are debatable. For example,

[26] They are not in the block because their ordering will never change (see later paragraph). Moreover, the KOF indicator is used only as a robustness check.

GDP growth is ordered prior to debt and deficit as on the ground that automatic stabilizers immediately change the ratios as the economy grows or shrinks. Nevertheless, there is no consensus among macroeconomists on this ordering. Among others, Bouvet et al. (2013) argue in favor of the reverse ordering on the ground that government budgets respond only sluggishly to aggregate outcomes growth. Worse still, in other cases there is no clear guidance in the literature. For example, while the VIX is usually ordered first, it is not exactly clear why it should immediately affect, but should not be immediately affected by, the euro/dollar exchange rate. Of course, the same case applies to the ordering of the "YES" and "NO articles". It seems sensible to suggest that the way the media discuss all but one country in a given group is more likely to have an immediate effect on the way the remaining country is talked about rather than the other way around. Nevertheless, as the crisis mostly originated in one country (Greece) and then spread to the rest of the group, such assumption is debatable.

Testing for all possible ordering combinations would be unwieldy since there are 13! = 6227020800 possible combinations. As a second best, I employ the following strategy. I keep the three blocks (global/regional, domestic, financial and articles) fixed and test for different combinations within each block. As such, I test for $n!_{bloc1} + n!_{bloc2} + n!_{bloc3}$ combinations. I report the results for the preferred specification in the main text and will report some alternative orderings in the appendix.[27] All remaining graphs are available upon request.

5 Results

5.1 pVAR

To briefly recap, the strategy to test for media-related peer effects is based on the following steps. First, I eliminate the common risk free rate by subtracting the German bond yield from each country's yields (Mosley 2003). Second, I augment a typical VAR model to study the determinants of sovereign bond interests rates by adding several measures of financial contagion (e.g. unweighted and weighted averages of the other countries' yields). The rationale is to control for as much variation as possible via standard channels of transmission.

[27] To be clear, I start from the main specification and change the ordering in the first block; then, again starting from the main specification, I change the ordering of the second block; etc. I also include only deficit (and not debt-to-GDP) as a fiscal variable. Including both would result in 720 combinations only for the second bloc. While I prefer keeping both in the main specification, the use of only one of the two fiscal variables is consistent with previous work as well (Mosley, 2003).

Finally, I include "NO article" variables. Once stripped away of all these factors, the NO variable is left to explain how the discursive reference to member countries as a cohesive bad-type group leads investors to infer future developments about a country from present economic and political conditions in some other members of the group. The analysis is done at the monthly and daily frequency. Results at the weekly frequency are substantively similar and available upon request.

Table 1 shows the panel Granger Causality results for the bivariate as well as multivariate relationship between a country's spread and the "NO articles" variable in the monthly dataset. As the tables in the appendix show, using daily dataset does not change the substantive results. Notice that I show the p-values for each lag instead that for the combined test (recall that the joint test is that all coefficient lags are jointly zero; hence, one being non zero would result in a statistically significant coefficient anyway). Notice also that the lag length can differ in the two equations because - after setting the maximum length as described below the table - the algorithm chooses the optimal one. By and large, both hypotheses are confirmed in this preliminary analysis. In both bivariate and multivariate case, each variable contains information that helps predicting the other variable beyond its own lags (and those of the other variables in the multivariate case).

Table 1: Granger Causality in Monthly Panel Dataset

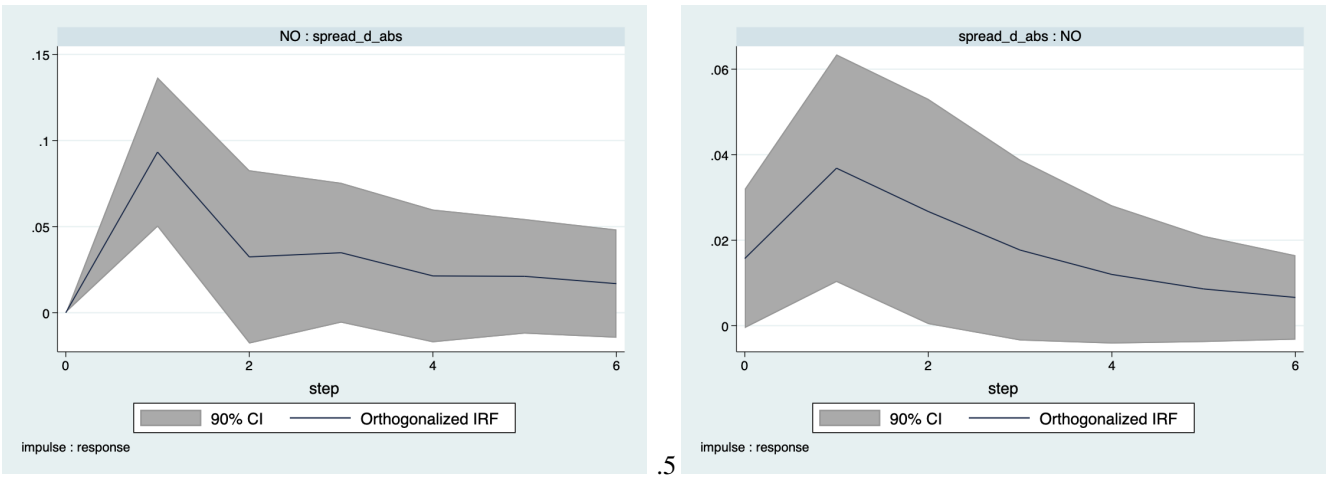
Direction of the Relationship	Controls	P-values
NO $\Rightarrow$ Spread		0.420 (t-1)
		0.000 (t-2)
	✓	**0.000 (t-1)**
	✓	0.314 (t-2)
	✓	**0.000 (t-3)**
Spread $\Rightarrow$ NO		**0.000 (t-1)**
	✓	**0.000 (t-1)**
	✓	0.436 (t-2)
	✓	**0.000 (t-3)**

Notes: The optimal lag length is determined independently in each equation by minimizing the Bayesian Information Criterion. The maximum length is set to 3 (one quarter) for the monthly dataset. All control variables - exogenous and endogenous - are included.All models allow for cross-sectional heteroskedasticity.

Turning to structural analysis, Fig. 1-2 show the orthogonalized (via Cholesky decomposition) impulse response functions for the monthly and daily panel datasets, respectively. The figures on the left show the

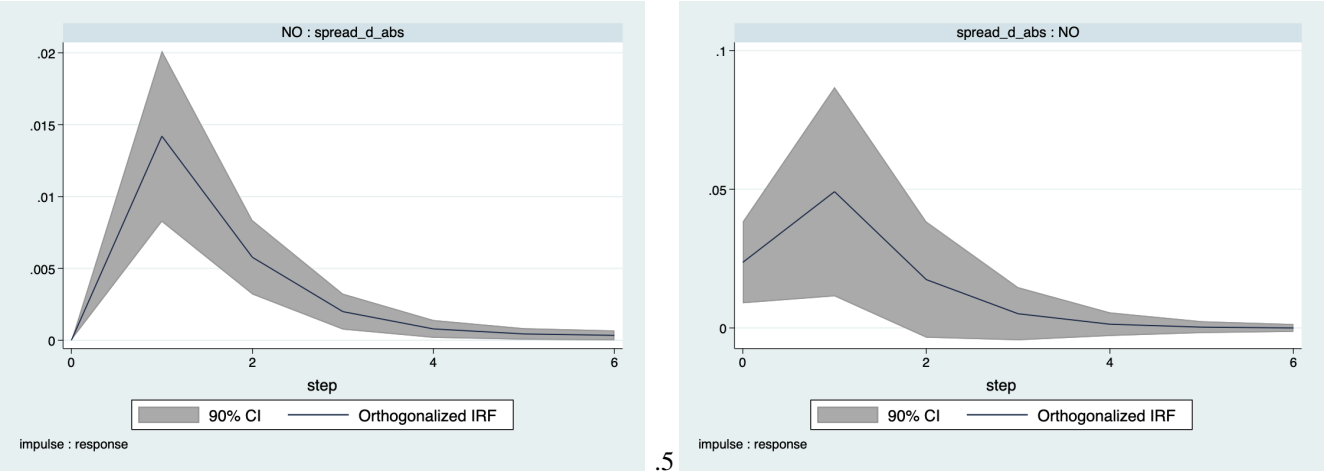
effect of a one standard deviation increase in the number of "NO articles" on the country's spread (hypothesis 1). In both cases, the figures show a statistically significant positive effect. In the first case, the target country pays an extra premium of around 10 basis point, which lasts for one month (all figures start from zero as, by construction, the "NO article" variable cannot affect spread contemporaneously). Similarly, the second figure on the left - based on the higher frequency daily dataset - shows statistically significant effect - an increase by 1.5 basis points - fading away in four days.[28] Moving on to the discussion of the second hypothesis, the two figures on the right column show the effect of a one standard deviation increase in a country's spread on the number of articles containing the acronym PIIGS in reference to the other countries in the group. Recall that, in this case, the contemporaneous relationship is not restricted to zero, hence the response function does not need to start from the origin. Hypothesis 2 seems also confirmed in the panel estimation: the target country experiences a 0.04 point increase in the number of "NO articles" after one month, which completely returns to its long-run mean in the third month. This is a small but non-trivial effect amounting to roughly a 12% increase in the number of "NO articles" (the mean of the "NO article" variable for the monthly dataset is 0.33). A similar story emerges from the daily dataset. There is an immediate positive effect by 0.05 points (17%) that disappears after two days.

Figure 1: OIRF from pVAR Monthly



[28] These figures are representative of all the other IRFs that I have computed as robustness checks.

Figure 2: OIRF from pVAR Daily



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Next, I move to the country-by-country analysis to explore causal heterogeneity. First, I test for Granger causality in the reduced form system for each country and dataset. The table below shows how Spain, Italy, and Ireland are distinct from Greece, whose spread is never Granger caused by the NO variable. Interestingly, though, except for the monthly dataset, the Greek spread does not Granger-cause the number of ”NO articles” either. This is probably explained by the fact that the increases in the Greek spread in 2015 took place in a no-contagion environment.

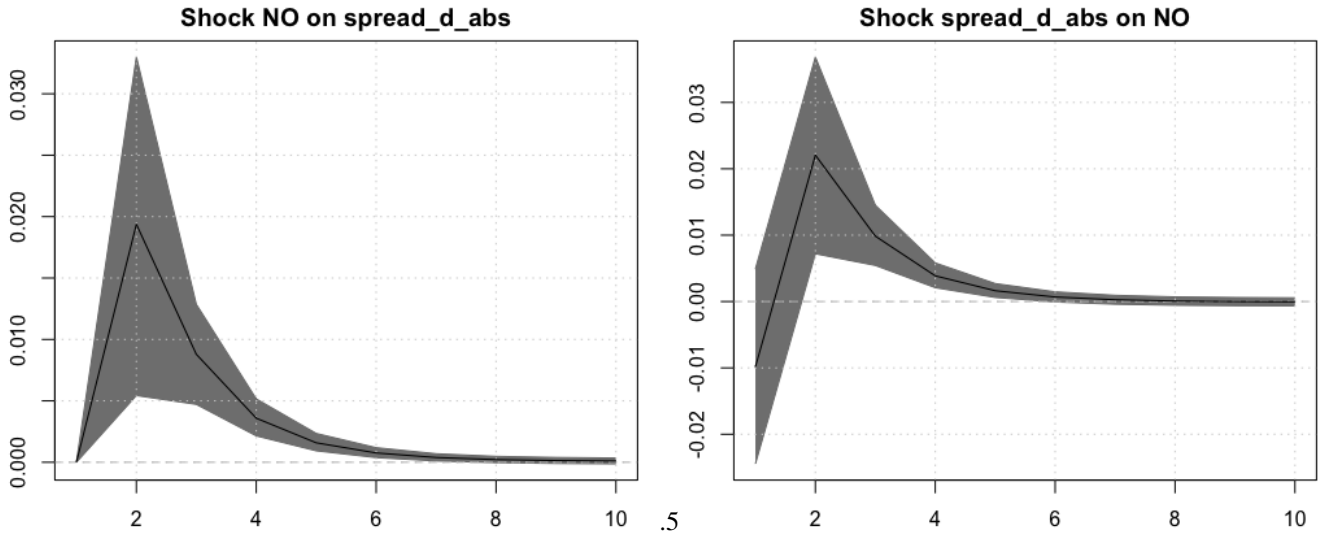
Table 2: Granger Causality

Country (time frequency)	Relationship	P-values
Greece (Monthly)	Spread ⇒ NO	0.000
Greece (Monthly)	NO ⇒ Spread	Not significant
Greece (Daily)	Spread ⇒ NO	Not significant
Greece (Daily)	NO ⇒ Spread	Not significant
Italy (Monthly)	Spread ⇒ NO	Not significant
Italy (Monthly)	NO ⇒ Spread	0.035
Italy (Daily)	Spread ⇒ NO	0.000
Italy (Daily)	NO ⇒ Spread	0.000
Spain (Monthly)	Spread ⇒ NO	Not significant
Spain (Monthly)	NO ⇒ Spread	0.000
Spain (Daily)	Spread ⇒ NO	0.000
Spain (Daily)	NO ⇒ Spread	0.000
Ireland (Monthly)	Spread ⇒ NO	Not significant
Ireland (Monthly)	NO ⇒ Spread	0.006
Ireland (Daily)	Spread ⇒ NO	0.000
Ireland (Daily)	NO ⇒ Spread	0.000

Notes: The optimal lag length is determined independently in each equation by minimizing the Information Criteria. As the criteria often suggest different numbers of lags I choose the one that is favored by most criteria. Most of the time it is one lag. The exception is the "spread to NO" equation for Spain in the monthly dataset. In that case, half of the information criteria suggest 1 lag and half suggest 3 lags. Using 3 lags would result in a p-value = 0.000.

Moving on to structural analysis, I follow the literature on BVAR and show the 68% credible intervals for the IRFs (Sims and Zha, 1999). Once again, identification is achieved via Cholesky decomposition. I will show the results from the daily dataset only (IRF from the monthly dataset are in the Appendix). Fig. 4 shows the result for Greece. In both cases, we see a positive and statistically significant effect of a one standard deviation shock. It lasts approximately 5 days. In both cases, the effect is small (it peaks at around 2 basis points and then declines), but not trivial. Considering that the the Greek average for daily changes in spread is 23 basis point, the peak effect constitutes an 8.6% increase in the spread change. Similarly, the daily mean for the PIIGS articles that do not contain reference to Greece is 0.24. Nevertheless, both results become statistically insignificant if one relies on a more conservative 90% error bands.

Figure 3: OIRF from BVAR Daily (Greece)



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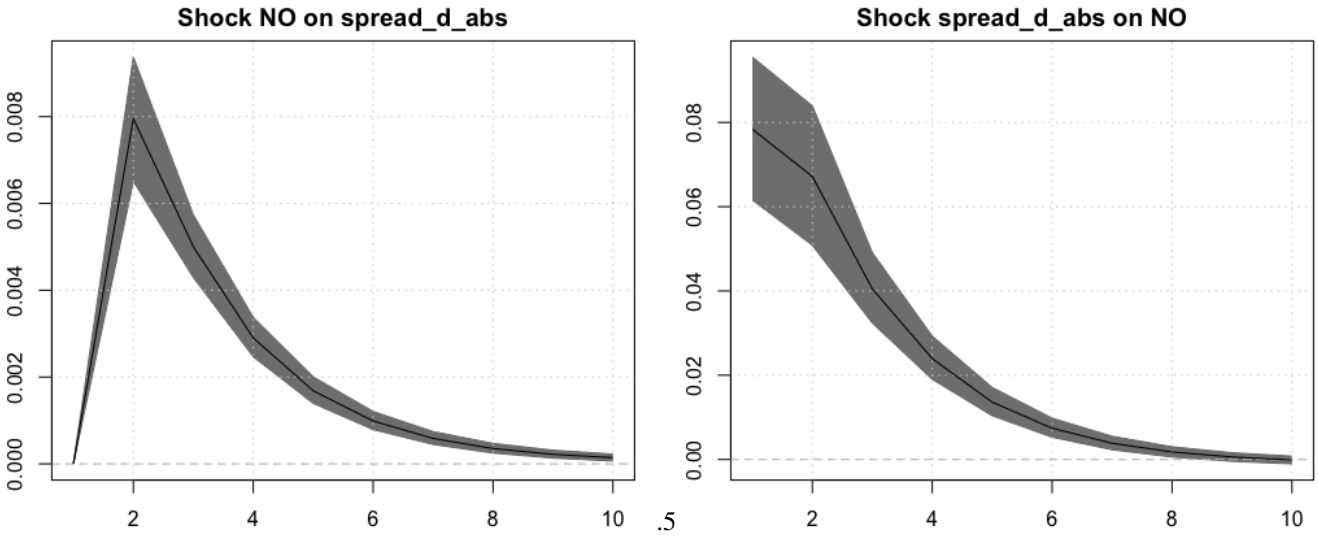
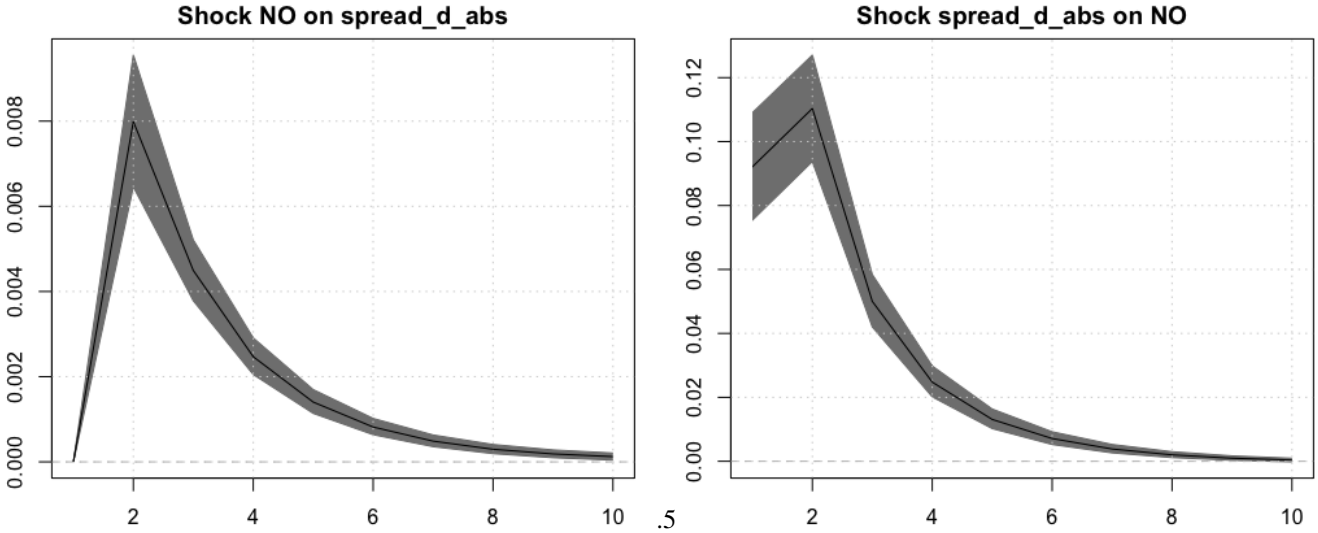
Likewise, Fig. 5 shows the equivalent results for Italy. The response functions are more precisely estimated. An interesting pattern emerges. The effect of the ”NO articles” shock is long lasting (it fades away completely after 10 days) and its substantive effect is large (somehow at odds with my expectations). The average daily change in spread is 5.8 basis point. A shock to the ”NO articles” increases the spread imperceptibly after one day, but then by 0.8 basis point after two days (roughly 15% of the overall daily change in Italian spreads). Moreover, unlike in the previous case, the effect is compounded for a much longer period. Italy also looks like a meaningful source of contagion. With an average of 0.31 ”NO articles” per day for the whole period, a one standard deviation shock to the Italian spread leads to an immediate 0.08 unit increase in the number of articles using the acronym in reference to the rest of the group, roughly a 25% increase, that fades away only after 10 days.

Figure 4: OIRF from BVAR Daily (Italy)



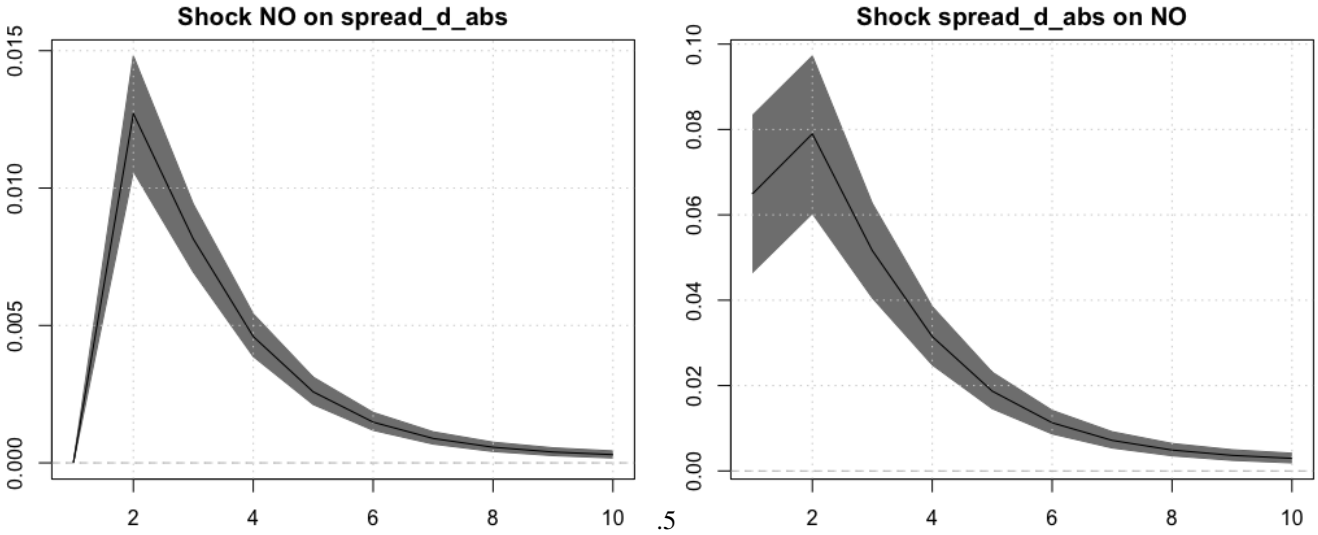
A similar picture emerges from the IRF for Spain (Fig. 6) and Ireland (Fig. 7). The average daily change of Spanish spread is 6.2 basis points and the shock to the ”NO articles” leads to a 0.8 basis point increase (a 13% increase). The effect of a spread shock on the ”NO articles” is impressive: it results in a 0.09 immediate increase to a variable whose daily average is 0.3 (thus a 26% increase). Similarly, the average daily change of Irish spread is 6.7 basis points and the shock to the ”NO articles” leads to a 1.2 basis point increase (a 17% increase). Likewise, a spread shock results in a 0.07 immediate increase in the volume of NO articles, equivalent to a 20% increase. In the Spanish case the effect fades away within two weeks, while in the Irish case it fades away in the third week (not shown in the figures).

Figure 5: OIRF from BVAR Daily (Spain)



Ireland (Fig. 7) tells us pretty much the same story.

