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**Divergent market reactions to abstract language:
A multi-country event study of European Central Bank communications**

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ABSTRACT

Prominent leaders regularly communicate with multiple markets around the world, but we know little about the challenges that can arise when trying to effectively convey one's message in a global setting. In this paper, we develop a theory about how language abstraction—a dominant strategy used to create common ground amongst diverse audiences—can become problematic when used in a global environment where market actors have divergent interests. Employing a multi-country event study, we analyze how the stock markets in 11 Eurozone countries react to the abstract language in public speeches delivered by the European Central Bank President. We find that abstract language, rather than creating common ground, produces divergent market reactions across core and peripheral countries, such that market actors in core countries react more favorably to abstract communication, while those in peripheral countries prefer concrete communication. We also show that this divergent reaction is stronger when the economic interests of the core and periphery are made more salient. This study contributes new insights to research on strategic communication in market settings, expands our understanding of audience heterogeneity and market power, and highlights the growing challenges of communicating in a globalized society.

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INTRODUCTION

Markets today are more global and interconnected than ever before. Goods, labor, and capital flow easily between countries, and communication technologies enable information to travel the world almost instantaneously (Manyika et al., 2014). Yet despite its benefits, globalization has also created challenges for organizational and institutional leaders that need to operate in and manage the expectations of market actors spread across multiple countries (Foley, Hines Jr, & Wessel, 2021; Kaufmann & Danner-Schröder, 2022). As such, one of the growing challenges that leaders face is how to effectively communicate important information when their stakeholders span the globe (Bartlett & Ghoshal, 2003; Bullock & Sanchez, 2021).

Existing research on communication in market settings, however, has lagged behind this trend towards globalization, largely overlooking its potential challenges. In fact, most work focuses on how strategic communications—whether used by prominent institutional leaders (Harmon, 2019), established firms (Guo, Sengul, & Yu, 2021; Lamin & Zaheer, 2012), or new ventures (Martens, Jennings, & Jennings, 2007)—affect investor reactions within a single, homogenous market. While this still growing body of work has produced valuable insights, especially for leaders communicating with United States (US) markets, we know little about how leader communication might affect market actors in different countries around the world.

To begin exploring this, we draw on a world systems perspective (Wallerstein, 1992), which argues that actors in different countries within an economic system often have conflicting or divergent interests. This perspective posits that because countries are deeply dependent upon one another for capital and labor in a global society, a natural hierarchy of power tends to emerge between wealthier and more stable countries in the *core* of the economic system, and poorer and less stable countries in the *periphery* (Chase-Dunn & Grimes, 1995). Because of this asymmetry, and because those in power generally come from the core, market actors in the core tend to trust

the establishment and prefer stability in the existing power hierarchy more than actors in the periphery. We suggest that these divergent interests might create divergent reactions when leaders communicate with global markets.

In fact, we argue that one of the most common strategies leaders use to build consensus when talking with these types of diverse audiences—the use of abstract language (Eisenberg, 1984; Huang, Joshi, Wakslak, & Wu, 2020)—will fail in a global market setting, where actors in different countries have divergent interests. Indeed, because abstract language is vague and difficult to verify (Semin & Fiedler, 1988), actors in core countries will be more trusting when those in power make vague statements, while the less trusting periphery will prefer specifics that can be fact-checked and used to hold those in power more accountable. Similarly, because abstract language avoids discussing specific actions that could bring about change to the existing power hierarchy (Semin & Fiedler, 1988), market actors in the core will prefer this implied status quo, while actors in the periphery will again prefer discussion of concrete actions that could bring about change. Taken together, our theory proposes that market actors in core countries will react favorably to abstract language, while those in peripheral countries will prefer more concrete language.

We test our theory using a multi-country event study (Park, 2004) within the Eurozone, an economic system made up of countries that have long exhibited a core-periphery divide (Campos & Macchiarelli, 2016, 2021). Empirically, we analyze 11 countries' stock market reactions to public speeches delivered by the European Central Bank (ECB) President, the powerful leader at the center of this economic system tasked with forging a consensus between member countries (Coenen et al., 2017: 8). Our results demonstrate strong support for our theory. We find that the more core (peripheral) a country is within the Eurozone, the more market actors in that country react positively (negatively) to the abstraction of ECB speeches. We also show

that this divergent market reaction is stronger when the economic interests of actors in core and peripheral countries are made more salient (i.e., when the economic outlook of the Eurozone is pessimistic, and when the ECB has recently taken monetary policy action). Finally, to corroborate our findings, we leverage interviews with former Eurozone central bankers Otmar Issing (ECB Board Member, 1998–2006), Gertrude Tumpel-Gugerell (ECB Board Member, 2003–2011), and Zsolt Darvas (former Deputy Head of Central Bank of Hungary, 1994–2005).

This study makes several contributions. First, we extend research on strategic communication in market settings by showing that markets around the world react differently to leader communication. Prior work has largely focused on these effects within single, homogenous markets (e.g., Guo et al., 2021; Harmon, 2019). By focusing on the core-periphery distinction embedded within most economic systems as an important contingency for how market actors interpret and react to information, our study also demonstrates an important source of market heterogeneity that extends existing conversations on stakeholder and market diversity (Kim & Jensen, 2014; Lamin & Zaheer, 2012; Sharkey, Kovacs, & Hsu, 2022; Siegel, Licht, & Schwartz, 2013). As such, our study seeks to open up new research opportunities not only on global communication strategies but also on how to effectively communicate in other settings where audience members maintain divergent interests.

Second, our study also extends our understanding of how investors react to abstract (or concrete) communications, especially from the leaders of global organizations and institutions. Prior research has produced mixed findings. For example, Huang and colleagues (2020) found that investors reacted more favorably to an entrepreneur’s abstract communication about their new venture, whereas Pan and colleagues (2018) found that investors reacted more favorably to more concrete language used in a firm’s quarterly earnings calls. While there may be multiple explanations for these conflicting results, our study offers one possible solution by showing that

the divergent interests of investors can drive contrasting reactions. In doing so, our findings shed new light on recent conversations that call for more work on different types of investors in market processes (Falchetti, Cattani, & Ferriani, 2021; Fisher, Kotha, & Lahiri, 2016).

Finally, this study also highlights one practical difficulty of communicating in a globalized society. Organizational and institutional leaders today are increasingly tasked with addressing global problems, such as climate change, equitable access to financing, or economic stability (George, Howard-Grenville, Joshi, & Tihanyi, 2016), and such efforts often require communicating with diverse audiences around the world and trying to build consensus. In this study, we investigated the efforts of the ECB's President, the prominent leader responsible not only for managing the Eurozone economy, but also for building consensus across member countries. Our findings reveal that a common strategy used to build consensus amongst diverse audiences—the use of abstract language—can backfire in global settings where stakeholders tend to have conflicting interests.

COMMUNICATING WITH MARKETS AROUND THE WORLD

Economic systems

Market economies around the world have become increasingly interdependent (Barkema, Baum, & Mannix, 2002; Tsui, 2007). As manufacturing and labor becomes more specialized, countries are forced to rely on one another to produce goods, source employment, and obtain capital (Wiersema & Bowen, 2008). These economic interdependencies are commonplace. The US and China, for example, share significant bilateral trade flows, entangled supply chains, and deep investment ties (Hass, 2021). Similarly, trade and labor interdependences between countries across Europe have grown substantially over the last half-century (Hooghe & Marks, 2019).

Such interdependencies between the market economies of individual countries have prompted the study of economic systems. An economic system, according to world system

theorists, is a system of production and distribution that “has boundaries, structures, member groups, rules of legitimation, and coherence” (Wallerstein, 1992: 347). For example, the United States-Mexico-Canada Agreement is a longstanding economic system in North America, as is Europe’s Economic and Monetary Union. Being a member of an economic system provides a number of country-level benefits, such as reduced transaction costs, increased trade, and greater competition (Flint & Taylor, 2018; Silva & Tenreyro, 2010; Wallerstein, 2004).

Alongside these benefits, however, comes a downside of economic systems—a natural hierarchy of power. Indeed, given their interdependencies, some countries enjoy a disproportionate share of the system’s economic activity, skilled labor, and capital accumulation (Chase-Dunn & Grimes, 1995; Klink, 1990), thus producing a hierarchy of power between wealthier and more stable countries in the *core*, and poorer and less stable countries in the *periphery* (Chirot & Hall, 1982; Snyder & Kick, 1979). Moreover, once a hierarchy of power emerges, it tends to persist, as powerful countries in the core seek positions of power to establish the rules and structures that enable them to maintain control over the means of production and distribution (Mahutga, 2006). As such, world system scholars have argued that an economic system tends to be “made up of the conflicting forces which hold it together by tension and tear it apart as each group seeks eternally to remold it to its advantage” (Wallerstein, 1992: 347).

Divergent interests of market actors in core and peripheral countries

Given this hierarchy of power, market actors in core and peripheral countries within an economic system tend to have *divergent interests* (Wallerstein, 1992). By divergent interests, scholars mean interests that are not only different from one another (e.g., Kim & Jensen, 2014), but are also in tension with one another. In this sense, divergent interests do not necessarily imply zero-sum outcomes, but instead emphasize conflicting interests that market actors across different countries tend to have towards the prevailing economic system of which they are a part.

Two divergent interests within most economic systems concern 1) the trust or distrust market actors have towards the establishment and those in power, and 2) the preferences market actors hold towards maintaining or changing the status quo in the existing power structure.

