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European Commission
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Abstract

This paper provides a quantitative assessment on the impact of media reporting about fiscal rules and fiscal councils on the effectiveness of EU fiscal rules. Media visibility can contribute to more effective fiscal rules, since it can improve transparency, contribute to a more informed debate and act as an informal enforcement device for non-compliance, through reputational damage. Some international organisations take media visibility into account when assessing the strength of fiscal frameworks. However, the strength of media visibility has been based on expert judgement, which can provide a subjective and incomplete picture. The paper explores a novel media database of almost 300 million of articles maintained by the Commission, covering 27 EU Member States and the UK in 2004-2020. We analyse the media sources using a text mining approach, which has been applied frequently in the economic literature to assess the effects of media visibility on financial markets.

The key findings can be summarised as follows: First, media reporting on fiscal rules appears to be more frequent in countries with well-developed fiscal institutions, but also during bad economic times or when the Commission releases its key fiscal policy news. Second, nationwide and influential media appear to report relatively more frequently on fiscal rules than regional media. References to fiscal rules in the media refer either to the need to keep public debt under control or to support growth and avoid austerity-related inequality, which reflects the existence of different views regarding the main objective of fiscal rules: fiscal sustainability vs. macroeconomic stabilisation. Third, panel regressions show that media visibility appear to have contributed to the effectiveness of EU fiscal rules, as measured by the stronger numerical compliance with these rules. Media from nationwide sources tend to be more effective than regional media. Finally, the creation of fiscal councils appears to have further increased the media reporting on fiscal rules..

JEL Classification: C23, D40, E31, L51.

Keywords: fiscal rules, fiscal councils, media visibility, tonality of news, enforcement, panel data.

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1. INTRODUCTION

The discussion on the effectiveness of fiscal frameworks has focused on the design of fiscal rules and institutions. There is ample evidence showing that a rules-based fiscal policy is superior to a discretionary approach. The key argument, which stems mainly from the field of political economy, is that discretionary fiscal policy is frequently time inconsistent ([1]). Evidence shows that the introduction of sound fiscal rules can lead, inter alia, to lower fiscal deficits ([2]), reduced procyclicality ([3]), lower sovereign interest rate spreads ([4]), lower output volatility ([5]) or create more fiscal space ([6]). Similarly, a sound institutional setup can have positive effects. In particular, national ownership and independent fiscal institutions can increase the accountability and fiscal transparency ([7]), but also increase the scrutiny and visibility of fiscal rules and therefore strengthen their enforceability ([8]). In a similar vein, the media is often also considered to play an important role vis-àvis fiscal policies.

There are three main reasons why media visibility can also contribute to more effective fiscal rules.

- *First, media visibility can raise the awareness of and increase the transparency of fiscal rules* ([9]). For instance, media can help policymakers or independent institutions disseminate the reasoning and evidence behind the fiscal policy stance to a broader audience ([10]). More transparency is important, since incomplete information can reduce the corrective function of fiscal rules. More transparency also reduces the uncertainty among citizens about the government's fiscal position, which, in turn, can help facilitate citizens' support for sustainable fiscal policy.
- *Second, media visibility can facilitate an independent assessment of fiscal policy and contribute to a more informed debate about fiscal rules and fiscal policy*. Evidence shows that fiscal rules that receive considerable media attention do spark a fair amount of public debate at national level ([11]). Strong media visibility of IFIs is shown to alleviate the 'opportunistic debt bias' ([12]). It can also reinforce the IFIs' legal and financial independence ([13]).
- *Third, the media can act as a reputation-based enforcement device.* Reporting on non-compliance with fiscal rules can shed light on fiscally irresponsible behaviour and imply reputational damage for governments ([14]). Evidence shows that this can push policymakers to publicly account ([15]) for

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[1] Taylor, (2000): 27, Cassette et al. (2012): 81, Kydland and Prescott (1977): 482

[2] Heinemann et al., 2016, for a meta-analysis.