Figure 6: OIRF from BVAR Daily (Ireland)



By and large, both hypotheses seem confirmed. Regarding hypothesis 1, unsurprisingly, Greece is the only exception in an otherwise homogeneous pattern. An increase in Greece's implicit association with the "untrustworthy" PIIGS type results in a small effect on Greek sovereign bond spreads. Moreover, using a

more conservative 90% credible interval error band, the IRFs for Greece become insignificant (while those for the other countries remain significant). The spread shock is also much more subdued in the case of Greece. This is apparently inconsistent with the idea that Greece is the streotypical "untrustworthy" type in the group. Nevertheless, we should not infer that developments in Greece did not affect the volume of articles classifying the other countries as PIIGS. Actually, the IRF for Greece are still impressive if one takes into account that the period covers until the end of 2015, while we know that the last part of the crisis was only about Greece. As Fig. 1 showed, there was almost no article mentioning the PIIGS acronym in late 2014 and throughout 2015. Indeed, restricting the analysis to the pre-2014 period - hence to the phase common to all Southern European countries - reveals that Greece was a a major "transmitter" as far as the PIIGS label go (i.e. higher Greek spreads lead to an increase in the number of articles mentioning the acronym in reference to the other countries). The empirical pattern emerging from the other countries is broadly consistent with the theoretical expectations. All three countries have lost in terms of financial reputation as a result of being associated with each other via the PIIGS acronym. Moreover, they have "contributed" to an increase use of the acronym. Somehow surprisingly, there seems to be little difference between Italy - notwithstanding its worse pre-crisis macroeconomic performances - and the other two.

6 Conclusion

Drawing from insights in behavioral finance and psychology, in Chapter 3 I have proposed and tested a theory linking the discursive reference to member countries as a cohesive "bad-type" group to investors' inference about each individual member's future economic prospects. In so doing, this study complements previous work suggesting that relatively unknown countries reap reputational gains (or suffer reputational losses) from joining organization with trustworthy (or untrustworthy) types (Gray, 2013). Well-known Western economies - such as Ireland, Italy, Greece and Spain - also lose from being associated with one another within a negatively connotated acronym. This is an important finding, since a country's reputation can influence its vulnerability across several dimensions, including military threats (Huth, 1997), trade relations (Jans et al., 1995), and access

to capital (Tomz, 2012). Moreover, I have shown how countries continuously absorb reputation from their peers over time and as a function of media's activity. While categories/classifications might be fixed or slow moving, their relevance for financial markets vary as their frequency in the media ebbs and flows, a point often overlooked in the literature. Methodologically, I employed a novel measurement strategy that allows us to minimize measurement errors in the identification of relevant texts. As a result, we can overcome the limitations of previous studies by distinguishing more neatly between informational effects (the effect of articles about Italy on Italy's creditworthiness) from peer effects.

Finally, this study also has implications for scholars of the European financial crisis more broadly. As Bourdieu (1977) suggested decades ago: "the specifically symbolic power to impose the principles of construction of reality - in particular social reality - is a major dimension of political power" (p. 165). While not necessarily attuned with Bourdieu's work, Southern EU countries' representatives arguably felt the same at an intuitive level. Indeed, during the European Sovereign Bond crisis, several Southern EU officials spoke out rather strenuously against the pejorative acronym PIIGS, with one Portuguese politician even calling it a "racist plot fired up by the British media".[29] Most often, though, the attempt was to pull one's own country away from the association with the members of the group. Indeed, Southern EU governments put a non trivial effort in differentiating their countries from their neighbors in the eyes of investors (Brooks et al., 2015). Most famously, the Irish Finance Minister Michael Noonan first downplayed the economic similarities between Ireland and Greece ("Ireland's only economic link with Greece was Feta cheese")[30] and then suggested he was considering ordering t-shirts with "Ireland is not Greece" printed on them.[31] Likewise, in early 2010, Italian bankers were already publicly arguing that their country should not be included in the PIIGS group.[32] To some extent, the results presented in this chapter vindicate these public relations strategis of several policymakers in Southern European countries.

[29] Available at https://www.cnbc.com/id/44058478
[30] Available at https://www.irishtimes.com/business/economy/noonan-still-cheesy-about-those-greeks-1.2127996
[31] Available at https://www.independent.ie/irish-news/noonan-were-not-greece-put-that-on-a-t-shirt-26745253.html
[32] https://www.aljazeera.com/opinions/2012/12/3/say-goodbye-to-pigs-and-gipsis

7 Appendix

7.1 Granger Causality in Daily Dataset

Table 3: Granger Causality in Daily Panel Dataset

Direction of the Relationship	Controls	P-values
NO ⇒ Spread from other PIIGS		**0.000 (t-1)**
		0.605 (t-2)
	✓	*0.052 (t-1)*
	✓	0.242 (t-2)
	✓	**0.000 (t-3)**
Spread from other PIIGS ⇒ NO		**0.004 (t-1)**
	✓	**0.013 (t-1)**
	✓	0.747 (t-2)
	✓	**0.003 (t-3)**

Notes: The optimal lag length is determined independently in each equation by minimizing the Bayesian Information Criterion. The maximum length is set to 5 (one working week) for the daily dataset. All control variables - exogenous and endogenous - are included. All models allow for cross-sectional heteroskedasticity.

7.2 Panel VAR OIRF for model augmented with KOF Monetary Policy Coummunication

Figure 7: OIRF from pVAR Monthly

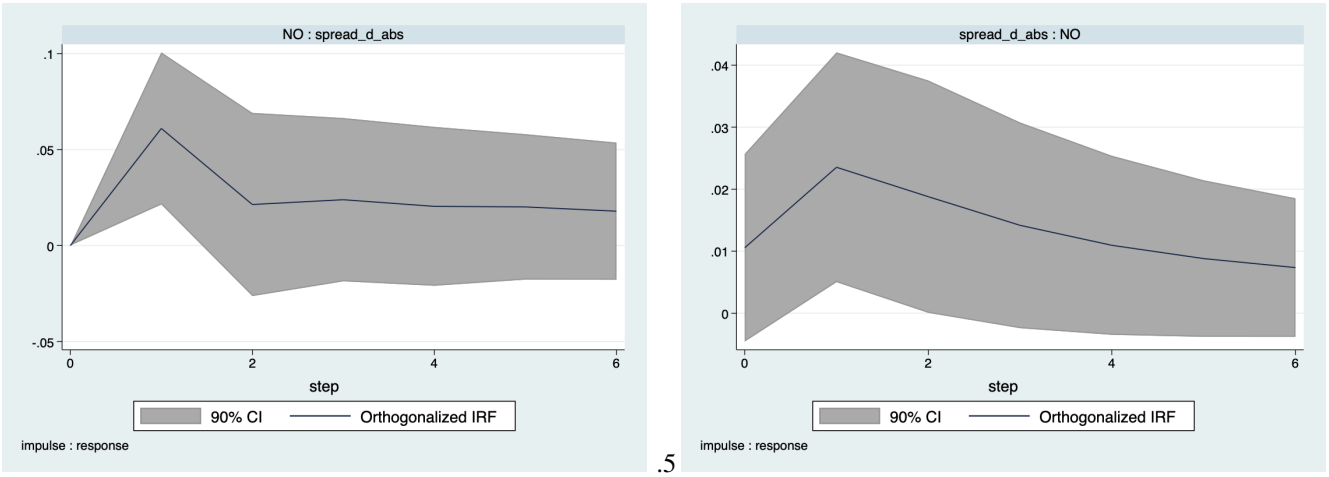


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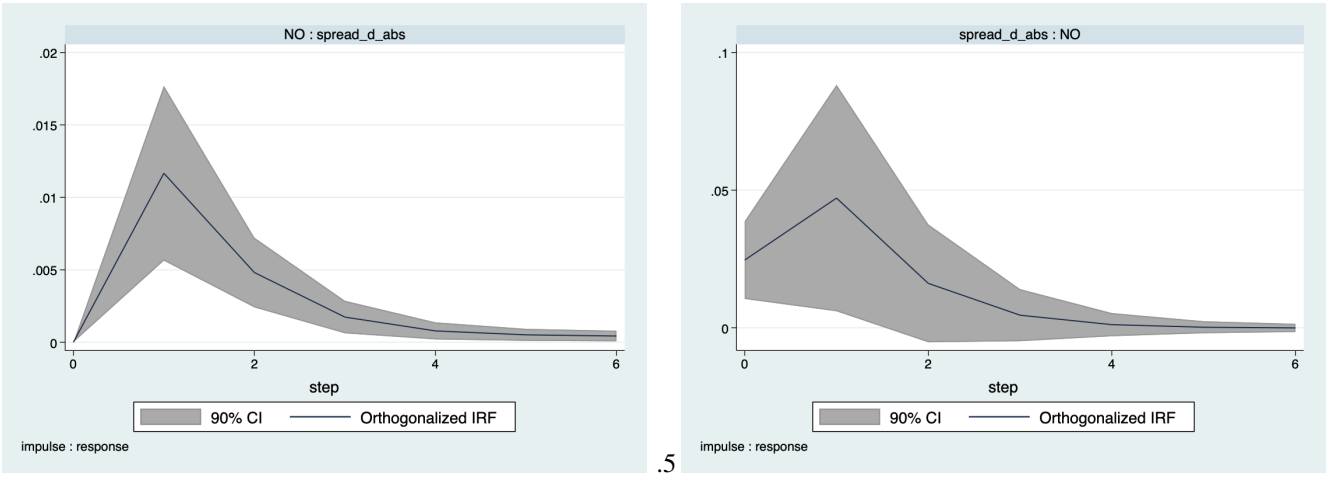
Figure 8: OIRF from pVAR Daily



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7.3 Panel VAR OIRF for Alternative contagion variables

7.3.1 First Principal Component of Other Countries' Credit Rating (exogenous) - Monthly (first row), Daily (second row)

Figure 9: OIRF from pVAR Monthly

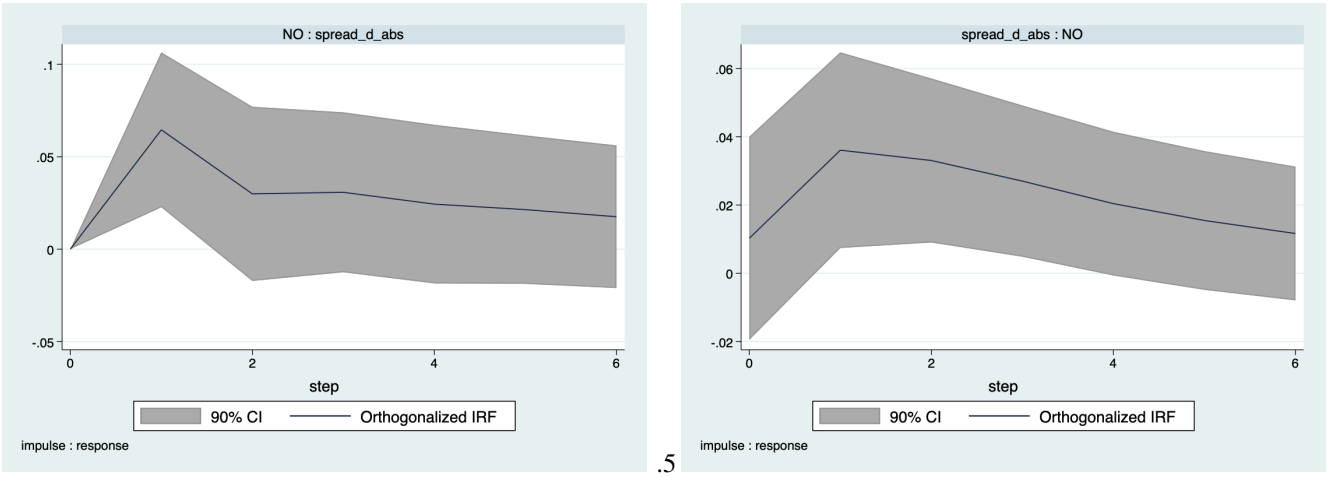

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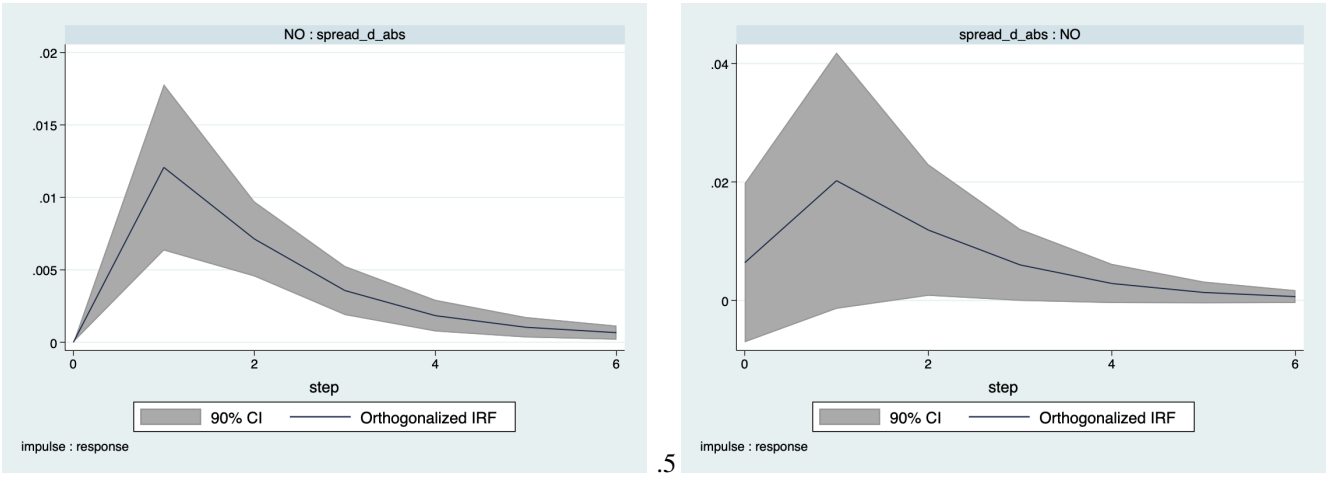
Figure 10: OIRF from pVAR Daily



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7.3.2 Weighted by Financial linkages (Measure 1)

Figure 11: OIRF from pVAR Monthly

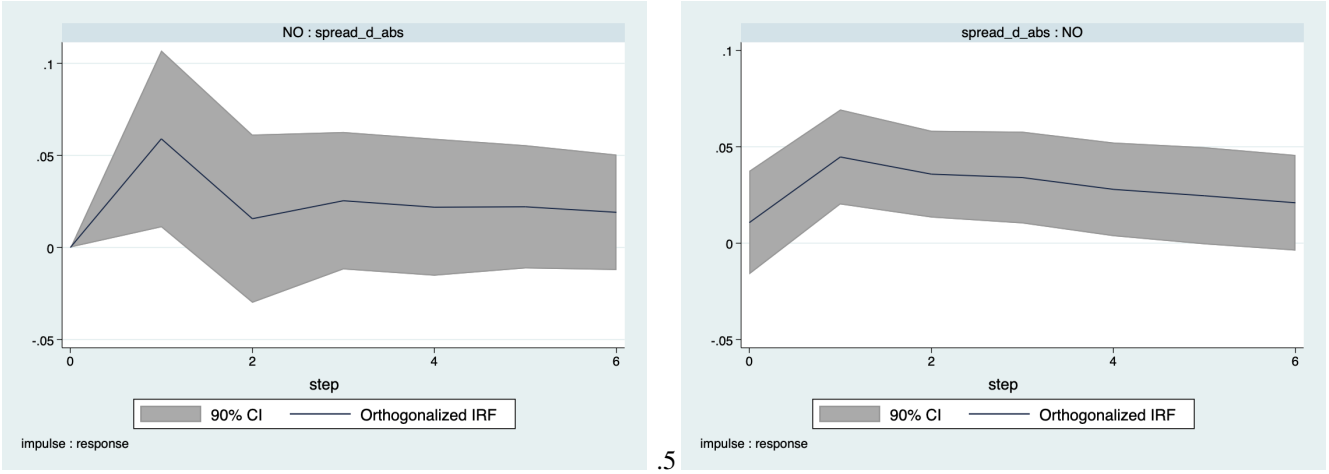

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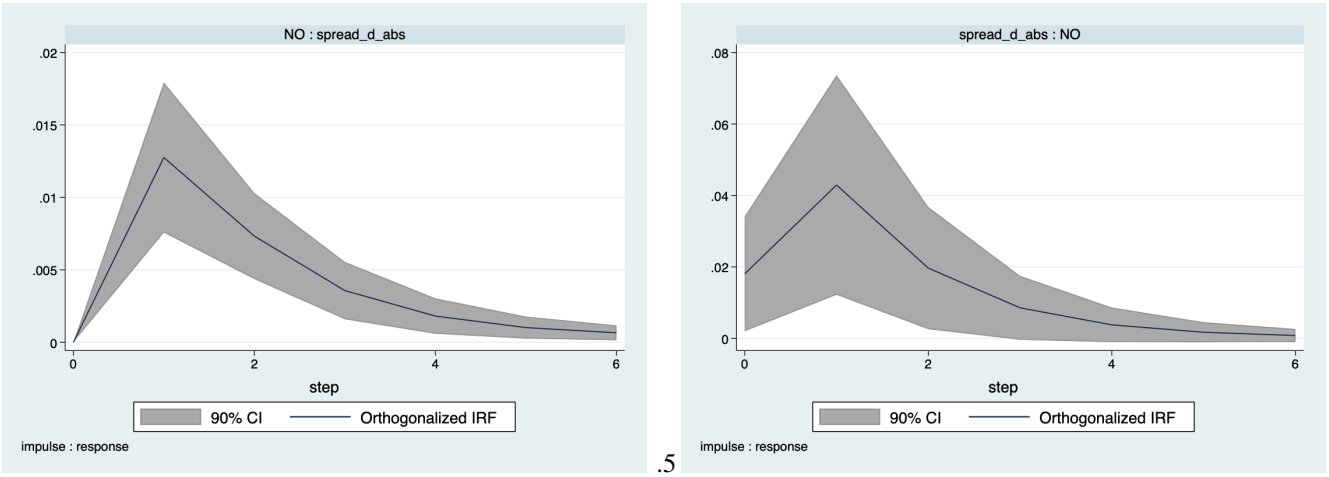
Figure 12: OIRF from pVAR Daily



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7.3.3 Weighted by Financial linkages (Measure 2)

Figure 13: OIRF from pVAR Monthly

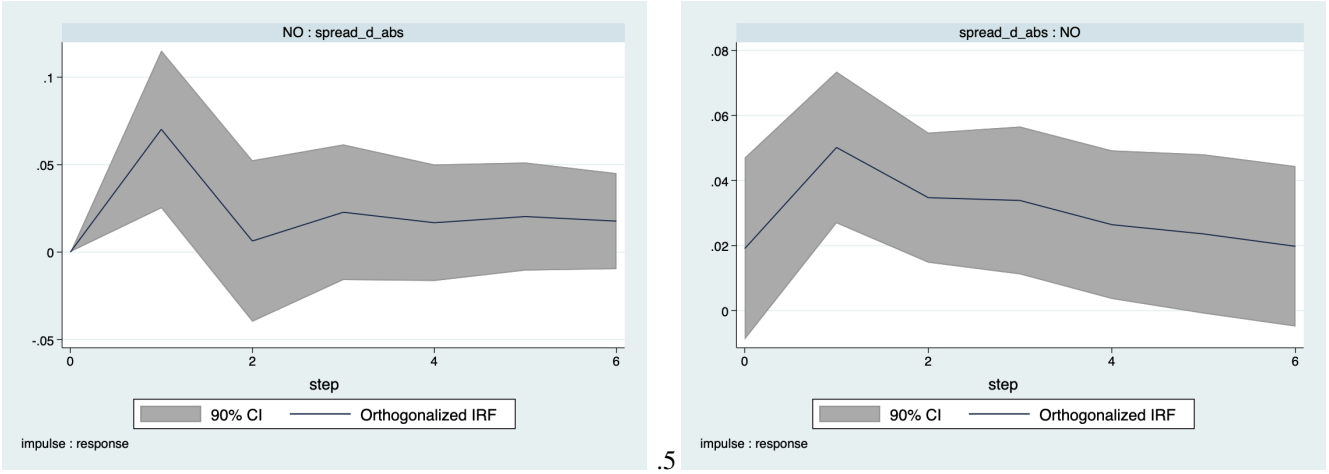

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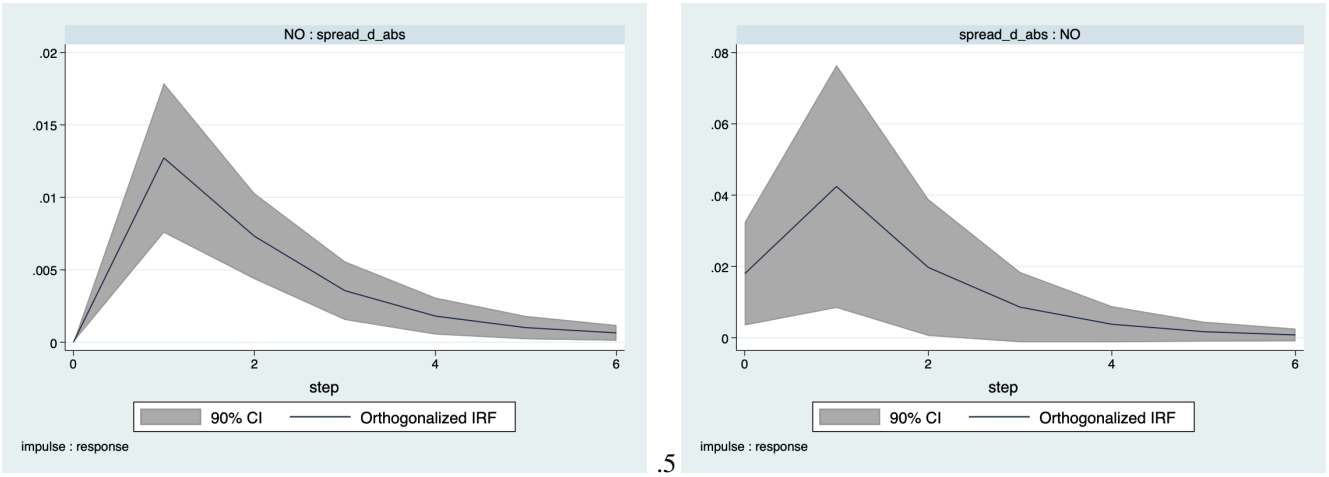
Figure 14: OIRF from pVAR Daily



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7.3.4 First Principal Component of Other Countries' spread