First, market actors in core countries tend to trust the establishment and those in power more than market actors in peripheral countries. Since core countries retain much of the power within an economic system (Schortman & Urban, 1994), the establishment is usually controlled by leaders from the core (Sweet & Sandholtz, 1997; Wallerstein, 1984; Werlin, 2003). As such, actors in core countries largely assume the existing system and those leading it are competent and working in their favor, whereas actors in peripheral countries tend to view the establishment and its leaders with more suspicion (Smith & Steel, 1995). Evidence for this in-group bias at the global level (e.g., Brewer, 1981; Brewer & Kramer, 1985) has garnered empirical support. For example, survey evidence shows that actors in core countries within the World System are more trusting than those in peripheral countries (Leonard, 2021: 27), and that this divergence of trust extends to those in power (Angino, Ferrara, & Secola, 2022; Roth & Jonung, 2020). This divergence can also be seen in whether actors in core and peripheral countries feel like they have the ability to engage in global affairs. Indeed, actors in core countries perceive that it is easier to contribute to international conversations, while actors in peripheral countries feel like they have “to go through several filters” before they are allowed access to participate (Chang, 1998: 528).

Second, market actors in core countries also tend to have a preference for maintaining the status quo in the existing power structure more than those in peripheral countries. Because the core is already in a position of power, actors in these countries have a vested interest in the status quo and “the continued reproduction of the legitimacy of those who produce or defend” the existing system (Bourdieu, 1993: 20). In contrast, market actors in peripheral countries lack this same motivation in perpetuating the establishment (Cattani, Ferriani, & Allison, 2014: 264) and,

instead, often have a desire to subvert the status quo to favor their own economic interests (Steinberg, 1999). For example, scholars have shown that actors in wealthier core countries tend to accept the unequal and hierarchical distribution of power more than actors in poorer peripheral countries (Hofstede, 2011), and that actors in core countries have a stronger preference towards maintaining the status quo than actors in peripheral countries (Furnham, 1993).

Communicating with market actors in core and peripheral countries

Given these divergent interests, how can leaders effectively communicate with market actors around the world? Communication scholars have long argued that one of the most effective strategies to persuade diverse audiences is the use of abstract communication—that is, naming objects or ideas in a general manner, apart from specific instances (Bizzell & Herzberg, 1990). The idea is that communicating information in an abstract manner allows leaders to talk at a level at which market actors with different interests can buy in. Because linguistic abstractions engender ambiguity, or the creation of multiple interpretations of the same issue (Weick, 1978), this increase in interpretative space gives more flexibility to an audience, thus allowing market actors to converge in their reaction to the same message but for entirely different reasons (Eisenberg, 1984).

Scholars have offered some evidence demonstrating that a leader's abstract communications can produce favorable reactions across diverse audiences and establish common ground (Jarzabkowski, Sillince, & Shaw, 2010). For instance, Jalonen, Schildt, and Vaara (2018) showed that abstract strategic business concepts like “self-responsibility” can help managers mobilize shared understandings around environmental issues and help establish common ground. Similarly, Wry, Lounsbury, and Glynn (2011) argued that abstract stories allow new ventures to legitimate their collective identity, and Harmon (2019) showed that abstract speeches delivered by the Federal Reserve led option traders in the US to converge on market pricing.

However, this work has largely examined settings where audiences, despite having some differences, nevertheless still shared a *common interest*. These common interests (e.g., to manage environmental challenges, grow a nascent market, or price a security) allow leaders to construct common ground by moving the conversation to a higher level where these common interests are aligned (Eisenberg, 1984). In contrast, in global market settings, where market actors tend to have fundamentally conflicting or *divergent interests*, even at these higher levels, we argue that the strategy of using abstract language may backfire. More specifically, because of their divergent interests, market actors in core and peripheral countries may interpret a powerful leader's abstract communications very differently, thus producing divergent reactions instead of common ground. There are two reasons for this.

First, abstract communications are, by definition, vague and more difficult to validate than concrete communications. Because abstract language is naturally detached from specific objects or situations, there is little for listeners to verify (Semin & Fiedler, 1988). This is in contrast to concrete language, which depicts specific situations or behaviors that can be investigated and easily confirmed (Menegatti & Rubini, 2013; Pan et al., 2018). Second, because abstract communications excludes specific actions, it tends to convey a sense of status quo and stability in the present circumstances. This can lead "listeners to infer the situation is stable and will remain consistent" (Pan et al., 2018: 2209; see also Cancellieri, Cattani, & Ferriani, 2022). This is again in contrast to concrete language, which depicts specific decisions or behaviors that describe clear action, and prompts listeners to infer the situation has the potential to change (Semin & Fiedler, 1988, 1991; Wigboldus, Semin, & Spears, 2000, 2006).

Given these differences, we suggest that market actors in core and peripheral countries will interpret a powerful leader's abstract language differently, thereby producing divergent reactions. Specifically, the more trusting market actors in core countries are not only going to be

more comfortable with leaders in power making abstract and generalized statements that cannot be verified, but they are also likely to prefer such abstractions that convey an enduring quality of existing power hierarchy that they enjoy. In contrast, market actors in peripheral countries will react unfavorably to such abstract communications from leaders in power and, instead, prefer more concrete language, which contains specifics that they can fact-check and conveys concrete actions that could bring change in the prevailing hierarchy of power.

Taken together, our theory proposes that when prominent leaders are communicating with market actors from the core and periphery of an economic system, market actors in core countries will react positively to abstract communication, while those in peripheral countries will react more negatively to abstract communication and, instead, respond favorably to concrete communication.

EUROPEAN CENTRAL BANK COMMUNICATIONS IN THE EUROZONE

We test this idea in the context of ECB communications in the Eurozone. The Eurozone—the economic and monetary union made up of the European Union (EU) countries that have adopted the euro (De Grauwe, 2018)—has a prominent core-periphery structure that has long separated member countries (Bayoumi & Eichengreen, 1993; Campos & Macchiarelli, 2021). At the center of the Eurozone sits the ECB, the supranational institution in charge of monetary policy for the system. Since the ECB’s inception in June 1998, there have been four Presidents—Willem Duisenberg (from the Netherlands), Jean-Claude Trichet (from France), Mario Draghi (from Italy), and Christine Lagarde (from France)—all of whom come from powerful core countries. The ECB President is responsible not only for monetary policy decisions (e.g., raising or lowering interest rates), but also for communicating with the public in order to manage expectations, build confidence, and convey important information to market actors across the Eurozone.

Divergent market reactions to abstract ECB speeches

Given the core-periphery divide within the Eurozone, our theory predicts that the ECB President's use of abstract language when communicating with market actors in core and peripheral countries will produce divergent reactions. We argue that this is driven by the fact that market actors in the core and periphery have divergent interests, prompting different interpretations of the ECB President's use of abstractions. To see how, consider a statement from the highly *abstract speech* delivered by Trichet on November 20, 2003, where he reflects on how their existing monetary policy framework enhances the transparency of their decision-making:

Our framework enhances the transparency and accountability of the ECB. The framework helps to convey to the public the complexity surrounding the monetary policy process, providing an honest account of all the relevant factors considered in monetary policy deliberations.

Note how this abstract statement omits specific details about what these "relevant factors" might be or how they actually led to greater transparency, making it difficult, if not impossible, for audience members to verify his claims. Also note how this statement avoids references to concrete actions the ECB has taken or will take in the future, thereby conveying a sense of stability in their existing circumstances.

In contrast, consider a statement from the more *concrete speech* delivered by Duisenberg on May 28, 2001, which not only contains specific details that can be easily verified by market actors, but also describes specific actions being taken that change the present circumstances:

Since my last appearance before this Committee on 5 March 2001, the Governing Council of the ECB decided to reduce its key interest rates by 25 basis points on 10 May. I would like to explain the reasons for the decision. Over the last few months, the Governing Council has gradually changed its view on the balance of risks to price stability in the euro area, moving from a situation where the risks basically remained on the upside towards a far more balanced situation.

We theorize that the more trusting market actors in core countries will not only be more comfortable with the ECB President making more abstract statements that cannot be verified, but that they will also prefer the stability that such abstract talk implies about the prevailing circumstances. In contrast, because market actors in peripheral countries are less trusting of and

prefer change in the establishment, they will not only be more suspicious of such abstract statements that cannot be verified, but will also respond negatively to the omission of specific actions or behaviors that could alter the current situation. This leads to our first hypothesis, which argues that market actors in core countries will react more favorably to abstract language, while those in peripheral countries will react more negatively to such abstract language and, instead, prefer more concrete language.

Hypothesis 1 (H1): *The abstractness of an ECB President's speech will produce divergent reactions from market actors in core versus peripheral countries across the Eurozone, such that higher speech abstraction will lead to more positive (negative) reactions from market actors in core (peripheral) countries.*

Boundary conditions of divergent market reactions

We argued that the interaction in H1 is driven by the divergent interests between market actors in core and peripheral countries. If true, then we might expect these divergent reactions to be stronger when core and peripheral market actors' divergent interests are made more salient. We consider two scenarios in which this is likely to occur: 1) when the economic outlook of the Eurozone is more pessimistic and 2) when the ECB has recently taken monetary policy action.

Pessimistic economic outlook. When the economic outlook of the Eurozone is pessimistic, this should amplify the divergent market reactions of actors across core and peripheral countries. This is because negative or pessimistic economic information leads people to perceive the world as more zero-sum (Sirola & Pitesa, 2017), where the success for one group implies a loss for another (Esses, Jackson, & Armstrong, 1998; Foster, 1965). Perceiving an existing economic system as increasingly zero-sum, *even if it is not*, will draw more attention to the power divide in terms of who typically wins and loses in economic affairs, thereby increasing the salience of the divergent interests between core and peripheral market actors. As these divergent interests (regarding trust in the establishment and preferences for status quo) become

more salient, this should lead to a stronger divergent reaction to speech abstraction from market actors in core and peripheral countries.