[3] European Commission (2018 / 2019).

[4] Heinemann et al. (2014).

[5] Fatás and Mihov (2006).

[6] Nerlich and Reuter (2015).

[7] Debrun et al. (2008).

[8] Jankovics and Sherwood (2017), Debrun and Kinda (2017), European Commission (2018), European Commission (2020a), European Commission (2020b).

[9] European Commission, (2006): 138, IMF (2007): 92, European Commission (2009): 6, Beetsma and Debrun (2018): 57.

[10] Beetsma et al. (2017): 4, IMF (2007): para. 255-256, Wolfinger et al. (2018).

[11] Debrun et al. (2008): 309, European Commission (2006): 153.

[12] See Beetsma et al. (2017): 4. The 'opportunistic debt bias' occurs when incumbent policy makers spend additional public funds while they are still in office, to appear more competent to the public during the elections. The underlying notion is that the public would see the policy maker as more active and competent when he/she is seen to spend funds on things that benefit the electorate directly.

[13] Debrun et al. (2017a): 401, IMF (2013): 12/26, Beetsma and Debrun (2018): 57.

[14] Eyraud et al. (2018), Meyer (2004).

breaches of the rules of the SGP ([16]). Evidence also shows that media visibility of fiscal rules reduces so-called 'political budget cycles' and helps to mitigate the deficit bias by means of reputational damage to governments ([17]).

Nevertheless, the role of the media in fostering the effectiveness of fiscal rules has not received much attention. It is true that media visibility has been taken into account in the indicators used by the IMF and the Commission to measure the design strength of fiscal councils and national fiscal rules, respectively (Box 1) ([18]). Specifically, these indicators assess the extent to which national media are covering fiscal rules or fiscal councils and whether media visibility seems to launch a public debate. However, only one paper has used the Commission's indicators to empirically analyse the impact of media visibility on national fiscal rules, without finding significant results ([19]). To the best of our knowledge, no paper has assessed the impact of media visibility on the effectiveness of EU fiscal rules.

A key reason for the limited assessment of media visibility on the effectiveness of fiscal rules is a lack of high-quality media data with a large coverage. Media visibility of fiscal rules has so far been based on expert judgement. This can lead to non-representative results, since the opinions of different experts may differ or may change over time. In the absence of a readily available alternative indicator, the Commission therefore eventually decided to discontinue the media visibility dimension in its fiscal rules design strength index. To the best of our knowledge, media visibility of fiscal rules has not yet been assessed based on a thorough assessment of media sources. By contrast, there is extensive literature on the impact of media visibility in the field of financial markets. In particular, several studies find that central bank communication can have a significant effect on financial markets, notably on bond spreads and exchange rates ([20]).

Against this background, this paper assesses the impact of media visibility on the numerical compliance with EU fiscal rules using a large media-database of almost 300 million of articles. We use data from the Commission's Europe Media Monitor (EMM). The EMM has been developed and maintained by the Text and Data Mining Unit in the Directorate for Competences of the Commission's Joint Research Centre (JRC) in Ispra.

The key objectives of this paper are twofold:

- *First, we develop a quantitative indicator for the media visibility of fiscal rules in EU countries over the past two decades*. For this purpose, we explore aggregated metadata from the automated analysis of almost 300 million of articles processed by the EMM database system in 27 Member States and the UK over 2004 to 2019. This is the first time we are exploring the EMM aggregated database metadata for such a large sample. We used a text mining approach to analyse data from this large amount of media sources, allowing us to take in both negative and positive reporting on fiscal rules. This approach has been frequently employed to assess the impact of media visibility on financial markets.
- *Second, we assess, using an empirical analysis, whether media visibility has had an impact on the effectiveness of EU fiscal rules.* We use panel regressions to try to identify the impact of media visibility on the effectiveness of EU fiscal rules in Member States over the past 16 years. We

[15] In this sense, the media could also be seen as a democratic accountability mechanism for policymakers.