Figure 15: OIRF from pVAR Monthly

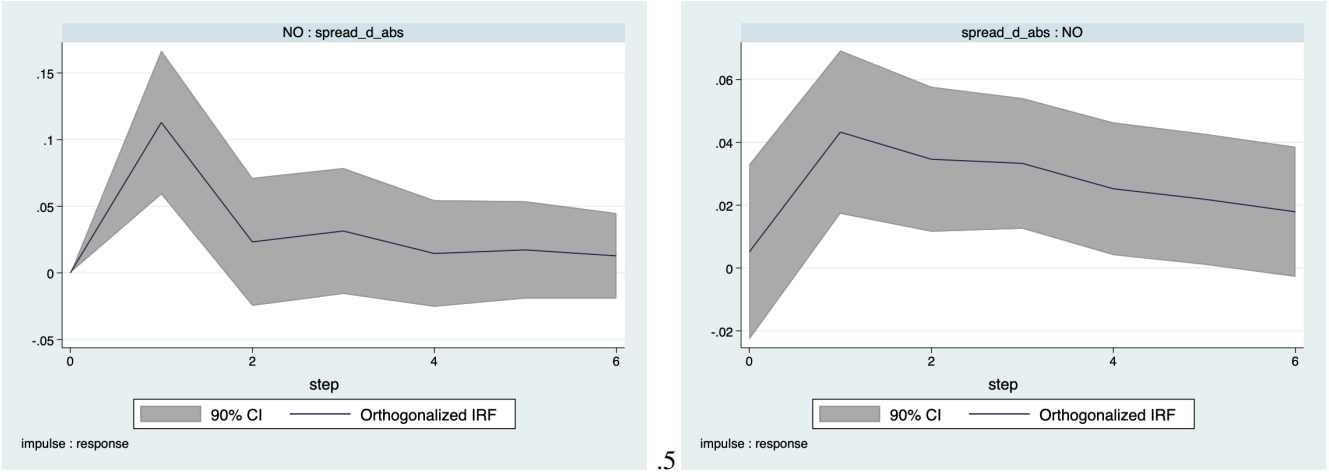

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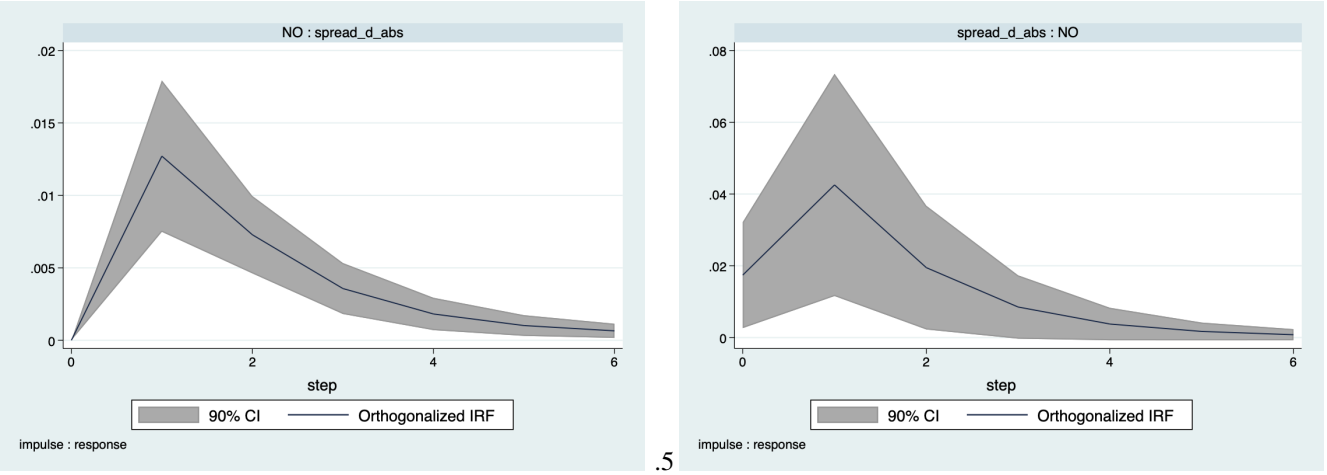
Figure 16: OIRF from pVAR Daily



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7.3.5 First Principal Component of Other Countries' spread and First Principal Component of Other Countries' Ratings (exogenous)

Figure 17: OIRF from pVAR Monthly

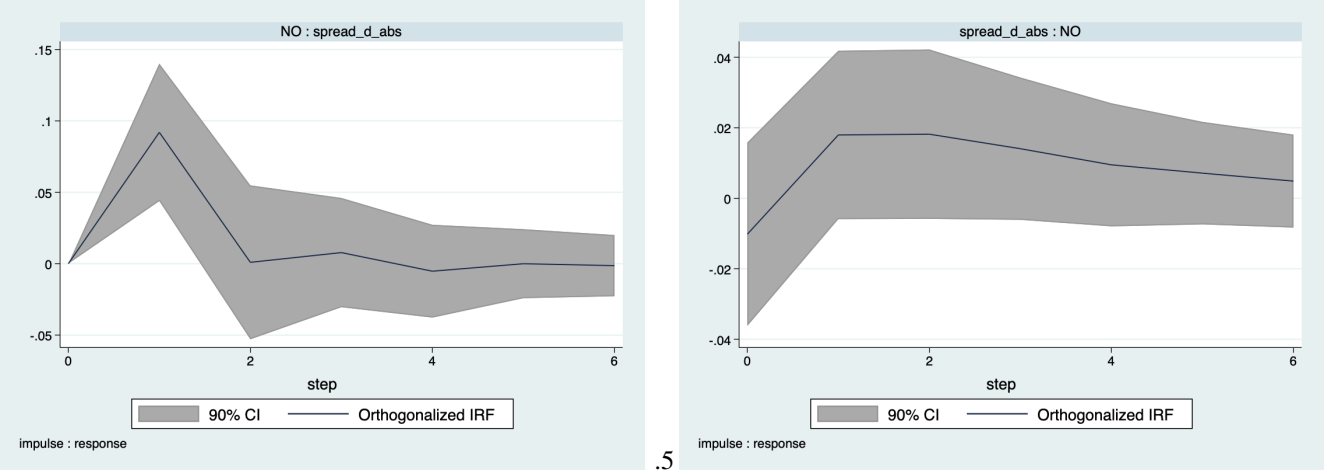

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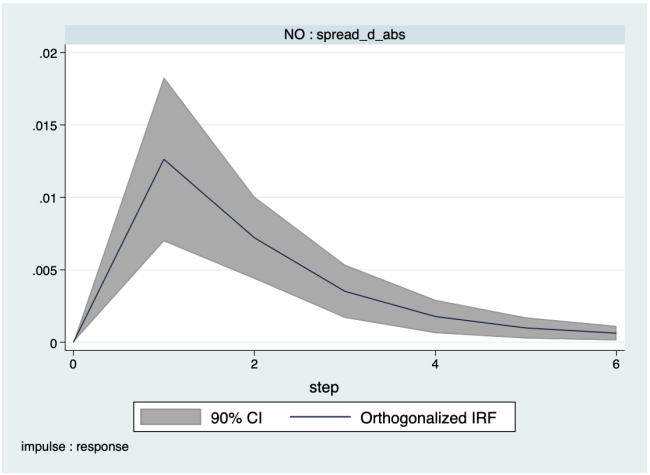
Figure 18: OIRF from pVAR Daily



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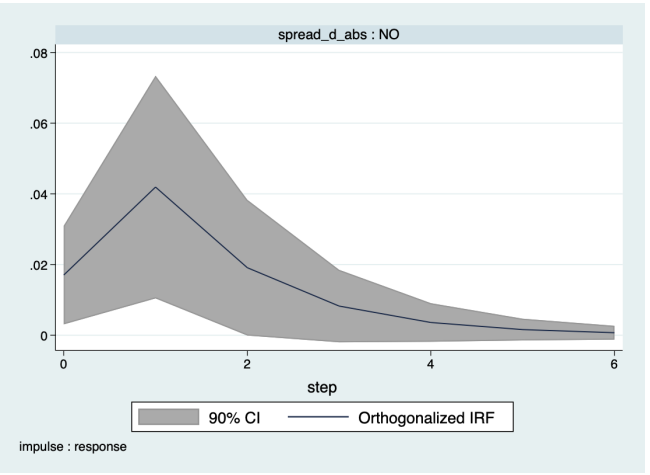


7.4 Single country BVAR for Monthly Datasets

Figure 19: OIRF from BVAR MOnthly (Greece Left, Italy Right)

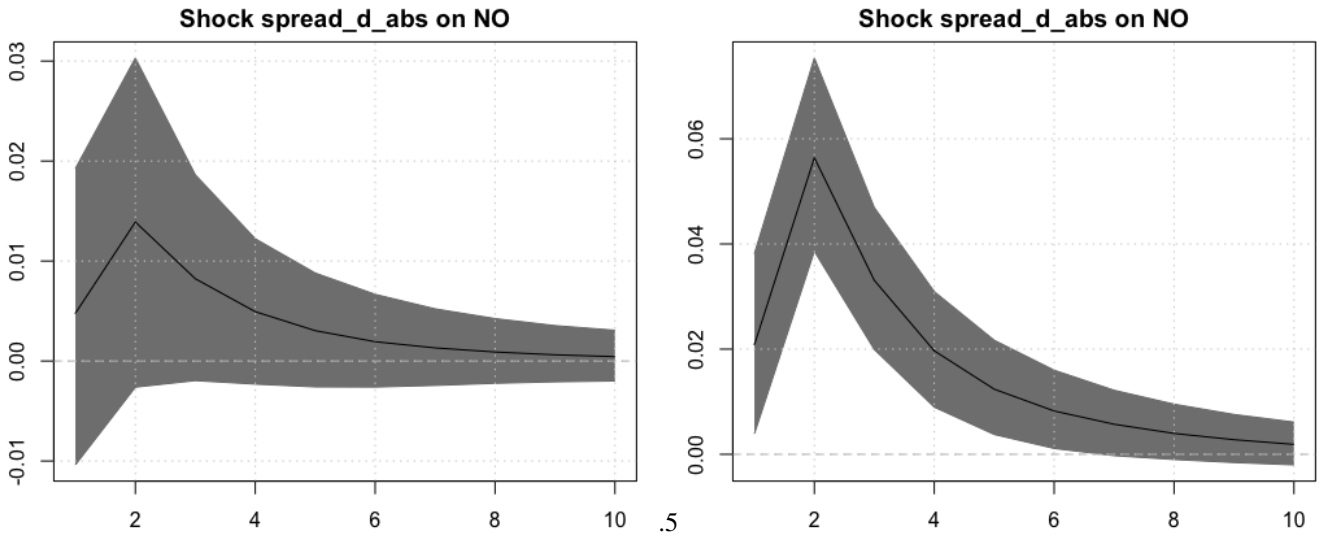
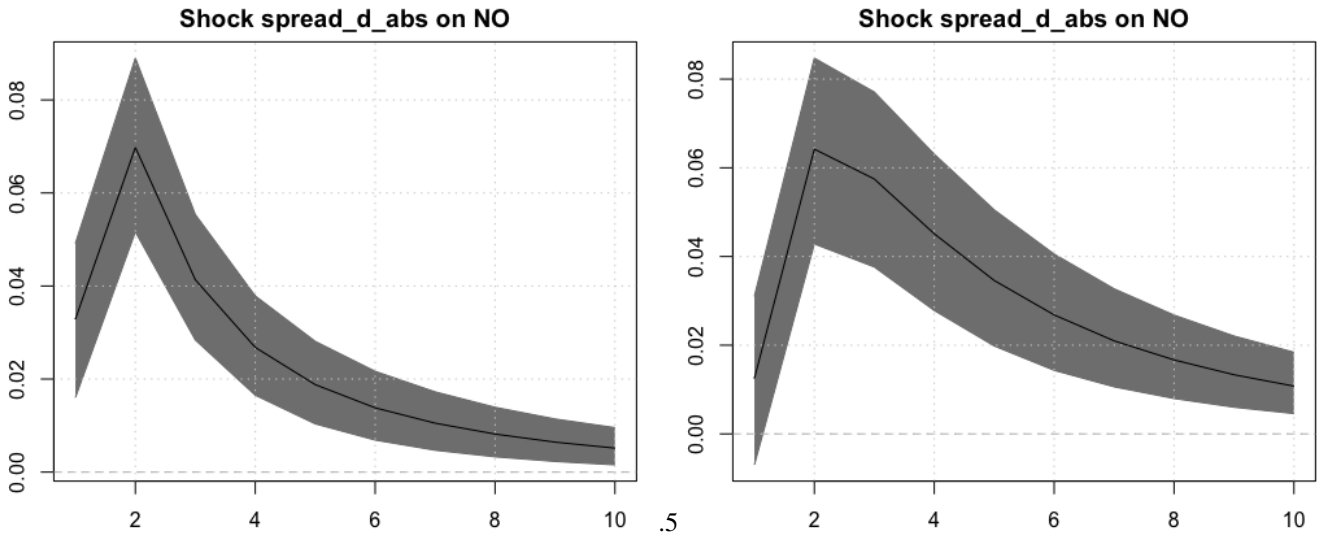


Figure 20: OIRF from BVAR Weekly (Spain Left, Ireland Right)



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Chapter 4: The BRIC(S) Acronym as a Heuristic Device in Sovereign Bond Markets

Abstract

How does media framing affect financial investors in sovereign bond markets? This chapter analyzes the performative power of investment categories, with a particular focus on the BRICS group (Brazil, Russia, India, China, and South Africa). I introduce a model of country risk evaluation based on investors' activation of the representativeness heuristic due to the media's usage of grouping acronyms such as BRICS or PIIGS. I argue that investors use categories as a heuristic shorthand which, in turn, affects their allocation decisions. While acronyms and categories can capture similarities, they can also be misleading insofar as they obscure otherwise important differences in economic fundamentals. I argue that this is due to two main behavioral tendencies on the part of investors: the representativeness bias and the availability bias. I examine the process through which these countries came to be grouped together in international media and then explore the contagion effect in sovereign bond markets during the period 2004-2020. Unlike other investment acronyms (e.g. PIIGS), the BRICS acronym contains a positive connotation. Consistent with this interpretation, I show how the number of articles containing the acronym BRICS in reference only to the other countries in the group decreases the bond spreads of a given country beyond what political conditions and economic fundamentals would predict. The results show that Brazil, Russia and, to a lesser extent, India have reaped substantial benefits from being labeled as BRICS. Consistent with the theoretical expectations, the heuristic BRICS effect is stronger when the country is more dependent on external financing, when investors face greater uncertainty and when international capital is scarce.

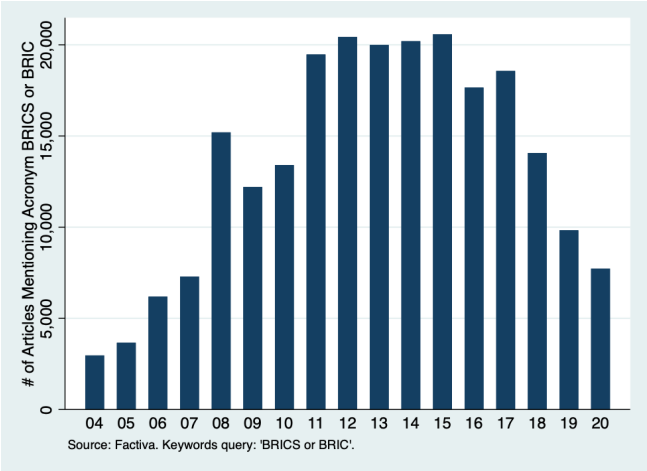
"First there was BRICs. Then came CIVETS. Then we were presented with BASIC, CRIM, BRICK, CEMENT, BEM, N11 and the 7% Club. Now barely a week goes by before someone tries to float another 'useful' investment acronym." (Global Dashboard, Jules Evans, December 6th, 2010).[1]

In November 2001, a team of Goldman Sachs analysts led by then-chairman Jim O'Neill published a report entitled *Building Better Global Economic BRICs*. This new category - lumping together Brazil, Russia, India, and China - soon attracted the attention of journalists, investors, and policy-makers alike. This new grouping acronym caught on partly thanks to the investment banks' extensive network and influence on financial discourse (Fourcade 2013). As remarked in the columns of the *Financial Times*, Goldman Sachs' executives viewed the concept "as a a snappy way of discussing strategy. [...] Unlike phrases such as 'emerging markets' or 'developing world', BRICs did not sound patronising, or unpromising."[2] Encouraged by the initial success, Goldman Sachs soon produced a 2003 sequel to the original report. The report - *Dreaming with Brics: The Path to 2050* (Wilson and Purushothaman, 2003) - was even more acclaimed than the initial one. Eventually, it would be downloaded ten times more than any other previous report in the Goldman Sachs website (O'Neill, 2011). Since then the acronym's popularity in the media only grew (see Fig. 1) and went on to become what the *Financial Times* charcaterizes as "a near ubiquitous financial term, shaping how a generation of investors, financiers, and policymakers view the emerging markets." (*Financial Times*, 15-10-2010).

Unlike other grouping acronyms, such as PIIGS (Portugal, Ireland, Italy, Greece, and Spain) or STUPID (Spain, Turkey, UK, Portugal, Italy, Dubai), BRIC(S) has an explicitly positive connotation and soon became "the developing world's most coveted club" (Brütsch and Papa (2013), p. 300). As Fourcade aptly puts it: "Who would you rather put your money on – the BRICs or the PIGS? The terms (which evocate, respectively, a sturdy material and a filthy porcine) are not irrelevant here: we think and feel through language" (Fourcade 2013, p.262). Likely for this reason, the member countries themselves welcomed the concept. For Brazil,

[1] Available at https://www.globaldashboard.org/2010/12/06/from-brics-to-pigs-whats-in-a-name/
[2] Available at https://www.ft.com/content/112ca932-00ab-11df-ae8d-00144feabdc0

Figure 1: Usage of BRIC(S) in Newspapers (2004-2020)



BRIC membership signified the emergence of the country as a different kind of world power with a specific emphasis on South-South relationships and soft power (Sotero and Armijo, 2007). In Russia, the concept was welcomed as a sign of Russia's return to a global status (Cooper, 2016). To India, the BRICs identity signalled its international stature vis-á-vis China (Bourne, 2015). Finally, Beijing has enjoyed its recognition as the de facto leader of the group (Roberts et al., 2018). In June 2009, the group held its first yearly meeting. At around the same, South Africa began its efforts to join the group, which it successfully did in late 2010. Since then the BRIC would be known as BRICS.[3] Tellingly, South African leaders were not alone in their aspirations to be part of the new group. As Jim O'Neill himself elaborated in his book-length treatment of the subject, "Friends from Indonesia goad me whenever I see them, suggesting that BRIC should really have been BRICI. Mexican policymakers tell me it should have been BRICM. In Turkey they wish it had been BRICT" (O'Neill (2011), p. 5).

Arguably, some of these (and other) countries could have well been part of the group. Indeed, one of the most interesting aspects of the BRICS concept is its not particularly well-defined membership criteria. As O'Neill himself readily conceded, the rationale resided not in the economic fundamentals of these economies, but on his views regarding their *potential* - largely yet unrealized at the time - economic and political influence. The analyst, who had never properly visited three of the four original countries, picked China and India

[3]From now on I will spell the acronym as "BRICS" for simplicity. It is to be understood as BRIC for the pre-2010 period.

mostly because of the sheer size of their population, while Russia was chosen given its participation at the G8 (O'Neill 2011, p.20). The inclusion of Brazil was arguably the most arbitrary of all. Beside the author's goal to draw a more geographically inclusive concept, the choice of Brazil over Mexico (the closest second candidate) was driven by the desire to construct the fitting metaphor of the resulting acronym,[4] but also because Brazil "happens to produce some of the world's best football players (an ongoing subject of obsession for this author)" (O'Neill 2011, p. 22). Regarding South Africa, O'Neill himself (among other economists) criticized its inclusion, on the grounds that it was a political decisions not based on the country's economic prospects. According to him, South Africa was "nowhere near constituting a Bric [nation]" from an economic standpoint, further warning that "being part of the Bric political club doesn't guarantee that you are going to be regarded as a Bric economically."[5]

Unsurprisingly, many have found the whole concept unconvincing. As one investment manager observed in 2007, "[i]t's a cool acronym but what it contains is four emerging markets that are large but don't have all the same prospects. Why is Bric ignoring Mexico, Turkey and Indonesia? It's a selection based on the fact that it is a cool acronym", soon followed by a colleague suggesting that "[t]o subdivide emerging markets into a verbally compelling – but not necessarily economically logical – category does a disservice to the overall growth opportunity within emerging markets." [6] The practical effectiveness of this scattered group of countries - "dispersed around the world only to be bound by the imagination of a Goldman Sachs economist" (Roberts et al. 2018, p. 67) - was soon called into question (Kahler, 2013). Economists scoffed at the idea that the member countries could ever represent the 'pillars of the 21st century economy' (Financial Times, 2010 January 16th, cited in Bourne 2015). Investment experts dubbed the concept an artificial marketing gimmick designed to reinforce Goldman Sachs' global power (Salway, 2010). Likewise, scholars have been quick to criticize the BRIC(S) as an analytical category emphasizing how its members' internal politics and economics are simply too different. In an attempt to make sense of the concept's wide acceptance from the perspective of the three

[4] As O'Neill himself recalled in 2010: "When I first spoke at a big group in Rio [after the paper was published], it was to around 1,000 investors from all of Latin America. The guy who was introducing me whispered in my ear as he went to the podium, 'we all know that the only reason the B is there is because without it there is no acronym.'" Avilable at https://www.ft.com/content/112ca932-00ab-11df-ae8d-00144feabdc0

[5] Available at https://www.dailymaverick.co.za/article/2011-10-04-oneil-south-africas-inclusion-in-brics-smacks-of-politics/

[6] Both available at https://www.ft.com/content/6dcceb14-6690-11dc-a218-0000779fd2ac

major schools in IR/IPE - liberalism, realism, and institutionalism/constructivism -, Armijo concludes that "the notion of the BRICs countries as a set thus appears forced" and that the category is "strictly speaking, a mirage" (Armijo 2007, p.40). Similarly, after a thorough analysis of similarities and differences, Glosny concludes that "BRIC commonalities and shared interests are excessively shallow" (Glosny 2010, p.126).

The largely arbitrary and partly exogenous (except for South Africa) nature of its inclusion criteria makes the BRICS acronym an ideal venue to study the performative role of language in financial markets. In particular, what are the reputational consequences of attaching a label based on largely arbitrary criteria? Is the acronym just a descriptive device or does it carry valuable information for investors? If so, under which conditions does the BRICS acronym help market agents coordinate their expectations? What are some possible mechanisms through which investors make sense of information that is largely orthogonal to a country's economic fundamentals? The present chapter attempts to answer these questions. In so doing, it contributes to the political economy literature on sovereign bond markets on theoretical, empirical, and methodological grounds. First, drawing from behavioral finance, I propose a theory linking the discursive reference to member countries as a cohesive "good-type" group to investors' inference about each individual member's future economic prospects. In doing so, I clarify the psychological mechanisms through which the performative role of language on financial markets takes place (Blyth et al., 2002; McNamara, 2019). Moreover, I theorize and test a more specific set of scope conditions under which investors are more (or less) likely to rely on the grouping acronym as a heuristic device. In so doing, this chapter further advances our knowledge of the "peer effects" of socially constructed categories in financial markets (Brooks et al., 2015; Brazys and Hardiman, 2015). Empirically, I contribute to the literature by showing that heuristic matters also in the case of well-known developing countries - about which information are not scarce -, and not only in the case of relatively unknown countries about which investors do not have well-defined priors (Gray and Hicks, 2014). Finally, I propose a relatively straightforward measurement strategy of written texts, which can be easily employed in other contexts as well. Such a strategy allows us to minimize measurement errors in the identification of relevant texts, a problem that may have affected previous studies (Büchel, 2013; Linsi and Schaffner, 2019).