Hypothesis 2 (H2): *The divergent reaction from market actors in core versus peripheral countries will be stronger when the Eurozone’s economic outlook is more pessimistic.*

Taking monetary policy action. We argue that divergent market reactions across core and peripheral countries will also become stronger when the ECB takes monetary policy action (Maitlis & Lawrence, 2007: 77). When central banks change their target interest rate, they usually tailor that action to their country’s inflation and economic activity (Taylor, 1993). This method can work well in systems with just a single country, but less so in systems with multiple countries that have fundamentally distinct economic situations (Nechio, 2011). In 2012, for example, the ideal implied interest rate was around *negative* 15 percent for some peripheral Eurozone countries, but *positive* four percent for most core countries (Darvas & Merler, 2013). Given these diverse economic needs, such “one-size-fits-all” policy actions by the ECB can produce heterogeneous effects across different Eurozone countries (Pagliari, 2021). As such, when the ECB takes monetary policy action, these “one-size-fits-all” policy decisions will draw greater attention to the asymmetric economic situations between countries, increasing the salience of the divergent interests between core and peripheral market actors. As these divergent interests become more salient, this should once again lead to a stronger divergent reaction to speech abstraction from market actors in core and peripheral countries.

Hypothesis 3 (H3): *The divergent reaction from market actors in core versus peripheral countries will be stronger when the ECB has recently taken monetary policy action.*

DATA AND METHODS

Sample of speeches

We collected the full population of ECB President speeches delivered between June 19, 1998 and December 31, 2015. Speech transcripts are posted on the ECB website on the day of

the speech. English is the procedural language of the ECB as well as the Eurozone, so most speeches are in English (we removed speeches that were not). The final sample consisted of 548 speeches: 129 by Duisenberg, 315 by Trichet, and 104 by Draghi. On average, 30 speeches were given each year. (Table A1 in Appendix A contains a summary and description of all variables.)

Dependent variable

Our dependent variable is *market reaction*, which is the standard measure used in event studies (Pan et al., 2018). We measure market reaction by calculating the cumulative abnormal returns (CAR) of the major stock market index of Eurozone member countries around the ECB speech event. However, given that this is a multi-country event study, we adopt the world market model (Park, 2004), which requires two adjustments to the traditional event study model.

First, while most event studies analyze the CAR of a single stock, we analyze the CAR of the primary stock market index within each Eurozone country. All Eurozone countries have a primary market index, similar to the S&P 500 in the US, which captures the performance of a basket of securities intended to replicate the country-level market activity. Table 1 lists the primary market index of each Eurozone country. For our main analyses, we examine the market reactions from the 11 countries that have been a part of the Eurozone the longest, but our results are robust to the inclusion of all countries on the euro (see our discussion of the Core-periphery measurement below). Each country enters our sample when data for the stock market index is available on Bloomberg or the date on which the country adopts the euro, whichever is earlier.

[Insert Table 1 here]

Second, we also adjust how we calculate the abnormal returns of each country's market index. Traditional event studies calculate abnormal returns by accounting for past performance of the stock and the market in which that stock is traded, thus capturing only the abnormal changes in price over and above what is expected. Since our abnormal returns are calculated at

the market-level already, we follow Park (2004) by identifying a superordinate index above the country-level against which to compare our country-level indices. We use the STOXX Euro 600, a value-weighted index representing large, mid, and small capitalization companies among Eurozone countries that covers 90 percent of the free-float market capitalization across the Eurozone. Our results are not sensitive to using alternative European-level market indices.

To calculate CAR, we first calculate the daily abnormal returns within each country's market index, which captures the portion of the return over and above what is expected:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}),$$

where AR_{it} are the daily abnormal returns for country market index i on day t , R_{it} is the return on country market index i for day t , β_i is the systemic risk of country market index i , and R_{mt} is the return on STOXX Euro 600 m on day t . Thus, abnormal returns are adjusted for both country- and EU-level expected market changes. We estimate expected returns at the country- and EU-level over a 240-day period prior to the event. For the event period, we follow Park's (2004) world market model and use a three-day event window (t_{-1} to t_1) around the speech.

Independent variables

Speech abstraction. We measure the ECB President's speech abstraction using the Linguistic Category Model (LCM). Developed by Semin and Fiedler (1988, 1991), the LCM is a well-established approach to measuring the abstractness and concreteness of communication (e.g., Douglas & Sutton, 2010; Johnson-Grey, Boghrati, Wakslak, & Dehghani, 2020; Maass, Salvi, Arcuri, & Semin, 1989). According to the LCM, how abstract or concrete communication is can be quantified based on the usage of different parts of speech, with verbs being the most concrete (of which there are three types), then adjectives, and then nouns. Table A2 in Appendix A summarizes these parts of speech, and how they relate to abstraction and concreteness. Table

A3 in Appendix A lists the top 25 most common verbs, adjectives, and nouns across all ECB Presidents speeches.

Figure 1 plots the average speech abstraction level across time, showing that Duisenberg (President from 1998–2003) and Trichet (President from 2003–2011) used similar levels of abstraction, while Draghi (President from 2011–2019) was, on average, more concrete. This difference was driven primarily by his higher use of verbs (i.e., need, remain, ensure, continue, and support) compared to his predecessors, which is consistent with the fact that Draghi was faced with the aftermath of the sovereign debt crisis. Famously, Draghi publicly committed to taking more concrete actions in a speech on July 26, 2012: “The ECB is ready to do whatever it takes to preserve the euro.”

[Insert Figure 1 here]

To measure the abstraction of ECB President’s speeches, we follow Seih, Beier, and Pennebaker’s (2017) two steps. First, we use a word dictionary approach, commonly used by management scholars (e.g., Guo, Yu, & Gimeno, 2017; Harmon, 2019), to calculate the percentage of each speech that is made up of descriptive action verbs (DAVs), interpretative action verbs (IAVs), state verbs (SVs), adjectives (ADJs), and nouns (NOUNs). We identify the DAVs, IAVs, and SVs using word dictionaries developed by Johnson-Grey and colleagues (2020), and we identify ADJs and NOUNs using the universal part-of-speech identifier, and then divide those by the total number of words in that speech. Second, using these percentages, we calculate speech abstraction as follows:

$$\text{speech abstraction} = \frac{[(DAV \times 1) + (IAV \times 2) + (SV \times 3) + (ADJ \times 4) + (NOUN \times 5)]}{(DAV + IAV + SV + ADJ + NOUN)}$$

We used LCM to measure speech abstraction because it is consistent with our theory. Indeed, our argument that market actors from core and peripheral countries will divergently react

to speech abstraction is based on the idea that abstract versus concrete communications convey distinct properties (i.e., verifiability and enduringness), which was originally developed by LCM researchers based on how different parts of speech change the level of abstraction in a message (Semin & Fiedler, 1988, 1991). Moreover, we label this construct “speech abstraction,” but our theory also implies that this construct (and, thus, measurement) captures the relative abstractness versus concreteness of a speech, which the LCM approach does nicely. This is in contrast to other measurement approaches that emphasize just the degree of concreteness (e.g., Brysbaert, Warriner, & Kuperman, 2014) or abstractness in language (e.g., Mergenthaler, 1996). For robustness, however, we also re-run our analyses using alternative measures of abstraction (see Appendix B).

Core-periphery. To measure the relative core- or peripheral-ness of each country in the Eurozone, we use the approach developed by Campos and Macchiarelli (2016, 2021). Using data on the 11 largest Eurozone countries from 1998 – 2015, these scholars developed a dynamic and fine-grained categorization of how core or peripheral each country is within the Eurozone in a given year. To do so, they utilize the classic Aggregate Demand-Aggregate Supply framework in macroeconomics to estimate how Eurozone countries respond to supply and demand shocks. The idea is that the more *symmetrically* a Eurozone country responds to these shocks, the more “core” they are, as it indicates that they are more integrated within that system and, therefore, accrue disproportionately more gains (e.g., reduced transaction costs and exchange rate uncertainty, increased trade and competition) compared to other countries within the system. In contrast, the more *asymmetrically* a Eurozone country responds to these shocks, the more “peripheral” they are, as it indicates that they are poorly integrated within that system and, in turn, accrue disproportionately lower gains compared to other countries.

Using this approach, Campos and Macchiarelli conduct a bootstrapped analysis (generating 10,000 data sets) to test the likelihood that a given country in a given year reacts symmetrically to demand and supply shocks. The percentage of times this test of symmetrical response is *rejected* thus determines the core- or peripheral-ness of a country. As such, a lower percentage indicates that the test of symmetry was rejected fewer times (i.e., the country tends to react symmetrically to these shocks and, therefore, is more integrated within the Eurozone), making the country more “core.” In contrast, a higher percentage indicates that the test of symmetry was rejected more times (i.e., the country tends to react asymmetrically to these shocks and, therefore, is less integrated within the Eurozone), indicating that country more “peripheral” (Campos & Macchiarelli, 2021: 5).

This core-periphery measure thus ranges from 0 (i.e., core) to 100 (i.e., periphery), and confirms the longstanding intuition that this core-periphery divide across the Eurozone has persisted well after the launch of the euro in the late 1990s (Bache, Bulmer, George, & Parker, 2014; De Grauwe & Ji, 2013). As shown in Figure 2, there indeed appears to be an increasingly stable group of core countries (i.e., Austria, Belgium, Germany, France, Italy, and the Netherlands), an entrenched group of peripheral countries (i.e., Finland, Ireland, and Portugal), as well as several intermediate countries that have moved over time in between the core and periphery (i.e., Greece and Spain).