[16] Meyer (2004), Vliegenthart et al. (2016).

[17] Ademmer and Dreher (2016).

[18] European Commission (2010), IMF fiscal council database, European Commission national fiscal rules database

[19] Reuter (2019).

[20] Ehrmann and Fratzscher (2007), Milani and Threadwell (2012), Mohl and Sondermann (2007), Gade et al. (2013).

assess the effectiveness of EU fiscal rules using an indicator measuring numerical compliance with these rules.

This paper is structured as follows: Chapter 2 reviews the relevant literature that assesses the impact of media visibility on financial markets and economic policy-making. Chapter 3 introduces the database and methodology to identify the relevant articles and build the indicator of media visibility of fiscal rules. Chapter 4 presents some stylised facts based on this novel media visibility indicator. Chapter 5 tries to identify a causal relationship between media visibility and the effectiveness of fiscal rules with a regression framework. Finally, Chapter 6 presents conclusions.

Box 1. **Media visibility matters for fiscal rules' strength indicators**

This box presents two indicators for the strength of fiscal frameworks, which explicitly take media visibility into account.

A. European Commission fiscal rules strength index

The Commission considered media visibility as an important dimension in its index measuring the strength of national fiscal rules. The index was measured across five categories (Deroose et al., 2005; European Commission, 2006: 163-164; European Commission, 2009: 91):

- statutory base of the rule;
- nature of the body in charge of monitoring respect of the rule;
- nature of the body in charge of enforcement of the rule;
- enforcement mechanisms of the rule;
- media visibility of the rule.

Media visibility was measured based on expert judgement. The scores for media visibility came from an annual questionnaire answered by government officials from EU Member States. The score is assessed on an interval from 1 to 3, as follows: (3) the media closely monitors rule observance, and non-compliance is likely to trigger public debate; (2) there is media interest in rule compliance, but non-compliance is unlikely to invoke public debate; (1) there is no or modest interest from the media on fiscal rules. This numerical system allows tracking of trends in media visibility over time.

The media visibility dimension of the index was discontinued in 2017. A review of the overall methodology underpinning this index found a high degree of variation in the scores that the experts gave to the media visibility of fiscal rules over time. As a result, and for lack of an alternative readily available measure, the media visibility dimension was discontinued in 2017.

B. IMF fiscal council index

The IMF's index measuring the strength of fiscal councils takes media visibility into account. The composite indicator is based on the following five categories (Debrun et al., 2013: 12, 26; Debrun et al., 2017b: 8):

- legal independence;
- safeguards on the fiscal council's budget;
- fiscal rules monitoring;
- media impact;
- forecast assessment.

Media visibility is measured based on expert judgement. The impact of media is assessed by IMF staff based on several factors such as the number of publications by fiscal councils, media references to the reports, and, for EU Member States, the authorities' own assessment, as reflected in the IMF's Fiscal Institutions Database. The assessment is binary, being one if there is a high media impact and otherwise zero.

2. LITERATURE REVIEW

This chapter reviews the economic literature assessing the impact of media visibility on financial markets and economic policy-making (see Table 1 for a summary).

Main scope

There is a rich literature showing that media visibility can have a significant impact on financial markets ([21]). A large part of the literature focuses on central bank communication and its effects on macro-financial indicators such as the euro exchange rate ([22]), asset prices ([23]), stock markets ([24]), bond yield spreads ([25]), credit default swaps ([26]) and unemployment rates ([27]). The general finding is that statements of central bankers can indeed have a significant effect on financial markets. In the aftermath of the European sovereign debt crisis, several studies have also assessed the impact of political communication. Authors assessed the extent to which statements by key policy-makers on fiscal consolidation measures, country bailouts or defaults had an impact on bond markets. The general finding is that communication by policy-makers can affect bond yields at least during times of deep crisis ([28]). More recently, this type of research has been extended beyond the crisis times, allowing for a comparison between deep crises and better economic times ([29]).