The main results can be summarized as follows. First, by association with one another via the BRICS

acronym, the member countries have gained credibility in bond markets, thus paying lower interest rates at the margin. The results by and large comport with the evidence provided in Chapter 2, with an obvious difference. The PIIGS acronym's unambiguously negative connotation led its member countries (except Greece) to lose from being associated with each other in terms of their perceived creditworthiness. In other words, they have been perceived to be "guilty by association". In stark contrast, the BRICS acronym - with its positive connotation and "uplifting" character (Fourcade, 2013) - has allowed its members to enjoy *better* conditions on financial markets. Thus, financial investors have viewed the BRICS members as "virtuous by association". In this sense, the two acronyms can be seen as the two opposite sides of the same reputational coin. A second set of results concerns the conditional effects of the BRICS heuristic. Drawing from the extant literature in behavioral finance and political economy, I argue that the heuristic effect is mediated by heightened uncertainty, global capital constraints, and a member country's sensitivity to financial stress. Empirically, I show this to be the case for the BRICS acronym.

The chapter is structured as follows. First, I review the literature on sovereign creditworthiness, cognitive shortcuts and the performative role of ideas. Second, I introduce a theoretical framework inspired by the behavioral finance literature. I will underline two broad mechanisms through which the continued use of grouping acronyms may affect investors' behavior - the representativeness bias and the availability bias. Moreover, I will theorize about the scope conditions of the relationship. The following section describes the research design, with a particular emphasis on the measurement strategy, the sample and variable selection, and the statistical methodology. After discussing the results, a conclusion follows.

1 Investors, Sovereign Borrowing, and Heuristics

How do financial investors assess a country's default risk? A long literature in economics and political science has suggested and empirically tested a plethora of factors as determinants of sovereign bond yields (e.g. Mosley 2003, Bernhard and Leblang 2006, Bechtel 2009, Fender et al. 2012, Afonso and Martins 2012). While some degree of consensus regarding the most important determinants of sovereign creditworthiness have emerged,

scholars disagree on the each factor's relative importance. In the economics literature, authors are often interested in disentangling the relative contributions of global or systemic factors on the one side, and country-specific factors on the other side. Several papers find that systemic variables - such as the US stock markets, international liquidity patterns, and other proxies for global risk premia - are more related to a country's creditworthiness than local factors (Longstaff, 2010; Fender et al., 2012). Others have stressed the importance of country-specific variables on long term interest rates, with a particular emphasis on budget deficits and government debt as well as the economic business cycle (Afonso, 2003; Ardagna et al., 2007; Afonso and Martins, 2012; Bernoth et al., 2012). Within political science, scholars of comparative and international political economy have also identified a variety of factors that contribute to sovereign creditworthiness at both the global and country-specific level. An additional useful distinction often advanced is that between the ability and the willingness to repay one's debt. In this framework, economic factors influence a country's *ability* to repay its obligations, while political considerations affect its *willingness* to do so. A particularly vibrant area of research has explored how political regime type affects politicians' willingness to repay (Schultz and Weingast, 2003; Beaulieu et al., 2012; DiGiuseppe and Shea, 2015; Ballard-Rosa et al., 2021). Others have emphasized the role of global constraints (Spanakos and Renno, 2009), constitutional and institutional checks (North and Weingast, 1989; Eichler, 2014), cabinet formation negotiations (Bernhard and Leblang, 2006), financial supervisory transparency (Copelovitch et al., 2018), reputation (Tomz, 2012) and elections (Bernhard and Leblang, 2002, 2006; Brooks et al., 2021). The upshot of the literature is that investors dislike political events that generate uncertainty, which in turn can generate a disjuncture between economic fundamentals and market movements (Pástor and Veronesi, 2013; Kelly et al., 2016).

As much as investors may want to avoid uncertainty altogether, some degree of uncertainty in economic, financial, and political matters is unavoidable. If so, how do investors cope with uncertainty? With respect to this question, an emerging sub-literature suggests that investors rely on heuristics to infer a country's future trajectory. More specifically, scholars have been interested in the role of categories and classifications (Fourcade and Healy, 2017) or what may be called the "classificatory regime of international finance" (Wansleben, 2013). For example, Gray (2013) shows how joining a "good" international organization sends a signal to investors

regarding the country's "quality". Importantly, the "company that states keep" in international organizations has a differential effect depending on each member country's prior creditworthiness. Lumping together "good" and "bad" types in a single institution results in the former's loss and the latter's gain in reputation (Gray, 2013; Gray and Hicks, 2014). Following a similar logic, Grittersová (2014) shows how the market entry of reputable multinational banks can signal the creditworthiness of the host country to financial investors. Still others have been investigating how investors weight the risk factors about a given sovereign (or a group of sovereigns) to infer the default risk of *other* related countries, thus emphasizing the role of "peer effects" due to socially constructed categories. Following this line of reasoning, Brazys and Hardiman (2015) investigate how Ireland's discursive inclusion in the PIIGS acronym affected the country's credit rating, while Brooks et al. (2015) show similar peer effects due to different country groupings — based on geography, credit ratings, and level of development - in the case of emerging markets. Finally, Linsi and Schaffner (2019) emphasize the scope conditions of investment heuristics showing that they are more likely to affect short-term equity investments rather than long term foreign direct investments.

What these studies have in common is the view that categorizations/classifications transcend their prima facie descriptive character to produce (and reproduce) value judgements about the categorized/classified. These judgements, in turn, may have tangible material consequences (Fourcade and Healy 2017). Why should simple categories work as a mechanism of market sentiment diffusion? After all, one may argue that groups may simply reflect underlying similarities in economic and/or political fundamentals. As noticed before, though, scholars and practitioners have often found a good degree of arbitrariness in these categorizations (O'Neill 2011, Wansleben 2013). Moreover, the possibly objective origin of these classifications does not exclude the possibility that its continued use in the public sphere might have real consequences for the countries in questions by shaping the way we talk about - and thus think of - them (Brazys and Hardiman 2015). In this sense, group acronyms (e.g. PIGS, BRICS, CIVETS) can be seen as heuristic tools in the "classificatory regime of international finance" that may shape, and not only reflect, investment patterns (Wansleben 2013). From this perspective, agents' reliance on heuristic devices is related to the need to overcome problems of incomplete information. They help translating unmeasurable "Knightian" uncertainty into quantifiable risks (LeRoy and

Singell Jr 1987). This way, economic agents obviate the costs of collecting complete information and of solving complex decision making processes. In other words, these heuristics offer the promise of being "good enough" (Brooks et al. 2015) or, to use Simon's famous terminology, "satisficing" (Simon, 1990).

What have we learned from the extant literature? Several scholars have convincingly theorized about and empirically tested how categorizations/classifications can have a performative role. Nevertheless, these studies have rarely explored how the degree of *salience/strength* of such categorizations may matter. In this sense, the role of the media as a transmitter of categorizations that links the present reality to future expectations has been overlooked. This is particularly surprising considering the intimate and co-constitutive relationship between media fads, public attention, and financial markets (Davis, 2006b; Shiller, 2015, 2020). As Shiller (1999) suggests: "investor's attention to categories of investments [...] seems to be affected by alternating waves of public attention or inattention" (p. 1346). While categories and classifications may not originate in the media per se, the media's reliance on and repetition of these concepts is likely to affect the relative salience of certain categories within the financial classificatory regime. As one investor aptly put it, "There are all sorts of classifications and generalizations that get slavishly followed and which prevent people from looking at fundamentals. And the media is responsible for a lot of it. It's journalists who are most obsessed with catchphrases, or awards, or lists of 'who's hot'."[7] After all, while a given category may be either fixed (e.g. Asian countries) or slowly varying (e.g. Emerging Markets), its salience largely depends on how frequently it is discussed. Hence, the media is likely to be an important channel through which socially constructed categories affect financial markets (Shiller, 2015). Consider two prominent studies in this literature. In an early study, Mosley (2003) convincingly showed that sovereign bond investors utilize distinct indicators to assess the creditworthiness of developed and developing countries. In particular, investors tend to focus on a "narrow" range of government policies in the former case, and a "broad" set of indicators in the case of developing countries. More recently, Brooks et al. (2015) show how peer effects diffuse across countries that have common credit ratings, levels of market developments, and belong to the same geographic area. In both studies, a country either belongs to a category or it does not. The varying degrees of salience/strength of the

[7] https://www.globaldashboard.org/2010/12/06/from-brics-to-pigs-whats-in-a-name/

categorization itself is not explored. Second, even those studies stressing the changing salience/strength of the categorizations have not dug much further in the specific psychological mechanisms tying classifications to investors' decisions regarding the classified entity. Moreover, with the exception of Linsi and Schaffner (2019), the extant literature has focused primarily on the direct unconditional effect of heuristic categories on capital flows, while paying scant attention to the scope conditions of the relationship, i.e. when and why these heuristic devices matter the most. Finally, and notwithstanding the methodological richness of these previous studies, relevant questions pertaining the measurement of peer effects via written texts loom large.

2 Grouping Acronyms and Investment Decisions

Standard economic models assume that agents possess relatively strong computational capabilities. Unfortunately, such assumptions are at odds with empirical psychological findings (Conlisk 1996). This is not surprising considering that modern professional investors tend to cover large numbers of countries (up to 50) about which there might be too little or, somehow paradoxically, too much information to make it possible to have an in-depth knowledge of about most of them (Naqvi, 2019). Interestingly, practitioners seem well aware of this fact. As the CEO of a large Investment Management Company notices: "it is very difficult even for sophisticated individuals to do a lot of research on the creditworthiness [of countries or companies]. I don't care how smart you are, it's just impossible for you to do that" (cited in Naqvi (2019)).

By contrast, behavioral scholars argue that agents employ mental shortcuts and "rules of thumb" to optimize deliberation costs. These specific shortcuts are often referred to as *decision heuristics* (Kahneman and Tversky 2013). Such heuristics, while individually rational, may lead to poor aggregate decision-making as they involve "blunders" that would otherwise be avoided if agents were to engage in a full Bayesian updating (Stracca 2004). Within the decision heuristics identified in the literature, two are particularly relevant for this study: the representativeness bias and the availability bias. Originally proposed in the classic study by Tversky and Kahneman (1974), the representativeness and availability heuristics help us understand how people reason under conditions of uncertainty. Under these conditions, clearly connotated investment acronyms can affect

expectations by constructing "analytical bridges to the near future" (Holmes (2009), p. 386). As these concepts and frameworks are disseminated through the media, they become socially shared, thus coordinating the actions of otherwise disconnected investors (Daniel and Hirshleifer, 2015). In what follows, I sketch a model of country risk evaluation based on investors' activation of the representativeness and availability heuristic due to the media's usage of grouping acronyms.

The two main actors are the media and quasi-rational investors.[8] They are both assumed to be driven by a desire to maximize their profits. On the one side, under conditions of uncertainty and imperfect information, boundedly rational investors often lack the time and resources for collecting the amount of information required for a full cost-benefit analysis. As such, they evaluate the probability that an element A belongs to a class B by examining the degree to which A is *representative* of B, i.e. how much A *resembles* B. Then, agents simply assign high (low) probability of A belonging to B if A is similar (dissimilar) to (from) B. Mutatis mutandis, to quickly assess a country's creditworthiness, investors compare that country with a stereotypical "trustworthy" or "untrustworthy" type. On the other side, the media employs catchy grouping acronyms such as PIIGS and BRICS to attract the readers' attention. They act as "fundamental propagators [...] through their efforts to make news interesting to their audience" (Shiller (2015), p. 95). While often based on a kernel of truth, these acronyms' membership criteria need not to be consistent with objective political and economic conditions. The evaluative connotation of the grouping acronyms – positive (e.g. BRICS) or negative (e.g. PIIGS) – determines the qualitative nature of the class. It is either a "trustworthy" or "untrustworthy" class. In our case, since the BRICS acronym has an unambiguously positive connotation, we can think of the class as "trustworthy type" and each country as a (possible) element. The contention here is that the discursive inclusion of a country in the acronym BRICS functions as a signaling mechanism about its type. The more the BRICS acronym is being used, the more its constitutive members are discursively linked together. In turn, such discursive proximity will result in economic agents perceiving the four (or five) countries as an increasingly homogeneous class. The more a country is discursively associated to the BRICS group (i.e. the more the BRICS acronym is being used in the media), the more quasi-rational investors will be sensitive to developments in that country to infer

[8] I use the words "boundedly rational" and "quasi-rational" interchangeably.

the future policies and performances of the remaining members of the group. In other words, quasi-rational investors will respond to this perceived homogeneity by updating their priors about one class member even if they receive new information about only the other class members (and vice versa).

While relying on such stereotypical reasoning is not without value at times (to state otherwise would be equivalent to assume that investors can never learn anything about a country unless the information concerns solely that country), it may also lead to sub-optimal outcomes. The main reason is that, while somehow informative, representativeness is independent of (thus, unaffected by) other factors that *should* influence our assessment of the probability of interest, such as the baseline probability of the event of interest (in this case, the perceived probability of default of any individual element of the group) and sample size (in this case, n cannot be greater than four in order to infer something about the remaining member of the group). As several studies studies have shown, the neglect of prior baseline probabilities and insensitivity to small sample size lead agents to over-rely on representativenss in their decision making process (Tversky and Kahneman, 1974; Griffin and Tversky, 1992).

A second psychological process, also widely documented in the behavioral literature, is likely to magnify the effect of representativeness. This is the availability heuristic (Tversky and Kahneman, 1974). Simply put, human beings tend to assess the probability of an event by the easiness with which examples of its occurrence can be brought to mind, i.e. are available. Mutatis mutandis, the implication to the BRICS is straightforward. As element A (e.g. India) becomes more and more discursively associated to group B (the BRICS), the easiness with which - and hence the likelihood that - actors will think of B when they are exposed to A increases. Since the remaining countries (A^C) are also members of B, actors will update their priors about the rest of the group (albeit probably to a lesser degree relative to their update about country A itself). In other words, as the BRICS acronym catches on, its sheer repetition in relation to the four/five countries increases the likelihood that actors would think of the "trustworthy" group type upon being prompted to think of any individual member. That "trustworthy" group type would then be translated in a favorable updating to every member of the group according to the representativeness heuristic. The mechanism suggested here has a close analogue in the literature on branding and advertising. Indeed, it is well-known that recall ease affects consumers' es-

timates of perceived risk. Repeated exposure to the same brand makes the product easier to recall and does, in fact, increase the likelihood that we will purchase it (Folkes, 1988). In particular, studies have repeatedly found clearly positive brand images to be associated with better risk-return perceptions beyond what a rational assessment would predict (Jordan and Kaas, 2002). Similarly, empirical studies in financial economics have found that, when facing multiple alternatives, investors are more likely to consider options that attract attention and disregards options that do not attract attention (Barber and Odean, 2008). In the BRICS case, the more the other countries are discussed in terms of a group, the more information about such countries will be viewed as somehow informative of the other group members. While the availability bias by itself is neither a necessary nor a sufficient condition for investors to update their priors about one member of the group upon receiving information about some other member, it is likely to facilitate the process by increasing the probability that the acronym BRICS would quickly come to mind.[9]

The theory sketched above, while novel in its application to sovereign entities, is consistent with well-known formal models constructed to explain stock market developments that are apparently at odds with the predictions of the Efficient Market Hypothesis (EMH). For example, Griffin and Tversky (1992) construct a model to explain the pattern of under- and over-reaction.[10] In their framework, agents update their beliefs based on both the *strength* and the *weight* of the evidence. Strength refers to aspects of the evidence such as its salience and extremeness, while weight refers to its statistical informativeness. The latter is clearly related to the previous mention of the small sample bias underlying the representativeness heuristic. In particular, Griffin and Tversky (1992) show how people tend to violate Bayes' theorem by focusing too little on the weight of the evidence and too much on its strength. More specifically, under-reaction (conservatism) tends to arise when actors face evidence that has high weight but low strength. Unimpressed by the low salience of the evidence, actors react only mildly. By contrast, when the evidence is of the high-strength/low-weight variety, actors over-react in a manner consistent with representativeness. In both cases, the reaction is present - and in the right direction, given the evidence - but is either exaggerated or attenuated relative to that of a fully Bayesian actor.

[9] One possible observable implication of the availability heuristic is that the relationship between the peer acronym and countries' creditworthiness may strengthen over time as the group becomes more established. In other words, the strength of relationship would be time-varying. This conjecture is left for future research to explore.

[10] Technically, they are concerned with under and over-confidence more generally. Nevertheless, Barberis et al. (2005) - to be discussed shortly - show that it can be applied to under and over-reaction in financial markets more specifically.

Moreover, such psychological sub-rational outcome is not minimized by expertise, experience, sophistication and, more generally, any of the traits associated with human capital (Daniel and Hirshleifer, 2015; Shiller, 2015). Indeed, experimental studies have found not only that such behavior is also present among experts, but that over-reaction is actually *more* likely among experts than novices as the overall uncertainty of an event increases. As Griffin and Tversky (1992) succinctly summarize it: "experts who have rich models of the system in question [financial markets] are *more* likely to exhibit overconfidence than lay people who have a very limited understanding of these systems." (p. 430, emphasis mine). Building explicitly on the intuitions sketched above, Barberis et al. (2005) develop a model of the stock market where agents overreact to new information due to representativeness bias (and under-react due to conservatism bias).[11] Once again, assuming that a consistent series of good (or bad) earning announcements represent high-strength/low-weight information (i.e. salient information about that company's current valuation, but not necessarily informative about its valuation in the future nor the valuation of other companies), the model predicts over-reaction in the correct direction. The connection to the present study should be straightforward. In general, news about a given country (say, X) are highly salient to investors in relation to their decision to invest in (or disinvest from) *that* country, but should have relatively low informativeness about *other* countries (say, Y). If, for some (possibly exogenous) reasons, investors employ a mental map that connects X to Y, though, they will over-rely on the information about X to update their priors about Y as well. Of course, as Griffin and Tversky (1992) aptly notice, in practice the difficulty here is to empirically measure the informational content of various combinations of strength and weight. In a later section, I will delineate a simple procedure to select informational evidence that is relatively high (and varying) in strength and low (and fixed) in weight, thus allowing us to test the over-reaction part of the model.

Finally, it is worth noticing the theory underlined above also resonates with the anecdotal views of market participants. Over the years, investors have warned that such acronyms can affect the market in an undesirable fashion. As Gerard Fitzpatrick, senior portfolio manager at Russell Investments in London, succinctly put it "These acronyms [...] create herd behaviour." Similarly, Jerome Booth, former Head of Research at emerging

[11] I focus only on the over-reaction part of the model, as it is the most relevant to the present chapter,

market asset manager Ashmore Group plc, criticized the proliferation of investment acronyms, suggesting that "the problem with all these acronyms is they're short-cuts. They save you the effort of thinking. Thinking is hard work."[12]

Overall, the above discussion suggests the main hypothesis of this study:

- **Hypothesis 1**: An increase in the *implicit association* to the *positive* BRICS label will lead to a decrease in the country's perceived riskiness.

While the reputational effects associated with the BRICS acronym may affect all members, there is no reason to suppose that they would all be affected the same way. Indeed, the proposed theoretical framework suggests that new evidence - in the form of increased association with a trustworthy type club - interacts with economic agents' priors regarding each country's reputation. For a country with a "bad" reputation, association with the BRICS group amount to "surprising" news, while for a country with "good" reputation, the association is likely to reinforce and confirm prior beliefs (Tomz, 2012). Hence, the greater gains should accrue to those members that are perceived relatively *less* trustworthy to begin with. This logic underlying this "reputational transfer" has been proposed before. For example, Gray (2013) shows how when "good" and "bad" type join forces in a single international organization, reputational gains and losses are distributed according to each member's prior perceived creditworthiness.

While it is not possible to unambiguously rank the five countries on a priori theoretical grounds, Table 1 below offers a comparison of the in-sample average of four key variables to suggest a tentative ranking. The debt and deficit ratios - averaged across the 2004-2020 sample - proxy the country's fiscal capacity, its ability to repay its debt. The third variable records how often the country defaulted on its monthly debt obligations in the twenty years before the BRIC(S) acronym was coined. The data comes from Asonuma and Trebesch (2016). The final row shows the Fitch's credit rating score for each country before entering the sample (2010 for South Africa and 2003 for the rest) after converting the original letter-based credit rating scores into numerical values (1-21). Higher scores indicate higher creditworthiness. The past frequency of default as well as the the credit scores before the establishment of (or joining) the group are meant to capture the country's historical reputation.

[12]Both available at https://www.globaldashboard.org/2010/12/06/from-brics-to-pigs-whats-in-a-name/

In macroeconomic terms, Brazil and India clearly stand out relative to the rest of the group, with the highest and second highest debt and deficit ratio, and with the lowest and second lowest credit rating score, respectively. Brazil's chequered macroeconomic history is also reflected in five defaults in the 80s and early 90s. These two countries are likely to gain from a positive reputational transfer. Russia is an interesting case insofar as it displays remarkably sound macroeconomic data, with the lowest debt ratio in the group and a public budget in surplus. Nevertheless, three reasons point at Russia as a net reputational winner. First of all, the country's relatively appealing economic situation is arguably the result of Russia's massive energy sector more than sound macroeconomic policies. Second, the country's perceived creditworthiness has suffered mostly due to geopolitical reasons, at least starting from the 2008 war in Georgia. Finally, the country's historical reputation in financial markets is as bad as, if not worse than, that of Brazil. This is reflected in a low credit score and four monthly default episodes in the late 90s, likely to be quite salient in investors' minds due to their recency (Shiller, 2015). The group's late-comer, South Africa, is in between Brazil/India and China in terms of fiscal capacity. Nevertheless, its relatively negative macroeconomic situation does not seem to be reflected in greater riskiness. South Africa has the second highest credit rating score and never defaulted on its debt since 1985. In contrast with all other members, China's positive macro-indicators reflect sound macroeconomic policy. With an average debt-to-GDP ratio below 40% and an average deficit at around 2% - and no default episode -, investors tend to view Chinese long term bonds as almost risk-free. Indeed, it was the country with the highest credit score in 2003.

Table 1: Country by Country Fiscal Capacity (2004-2020 Average), Number of Defaults and Credit Rating Scores (prior to 2004)

	BRA	RUS	IND	CHI	SAF
Debt-to-GDP Ratio	62.6	12.29	71.11	39.26	45.00
Budget-to-GDP Ratio	-5.14	0.84	-4.63	-2.15	-3.91
Defaults	5	4	0	0	0
Fitch Credit Rating Score	7.16	10.33	10	15	14

Overall, a country-by-country comparison of key factors affecting a creditworthiness offers some insights, although it does not allow us to suggest a definitive rank of the five BRICS members. All countries except China may be expected to reap the reputational gain from being associated to a trustworthy club. In purely

macroeconomic terms, Brazil and India lag behind the rest of the group and are good candidates for reaping the gains of membership. Due to its historical reputation more than macroeconomic mis-management, Russia is also likely to be a net winner. It is hard to suggest clear-cut expectations regarding South Africa. On the one side, the country's macroeconomic indicators may suggest the possibility of reputational gains. On the other hand, though, the country already enjoyed relatively good terms in capital markets even before joining the group in 2010. By contrast, Beijing stands on its own. Clearly the most economically dynamic country and a raising world power, China is the accepted leader of the group, the "colossus within the group" (Cooper (2016), p. 12). It has relatively little to gain in terms of creditworthiness from being associated with the other members (although, of course, there are other material and diplomatic benefits stemming from being the group leader). Such expectation is in line with the theoretical discussion in Chapter 3 of this dissertation. In that case, Greece - the stereotypical "bad" type - was the least likely country to be affected by the PIIGS acronym due to the already negative perceptions regarding its creditworthiness. Now, instead, Beijing is the stereotypical "good" type, i.e. the least likely to be affected by the BRICS acronym due to the already positive perceptions regarding its creditworthiness.