[Insert Figure 2 here]

One limitation of this measure is that it requires “the availability of data going back to the early 1960s” (Campos & Macchiarelli, 2021: 7). Because data for some countries are not available (e.g., they were not recorded in the OECD Annual Accounts or the country was communist prior to 1990), Campos and Macchiarelli only constructed this measure for the aforementioned 11 countries between 1998 – 2015. These countries thus make up our main

sample. For robustness, however, we obtained a *static* core-periphery measure for the remainder of countries directly from Campos and Macchiarelli, and our findings remain consistent when these countries are included. Finally, we exclude EU countries *not* in the Eurozone because they are not on the euro and, as such, are not under the monetary purview of the ECB (see Table 1).

Pessimistic outlook. Hypothesis 2 theorizes that the divergent reaction from market actors in core versus peripheral countries will be stronger when there was a more pessimistic economic outlook for the Eurozone. We capture the degree of pessimism in economic outlook by analyzing the tone of the ECB President’s speeches, since central bank communications discuss primarily economic issues and are, thus, a major indicator of the economic health across the Eurozone system (Blinder, 2001; Harmon, 2019). To measure this, we use the “tone” variable from the text analysis software Linguistic Inquiry and Word Count (LIWC). This variable uses the LIWC dictionary for positive emotion, which captures the percentage of positive words (e.g., good, well, hope) in a text, and the LIWC dictionary for negative emotion, which captures the percentage of negative words (e.g., bad, wrong, hate) in a text, to create a single summary variable. Pennebaker and colleagues (2015) developed this variable so that the higher the number, the more positive the message. To ease interpretation, we reversed this by subtracting the measure from 100. As such, the higher the number, the more pessimistic the ECB’s message is about the outlook of the Eurozone’s economy.

Policy action. Hypothesis 3 theorizes that the divergent reaction from market actors in core versus peripheral countries will be stronger when the ECB has recently taken monetary policy action. To measure this, we identified when the ECB made changes to their primary interest rate. The dates of rate changes were collected from press releases posted on the ECB website. We include both expansionary (i.e., lowering the interest rate) and contractionary policy actions (i.e., raising the interest rate), since both actions affect borrowing costs of all market

economies across the Eurozone. The variable was coded 1 if the ECB President's focal speech was delivered within three months of an interest rate change, 0 otherwise.

Control variables

Country factors. We controlled for each country's *inflation rate*, *unemployment rate*, and ratio of general government *debt to GDP*. Inflation and unemployment data were collected from the Organisation for Economic Co-operation and Development's website, and measures were lagged by one month. Debt to GDP data was collected from the International Monetary Fund's website and lagged one year. To account for the effect a country's recent stock market returns might have on the market's reaction to the ECB President's speeches, we also controlled for the *extant market returns* in the 30 days before the focal speech.

Central banking factors. Following prior studies that explore the impact of central bank communication on financial markets (Harmon 2019), we created a dummy variable called *ECB communications* that was coded 1 if the ECB had a press release, press conference, or interview on the same day as the speech, 0 otherwise. This controls for the possibility that information released by the ECB outside of the speech itself may be driving our results. We also control for a country's *voting power* on the ECB governing council by creating a variable that captures the relative influence that country has in ECB decisions. We coded 3 if, at the time of the speech, the ECB President was from their country, 2 if the Vice President was from their country, 1 if any other council member was from their country, and 0 if the country has no member represented on the council. Results are robust to a simple binary measure of council representation.

Speech factors. Following prior event studies that explore the impact of language on investor reactions (Pan et al., 2018), we control for a number of speech-related variables. Since longer speeches influence how markets react (Van Buskirk, 2012), we controlled for *word count*. We also controlled for factors that capture the unique character of central bank communications

(Harmon 2019). We controlled for *speech complexity* by using the Flesch–Kincaid reading grade level (Kincaid, Fishburne Jr, Rogers, & Chissom, 1975); *speech future focus* by using the LIWC “focusfuture” word dictionary; *speech uncertainty* by using the Financial Sentiments Dictionary created by Loughran and McDonald (2011); and *speech vagueness* by using a dictionary compiled and validated by Hiller and colleagues (1969; also used by Guo et al., 2017).

Finally, we controlled for the topic of the speech using a topic modeling approach (Hannigan et al., 2019; Kaplan & Vakili, 2015). This approach offers an advancement over controlling for topics using dummy variables, since it allows a speech to have multiple topics. We ran a topic model to identify 15 topics and used the five most prominent in terms of coverage as control variables. The five topics were—the European Union, the European Central Bank, central banking activities, the financial system, and financial crisis—and together covered 54 percent of all the words in the ECB speech discourse. We controlled for the percentage of each topic in each speech (see Appendix C for more details).

Analysis

To conduct our multi-country event study analysis, we used OLS regression to estimate the market reaction of Eurozone member countries to the abstraction of the ECB President’s speeches. Consistent with similar studies (Harmon, 2019), we include year, weekday, speaker, and speech location fixed effects. Following prior research on the effects of different languages on market behaviors (Chen, 2013; Roberts, Winters, & Chen, 2015), we also include language family fixed effects, which control for common origins of the languages (see Table A4 in Appendix A). Country market indices are weighted by market capitalization because the ECB employs a weighted average approach across member countries to evaluate and determine policy actions. We use OLS estimators with standard errors clustered at the speech level, since this is

the level at which treatment occurs (Abadie, Athey, Imbens, & Wooldridge, 2023), but our results are robust to alternative specifications (see Robustness section).

RESULTS

Table 2 reports descriptive statistics and correlations. The CAR surrounding ECB speech events, on average, was zero (0.00), but there is a standard deviation of 1.45, implying substantial variance. We include all observations in our main analyses, but our results are robust to excluding potential outliers plus or minus three standard deviations surrounding the mean. Speeches, on average, were about 3,000 words (i.e., five single-spaced pages of text), more positive than negative, and comparatively less complex, uncertain, and vague than speeches delivered by central bankers at the Federal Reserve (see Harmon, 2019).

[Insert Table 2 here]

Main analyses

Table 3 presents our results. Model 1 includes only control variables and fixed effects, and Model 2 adds all of our independent variables. Model 3 tests Hypothesis 1 by adding an interaction term between speech abstraction and core-periphery. We find a significant interaction effect ($p < .001$). To interpret this, Figure 3 plots the predicted values of the interaction at core-periphery levels of one standard deviation above and below the mean. We can see that while market actors in core countries react more positively to the increase of speech abstraction, market actors in peripheral countries react more negatively. We then explore different levels of speech abstraction to see when core and peripheral market reactions significantly diverge from one another. When speech abstraction is one standard deviation *above* the mean, the predicted value of markets in core countries is significantly *higher* than the predicted value of markets in peripheral countries ($p = .024$). In contrast, when speech abstraction is one standard deviation *below* the mean, the predicted value of markets in core countries is significantly *lower* than the

predicted value of markets in peripheral countries ($p = .019$). These findings demonstrate an asymmetric and divergent reaction between the market actors of core and peripheral countries to the abstraction of ECB President's speeches, thus providing support for Hypothesis 1.

[Insert Table 3 and Figure 3]

Model 4 in Table 3 tests Hypothesis 2, which predicts that the divergent reaction from market actors in core versus peripheral countries will be stronger when the Eurozone's economic outlook is more pessimistic. To test this, we created a three-way interaction between speech abstraction, core-periphery, and the pessimistic outlook variable. The three-way interaction is significant ($p = .033$). Figure 4 plots this interaction. When the ECB conveys a more pessimistic view of the Eurozone's economic health, the divergent reaction between market actors in core and peripheral countries is stronger (see black lines; plots pessimism two standard deviations above the mean) than when they convey a less pessimistic view (see gray lines; plots pessimism two standard deviations below the mean). This provides support for Hypothesis 2.

[Insert Figure 4 here]

Model 5 in Table 3 tests Hypothesis 3, which predicts that the divergent reactions from market actors in core versus peripheral countries will be stronger when the ECB has recently taken monetary policy action. To test this, we created a three-way interaction between speech abstraction, core-periphery, and the policy action variable. The three-way interaction is significant ($p = .041$), and Figure 5 plots the interaction. The divergent reaction between market actors in core and peripheral countries is stronger when the ECB has taken policy action within the three months prior to the speech (see black lines) compared to when they have not (see gray lines). This provides support for Hypothesis 3.

[Insert Figure 5 here]

When we look at the fully saturated model (Model 6, Table 3), both three-way interactions remain significant.

Omitted variable bias

One concern is that an omitted market variable might be driving the ECB to deliver a more abstract speech and simultaneously create divergent market reactions from the core and periphery. To explore this concern, we took three steps. First, we controlled for variables that might simultaneously influence speech abstraction and market returns. For instance, we controlled for extant market returns in the 30 days leading up to the focal speech as a way to minimize the possibility that a country's market movements were endogenous to our results. We also controlled for our key moderating variables to minimize the possibility that ECB Presidents were strategically adjusting their use of abstraction when markets were most sensitive.

Second, we conducted an empirical test to assess how many of our sample's observations would need to be biased in order to invalidate our main result. Following prior management scholars (Harmon, 2019; Hubbard, Christensen, & Graffin, 2017), we use Ken Frank's (2000) method to determine that in order for the coefficient of our main H1 result to fall below significance, 50.99 percent of our sample (or 2911 of our 5709 observations) would have to be replaced with observations for which there is a zero effect. While possible, this magnitude of bias needed to overturn our results is quite large, thus diminishing the concern.

Finally, we conducted several interviews with individuals who have worked for the ECB and understand the timing of the speechwriting process. Most notably, we interviewed Otmar Issing (ECB Board Member from June 1998–May 2006) and Gertrude Tumpel-Gugerell (ECB Board Member from June 2003–May 2011), who worked with Duisenberg and Trichet, respectively. Speeches are typically written between one and six months before the scheduled speech date. Once written, the ECB president and other staffers closely scrutinize the text, often

times vetting the transcript word by word. Although speeches are edited, they are unlikely to change substantially as the speech date approaches. This information is useful because the longer the window between the writing of a speech and when the market gets access to and reacts to the speech (i.e., a window of one to six months), the lower the likelihood that an omitted variable is driving both the level of speech abstraction and divergent market reactions.