The literature also concludes that media visibility can influence economic policy-making. Case studies show that media coverage can influence policymakers' stances on EU fiscal policy in the context of the Stability and Growth Pact. For example, German policymakers have stated that strong controversy in the national press regarding an early warning by the Commission in 2002 about Germany's state finances facilitated the creation of a stability pact between the German federal government and Laender authorities ([30]). Moreover, empirical studies show that members of parliament more often ask parliamentary questions about economic or fiscal policies if these topics receive more attention in the media ([31]). Similarly, political parties appear to adjust their agenda to topics, which receive a lot of media attention ([32]). These findings suggest that media visibility can help increase democratic accountability.

Role of events and economic cycle

The impact of media visibility is often assessed around specific events. Many studies analyse the intensity of the debate around specific events, for instance election dates ([33]) or important policy

[21] Tetlock (2007), Garcia, (2013), Caporale et al. (2018).

[22] Erhmann et al. (2014).

[23] Ehrmann and Fratzscher (2007).

[24] Haupenthal and Neuenkirch (2016).

[25] Hansen and McMahon (2015).

[26] Buechel (2013), Apergis et al. (2016).

[27] Fraccaroli et al. (2020).

[28] Beetsma et al. (2013), Gade et al. (2013), Mohl and Sondermann (2013).

[29] Caporale et al. (2018), Erlwein-Sayer (2018), Diaz Kalan et al. (2018), Wolfinger et al. (2018), Afonso et al. (2019).

[30] Meyer (2004).

[31] Vliegenthart et al. (2016).

[32] Van der Pas et al. (2017).

[33] O' Malley et al. (2014), Bernhagen and Brandenburg, (2015).

announcements. For instance, the 'whatever it takes' speech by former ECB President Draghi in London was found to have had a substantial impact on financial markets in the euro area ([34]).

The economic cycle appears to influence media reporting. Some studies assess the impact of media visibility over a longer period. This helps control for other relevant factors, such as the economic cycle. Evidence shows that there is indeed a higher amount of news on fiscal policy during economic downturns ([35]), but also that the content of the economic policy debate changes in times of economic crisis ([36]).

Country coverage

Most studies compare the impact of media visibility across several countries. Studies that focus on financial markets during the Great Recession of 2008 and 2009 usually compare the media impact in fiscally vulnerable and non-vulnerable Member States ([37]). Some studies also compare the euro area experience with the US, in particular regarding the impact of central bank communication on financial markets.

Types of media sources

The literature has assessed different types of media source. The impact of media visibility has been assessed in diverse media outlets (e.g. in print media, TV or radio news) and also in terms of direct communication from policymakers or central bank officials (e.g. interviews or official press releases by central bank officials). Many studies use a selection of media sources, such as newspapers or newswire agency reports from a given country due to a specific focus or lack of data availability ([38]). However, this type of limited selection arguably only mirrors part of the debate in any given country and can therefore lead to biased results ([39]).

A key challenge in the literature is the availability of media data. Some studies that employ direct news data rely on news databases, such as Lexis-Nexis ([40]) or Factiva ([41]). The benefit of using such a database is that it potentially allows for collection of news data from different media sources on a daily basis. A downside is that this information is not always publicly available and requires a paid subscription.

Tonality of media articles

Some studies investigate the impact of the tonality of the discussion. Studies confirm that 'good' news tends to positively affect financial markets, whereas 'bad' news usually affects these markets negatively ([42]). Some studies give this tonality a more context-specific financial interpretation, for example through the use of 'contractionary versus expansionary' budgetary policies or 'dovish' versus `hawkish' statements ([43]).

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[34] Saka et al. (2015), see Draghi's speech: https://www.ecb.europa.eu/press/key/date/2012/html/sp120726.en.html

[35] Ahmad et al. (2015).