The above discussion hypothesizes an unconditional effect of the BRICS heuristic on financial markets. Nevertheless, the benefits of being (implictly) associated to "trustworthy" type via the BRIC(S) acronym are unlikely to be static.

To begin with, individuals tend to default towards heuristic use more often when they are under pressure (Goodie and Crooks, 2004; Itzkowitz and Itzkowitz, 2017). During periods of uncertainty rational optimization becomes more complex and time-consuming and the opportunity cost of relying on sub-optimal decision strategies decreases (Büchel 2013). Several asset pricing scholars, for example, suggest that behavioral biases become more, not less, important during periods of uncertainty (e.g. Stracca 2004; Rigotti and Shannon 2005). More specifically concerning the cost of borrowing, it as at times of increased uncertainty that the distributional cleavage between winners and losers is exacerbated and, as a result, preferences over debt repayment tend to be the most divided (Tomz, 2012). Uncertainty can generate a disjuncture between fundamentals and market movements (Brooks et al., 2021) and, under these circumstances, association with a "trustworthy" type group

may become particularly valuable. To be true, an alternative interpretation may suggest the opposite relationship. Indeed, scholars working in more rationalist traditions sometimes dismiss the substantive significance of behavioral research on the grounds that heuristics use may be of little importance when the stakes are high (Barberis and Thaler, 2003). In other words, rationality may obtain "when it counts" the most (Thaler 1987, p. 156). This interpretation would suggest that investors are *more* likely to scrutinize all available information, and *less* likely to rely on heuristic thinking, at time of heightened uncertainty. While plausible, this view presupposes that actors can measure and quantify uncertainty by looking at fundamentals more carefully. Under many circumstances in finance, this assumption might not hold. Indeed, as previous scholars have noted the ability to rationally assess the probability of an event is particularly low in the case of rare, high-impact events such as financial crisis, bank failures, and government defaults (Taleb, 2007; Aikman et al., 2021). In these circumstances, actors face "fundamental uncertainty" rather than quantifiable risks (Knight, 1921). Unable to assess and quantify this uncertainty, while in need to make quick decisions, market actors will be more likely to substitute other methods of decision making for rational calculation (Nelson and Katzenstein, 2014). Consistent with this view, then, I test the following hypothesis:

- **Hypothesis 2**: Investors' reliance on the BRICS acronym as heuristic device increases as global uncertainty *increases*, i.e. an increase in the discursive use of the BRICS acronym will lead to greater increases in a country's perceived creditworthiness when global uncertainty *increases*.

Second, another mediating factor that investors face when making investment decisions concerns capital availability. It is well-known that contemporary global finance generates boom and bust capital flow cycles (Bauerle Danzman et al., 2017). The effect of such cycles on the availability of international liquidity is particularly consequential to developing countries. Indeed, the notion that developing countries are constrained by developments at financial and political centers has a long intellectual history and strong empirical backing (Frieden, 1991; Maxfield, 1998; Mosley, 2003; Arias, 2017; Miranda-Agrippino and Rey, 2020). When interest rates and returns on safe assets (e.g. US long term bonds) are relatively low, international markets are liquid and investors more risk-accepting. When returns on those assets are relatively high, global liquidity is low and investors are more risk averse (Ballard-Rosa et al., 2021). In this case, the core of the financial system

(by and large the US) becomes a net importer of foreign capital, while other economies struggle to attract it (Bauerle Danzman et al., 2017). It is at this time that being associated to a "good/trustworthy" type group of country should be particularly valuable in so far as it provides its members an extra premium in perceived creditworthiness. Hence, investors may be *more* likely to rely on heuristics when capital availability decreases and the uncertainty regarding a country's future growth prospects increases. The underlying logic here is consistent with recent findings in the "democratic advantage" literature. For example, Ballard-Rosa et al. (2021) find that the credibility gains from "good" institutions increase as capital becomes more scarce. Consistent with this view, I hypothesize the following:

- **Hypothesis 3**: Investors' reliance on the BRICS acronym as heuristic device *increases* as international capital becomes more scarce, i.e. an increase in the discursive use of the BRICS acronym will lead to greater increases in a country's perceived creditworthiness when global liquidity is *low*.

Finally, not all countries are equally exposed to financial markets (Campello, 2015). Those countries that necessitate greater inflows of foreign capital tend to be more sensitive to international financial fluctuations (Campello and Zucco Jr, 2016; Arias, 2017). Indeed, most models of international debt posit a monotonic relationship between debt service obligations and the probability of default (e.g. Eaton and Gersovitz (1981)). Unlike the previous two cases, relative *sensitivity* to financial market may not necessarily related to investors' psychological processes underlying the use of heuristic devices. Nevertheless, greater sensitivity to financial markets implies that *any* financial market development would have more pronounced consequences, thus including those processes set in motion by psychological biases. As such, I hypothesize that a country's sensitivity to international markets accentuates the benefits of being associated to a "trustworthy" type group:

- **Hypothesis 4**: The reputational effect of investors' reliance on the BRICS acronym as heuristic device *increases* as sensitivity to financial market developments' *increases*, i.e. an increase in the discursive use of the BRICS acronym will lead to greater increases in a country's perceived creditworthiness when the country's sensitivity to financial markets is *high*.

To sum it up, a behavioral model based on the BRICS acronyms suggests a negative relationship between

the discursive association of a country with the BRICS and the country's perceived riskiness among financial actors. Moreover, uncertainty, capital scarcity, and sensitivity to international finance all compound the negative relationship. By contrast, a rationalist interpretation would be partly vindicated if the effects of psychological biases was limited to low-stake situations, i.e. when uncertainty is low and when capital availability is high.

3 Research Design

3.1 Measurement strategy

Scholars working at the intersection of finance and communication usually employ one of two measurement strategies - which we could label as "general" and "targeted", respectively - to retrieve information about the entity of interest (for a discussion of this distinction in a similar context see Büchel 2013). In the literature on text linguistics and natural language processing, the identification of the optimal information retrieval procedure is commonly referred to as "the problem of aboutness" (Hutchins, 1977).

At times, authors have simply looked at the frequency with which the token(s) of interest (e.g. BRICS) are used, without differentiating between the *target* entity[13] and the other members of the group. For example, this is the approach in Brazys and Hardiman (2015) and Linsi and Schaffner (2019)' studies of PIIGS and BRIC acronyms, respectively. The weakness of this "general" approach is that it results in a mix of information about the target country and the other members, thus making it difficult, if not impossible, to distinguish between genuine reputational "peer group" effects from standard informational effect of news media (i.e. the effect of articles about China on Chinese perceived creditworthiness). Information about the target country's "good/bad" policies - rather than the "good/bad company" that it keeps via the acronym - might be affecting perceptions of creditworthiness (Gray and Hicks, 2014).

The second approach - arguably more prominent - is to restrict the focus on the target entity by imposing an explicit set of search criteria. Unfortunately, scholars have struggled to find a set of generalizable criteria to perform the query. Lacking an optimal strategy, different criteria have been proposed to minimize the

[13] I will refer to the entity/country about which one aims to retrieve information as the target.

probability of mis-classification. Some scholars have opted for casting a fairly wide net - such as Breeze (2014)'s search for one single mention of both "Spain" and "crisis" - while other scholars have used more restrictive criteria. For example, Liu (2014) requires that the headline contains the country name and that the article mentions either "sovereign" or "debt" at least five times. Similarly, in a study on the European sovereign bond crisis, Büchel (2013) searches for politicians' last names and more than one crisis-related key word (e.g. "Tsipras" and "crisis"). Other prominent works in finance also display similar variations in the search query criteria (e.g. Tetlock 2007, Ahmad et al. 2016).

While it is certainly desirable to restrict news information to a specified and easily recognized entity, this approach also comes at a cost. In particular, while the "general" approach runs the risk of inadvertently incorporating information about the target country, the "targeted" strategy - at least as usually implemented - suffers from the opposite risk, i.e. that of incorporating information about the other countries. In other words, even if an article including the words "Putin" and "crisis" is *also* about Russia, it might not be *mostly* about Russia. The main focus of the article might be on China, while Russia is only mentioned en passim. As such, one may detect narrative contagion from Russia to China, while the effect should be attributed to new information about China itself. Whereas the two approaches could be combined to assess the effect of both "targeted" and "general" news, this would not solve the underlying uncertainty about what is being excluded and/or included and, hence, what exactly is being measured. A "general" search is prone to select articles about the target country even if that is not the result we are interested in, while the "targeted" search does not guarantee the exclusion of extraneous articles.

Keeping the above discussion in mind, I propose an alternative simple strategy, which may be labelled as "negative". More specifically, I search for news articles on the Factiva database that are *not* about the target country, thus blocking the informational channel mentioned above. I do so by querying the following search string:

("BRICS" or "BRIC") not "Target Country Noun" not "Target Country Adjective" not "Target Country Population"

and(”Other Country 1” or ”Other Country 2” or ”Other Country 3” or ”Other Country 4”)

I further restrict the search to articles written in English to make sure that the acronym is correctly searched for.[14] Moreover, this avoids possible selection issues since the Factiva database contains a comparatively smaller number of non-English written newspapers, which might be systematically different from the ones left out. I do not distinguish between financial and non-financial sources as the former represents a small fraction of total papers.[15] Nevertheless, I select the following subject options: ”Commodity/Financial Market News”, ”Corporate/Industrial News”, ”Economic News” and ”Political General News”.[16] I repeated the above-described strategy three times, varying the required frequency of the BRICS terms in each article. I request the acronym to be present at least once (”BRICS1”), then twice (”BRICS2”), and finally at least three times (”BRICS3”). The volume of articles was aggregated at the monthly level. After the search was complete, I randomly selected 500 articles to make sure that the query was successful. The series starts in January 2004 and ends in March 2020.[17] South Africa enters the series in 2010 since it was not part of the BRIC group before. The final result of my measurement strategy for the BRICS2 series is displayed in Fig. 2 below.[18] The graphs for the remaining two variables are very similar since the three series are highly correlated (see Table 2).

Table 2: Article Volume Series Correlations

	BRICS1	BRICS2	BRICS3
BRICS1	1.00		
BRICS2	0.92	1.00	
BRICS3	0.87	0.97	1.00

[14] For example, even after transliteration, the acronym in Russian is often spelled as BRIKS.

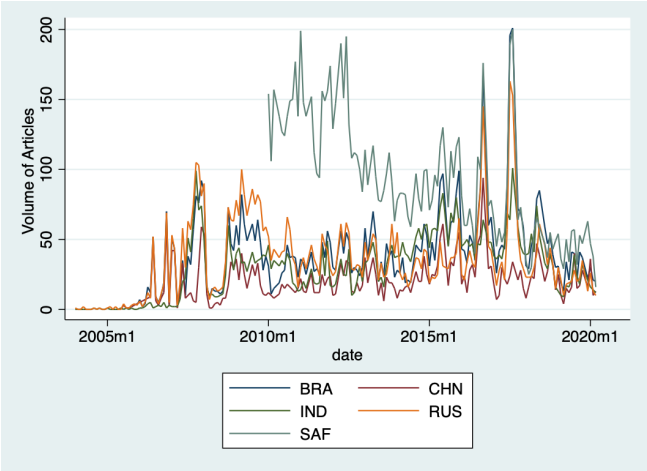
[15] In the Appendix, I show the results relying only on financial newspapers

[16] I also exclude duplicate texts, as identified by Factiva itself under the ”similar duplicates” option.

[17] It is only after the second Goldman Sachs report published in October 2003 that the acronym becomes truly widespread in the media (see Fig. 1).

[18] To make the figure more readable I exclude the observations when the BRICS summit is taking place. The spikes in the graph would make it hard to appreciate the month-to-month variation during normal periods. I control for the summits in the empirical models.

Figure 2: The BRICS2 Series from the 'Negative' Search Strategy



Overall, the string query described above minimize the possibility of measurement error.[19] A few points are worth emphasizing. The first line guarantees that the retrieved articles mention the acronym but do not contain any direct information about the target country by construction. This is arguably the most conservative search criterion one could use, as it even excludes all articles that use the acronym followed by the parenthetical "(Brazil, Russia, India, China, South Africa)". While a country mentioned only in parenthesis (but not throughout the text) would be unlikely to be the main topic of the article, this would cast doubts on the assumption that the news articles contain no explicit association between the target country and the other members. In other words, the articles may affect investors' perception of the target's creditworthiness only by *implicit* association with the other members via the BRICS heuristics. Second, the bottom line of the query guarantees the exclusion of articles about the group as a whole, with no mention of any specific country. Without such restriction articles about economic growth projection for the BRICS group as a whole may contain relevant information about each individual country even if none of them is explicitly mentioned.[20]

To relate this strategy to the previous theoretical discussion, this method guarantees a fixed, low informativeness (weight) about the target country by construction (since it is never mentioned in the text). At the same

[19] I take care to use different spellings when needed (e.g. Brazil and Brasil) and to exclude articles containing the words "brac", "bracs" and "abrac" which would retrieve extraneous articles (e.g. "bric-a-brac"). For example, the complete query for Brazil is "(BRIC or BRICS) not Brazil not Brazilian not Brazilians not Brasil not Brasilian not Brasilians not brac not bracs not abrac and (Russia or India or China or South Africa)". Upon noticing that some articles may contain metonymic references, I randomly selected 100 articles for each country and inspected the content. Only one article was mis-classified to be not about India even if New Delhi was mentioned en passim.

[20] While quite rare, such articles tend to happen around the BRICS Ministerial meetings.

time, this strategy allows for varying degrees of strength of the signal captured by the volume of articles using the acronym per unit of time. In the case of Brazil, for example, the articles must be mentioning at least one other BRICS member country (Russia/India/China/South Africa). As such, the articles are likely to be salient to investors regarding the political-economic trajectory of Russia/India/China/South Africa, respectively. Nevertheless, since Brazil is never mentioned in the texts, the articles should have low informativeness about the prospects of the Brazilian economy.[21]

To summarize, the proposed measurement strategy is novel and different from that used in other studies (e.g. Brazys and Hardiman 2015, Linsi and Schaffner 2019). It allows us to investigate the acronym's "peer effect content" using only sources that are by construction only implicitly related to the target country. This way, the empirical results can be interpreted as evidence that the target country is viewed as "virtuous by association". This strategy also clearly differs from studies operationalizing contagion as assets' spatial correlations between the target country and the other group members (Brooks et al. 2015).

3.2 Variables Selection

As a dependent variable, I use the 10-year government bond yield and its spread from the equivalent US bonds yield. Unlike short-term bonds interest rates, long term bonds are more market driven and less affected by the central bank's monetary policy, thus making them an ideal indicator of a country's creditworthiness (Mosley, 2003). These variables capture the expected losses from default as well the risk associated with the possibility of unexpected losses (Remolona et al., 2007). Through the pricing of sovereign risk, the bond market "passes a daily judgement on the credibility of [the government]" (Ferguson (2008), p.69). Higher/lower yields indicate a higher/lower perceived likelihood of default, thus reflecting the investors' perception of a government's reputation. Both variables are widely used in the analysis of sovereign credit risk (Mosley, 2003; Grittersová, 2014).

[21] The underlying assumption is that the numbers of articles using the acronym BRICS in reference to the countries other than the target is a function of the strength of the set of information being reported in the article. In other words, the publication of more (less) articles using the acronym without mentioning the target is assumed to reflect a state of the world in which economic and political developments in the other countries are of greater (lesser) interest. The assumption is justified in light of the empirical literature on media and economics. One of the most robust findings there is that economic factors affect the *volume* of news articles as much as, if not more than, the tone. Consistent with this fact, news volume tends to a better predictor of financial market returns than news tone. See, for example, Liu (2014) or Chapter 1 of this dissertation.

The independent variable is the volume of article containing the acronym BRICS without any direct mention of the target country, as described previously. Throughout the chapter, I show the results using the volume of articles that contain at least two mentions of the acronym.[22] The Appendix contains the results using the volume of articles using the acronym at least one and at least three times. The average number of articles per month is 46, with a minimum of 0 and a maximum of 581.

A host of political and economic variables are well-known to contribute to a country's creditworthiness. The state of the economy and domestic macroeconomic factors are the principal country-specific variables affecting sovereign risk (Cantor and Packer, 1996; Grossman and Van Huyck, 1985). As such, I control for the *total level of debt as % of GDP* (to proxy for debt sustainability), the level of GDP (a proxy for *Economic size*) and of GDP per capita (to capture *Economic development*), *economic growth* (to proxy for the business cycle), *inflation*, *foreign currency reserves*, and two variables capturing the "twin deficit", the *current account balance* (the sum of net exports of goods and services) and the *government budget balance* (the difference between a government's revenues and its spending). I also include a measure of *capital account openness* (the Chinn-Ito index), which may influence expectations about pro-market governments' policies (Brooks et al., 2015). Given the voluminous literature on the "democratic advantage" (Schultz and Weingast, 2003; Beaulieu et al., 2012; DiGiuseppe and Shea, 2015; Ballard-Rosa et al., 2021), I also control for political *regime type* as measured by the Polity2 score.[23] Given the limited cross-sectional sample, I refrain from including other political variables that are suggested in the literature, such as a country electoral institutions (Bernhard and Leblang, 2006) and ideology (Brooks et al., 2021), which are either time-invariant or too slowly moving. The models include country fixed effects, thus subsuming much of that variation.[24] Finally, I also include a dummy for the BRICS ministerial meetings (*Summit*), which tend to generate a spike in the articles using the acronym.

Second, I control for global factors that are well known determinants of sovereign bonds interest rates. First, I control for the *exchange rate* via-à-vis the dollar to capture exchange rate risk (D'Agostino and Ehrmann, 2014). Second, I include the *VIX* - a measure of global volatility risk premium - to proxy for general risk

[22] This measure offers the best balance between precision and coverage.

[23] The capital account openness and democracy score end in 2019. I carry the last value on to complete the series.

[24] The Polity2 score for the period under consideration changes only for Russia. Nevertheless, I opt to include it because the beginning of democratic reversal in Russia starts at around 2007, which also marks the end of the decreasing trend in Russian spread and the beginning of its upward trending trajectory.

aversion and global uncertainty (Longstaff et al., 2011). I also control for Fitch's *credit rating scores* (Afonso and Martins, 2012). I follow standard practice in the literature and turn the letter grades into a numerical score (1-21). Since all five countries are dependent on or exporter of coal, crude oil, and natural gas, I follow Brooks et al. (2015) and include an index of world prices of *energy commodities* (which includes all three). Finally, I construct a *financial crisis* dummy that captures currency, sovereign bond, or banking crises (Laeven and Valencia, 2018).[25]

Importantly, interpreting the BRICS effect as financial contagion necessitates to control for alternative channels through which contagion may take place. Indeed, as noted in Kaminsky and Reinhart (2000) classic study on financial contagion, true contagion "arises when common shocks and channels of potential interconnection are either not present or have been controlled for" (p. 146). In our case, a rise in the other members' yields may increase the number of articles using the acronym, while at the same time directly affecting the target country's yields. I employ two measures to block this alternative path. First, in the main analysis, I take the standard approach of controlling for the average yield of the other member of the group (Brooks et al., 2015; Edwards, 1983; Beirne and Fratzscher, 2013). Second, as a robustness check, I use the first principal component of the other countries' yields. The extracted financial shocks are commonly used to investigate and/or control for the presence and size of regional spillover effects (Fukuda and Tanaka, 2020; Altınbaş et al., 2021)

Finally, I need to select the appropriate variables to capture the mediating effect of global uncertainty, global liquidity, and sensitivity to financial markets as hypothesized in hypotheses 2, 3, and 4. Regarding global uncertainty, I rely on the VIX, a measure of the implied volatility of S&P 500 index options (Longstaff, 2010; Brooks et al., 2021). Higher scores indicate an increase in uncertainty. As a robustness check, I use the global risk factor estimated by Miranda-Agrippino and Rey (2020).[26] The measure reflects both aggregate volatility of asset markets and the time-varying degree of risk aversion in the markets.

To capture global liquidity constraints, I rely on the interest rate of US ten-year constant maturity Treasury bonds (Bauerle Danzman et al., 2017). The US represents the core of the financial system meaning that the rate at which its government can borrow affects the interest rates of other countries as well. An increase in the US

[25] I include them all together because the frequency of each crisis individually is very low.
[26] I reverse-code the original variable to ease comparisons with the VIX results.

bonds interest rates attracts foreign capital and makes it harder for developing countries to do so (Ballard-Rosa et al., 2021). As a robustness check, I follow Betz and Kerner (2016) and use the real US lending interest rates, which measures the US interest rates net of inflation and is an oft-cited proxy for the availability of capital to countries other than the United States (Frankel and Roubini, 2001).[27]

Finally, hypothesis 4 posits that the effect of being discursively associated with the BRICS group is greater as the target country's sensitivity to financial markets increases. To capture sensitivity, I employ the value of *public* debt service obligations as a ratio of the total value of exports, a frequently used solvency indicator (Campello, 2015). A higher ratio indicates a greater burden of servicing the debt, with the magnitude of the burden depending also on the difference between the interest rate and the growth rate of exports. According to the International Monetary Fund, debt over export indicators are considered the best way to capture financial sensitivity in emerging markets (Fund, 2000, 2003). This measure has the advantage that it is less volatile than debt-to-GDP in the presence presence of over- or under-valuations of the real exchange rate, a recurrent feature in emerging markets. Previous studies used the raw values to construct a binary indicator at the 35% threshold (Campello and Zucco Jr, 2016; Arias, 2017). Given the small N in my study, I rely on the raw percentages instead. If private defaults take place on a significant scale, this too is likely to lead to a sharp reduction in financial inflows, and public default may follow (Fund, 2003). Hence, as a robustness check, I re-run the analysis using the total debt-to-service ratio (including non-public debt obligations). The Appendix shows the graphical results using the alternative three variables for uncertainty, capital availability, and financial sensitivity.

3.3 Empirical Models

To test my main hypothesis in the pooled dataset, I estimate a set of two-way linear fixed-effects models with the following single-equation form:

$$\Delta Y_{i,t} = \alpha_i + \gamma_t + \beta_1 \Delta X_{i,t-1} + \beta_2 \mathbf{X_{i,t-1}} + \varepsilon_{i,t}$$

[27] This measure is available only at a yearly frequency from the World Development Indicator, thus lowering the overall power of the statistical tests.

Unit fixed-effects (α_i) account for unobserved heterogeneity at the country level, while the inclusion of year fixed effects (γ_t) control for the variation in the dependent var due to global events. Unit root tests in the Appendix suggest that both the dependent and the independent variables are likely to be integrated as well as four control variables (the foreign currency reserves, the exchange rate, the energy index, and the financial contagion variable).[28] To preserve equation balance, these variables enter the model in first difference.[29] Substantively, the coefficient of interest is (β_1), i.e. the short term effect (impact multiplier) of being implicitly associated with the BRICS group. This is arguably the most appropriate model from a theoretical perspective as well since financial markets should incorporate information quickly (Breen et al., 2021; Brooks et al., 2021). Given the structure of the dataset, serial correlation in the residuals is an issue. Thus, I employ Newey-West standard errors up to 4 lags.[30] To reduce concerns about reverse causality in the control variables (e.g. the effect of spreads on inflation), I lag them by one period in all the estimations. I do not lag the BRICS summit binary indicator as both the media and financial markets are likely to respond immediately to new information from a pre-scheduled meeting.[31] Moreover, there can be no reverse causality in this case since the meetings are regularly scheduled months ahead.