Robustness

We conducted several analyses to examine the robustness of our results. First, we examine whether our main finding in H1 is affected by our model specification (i.e., our choice of fixed effects, standard errors, etc.). Figure 6 displays what is called a specification curve, a figure that plots the primary coefficient of interest across numerous model specifications at the same time (Simonsohn, Simmons, & Nelson, 2020). Plotted along the y-axis is the coefficient of our main interaction testing H1 (from Model 3, Table 3), along with the associated 90 and 95 percent confidence intervals. Along the x-axis are 150 different model specifications that vary the inclusion or exclusion of different fixed effects, clustering of standard errors, and the use of different European-level market indices to calculate CAR. The interaction coefficient between speech abstraction and core-periphery is negative, significant, and relatively stable across all specifications. Our preferred specification (denoted by the red dot) falls near the middle of all models and has larger standard errors than many other specifications. Figure 6 thus suggests that our main results are not an artifact of our choice of model specification.

[Insert Figure 6 here]

Second, we also replicate our results using all 19 Eurozone countries listed in Table 1. Our primary analyses included only the 11 Eurozone countries for which data were available to calculate a dynamic measure of core-periphery (see Campos & Macchiarelli, 2021). Using these dynamic measures for our 11 original countries, and static measures obtained from Campos and

Macchiarelli for the remaining eight countries, we re-ran all our analyses. We again find strong support for all predictions (H1, $p < .001$; H2, $p = .032$; H3, $p = .042$).

DISCUSSION

Prominent leaders regularly communicate with multiple markets around the world, but the challenges that can arise when doing so have not been thoroughly examined. Using speeches delivered by the ECB President to Eurozone countries, we analyze multiple countries' market reactions to speech abstraction, a dominant strategy used by leaders to create common ground across diverse audiences. Rather than creating common ground, however, we show that this strategy produces divergent reactions from market actors across core and peripheral countries. We also offer support for our proposed mechanism—divergent interests between market actors in core and peripheral countries—by showing that when these interests are made more salient, the divergent reaction across markets gets stronger. Taken together, our findings contribute new insights to research on strategic communication in market settings, expand our understanding of audience heterogeneity and market power, and highlights the growing challenges of communicating in a globalized society.

Strategic communication in market settings

This study contributes to research on strategic communication in market settings in two ways. First, this is one of the first papers to investigate the challenges that confront leaders when trying to communicate with market actors around the world. Prior work has largely focused on the effects of communication within single, homogenous markets that reside almost exclusively in the US (Guo et al., 2021; Harmon, 2019; Huang et al., 2020; Martens et al., 2007; Pan et al., 2018; Rhee & Fiss, 2014). Our study extends this conversation by analyzing the effects of strategic communication not only outside the US, but across multiple countries.

In doing so, we reveal an important factor that we believe becomes more important as leaders try to communicate globally—the core-periphery divide between countries. Indeed, economic systems around the world often have a core-periphery structure that separates wealthier and more powerful countries from the poorer and less powerful (Snyder & Kick, 1979; Wallerstein, 1992), and we argued that this divide can lead market actors across countries to interpret a leader’s communications differently. Indeed, by showing that market actors in core and peripheral countries in the Eurozone react divergently to the exact same communications, our study reveals an important country-level difference that can affect how market actors interpret and react to information. Moreover, because leaders of governments, supra-national organizations, and even for-profit firms are faced with communicating in an increasingly global society (Bartlett & Ghoshal, 2003; Bullock & Sanchez, 2021; Hartmann, Lindner, Müllner, & Puck, 2022), these findings shed light on an important contingency that leaders might want to consider when trying to convey information with market actors in multiple countries.

Second, our study also expands our understanding of how market actors react to one particularly important strategy used by leaders—abstract communication. Indeed, abstract language has long been considered an important strategy when trying to persuade large and diverse audiences (Joshi & Wakslak, 2014; Weick, 1978), as it ostensibly encourages different audience members to converge in their reaction to a given message and find common ground (Eisenberg, 1984). Prior research has explored market reactions to abstract communications, but has produced mixed findings. Huang and colleagues (2020), for example, find that investors react more favorably to an entrepreneur’s abstract communication about their new venture, whereas Pan and colleagues (2018) find that investors react more favorably to more concrete language used in a firm’s quarterly earnings calls. While there are likely multiple reasons for

these contrasting findings (e.g., Berson & Halevy, 2014; Menegatti & Rubini, 2013; Pontikes, 2012), our study suggests one possible explanation.

More specifically, our results suggest that investors may be reacting differently because they have conflicting or divergent interests. For example, because Pan and colleagues (2018) studied investors listening to a firm's quarterly earnings calls, these investors have a strong interest in short-term predictions and deciphering how the firm's decisions affect stock price. As such, it makes sense that more concrete or precise language that they can fact-check and confirm is preferred. In contrast, because Huang and colleagues (2020) studied investors who are listening to pitches by new ventures, these investors were trying to gauge the long-term growth potential and scalability of these firms. As such, rather than being focused on short-term impact on stock price, it makes sense that these investors preferred hearing more abstract and big picture ideas. These observations thus suggest that it may be the conflicting or divergent interests—whether arising because investors are evaluating different types of firms, or because investors are from a core versus peripheral country—that help explain the divergent market reactions to abstract communications. We believe that such considerations warrant more investigation.

Audience heterogeneity and market power

This study also expands our understanding of heterogeneity amongst market actors. Scholars have grown increasingly interested in the role of market heterogeneity, or how the diversity within an audience can shape reactions to organizational action. For example, we know that different stakeholders (e.g., media versus investors) can interpret an organization's communications differently (Lamin & Zaheer, 2012), and that even the same type of stakeholder might perceive the same event in distinct ways. Indeed, consumers can have very different preferences (Kim & Jensen, 2014), intermediaries can vary in their basis of evaluation (Sharkey et al., 2022), and investors can vary in their expertise (Falchetti et al., 2021). Our paper expands

this conversation by introducing the divergent interests of actors from the core versus periphery of a system as an important source of heterogeneity that can change how audience members interpret and react to information. In doing so, we extend existing research in two ways.

First, we are one of the first papers to explore this core-periphery divide from the audience's perspective. Although management scholars have examined this core-periphery distinction (e.g., Cattani & Ferriani, 2008; Cattani et al., 2014), this work has done so from the perspective of producers. Indeed, Cattani and colleagues have shown that the core or peripheral positioning of Hollywood film producers influences their creative results. Our study, in contrast, examines this core-periphery distinction from the perspective of the audience, shifting the focus to be about how an organization's actions can be interpreted divergently by different audience members. This shift is important because core-peripheral structures are commonplace amongst audiences beyond the global economic systems (Wallerstein, 2004). Indeed, banks within the US financial system (Veld, van der Leij, & Hommes, 2020), voters spread across urban and rural geographic locations (Smith & Steel, 1995), and employees within an organization (Coleman & Voronov, 2003; Guerrier & Lockwood, 1989; Tushman, 1977) often exhibit a core-periphery structure. More research could thus be done on how this core-periphery divide in other settings might influence an audience's interpretation of and reaction to organizational action.

Second, introducing this core-periphery divide amongst audience members also draws attention to the subtle role that communication plays in the power dynamics of a market. Indeed, communication strategies like abstract language have largely been seen as useful consensus-building tactics that bring diverse audiences together (Carton & Lucas, 2018; Eisenberg, 1984; Joshi & Wakslak, 2014) and allow leaders to remain adaptable (Drucker, 1994; McDonald & Gao, 2019). However, when used in the context of a system that has a core and peripheral divide, our findings suggest that this can change the role abstract language plays. Indeed, because

leaders these systems are typically from the powerful core, the use of abstract language may become a political tool that allows those already in power to maintain the existing hierarchy (Bourdieu, 1993; Steinberg, 1999). Just as Oakes, Townley, and Cooper (1998) argued that something as seemingly benign as business planning “is not a neutral mechanism of transcription but, rather, has significant implications for the amounts of capital within a field” (p. 258), our findings imply that abstract communications from the ECB President may not be a neutral mechanism of information sharing, but rather, have important implications for power and identity within the Eurozone (Bache et al., 2014). In this sense, our study reveals one of the less visible sources of power embedded within the everyday market activities (Harmon, 2019; Holm, 1995; Rojas, 2010; Schildt, Mantere, & Cornelissen, 2020).

Communicating in a globalized society: Generalizability and Practical Implications

There are several important boundary conditions that may limit the generalizability of our findings and, therefore, warrant additional study. For example, in our sample, there were only three ECB Presidents (i.e., Duisenberg, Trichet, and Draghi), all of whom were from core countries within the Eurozone. Although this is common in systems exhibiting a core-periphery structure, we believe that this is likely an important requirement for our theory to hold. Indeed, if the next ECB President to be appointed after Lagarde (who is the current President and is also from the core) were from, say, Portugal or Greece, we may expect divergent reactions to either diminish or even emerge in the other direction. As a result, scholars might consider exploring this contingency to expand the generalizability of these ideas.