To test hypotheses 2, 3, and 4, I interact the BRICS variable ($\Delta X_{i,t-1}$) with the relevant mediating factors as described in the previous section. The moderators that capture global uncertainty and global liquidity enter the equation contemporaneously. Any short-term change in an individual country's bond interest rates is unlikely to affect global economic conditions, thus easing concerns about reversed causality. For the opposite reason, the debt-to-exports ratio, i.e. the proxy for a country's financial sensitivity, is lagged. Since the ratio includes a measure of a country's total outstanding debt in the numerator, short-term changes in interest rates can directly

[28] Given the small cross-sectional sample (five countries) and the low power of panel unit root tests, I rely on unit root tests country-by-country. The tables in the Appendix show the Augmented Dickey Fuller and KPSS tests results for the non-stationary variables. Unit root tests for the remaining variables are available upon request.

[29] There is no evidence of co-integration among these variables. Unit root tests on the differenced series strongly suggest stationarity.

[30] I rely on two commonly used rules of thumb to determine the number of lags. Stock and Watson (2002) suggest to use $0.75 * T^(1/3)$, while Greene (2012) suggests thw following formula $T^(1/4)$. After rounding, both formulas yield 4. Hence, the variance estimates are computes using the following formulation:

$$\mathbf{X}'\hat{\Omega}\mathbf{X} = \mathbf{X}'\hat{\Omega}_0\mathbf{X} + \frac{n}{n-k}\sum_{l=1}^{4}\left(1-\frac{l}{5}\right)\sum_{t=l+1}^{n}\hat{e}_t\hat{e}_{t-l}(\mathbf{x}'_t\mathbf{x}_{t-l} + \mathbf{x}'_{t-l}\mathbf{x}_t)$$

At any rate, the results are robust to different autocorrelation lags. Available upon request.

[31] Indeed, there are clear spikes in the news article series for all countries on the same month of the BRICS meeting. Lagging the indicator would fail to account for that abnormal variation.

and immediately affect it.

4 Results

Table 3 shows the main results for hypothesis 1 in the pooled regression using the spread as the dependent variable. Table 17 in the Appendix shows the results using the 10 year government Bond yields as a robustness check. To facilitate interpretation, both variables are measured in basis points, the standard way to express interest rates in finance. One basis point equals 1/100th of 1%. To ease concerns about suppression effects of the main variable of interests due to the inclusion of control variables, I include the covariates sequentially (Lenz and Sahn, 2021). Model 1 shows the simple bivariate relationship with time and country fixed effects. Model 2 includes the domestic variables and in Model 3 I add the global variables (i.e. the exchange rate, the energy index and the financial contagion variable). To facilitate a more meaningful interpretation of the results, the independent variable was divided by 10 prior to estimating the models. Hence, the BRICS coefficients represent the reputational effects of a 10 additional article increase.

Table 3: Linear Fixed Effects Models

	Model 1	Model 2	Model 3
ΔBRICS2 (t-1)	-0.576***	-0.540**	-0.621***
	(0.176)	(0.214)	(0.217)
Total debt % GDP (t-1)		1.921***	1.650**
		(0.724)	(0.658)
Current Account Balance (% GDP) (t-1)		-0.076	-0.564
		(1.462)	(1.399)
Economic Size (t-1)		-0.005	-0.004
		(0.004)	(0.004)
Economic Development (t-1)		-0.000	0.001
		(0.008)	(0.008)
Deficit (% GDP)		2.765*	2.604*
		(1.493)	(1.384)
Regime Type (t-1)		-16.628	-14.029
		(13.296)	(12.149)
Capital Account Openness (t-1)		6.232	-7.269
		(35.302)	(32.747)
Financial Crisis (t-1)		-1.594	-9.170
		(31.266)	(30.293)
Economic Growth (t-1)		0.469	0.929
		(1.620)	(1.281)
Credit Rating Score (t-1)		10.220**	8.955*
		(5.022)	(4.691)
Inflation (t-1)		-0.095	-0.317
		(0.982)	(0.886)
Δ Foreign Reserve Currency		-0.000	-0.000
		(0.000)	(0.000)
Summit		-1.048	2.504
		(4.001)	(4.426)
Δ Energy Index			-0.229
			(0.334)
Δ Exchange Rate			7.934***
			(2.039)
VIX (t-1)			0.363
			(0.640)
Δ Financial Contagion Spread			-10.303
			(7.179)
Constant	1.282	-78.525	-76.299
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	852	852	852
R^2	0.076	0.103	0.141
Adj.R^2	0.054	0.070	0.105

Note: Newey West Standard Errors in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01\}$

As discussed before, higher spread (or bond) yields indicate a greater perceived risk of default. The monthly changes in spreads (or bonds) are measured in basis points. As we can see, the analysis of these monthly data

provides supports for hypothesis 1. Depending on the specification, increasing the volume of articles by 10 decreases the target country's spread by between 0.54 and 0.62 basis points, depending on the specification. This is a small but precisely estimated effect. It is also in line with previous studies on peer effects in financial markets. For example, Brooks et al. (2015) find short-term peer effects to be in the neighborhood of between half and a third of a basis points.[32] Focusing on Model 3, a one standard deviation increase in the number of BRICS articles (SD = 6) is associated with to a 3.74 basis point decrease in the spread. Substantively, this is roughly the same effect of a 1.4% decrease in the government deficit.

Which country gained the most from being discursively associated to a "trustworthy" type group? Following the logic of the argument, the reputation gain should be greater for the members that are perceived relatively less trustworthy on their own. As suggested in the theory section, it seems reasonable to except that all countries except China may be on the receiving end of the reputational transfer, albeit to different extents. To explore unit heterogeneity, I rerun the full model (Model 3 above) for each country.[33] As shown in Table 4, the results by and large comport with the theoretical expectations. The estimated coefficients are negative - thus implying a decrease in credit riskiness - for all BRICS members except China. For every ten instances increase of BRICS usage, Brazil and Russia gain more than 1 basis point in reputation, while India enjoys a 0.64 basis point decrease in interest rates. By contrast, as expected, the discursive association of China as a BRICS country does not affect its reputation in the investors' eyes. Somehow surprisingly, the coefficient for South Africa is also not statistically significant, albeit in the expected direction.

Table 4: OLS Models - Country by Country

	BRA	RUS	IND	CHI	SAF
Δ BRICS2	-1.017***	-1.051**	-0.636*	0.019	-0.178
	(0.360)	(0.493)	(0.373)	(0.389)	(0.321)
All controls	Yes	Yes	Yes	Yes	Yes
Linear Year Trend	Yes	Yes	Yes	Yes	Yes
N	170	195	195	170	122
R^2	0.222	0.287	0.126	0.146	0.343
Adj.R^2	0.129	0.209	0.047	0.056	0.236

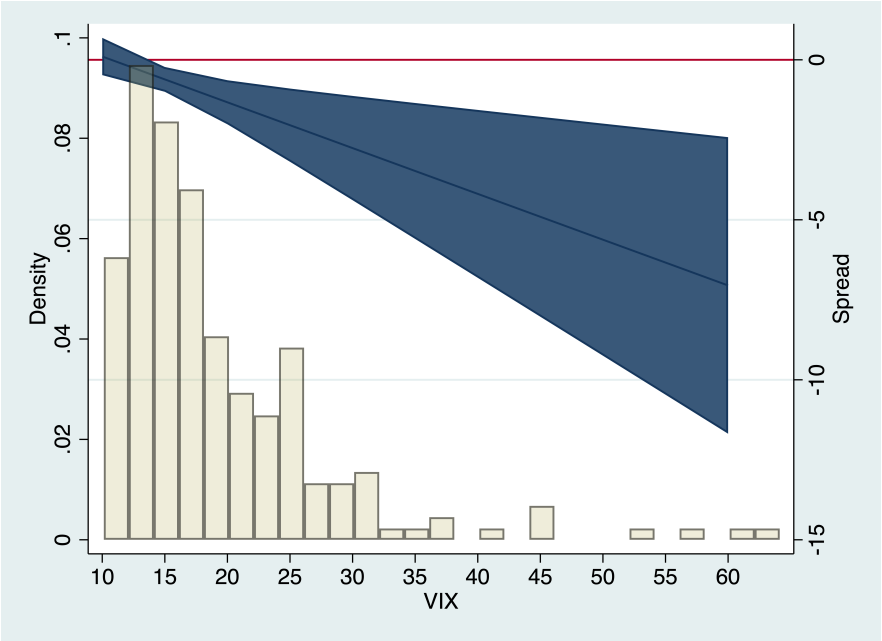
Note: Newey West Standard Errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01\}$

[32] The authors estimate an ECM model and also calculate the long run multiplier. The appropriate comparison here, though, is between the short-term effects (the third coefficient in the authors' Table 3).

[33] Since there is no panel, I replace year fixed-effects with a linear yearly time trend.

Moving on to the conditional hypotheses, I suggested that the BRICS peer effect is mediated by global uncertainty, liquidity constraints, and sensitivity to financial markets. Since interaction coefficients are hard to interpret, I only show the graphs for the average marginal effect conditional on the interacting term. I show the results using all controls, the full set of fixed effects, and the spread as the dependent variable (i.e. Model 3 of Table 3). As Fig. 3 shows, the marginal effect of being discursively associated to the BRICS group is greater as global uncertainty increases. The results are consistent with a behavioral interpretation. As uncertainty increases, investors rely more on the BRICS heuristics. During periods when uncertainty is low, the effect is not statistically significant. Conversely, as a behavioral interpretation suggests, as uncertainty and investors' reliance on heuristics increase, so does the effect of the BRICS articles on the target country's spread. To put this in perspective, in the period around the 2008-2009 Global financial crisis, when the VIX index reached its peak, the reputational transfer amounts to roughly 7 full basis points, on average.

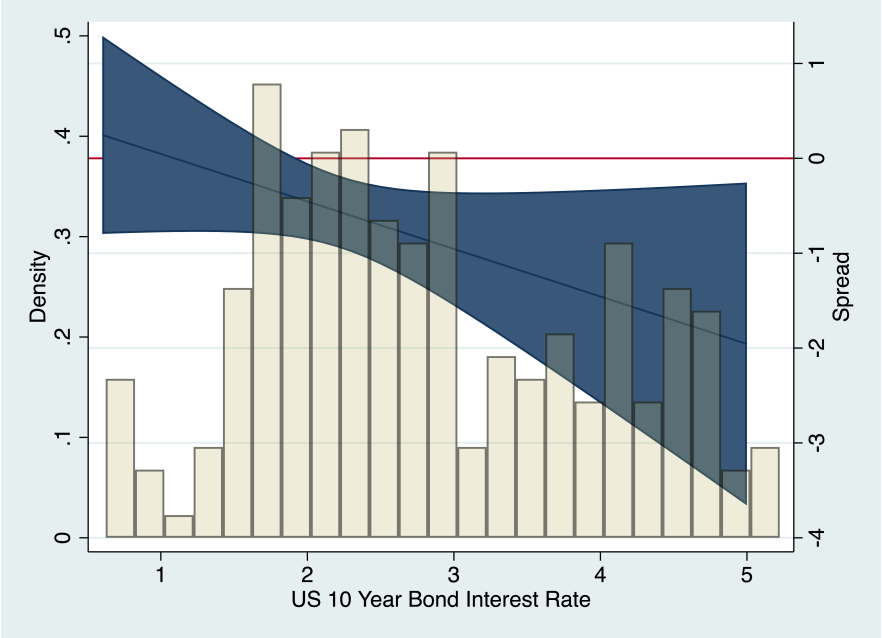
Figure 3: Average Marginal Effect of BRICS conditional on Global Uncertainty



Similarly, Fig. 4 shows the mediating role of global capital scarcity measured by the US 10 Year bond interest rates. As shown in the Appendix, the results are robust to the alternative measure of capital avilability,

i.e. the US real interest rate.[34] Once again, the hypothesized relationship holds. An increase in the interest rates at the core of the international financial system makes it harder for countries in the periphery to raise international capital. It is at this time of capital scarcity that the implicit association to a trustworthy club - the BRICS - becomes particularly valuable to distinguish a given sovereign from other less trustworthy types.

Figure 4: Average Marginal Effect of BRICS conditional on International Capital Liquidity



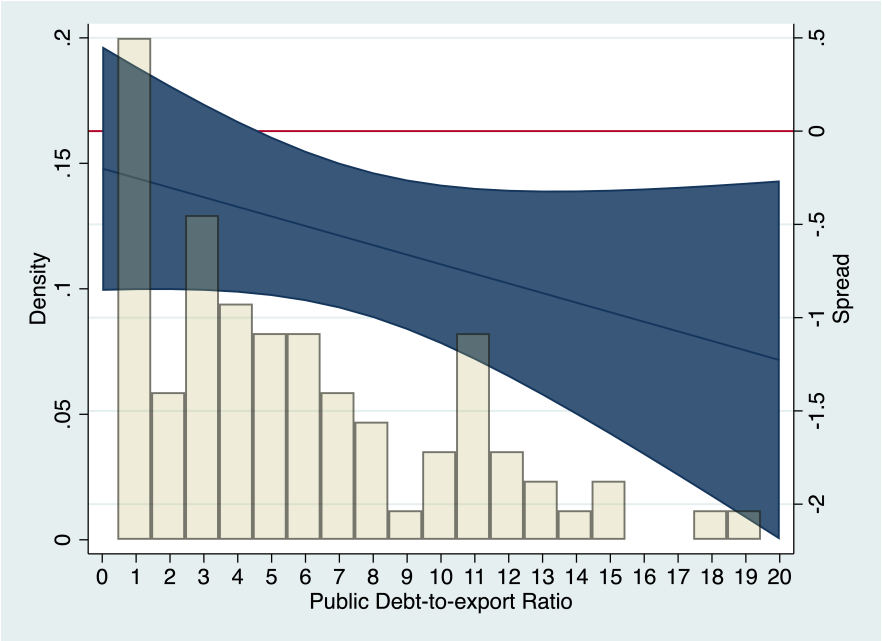
Overall, the results above vindicate a behavioral interpretation suggesting an over-reliance on heuristics during "bad" time. This conclusion comports with previous studies on the Great Financial Crisis. For example, drawing from a set of in-depth interviews with financial practitioners and a qualitative analysis of the financial press. Naqvi (2019) concludes that during the height of the panic phase [...] investors stopped paying much attention to country fundamentals altogether, reflected in a lack of reporting on [Emerging Markets] domestic fundamentals in the financial press." (p. 768).

Finally, hypothesis 4 suggests that the BRICS peer effect is mediated by a country's sensitivity to financial markets. In particular, the BRICS effect should be stronger as sensitivity to international markets increase. Fig. 5 shows that the marginal effect of the BRICS articles is statistically insignificant at low levels of financial

[34]The latter measure is available at the yearly frequency, which is reflected in the larger confidence intervals.

vulnerability, but it becomes increasingly more pronounced as the debt burden increases. The implicit association to a trustworthy club results in additional benefits at higher level of financial dependence. When the public debt-to-export ratio reaches its maximum in the dataset - at around 20% - there is a 1.2 basis point reputational transfer.

Figure 5: Average Marginal Effect of BRICS conditional on Financial Sensitivity



Overall, the empirical analyses provides support for a behavioral model of implicit reputational transfer via the use of grouping acronyms in the media. The analysis reveals significant short-term effects for the group as a whole as well as for Brazil, India, and Russia individually. Substantively, the effect is small but consistent with that of previous studies on categorizations and heuristics (e.g. Brooks et al. (2015)). The empirical results also comport with previous studies on international organization membership and reputational transfer (Gray, 2009, 2013; Gray and Hicks, 2014). Not only do investors assess a country's creditworthiness based on the "the company states keep" in international organizations, but also as a result of the company it keeps in the grouping acronyms used in the media.

5 Robustness and Placebos

As it is often the case in observational studies, causality is hard to prove and inferential threats loom large. With this in mind, I run a number of robustness checks and a placebo analysis to further probe the reliability of the results.

First of all, the decision to count the volume of articles containing at least two mentions of the acronym is somehow arbitrary. As such, I re-run the main analysis using the alternative series, i.e. the number of articles mentioning the acronym at least once, and the volume of articles containing at least three mentions, respectively (Table 19, Table 20, Table 21, and Table 22 in the Appendix). Interestingly, the results are substantively stronger as I select the number of articles according to the more restrictive criteria. While not a rigorous test, such pattern is consistent with the view that the availability heuristic also plays a role. As the number of BRICS mention increases, the BRICS concept is more readily available in the investors' minds and the implicit association is more likely to ensue.

Second, throughout the chapter I take the standard approach of controlling for the unweighted average of the sovereign yields in the other members of the group (after excluding the country of interest) (Edwards 1983, Beirne and Fratzscher 2013). Nevertheless, one may call into question my interpretation of the evidence on the grounds that the channel of financial contagion between BRICS has not been properly accounted for. While it is not possible to rule out this possibility completely, I explore several different specifications borrowed from the finance literature (Kaminsky and Reinhart, 2000). To begin with, I summarize the information contained in the other countries' bond yields via Principal Component Analysis to capture any group-wide co-movement. Following the literature, the first PC is then included in the equation (Altınbaş et al. 2021). The extracted financial shocks are commonly used to investigate and/or control for the presence and size of regional spillover effects (Fukuda and Tanaka 2020, Altınbaş et al. 2021). The results are by and large identical (see Table 27, Table 28, and Fig 9, Fig 10, Fig 11). Second, we know that credit ratings are a likely source of contagion effects (Longstaff 2010). As such, I control for Credit Rating Agency's announcements for the other countries in the group. To avoid over-parameterizing an already rich model, I extract the first principal component of

the credit rating announcements of the other BRICS country (after excluding the target country) and include the first principal component. The announcements shocks have been used in previous investigations of group acronyms and financial markets (Brazys and Hardiman 2015). Finally, in the most conservative specification, I include both the first Principal Component of credit rating announcements as an exogenous variable as well as the first Principal Component of sovereign bond interest rates. The results - available upon request - continue to hold under both scenarios.

Third, a similar line of reasoning might suggests that the results are driven by the past ten years or so. Indeed, scholars often suggest that the 2008-2009 Global Financial Crisis and the European Sovereign Bond crisis created a "window of opportunity" for BRICS countries (Stuenkel, 2013). Soon after, in June 2009, the first official Summit was host in Russia. In 2010, the group agreed to include South Africa. Since then, intra-BRICS cooperation increased on both economic and (geo)political matters (Brütsch and Papa, 2013). Unsurprisingly, there is some some evidence that the five countries' financial markets have become more integrated over time, although it is hard to identify the exact time break (Bianconi et al., 2013; Matos et al., 2015; Çepni et al., 2020). To assess the extent to which intra-BRICS sovereign bond markets have integrated over time, I run rolling regressions with a fixed 50 month window. I regress the average BRICS spread (after excluding the target country) on the target country's own spread. As Fig. 18 and Fig. 19 attest, there is clear evidence of an increasingly positive correlation between the country's spreads after 2009-2010. While far from a rigorous test, the results comport with the common wisdom on intra-BRICS cooperation and previous econometrics tests. As such, I divide the sample in pre- and post 2009 and rerun the main analysis. As Table 29 attests, the results hold also in the pre-financial crisis period, although they are significant only at the 10% level. This is unsurprising considering that that the pre-2009 contains half of the observations relative to the post-2009 period. The results are virtually identical if I break the sample at the 2010 mark (see Table 30).

Fourth, one may question the importance of mainstream news media to professional and institutional investors who are likely to weight information from the financial press more heavily relative to business-related news on more generalist media (Davis, 2006a). Moreover, while at the turn of the century a majority of investors still indicated newspapers as a major source of information (Mori, 2000), that figure has been declining

ever since due to the rise of electronic real-time sources of information (Davis, 2018). As such, the media - both generalist and the financial press - may lag behind real world developments, thus suggesting a merely reactive role. To ease both concerns, I re-run the analysis on two sub-samples of article volumes. First, I use the count of articles identified by the same criteria described before but only in the financial press. In particular, I search for articles in the following outlets (the selection is driven by availability in the Factiva dataset): The Financial Times, The Economist, the Wall Street Journal, the Economic Times, Barron's, Kiplinger, Forbes, the Investors' Business Daily, and the Dow Jones. Second, I rely solely on the volume of articles from the Dow Jones Newswire, the only real-time financial source available on Factiva. Reassuringly, not only the results are confirmed in both cases, but the effect size is much larger than in the main analysis on all newspapers (See Table 31 and Table 32).[35]

Beside the above-mentioned sensitivity analysis, I assess the viability of my argument relative to alternative explanations by designing two placebo tests. These tests identify contexts in which my theory would *not* suggest a relationship between article volumes and sovereign bond spreads. If we observe the same pattern in these other contexts, my interpretation would be called into question.

To design the first test, I leverage the BRICS membership's arbitrariness criteria to select five countries that are somehow similar to the BRICS but, by definition, they are not included in the acronym. In lieu of Brazil, I select Mexico, which O'Neill himself singled out as the natural alternative. For the same reason, I replace South Africa with Nigeria. Given geographic proximity, political regime and economic development similarity, I use Turkey in place of Russia. It is harder to select neat counter-examples for the remaining two countries. I opt to replace China with Vietnam and India with Indonesia. Using Pakistan and South Korea does not alter the results (available upon request). Notice that four of these five countries are also grouped together in another, somehow rival, investment acronym, i.e. the MINT (Mexico, Indonesia, Nigeria, Turkey). I retrieve the volume of articles following the same procedure described in the Measurement Strategy section.[36] As Table 5 shows,

[35]We should notice that this analysis promises more than it delivers. First of all, even after aggregating all financial and business newspapers the BRICS series remains sparse, with several zeroes and little variation in the independent variable. The average number of articles per month is only 2.7. Once the coefficients in Model 3 Table 31 are standardized, the effect of one standard deviation increase in the number of business/financial articles is 4-basis points decrease in the spread, thus in line with the 3.74 basis points decrease in Model 3 Table 3. Second, while there are good reasons to suggest that investors may be influenced from real-time news more than by paper media, my analysis is aggregated at the monthly level. Hence, the results in columns 4-5-6 in Table 31 should not be interpreted as a "real-time" effects of news, but only as a robustness check for a specific sub-sub-sample.

[36]I modify the search string slightly. Since the target country in this case is not part of the acronym, I query articles mentioning any of

there is no relationship between the number of BRICS articles and these five countries.

Table 5: Placebo Test - Non BRICS Countries

	Pooled	MEX	TUR	IND	VTN	NIG
Δ BRICS2	-0.063	-0.117	-0.124	-0.120	0.065	-0.152
	(0.084)	(0.074)	(0.219)	(0.108)	(0.125)	(0.359)
All controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes					
Year FE / Linear Trend	Yes	Yes	Yes	Yes	Yes	Yes
N	798	181	121	193	156	147
R^2	0.106	0.094	0.473	0.123	0.220	0.112
Adj.R^2	0.061	0.006	0.388	0.033	0.123	-0.012

Note: Newey West Standard Errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01\}$

To design the second placebo test, I rely on the underlying logic of the argument. In the proposed theoretical framework, the volume of news in reference to some BRICS members is not, in and of itself, sufficient to engender the reputational transfer. It is the acronym that links the news about A^{C} to the investors' perception of country A's creditworthiness. Hence, I modify the original strategy to retrieve the volume of articles according to the following criteria: no mention of A; at least two mentions of any country in A^{C}; no mention of the BRIC(S) acronym. Table 6 shows the results. The effects are minuscule and either statistically insignificant or in the opposite direction across both pooled and country-by-country regression.

Table 6: Placebo 2 - Volume of Articles without BRIC(S) Acronym

	Pooled	BRA	RUS	IND	CHN	SAF
Δ No BRICS	0.001	-0.001	0.007**	0.003*	0.002*	0.001
	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)
All controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes					
Year FE / Linear Trend	Yes	Yes	Yes	Yes	Yes	Yes
N	838	170	194	194	170	110
R^2	0.148	0.208	0.296	0.134	0.154	0.388
Adj.R^2	0.107	0.113	0.219	0.056	0.065	0.275

Note: Newey West Standard Errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01\}$

the BRICS, not just the remaining four.

6 Conclusion

In the concluding remarks of their study on "peer effects", Brooks et al. (2015) mention that investors may have assessed Brazil quite differently as "it came to be known as one of the high-growth BRICS countries" relative to when it was grouped alongside other Latin American economies and their legacy of sovereign defaults, runaway inflation, and unstable political institutions. As this chapter arguably demonstrates, this might have indeed been the case, and not only for Brazil. Language matters as it structures the way we think about countries within the international economy. Describing a country as a BRICS carries different connotations than depicting it as a Latin American country or an emerging economy. Language is not a merely descriptive tool, but can also play a performative role (Blyth et al., 2002; McNamara, 2019).

In this chapter, I have proposed and tested a theory linking the discursive reference to member countries as a cohesive "good-type" group to investors' inference about each individual member's future economic prospects. Moreover, I have shown how a set of scope conditions - global uncertainty, capital availability, and sensitivity to financial markets - magnify investors' reliance on heuristics and, as a consequence, the reputational gains from being associated with a trustworthy group. In so doing, this study complements previous work suggesting that relatively unknown countries reap reputational gains (or suffer reputational losses) from joining organization with trustworthy (or untrustworthy) types (Gray and Hicks, 2014). Relatively well-known emerging economies - such as Brazil, India, China, Russia, and South Africa - also gain from being associated with one another within a positive-sounding acronym. This is an important finding, since a country's reputation can influence its vulnerability across several dimensions, including military threats (Huth, 1997), trade relations (Jans et al., 1995), and access to capital (Tomz, 2012). Moreover, I show how countries continuously absorb reputation from their peers over time and as a function of media's activity. While categories/classifications might be fixed or slow moving, their relevance for financial markets vary as their frequency in the media ebbs and flows, a point often overlooked in the literature. Methodologically, I employed a novel measurement strategy that allows us to minimize measurement errors in the identification of relevant texts. As a result, we can overcome the limitations of previous studies by distinguishing more neatly between informational effects (the effect of

articles about Brazil on Brazil's creditworthiness) from peer effects. Finally, this study also has implications for scholars of business leadership and strategy as it shows how Goldman Sachs successfully helped building trust in the BRICS as stable, rational investment places, thus contesting the common discourses of emerging markets as volatile and risky (Bourne, 2015). As Bourdieu (1977) suggested decades ago: "the specifically symbolic power to impose the principles of construction of reality - in particular social reality - is a major dimension of political power" (p. 165). Whether consciously or not, Goldman Sachs exerted such power in its crafting, developing, and branding of the group acronym.

7 Appendix

Table 7: Augmented Dickey Fuller Tests - Brazil

	Level	FD	Level (c)	FD (c)	Level (c, t)	FD (c, t)
BRICS	-0.420	-5.156***	-1.916	-5.141***	-1.044	-5.406***
BRICS2	-0.608	-5.766***	-1.575	-5.747***	-1.097	-5.863***
BRICS3	-0.722	-5.729***	-1.630	-5.713***	-1.184	-5.817 ***
Spread	-0.406	-4.127***	-2.503	-4.108***	-2.901	-4.084***
Foreign Reserves	0.320	-1.993**	-2.144	-2.573*	-0.920	-2.972*
Exchange rate	0.396	-3.447 ***	-0.651	-3.564***	-2.645	-3.673**
Energy Index	-0.106	-3.582***	-2.231	-3.600***	-2.313	-3.540 **

Note: c = constant; t = trend.
Maximum lag length for the tests is chosen according to the formula in Schwert (1989).
Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 8: Augmented Dickey Fuller Tests - Russia

	Level	FD	Level (c)	FD (c)	Level (c, t)	FD (c, t)
BRICS	-0.359	-5.513***	-2.239	-5.529***	-1.306	-5.937***
BRICS2	-0.765	-5.703***	-2.481	-5.697***	-2.167	-5.866***
BRICS3	-0.976	-5.796***	-2.221	-5.790***	-2.507	-5.834***
Spread	-0.343	-4.471***	-2.316	-4.471***	-2.855	-4.463***
Foreign Reserves	0.591	-2.846***	-2.239	-3.119**	-2.541	-3.138 *
Exchange rate	1.376	-3.174***	0.016	-3.542***	-2.394	-3.711**

Note: c = constant; t = trend.
Maximum lag length for the tests is chosen according to the formula in Schwert (1989).
Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 9: Augmented Dickey Fuller Tests - India

	Level	FD	Level (c)	FD (c)	Level (c, t)	FD (c, t)
BRICS	-0.593	-5.640***	-2.078	-5.648***	-1.663	-5.886***
BRICS2	-0.796	-5.951***	-2.161	-5.947***	-2.117	-6.112***
BRICS3	-0.767	-7.035***	-2.115	-7.047***	-3.419*	-7.066***
Spread	0.327	-4.158***	-2.433	-4.198***	-1.653	-4.461***
Foreign Reserves	-1.900*	-2.414***	0.253	-3.109**	-1.765	-3.178*
Exchange rate	-2.127**	-3.392***	-0.021	-3.942***	-2.527	-3.969***

Note: c = constant; t = trend.

Maximum lag length for the tests is chosen according to the formula in Schwert (1989).

Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 10: Augmented Dickey Fuller Tests - China

	Level	FD	Level (c)	FD (c)	Level (c, t)	FD (c, t)
BRICS	-0.429	-5.893***	-2.252	-5.884***	-1.814	-6.048***
BRICS2	-0.532	-6.744***	-2.233	-6.735***	-2.361	-6.777***
BRICS3	-0.700	-6.949***	-1.799	-6.946***	-2.391	-6.942***
Spread	-1.580	-2.517**	-2.874*	-2.579 *	-2.601	-2.683***
Foreign Reserves	0.175	-1.669*	-2.231	-1.831	-1.430	-2.385
Exchange rate	-1.529	-3.017***	-2.476	-3.277**	-1.965	-3.600**

Note: c = constant; t = trend.

Maximum lag length for the tests is chosen according to the formula in Schwert (1989).

Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 11: Augmented Dickey Fuller Tests - South Africa

	Level	FD	Level (c)	FD (c)	Level (c, t)	FD (c, t)
BRICS	-1.313	-5.073***	-0.637	-5.285***	-2.473	-5.325***
BRICS2	-1.319	-5.445***	-1.577	-5.556***	-2.493	-5.528***
BRICS3	-1.163	-5.679***	-2.163	-5.716***	-2.652	-5.684***
Spread	0.468	-3.454***	-1.548	-3.484***	-2.432	-3.449**
Foreign Reserves	0.858	-3.134***	-0.768	-3.253**	-1.727	-3.226*
Exchange rate	1.080	-3.121***	-1.475	-3.495***	-1.650	-3.669**

Note: c = constant; t = trend.

Maximum lag length for the tests is chosen according to the formula in Schwert (1989).

Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 12: KPSS Tests - Brazil

	Level	FD	Level (t)	FD (t)
BRICS	0.704**	0.047	0.210**	0.023
BRICS2	0.648**	0.027	0.105*	0.019
BRICS3	0.755***	0.022	0.098	0.019
Spread	0.335	0.047	0.143*	0.044
Foreign Reserves	1.690***	0.584**	0.485**	0.108
Exchange rate	1.460***	0.261	0.438***	0.063
Energy Index	0.245***	0.081	0.301	0.083

Note: t = trend. Null hypothesis: the series is stationary or trend stationary.
Max lag order from automatic bandwidth selection procedure in Newey and West (1994).
Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 13: KPSS Tests - Russia

	Level	FD	Level (t)	FD (t)
BRICS	0.976***	0.069	0.335***	0.025
BRICS2	0.545**	0.037	0.168**	0.021
BRICS3	0.898***	0.026	0.083	0.021
Spread	0.599**	0.053	0.139*	0.043
Foreign Reserves	1.030***	0.200	0.278***	0.145*
Exchange rate	1.850***	0.183	0.303***	0.045

Note: t = trend. Null hypothesis: the series is stationary or trend stationary.
Max lag order from automatic bandwidth selection procedure in Newey and West (1994).
Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 14: KPSS Tests - India

	Level	FD	Level (t)	FD (t)
BRICS	1.010***	0.061	0.344***	0.023
BRICS2	1.010**	0.045	0.165**	0.025
BRICS3	1.350***	0.031	0.069	0.025
Spread	1.100***	0.402*	0.444***	0.042
Foreign Reserves	1.820***	0.192	0.236***	0.118
Exchange rate	1.99***	0.120	0.228***	0.059

Note: t = trend. Null hypothesis: the series is stationary or trend stationary.
Max lag order from automatic bandwidth selection procedure in Newey and West (1994).
Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 15: KPSS Tests - China

	Level	FD	Level (t)	FD (t)
BRICS	0.676**	0.046	0.232***	0.022
BRICS2	0.810***	0.025	0.086	0.019
BRICS3	1.030***	0.021	0.083	0.019
Spread	0.844***	0.327	0.231***	0.052
Foreign Reserves	1.150***	0.754**	0.494***	0.131*
Exchange rate	1.850***	0.316	0.463***	0.104

Note: t = trend. Null hypothesis: the series is stationary or trend stationary.
Max lag order from automatic bandwidth selection procedure in Newey and West (1994).
Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 16: KPSS Tests - South Africa

	Level	FD	Level (t)	FD (t)
BRICS	1.170***	0.037	0.115*	0.025
BRICS2	0.839**	0.034	0.069	0.022
BRICS3	0.488***	0.024	0.068	0.022
Spread	1.260***	0.089	0.072	0.053
Foreign Reserves	1.960***	0.191	0.482***	0.128*
Exchange rate	1.710***	0.082	0.351***	0.051

Note: t = trend. Null hypothesis: the series is stationary or trend stationary.
Max lag order from automatic bandwidth selection procedure in Newey and West (1994).
Asterisks denote rejection of the unit root null hypothesis at 1% (***),5% (**), and 10% (*).

Table 17: Linear Fixed Effects Models - 10 Year Sovereign Bond Yield

	Model 1	Model 2	Model 3
ΔBRICS2 (t-1)	-0.537***	-0.714***	-0.673***
	(0.151)	(0.180)	(0.185)
Total debt % GDP (t-1)		1.658**	1.539**
		(0.698)	(0.629)
Current Account Balance (% GDP) (t-1)		0.024	-0.207
		(1.355)	(1.280)
Economic Size (t-1)		-0.007*	-0.007*
		(0.004)	(0.004)
Economic Development (t-1)		0.004	0.005
		(0.008)	(0.007)
Deficit (% GDP)		2.559*	2.719**
		(1.333)	(1.277)
Regime Type (t-1)		-11.097	-9.567
		(12.354)	(11.716)
Capital Account Openness (t-1)		1.167	-9.419
		(32.218)	(30.446)
Financial Crisis (t-1)		6.274	0.061
		(28.194)	(27.002)
Economic Growth (t-1)		-0.081	-0.271
		(1.430)	(1.056)
Credit Rating Score (t-1)		7.880	7.773*
		(4.911)	(4.535)
Inflation (t-1)		-0.154	-0.426
		(0.897)	(0.821)
Δ Foreign Reserve Currency		-0.000	-0.000*
		(0.000)	(0.000)
Summit		9.613**	8.387**
		(3.892)	(4.239)
Δ Energy Index			0.430
			(0.322)
Δ Exchange Rate			8.021***
			(1.920)
VIX (t-1)			-0.202
			(0.614)
Δ Financial Contagion Spread			-15.709**
			(7.608)
Constant	1.043	-115.381	-111.783
	(7.393)	(132.950)	(125.881)
Country FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	852	852	852
R^2	0.047	0.080	0.130
Adj.R^2	0.023	0.042	0.089

Note: Newey West Standard Errors in parenthesis. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01\}$

Table 18: Interaction Models - Hypotheses 2,3,4

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
ΔBRICS2	1.538**	-0.570***	-0.120	-0.261	-0.199	-0.214
	(0.766)	(0.211)	(0.855)	(0.579)	(0.335)	(0.301)
VIX	1.809***					
	(0.434)					
ΔBRICS2 * VIX	-0.143***					
	(0.052)					
Global factor		-10.698*				
		(6.210)				
ΔBRICS2 * Global factor		0.193				
		(0.269)				
US 10 Year Yield			-13.268*			
			(6.618)			
ΔBRICS2 * US 10 Year Yield			-0.229			
			(0.363)			
Real US lending interest rate				-34.552***		
				(8.347)		
Δ BRICS2 * Real US lending interest rate				-0.148		
				(0.253)		
Public Debt-to-export ratio					1.202**	
					(0.523)	
ΔBRICS2 * Public Debt-to-export ratio					-0.051	
					(0.036)	
Debt-to-export ratio						0.062
						(0.397)
ΔBRICS2 * Debt-to-export ratio						-0.016**
						(0.009)
All controls	Yes	Yes	Yes	Yes	Yes	Yes
Country and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.207	0.156	0.166	0.156	0.098	0.158
Adj.R^2	0.168	0.113	0.125	0.116	0.074	0.116
N	895	840	895	895	895	895

Newey West Standard Errors in parenthesis * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 6: Average Marginal Effect of BRICS conditional on Global Uncertainty (measured as Global Risk Factor)

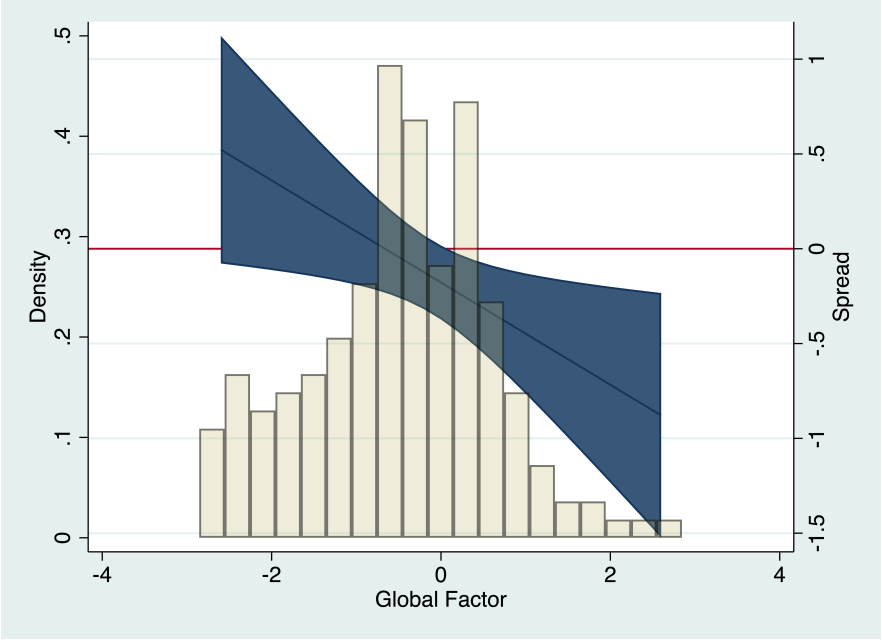


Figure 8: Average Marginal Effect of BRICS conditional on Financial Sensitivity (measured as Total Debt-to-Export ratio)

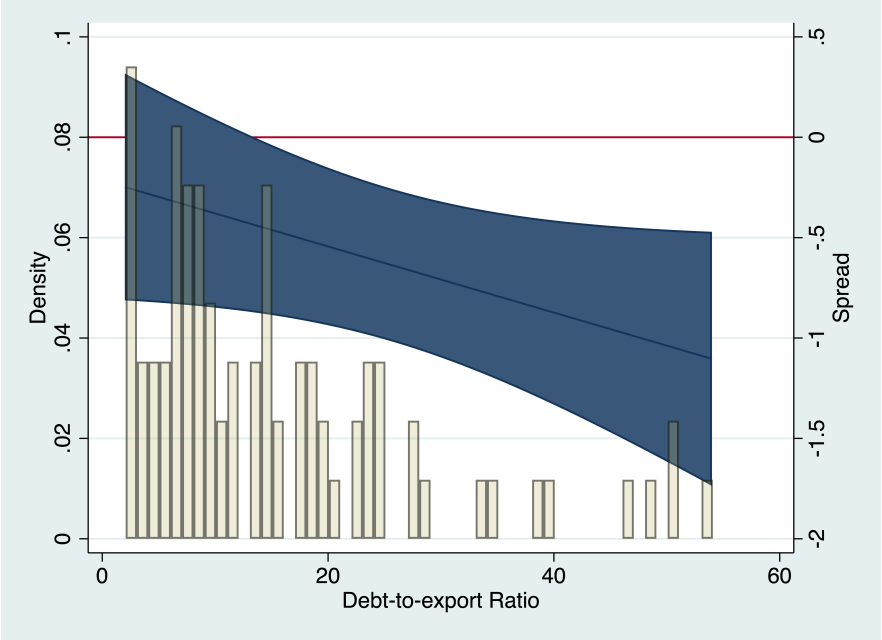


Figure 7: Average Marginal Effect of BRICS conditional on International Capital Liquidity (measured as Real US Interest Rates)

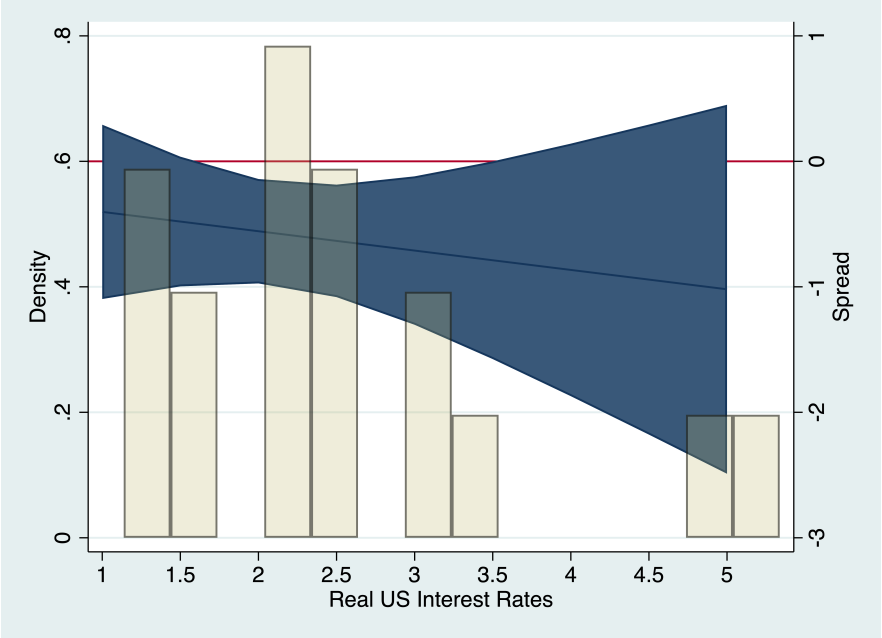


Table 19: Pooled Models using BRICS1 - Hypothesis 1

	Spread	Spread	Spread	Bond	Bond	Bond
Δ BRICS 1 mention	-0.183**	-0.155	-0.177*	-0.199***	-0.269***	-0.260***
	(0.078)	(0.095)	(0.096)	(0.069)	(0.081)	(0.084)
Domestic controls		Yes	Yes		Yes	Yes
Global controls			Yes			Yes
Country and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	852	852	852	852	852	852

Newey West Standard Errors in parenthesis

Table 20: Pooled Models using BRICS3 - Hypothesis 1

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Δ BRICS 3 mentions	-0.819***	-0.749**	-0.873***	-0.815***	-1.070***	-1.041***
	(0.266)	(0.319)	(0.327)	(0.228)	(0.271)	(0.279)
Domestic controls		Yes	Yes		Yes	Yes
Global controls			Yes			Yes
Country and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	852	852	852	852	852	852

Newey West Standard Errors in parenthesis

Table 21: Single-Country Models using BRICS1 - Hypothesis 1

	BRA	RUS	IND	CHI	SAF
Δ BRICS1	-0.241	-0.582**	-0.077	0.162	-0.036
	(0.226)	(0.286)	(0.161)	(0.174)	(0.126)
All controls	Yes	Yes	Yes	Yes	Yes
Linear Year Trend	Yes	Yes	Yes	Yes	Yes
N	170	195	195	170	122
R^2	0.211	0.288	0.121	0.150	0.341
Adj.R^2	0.117	0.211	0.042	0.061	0.234

Note: Newey West Standard Errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$}

Table 22: Single-Country Models using BRICS3 - Hypothesis 1

	BRA	RUS	IND	CHI	SAF
Δ BRICS3	-1.601***	-1.481*	-0.898*	0.179	-0.248
	(0.550)	(0.790)	(0.531)	(0.556)	(0.462)
All controls	Yes	Yes	Yes	Yes	Yes
Linear Year Trend	Yes	Yes	Yes	Yes	Yes
N	170	195	195	170	122
R^2	0.223	0.286	0.125	0.146	0.343
Adj.R^2	0.131	0.209	0.046	0.057	0.236

Note: Newey West Standard Errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$}

Table 23: Pooled Models PCA Spread - Hypothesis 1

	Model 1	Model 2	Model 3
Δ BRICS1	-0.177**		
	(0.076)		
Δ BRICS2		-0.621***	
		(0.217)	
Δ BRICS3			-0.873***
			(0.327)
All controls	Yes	Yes	Yes
Country and Year FE	Yes	Yes	Yes
N	852	852	852
R^2	0.152	0.149	0.152
Adj. R^2	0.113	0.110	0.112

Newey West Standard Errors in parenthesis

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 24: Single-country Models PCA Spread (BRICS2) - Hypothesis 1

	BRA	RUS	IND	CHN	SAF
Δ BRICS2	-0.988***	-1.055**	-0.636*	0.040	-0.172
	(0.360)	(0.491)	(0.372)	(0.394)	(0.317)
All controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	170	195	195	170	122
R^2	0.225	0.318	0.141	0.141	0.355
Adj. R^2	0.130	0.229	0.049	0.049	0.245

Newey West Standard Errors in parenthesis

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 9: AME of BRICS2 conditional on Global Uncertainty PCA Spread - Hypothesis 2