Another boundary condition of our theory is the presence of divergent interests between audience members. The Eurozone is a canonical example of an economic system with a longstanding core-periphery structure (Bayoumi & Eichengreen, 1993; Campos & Macchiarelli, 2021), where market actors in core and peripheral countries tend to have conflicting or divergent

interests. Indeed, we showed that when these divergent interests were salient (i.e., when the economic outlook of the Eurozone was pessimistic or when monetary policy action was recently taken), market actors in core and peripheral countries reacted divergently to the ECB President's speech abstraction. However, to the extent that audience members do not have divergent interests, or these interests are not salient, we think that abstract communications from a powerful leader could actually produce convergent reactions (Eisenberg, 1984). In fact, our results show that when the economic outlook of the Eurozone was more optimistic, and when no monetary policy action was recently taken, market actors in core and peripheral countries actually reacted similarly and converged in their reactions to the ECB President's abstractions. More work is needed on this topic to better understand how a leader's communications can successfully produce common ground amongst diverse audience members.

Despite these potential limitations, we believe that this study offers insight into the challenges leaders today face when trying to communicate in an increasingly complex, globalized society. Management scholars often refer to these situations as grand challenges, or global problems that require coordination amongst people, organizations, and countries (George et al., 2016). This coordination, however, requires prominent leaders to communicate about these global problems (e.g., climate change, equitable access to financing, or economic growth) with actors that often have *divergent* cultural, economic, and/or political interests (Parry, 2019). In this study, we investigated the efforts of the ECB's President, the prominent leader in charge of the Eurozone economy and building consensus across member countries. In doing so, we show that one of the most common strategies used to build common ground—the use of abstract language—can inadvertently produce divergent reactions when used in a global setting where market actors have conflicting economic interests. This finding, we believe, reveals a key

challenge that our leaders are likely to face as they continue to communicate about these increasingly important problems with actors around the globe.

CONCLUSION

Given the growing globalization and interconnectedness of markets today, organizational and institutional leaders find that they must identify effective strategies to communicate with increasingly heterogeneous audiences. In this study, however, we show how even the most common strategies for doing so can backfire. Taken together, this study highlights the need for more research on the growing number of trade-offs that organizations likely face as they manage the expectations of increasingly global markets.

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Figure 1. Average speech abstraction, 1998 – 2015.

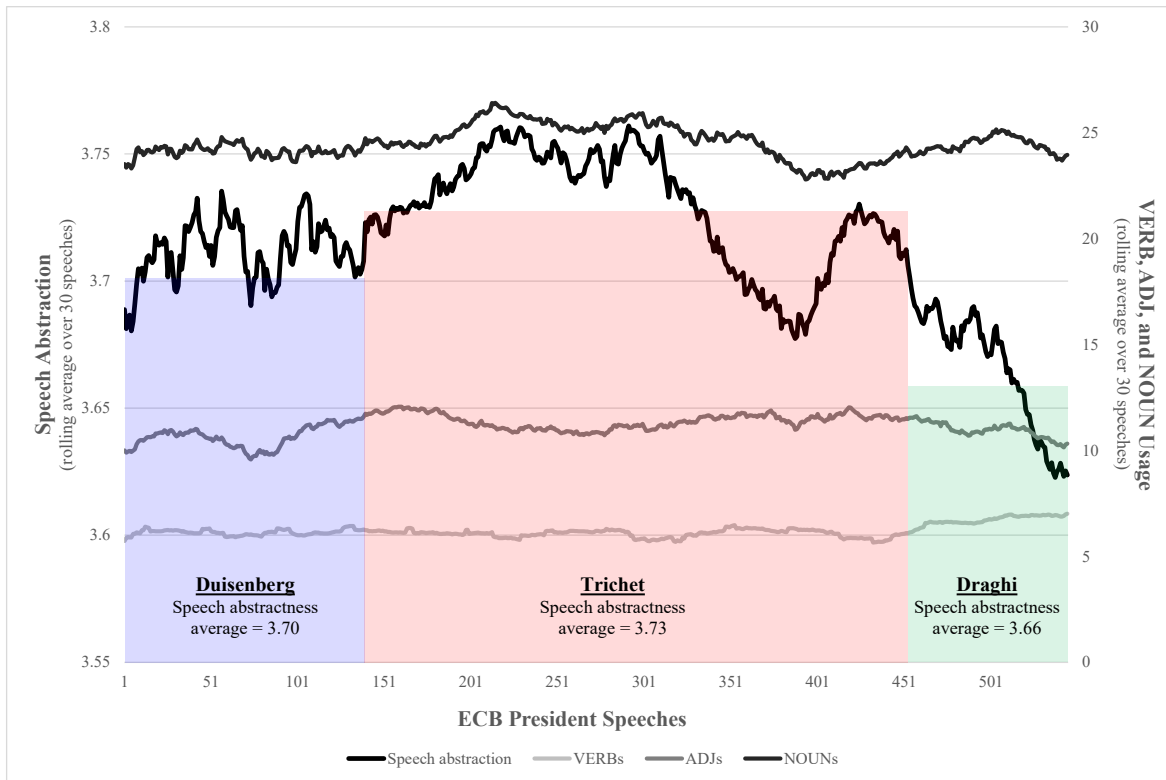


Figure 2. Core and peripheral countries in the Eurozone.

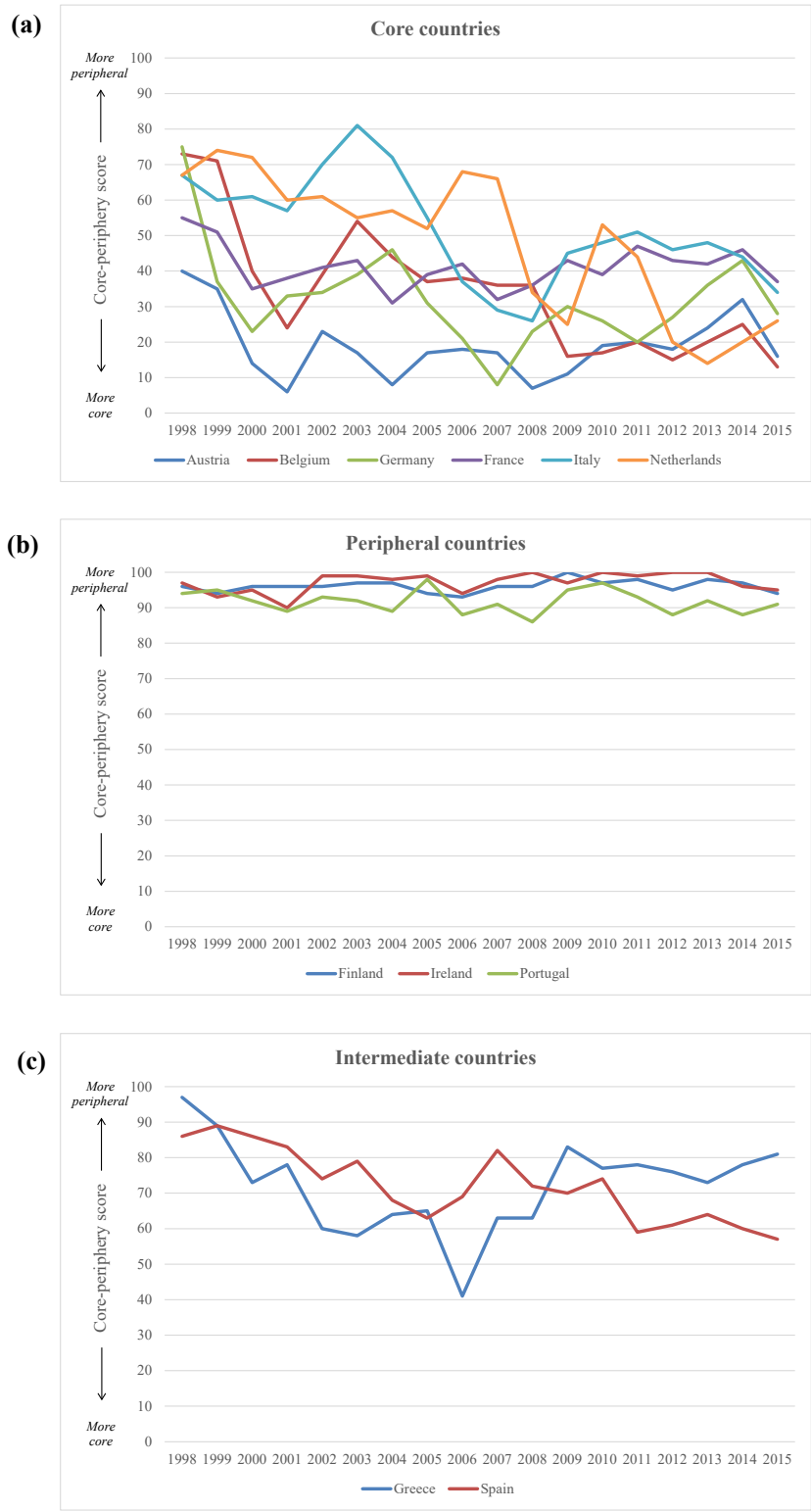


Figure 3. Interaction between Speech abstraction * Core-periphery

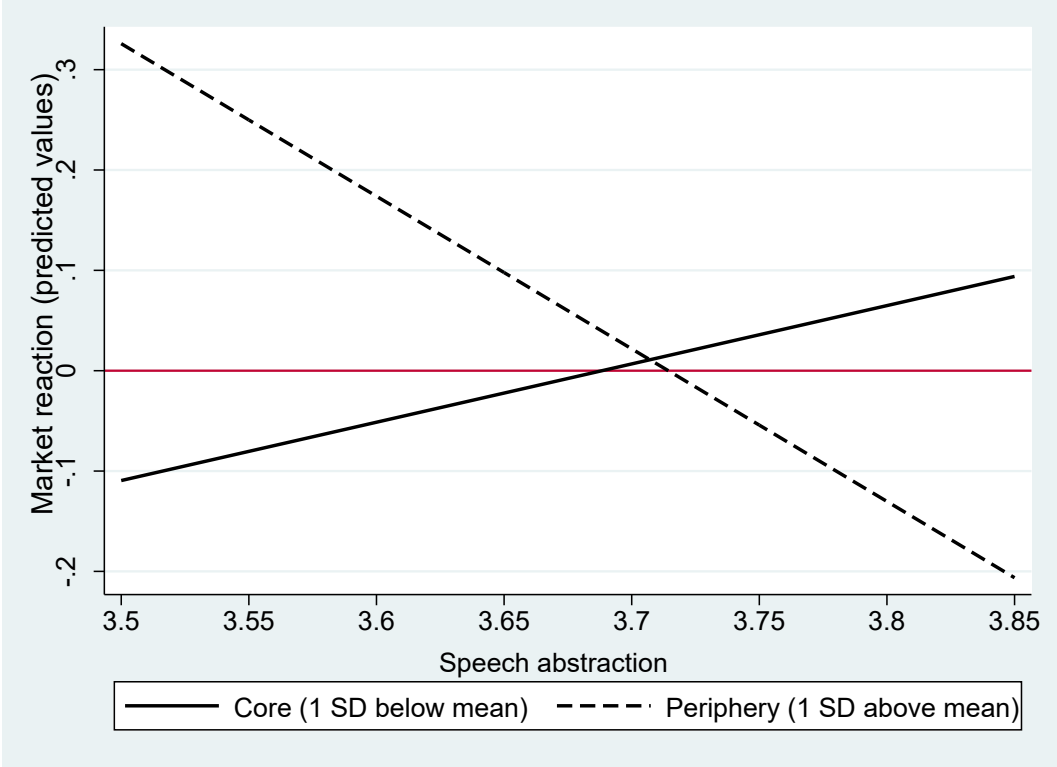


Figure 4. Interaction between Speech abstraction * Core-periphery * Pessimistic outlook

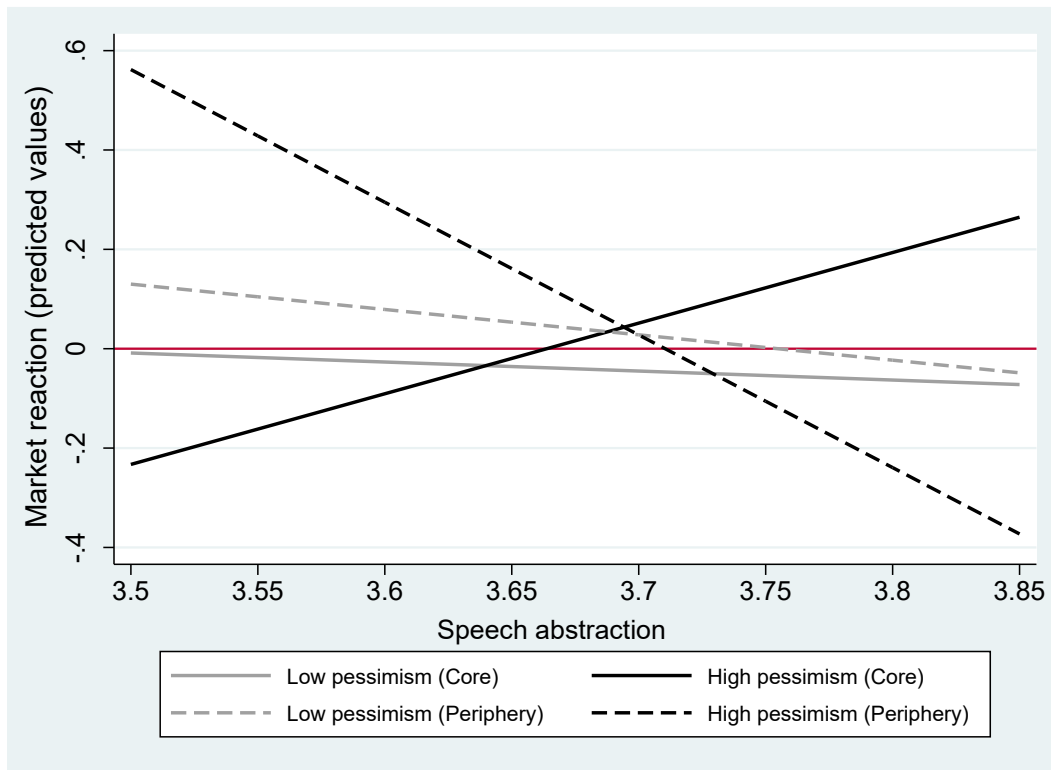


Figure 5. Interaction between Speech abstraction * Core-periphery * Policy action