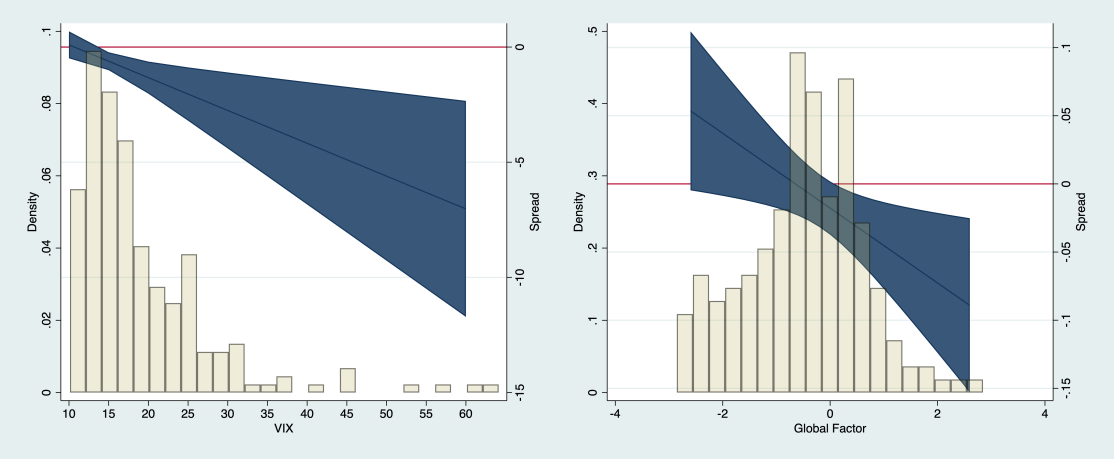


Figure 10: AME of BRICS2 conditional on Capital Liquidity PCA Spread - Hypothesis 3

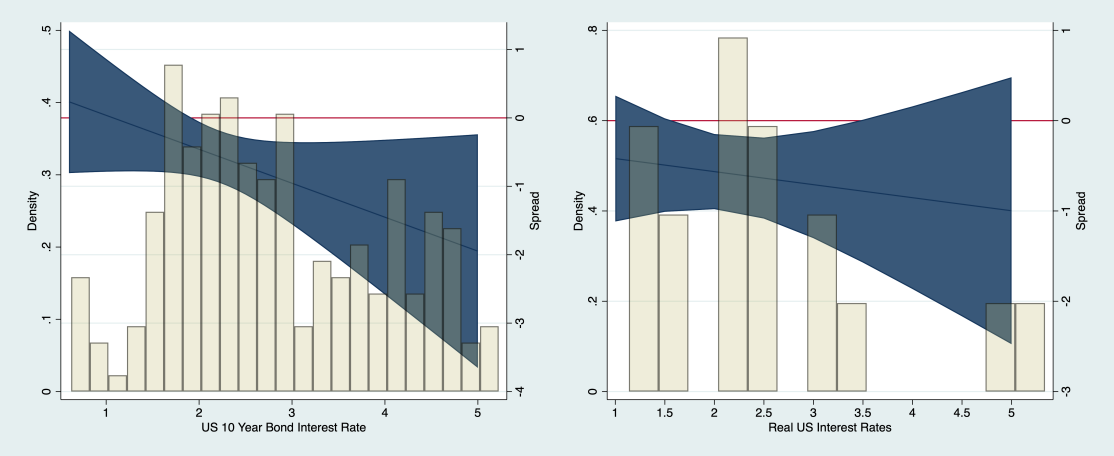


Figure 11: Average Marginal Effect of BRICS2 conditional on Financial Sensitivity PCA Spread - Hypothesis 4

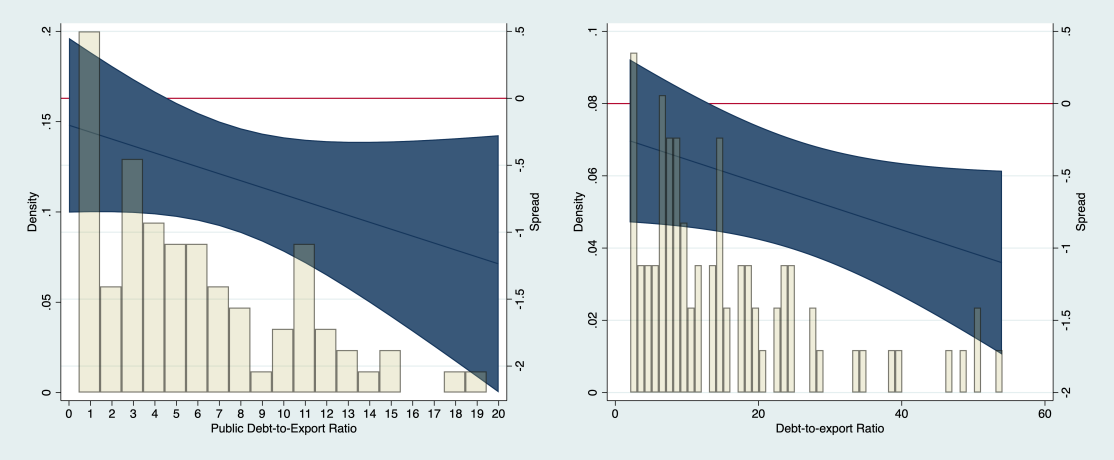


Table 25: Pooled Models PCA Credit Rating Scores - Hypothesis 1

	Model 1	Model 2	Model 3
Δ BRICS1	-0.180*		
	(0.097)		
Δ BRICS2		-0.639***	
		(0.216)	
Δ BRICS3			-0.898***
			(0.327)
All controls	Yes	Yes	Yes
Country and Year FE	Yes	Yes	Yes
N	852	852	852
R^2	0.151	0.147	0.150
Adj. R^2	0.111	0.107	0.110

Newey West Standard Errors in parenthesis

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 26: Single-country Models PCA Credit Rating Scores (BRICS2) - Hypothesis 1

	BRA	RUS	IND	CHN	SAF
Δ BRICS2	-1.077***	-1.075**	-0.611	0.081	-0.176
	(0.362)	(0.491)	(0.374)	(0.398)	(0.314)
All controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	170	195	195	170	122
R^2	0.214	0.286	0.120	0.117	0.335
Adj. R^2	0.120	0.209	0.041	0.024	0.227

Newey West Standard Errors in parenthesis

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 12: AME of BRICS2 conditional on Global Uncertainty PCA Credit Rating Score - Hypothesis 2

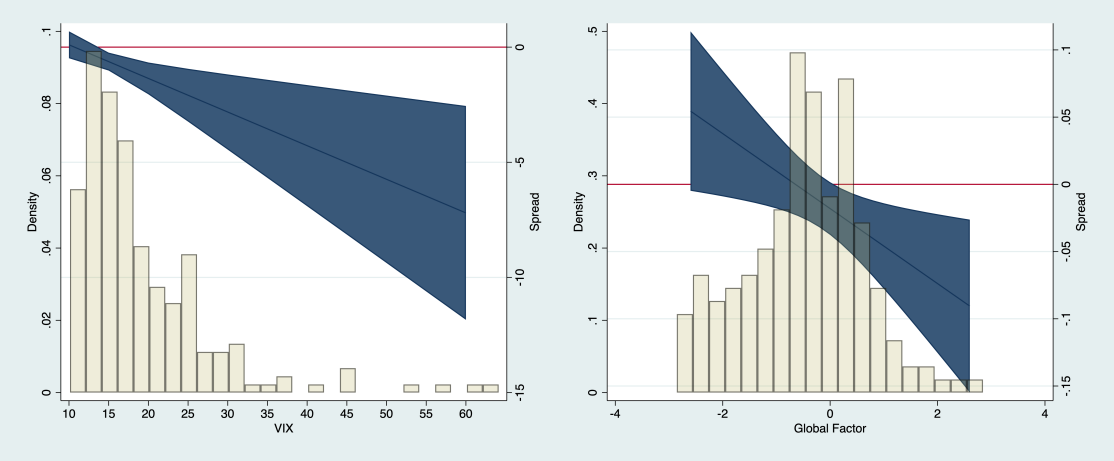


Figure 13: AME of BRICS2 conditional on Capital Liquidity PCA Credit Rating Score - Hypothesis 3

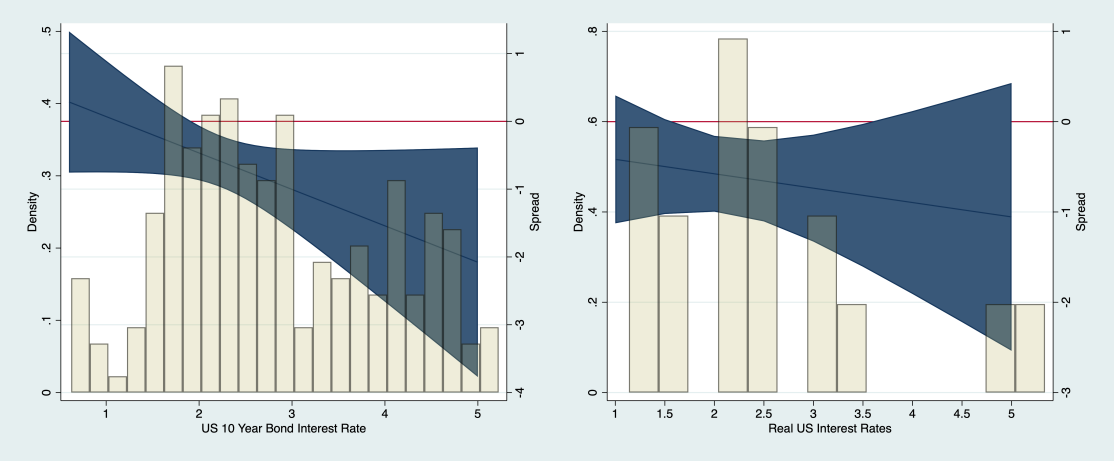


Figure 14: Average Marginal Effect of BRICS2 conditional on Financial Sensitivity PCA Credit Rating Score - Hypothesis 4

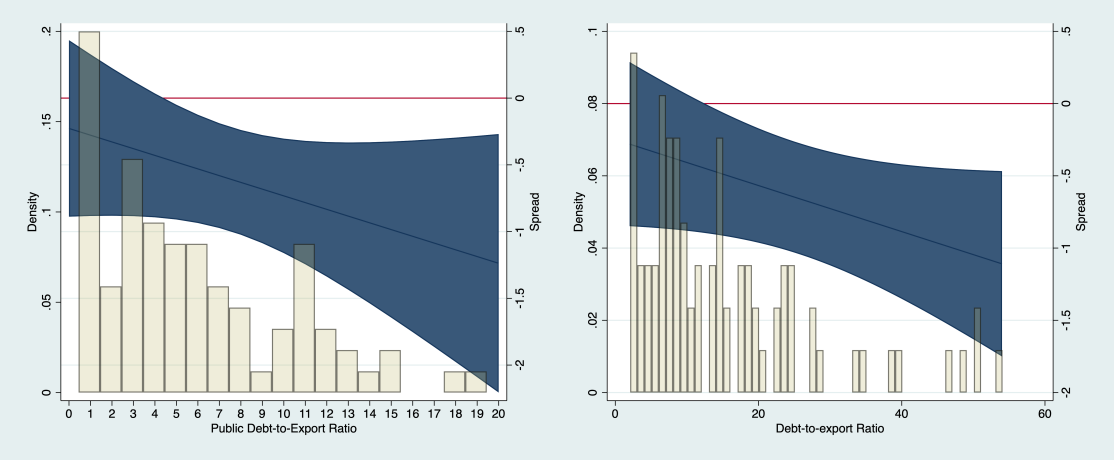


Table 27: Pooled Models PCA Spread and PCA Credit Rating Scores - Hypothesis 1

	Model 1	Model 2	Model 3
Δ BRICS1	-0.178*		
	(0.096)		
Δ BRICS2		-0.630***	
		(0.217)	
Δ BRICS3			-0.885***
			(0.327)
All controls	Yes	Yes	Yes
Country and Year FE	Yes	Yes	Yes
N	852	852	852
R^2	0.153	0.149	0.152
Adj. R^2	0.112	0.108	0.111

Newey West Standard Errors in parenthesis

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 28: Single-country Models PCA Spread and PCA Credit Rating Scores (BRICS2) - Hypothesis 1

	BRA	RUS	IND	CHN	SAF
Δ BRICS2	-0.997***	-1.065**	-0.675*	0.038	-0.168
	(0.361)	(0.490)	(0.382)	(0.395)	(0.318)
All controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N	170	195	195	170	122
R^2	0.214	0.286	0.120	0.117	0.335
Adj. R^2	0.120	0.209	0.041	0.024	0.227

Newey West Standard Errors in parenthesis

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 15: AME of BRICS2 conditional on Global Uncertainty PCA Credit Rating Score and PCA Spread - Hypothesis 2

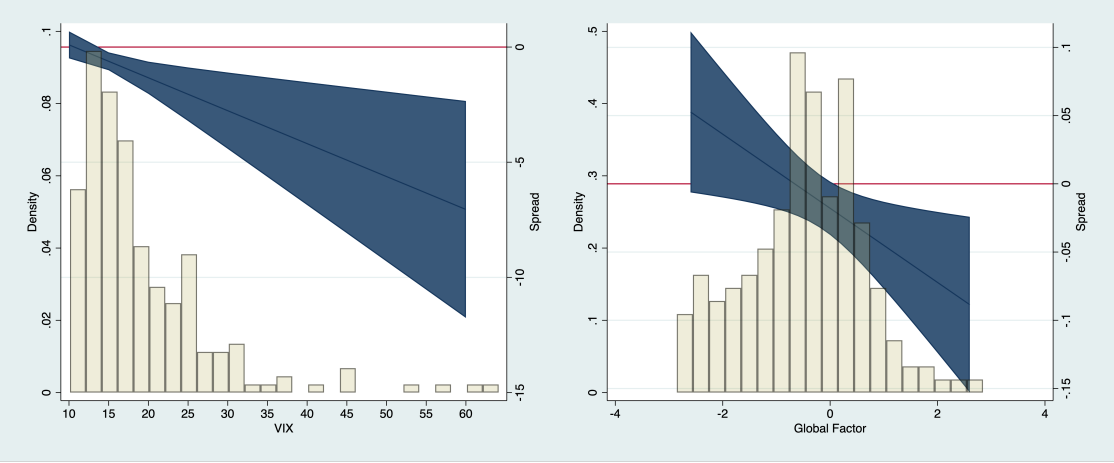


Figure 16: AME of BRICS2 conditional on Capital Liquidity PCA Credit Rating Score and PCA Spread - Hypothesis 3

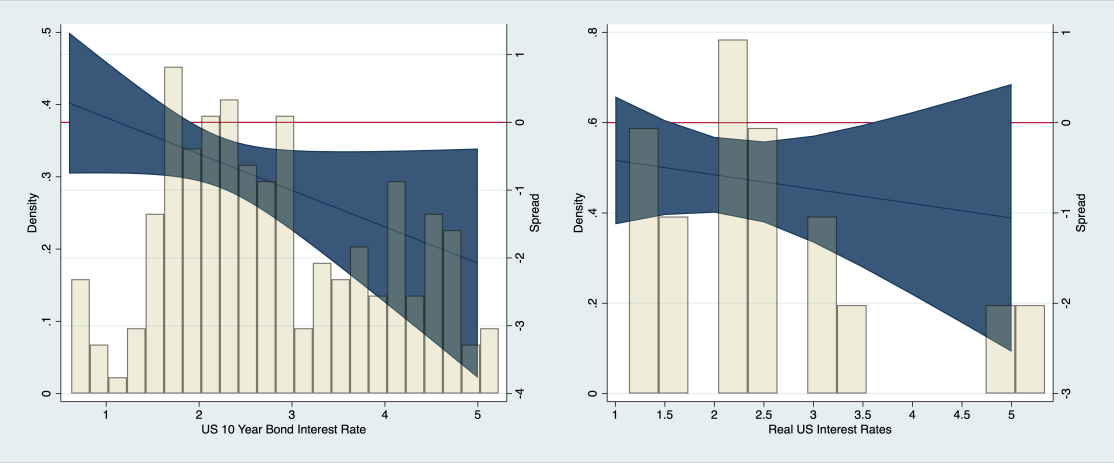


Figure 17: Average Marginal Effect of BRICS2 conditional on Financial Sensitivity PCA Credit Rating Score and PCA Spread - Hypothesis 4

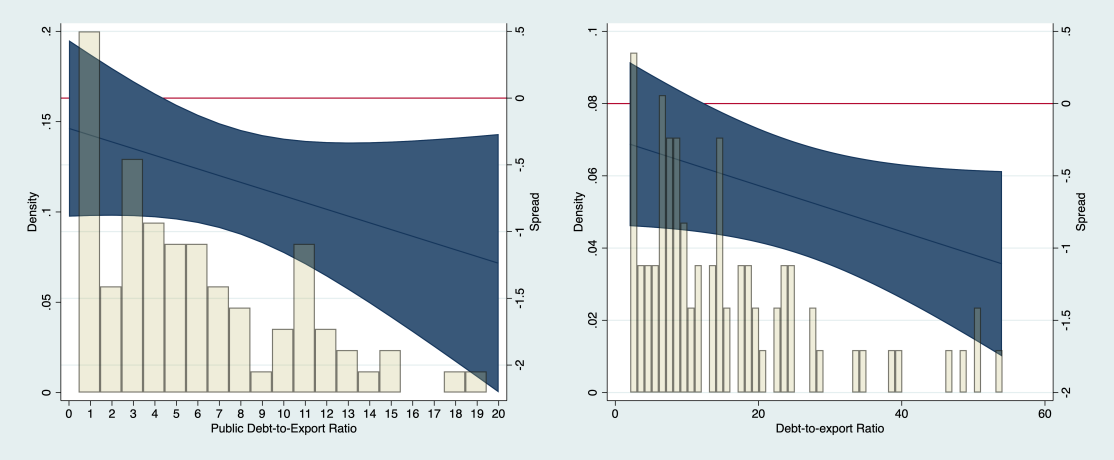


Figure 18: Rolling Regression Spreads - From BRICS to Brazil (Left) and Russia (Right)

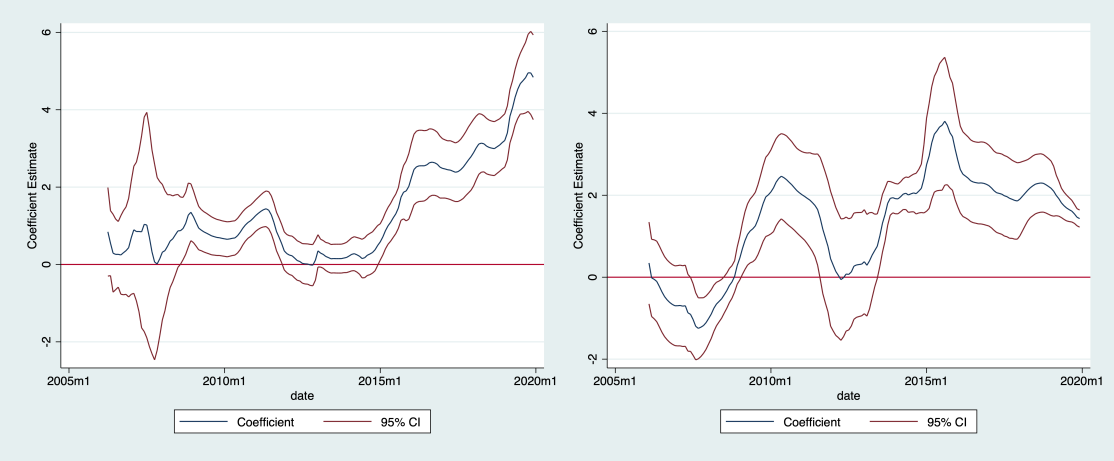


Figure 19: Rolling Regression Spreads - From BRICS to India (Left) and China (Right)

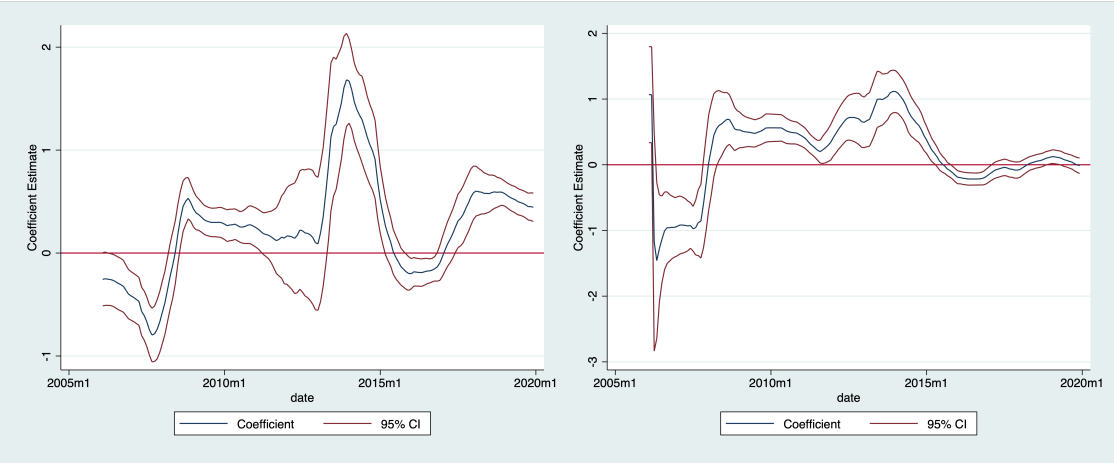


Table 29: Pooled Models Pre- and Post-2009

	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Time Frame	Pre-2009	Pre-2009	Pre-2009	Post-2009	Post-2009	Post-2009
Δ BRICS2	-0.541	-0.603*	-0.626*	-0.592***	-0.569***	-0.594***
	(0.332)	(0.364)	(0.366)	(0.178)	(0.215)	(0.211)
Domestic controls		Yes	Yes		Yes	Yes
Global controls			Yes			Yes
Country and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	307	304	304	615	615	615

Newey West Standard Errors in parenthesis - Lag order of autocorrelation is 3 for pre-2009 and 4 for post-2009

Table 30: Pooled Models Pre- and Post-2010

	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Time Frame	Pre-2010	Pre-2010	Pre-2010	Post-2010	Post-2010	Post-2010
Δ BRICS2	-0.821**	-0.695*	-0.767*	-0.538***	-0.533**	-0.545***
	(0.366)	(0.398)	(0.402)	(0.173)	(0.213)	(0.207)
Domestic controls		Yes	Yes		Yes	Yes
Global controls			Yes			Yes
Country and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	367	364	364	555	555	555

Newey West Standard Errors in parenthesis - Lag order of autocorrelation is 3 for pre-2010 and 4 for post-2010

Table 31: Pooled Models Financial Journals (All Combined) and Real-Time Dow Jones

	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Media Type	Financial	Financial	Financial	Dow Jones	Dow Jones	Dow Jones
Δ BRICS2	-8.630***	-8.261***	-7.867***	-8.066***	-7.836***	-7.542***
	(1.931)	(2.139)	(2.309)	(1.808)	(2.026)	(2.155)
Domestic controls		Yes	Yes		Yes	Yes
Global controls			Yes			Yes
Country and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	850	850	850	850	850	850

Newey West Standard Errors in parenthesis

Table 32: Business and Financial Media Only

	Pooled	BRA	RUS	IND	CHN	SAF
Δ BRICS2	-7.542***	-14.598**	-6.566	-7.520***	-1.388	0.418
	(2.155)	(6.303)	(7.614)	(1.851)	(6.329)	(5.017)
All controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes					
Year FE / Linear Trend	Yes	Yes	Yes	Yes	Yes	Yes
N	850	170	194	194	170	122
R^2	0.160	0.310	0.376	0.194	0.223	0.456
Adj.R^2	0.121	0.155	0.243	0.040	0.059	0.307

Note: Newey West Standard Errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$}

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