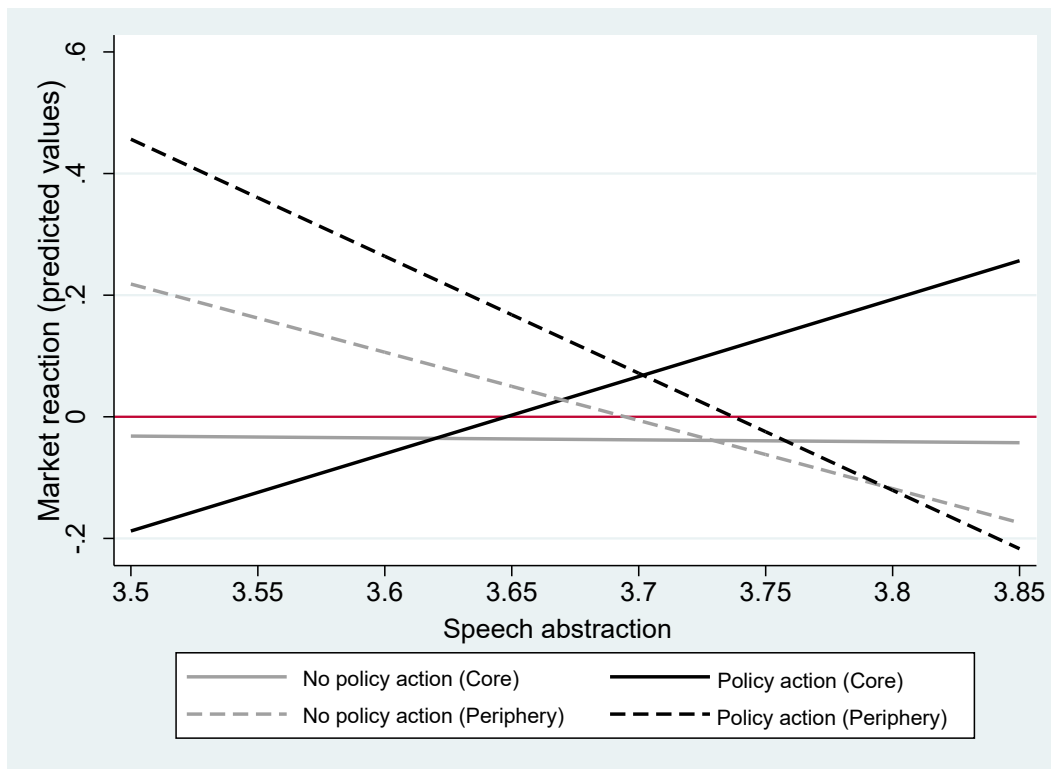


Figure 6. Specification curve

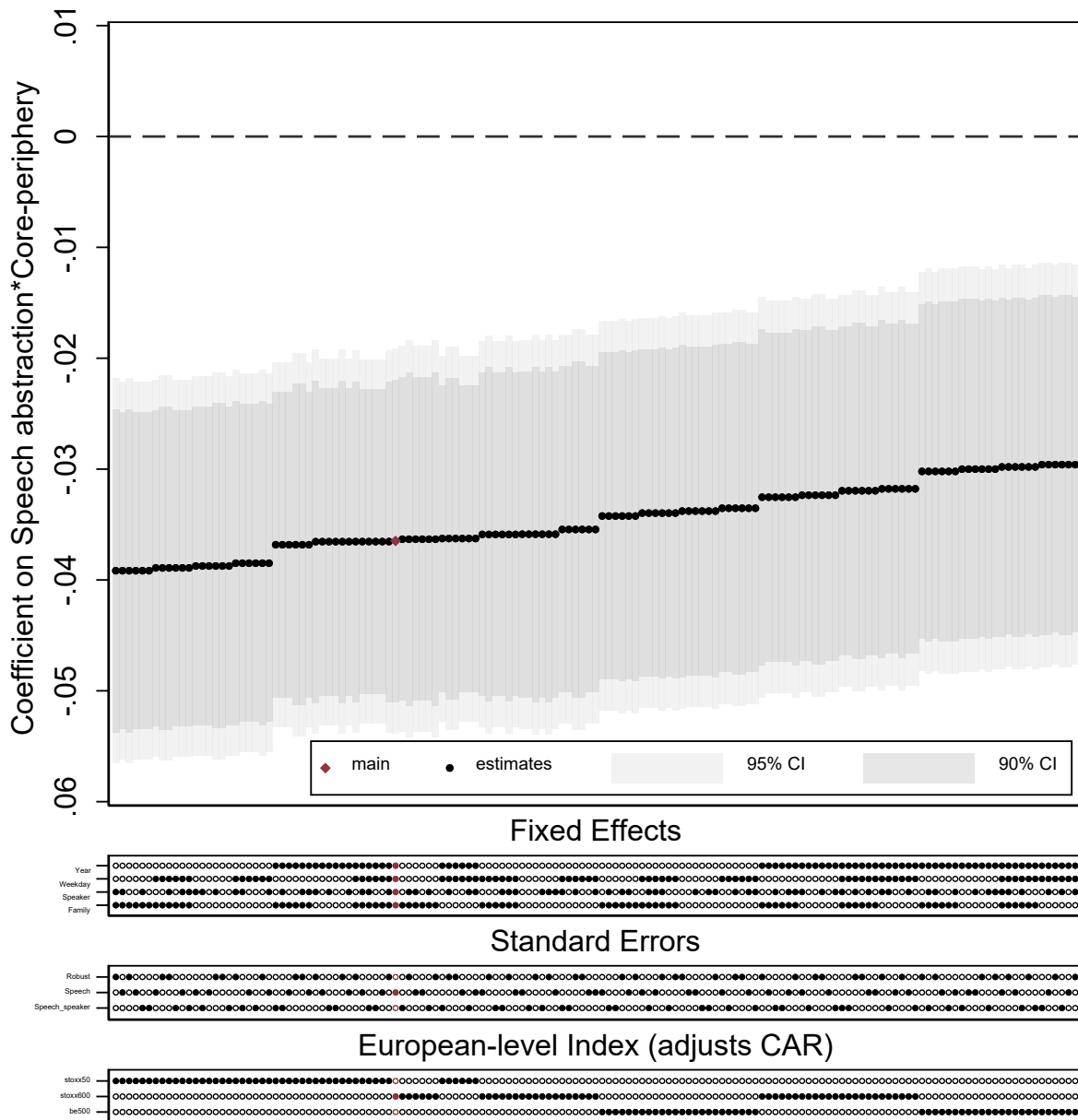


Table 1. European countries and the Eurozone

	Country	Entered EU	Exited EU	Adopted Euro	Eurozone Member	Market index	Included in Sample
1	Belgium	1958		1999	Yes	BEL	Yes
2	France	1958		1999	Yes	CAC	Yes
3	Germany	1958		1999	Yes	DAX	Yes
4	Italy	1958		1999	Yes	FTSEMIB	Yes
5	Luxembourg	1958		1999	Yes	LUXX	a
6	Netherlands	1958		1999	Yes	AEX	Yes
7	Ireland	1973		1999	Yes	ISEQ	Yes
8	Portugal	1986		1999	Yes	PSI	Yes
9	Spain	1986		1999	Yes	IBEX	Yes
10	Austria	1995		1999	Yes	ATX	Yes
11	Finland	1995		1999	Yes	HEX	Yes
12	Greece	1981		2002	Yes	ASE	Yes
13	Slovenia	2004		2007	Yes	SBITOP	a
14	Cyprus	2004		2008	Yes	CYSMFTSE	a
15	Malta	2004		2008	Yes	MALTEX	a
16	Slovakia	2004		2009	Yes	SKSM	a
17	Estonia	2004		2011	Yes	TALSE	a
18	Latvia	2004		2014	Yes	RIGSE	a
19	Lithuania	2004		2015	Yes	VILSE	a
20	Croatia	2013		2023	Yes	CROBEX	a
21	United Kingdom	1973	2020		No		b
22	Denmark	1973			No		b
23	Sweden	1995			No		b
24	Czech Republic	2004			No		b
25	Hungary	2004			No		b
26	Poland	2004			No		b
27	Bulgaria	2007			No		b
28	Romania	2007			No		b

^a Per Campos & Macchiarelli (2021), the historical data required to calculate their dynamic core-periphery measure was not available for these countries (e.g., the data are not in the OECD Annual Accounts or because the country was communist prior to 1990). As such, we exclude these countries in our primary analyses. For robustness, however, we obtained static (not dynamic) measures of core-periphery for these countries from Campos & Macchiarelli. When running our analyses with this full sample, we find consistent results.

^b While these countries are part of the EU (with the exception of the UK after 2020), they are not part of the Eurozone nor have they adopted the euro as their primary currency. As a result, these countries are excluded from our sample, as they do not fall within the purview of the ECB.

Table 2. Descriptive statistics and correlations

Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9	10	11
1. Market reaction	0.00	1.45	-13.08	15.52											
2. Speech abstraction	3.71	0.08	3.31	3.88	-0.02										
3. Core-periphery	57.07	28.80	6.00	100.00	0.00	-0.01									
4. Pessimistic outlook	39.41	16.78	1.00	92.24	-0.02	0.11	0.00								
5. Policy action	0.40	0.49	0.00	1.00	0.00	0.04	-0.01	0.03							
6. Inflation ^a	2.28	1.93	-4.48	11.60	-0.02	0.06	0.13	0.00	0.12						
7. Unemployment ^a	8.82	4.27	2.12	27.47	0.01	-0.13	0.29	0.01	-0.02	-0.10					
8. Debt to GDP ^a	77.16	29.91	23.65	184.00	0.01	-0.14	-0.15	0.02	-0.04	-0.23	0.43				
9. Extant market returns	0.00	0.00	-0.02	0.01	0.06	-0.04	-0.02	-0.02	-0.12	-0.05	0.03	0.01			
10. ECB communication	0.29	0.46	0.00	1.00	0.04	-0.15	0.00	-0.06	0.06	-0.02	0.05	0.05	-0.08		
11. Voting power	0.89	0.95	0.00	3.00	0.02	0.01	-0.19	0.00	-0.01	-0.02	0.02	0.16	-0.01	-0.01	
12. Speech wordcount	2969	2230	33	19740	-0.01	-0.07	0.01	0.21	0.06	0.07	-0.05	-0.08	0.03	-0.06	0.01
13. Speech complexity	13.50	1.72	6.30	19.00	-0.01	0.52	0.01	0.02	0.02	0.06	-0.13	-0.15	-0.05	-0.17	0.01
14. Speech future focus	1.15	0.49	0.00	3.23	0.01	-0.25	0.04	-0.06	-0.11	0.09	0.03	0.01	0.07	0.06	0.02
15. Speech uncertainty	0.93	0.51	0.00	4.02	-0.02	0.16	0.01	0.51	0.02	0.06	-0.06	-0.07	-0.02	-0.11	0.01
16. Speech vagueness	0.77	0.30	0.00	2.06	0.01	-0.09	0.01	0.14	0.06	0.08	-0.01	-0.02	-0.03	-0.03	0.02

Variable	12	13	14	15
13. Speech complexity	-0.04			
14. Speech future focus	0.05	-0.06		
15. Speech uncertainty	0.22	0.25	0.14	
16. Speech vagueness	0.23	-0.11	0.16	0.32

N = 5,709, aVariable lagged

Table 3. Main results predicting market reaction (CAR $t-1$ to $t+1$)

	Model 1	Model 2	Model 3 (H1)	Model 4 (H2)	Model 5 (H3)	Model 6
Speech abstraction		-0.210 (0.344)	1.613*** (0.587)	-0.285 (1.067)	0.486 (0.658)	-1.399 (1.092)
Core-periphery		-0.000 (0.001)	0.135*** (0.033)	0.002 (0.061)	0.070* (0.041)	-0.065 (0.065)
Pessimistic outlook		0.001 (0.002)	0.001 (0.002)	-0.184* (0.106)	0.001 (0.002)	-0.183* (0.104)
Policy action		0.104* (0.060)	0.106* (0.060)	0.106* (0.060)	-8.382** (4.049)	-8.410** (3.999)
Speech abstraction * Core-periphery			-0.036*** (0.009)	-0.000 (0.017)	-0.019* (0.011)	0.018 (0.018)
Speech abstraction * Pessimistic outlook				0.050* (0.029)		0.050* (0.028)
Core-periphery * Pessimistic outlook				0.004** (0.002)		0.004** (0.002)
Speech abstraction * Core-periphery * Pessimistic outlook				-0.001** (0.000)		-0.001** (0.000)
Speech abstraction * Policy action					2.297** (1.090)	2.304** (1.076)
Core-periphery * Policy action					0.134** (0.066)	0.137** (0.064)
Speech abstraction * Core-periphery * Policy action					-0.036** (0.018)	-0.037** (0.017)
Inflation ^a	0.013 (0.012)	0.014 (0.013)	0.012 (0.013)	0.011 (0.013)	0.011 (0.013)	0.011 (0.013)
Unemployment ^a	0.005 (0.006)	0.005 (0.006)	0.002 (0.006)	0.002 (0.006)	0.002 (0.006)	0.002 (0.006)
Debt to GDP ^a	-0.001 (0.001)	-0.001 (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001* (0.001)
Extant market returns	11.841 (9.843)	12.883 (9.809)	12.981 (9.825)	12.884 (9.778)	13.387 (9.804)	13.243 (9.772)
ECB communication	0.040 (0.052)	0.028 (0.053)	0.027 (0.053)	0.027 (0.053)	0.025 (0.053)	0.025 (0.053)
Voting power	0.022 (0.017)	0.020 (0.019)	0.015 (0.019)	0.015 (0.019)	0.016 (0.019)	0.016 (0.019)
Speech wordcount	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Speech complexity	0.028* (0.016)	0.032* (0.017)	0.033* (0.017)	0.032* (0.017)	0.034** (0.017)	0.033* (0.017)
Speech future focus	0.048 (0.047)	0.055 (0.050)	0.061 (0.050)	0.060 (0.050)	0.059 (0.050)	0.058 (0.050)
Speech uncertainty	-0.098 (0.067)	-0.111 (0.074)	-0.109 (0.073)	-0.108 (0.073)	-0.109 (0.073)	-0.108 (0.072)
Speech vagueness	0.148 (0.106)	0.151 (0.104)	0.149 (0.105)	0.146 (0.106)	0.152 (0.105)	0.149 (0.106)

Observations	5,709	5,709	5,709	5,709	5,709	5,709
R-squared	0.023	0.024	0.028	0.029	0.029	0.030
Adjusted R-squared	0.015	0.016	0.019	0.020	0.020	0.021

*** p<0.01, ** p<0.05, * p<0.1

Notes: Dependent variable is market reaction of country-level index. Coefficients based on OLS regression. All models include year, weekday, location, speaker, and language family fixed effects. Standard errors are clustered at the speech level, and are reported in parentheses. ^aVariable lagged.

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