[36] As suggested in Fraccaroli et al. (2020).

[37] Dergiades et al. (2014), Mohl and Sondermann (2013).

[38] As done by for example Barnes and Hicks (2017).

[39] Buechel (2013): 415.

[40] Van der Pas et al. (2017), van Elsas et al. (2020).

[41] Buechel (2013), Ehrmann et al. (2014), Apergis et al. (2016).

[42] For example, leading to lower or high bond yield spreads and lower or higher Euro exchange rate. See Beetsma et al. (2013), Mohl and Sondermann (2013), Gade et al. (2013), Ehrmann et al., (2014), Wolfinger et al. (2018).

[43] Peterson and Sattler (2018), Buechel (2013), Afonso et al. (2019) respectively.

The choice of methodology

Studies assessing the impact of media visibility typically analyse large amounts of news media using text mining techniques. Text mining can be used to search (or 'mine') large amounts of text. The key objective is to gather and analyse large quantities of relevant information, such as newspapers, which can then be used for empirical analyses ([44]).

Three main approaches have been used to analyse the content or tone of news. After selecting or mining the relevant news, the approaches used to analyse the content or tone of news are of three types.

- The *expert judgement approach* puts an expert in the field in charge of analysing the data. The expert assesses the collected data and codes each article by hand ([45]). Expert judgement can ensure a high-quality assessment if experts are carefully selected. At the same time, there is a risk of partial or subjective assessment, which can hamper a sound comparison across experts or time. The use of expert judgement also appears challenging if the amount of text is too large.
- *Lexicon approach* (also rule-based dictionary or bag-of-words approach): This approach requires first defining a specific set of keywords or lexicon ([46]). This approach identifies a media source as relevant if it contains at least one keyword ([47]). It can also be used to analyse the content of news, for instance by assigning keywords to either a 'positive' or 'negative' category and assessing the tone of an article ([48]). The lexicon approach is the most widely used approach in the economic literature on text mining. While this approach allows a large amount of media news to be analysed, it can be challenging to set up a useful list of keywords and assess the tone of news.
- The *machine learning approach* selects the relevant news with the help of a search engine using a probability model ([49]). The search engine constructs the model based on a sample of similar articles that are selected by an expert and entered into the system beforehand. The system will then 'learn' to identify articles that it deems to be similar enough to those that the expert has preselected. In a way, this approach mimics the capacity of a human expert to learn new things along the way, but with the near unlimited calculating power and memory of a computer ([50]). As such, this approach can be used to classify large amounts of data and find the optimal model when working with many different variables. It therefore allows predictions of outcomes for different complex policy choices. For example, machine learning is used to construct different indicators that predict compliance with the fiscal rules of the SGP in different financial scenarios ([51]) and also for the construction of new economic and financial variables ([52]).

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[44] Other names for this type of approach are text sentiment analysis, natural language processing or computational language analysis. Also, see Hotho et al. (2005).

[45] Wolfinger et al. (2018).

[46] Fraccaroli et al. (2020).

[47] Tetlock (2007); Loughran and McDonald (2011).

[48] Beetsma et al (2013), Gade et al. (2013), Ehrmann et al. (2014), Falagiarda and Gregory (2015), Apergis et al. (2016), Conrad and Zumbach (2016), Wolfinger et al. (2018). Alternatively, Buechel (2013) speaks of 'dovish' versus 'hawkish' statements.

[49] Liu (2010).

[50] Shapiro et al. (2019).

[51] Baret and Papadimitriou (2019). Another use of machine learning comes from Athey (2018), who looks at its applications in the field of macroeconomics.

[52] Soroka et al. (2014); Tobback et al. (2018).

Table 1. **Impact of media visibility on financial markets and politics - literature overview**

Impact of media visibility on financial markets							
Paper	**Context**		**Media qualifiers**				
Authors	**Impact of media on…**	**Period & country**	**Topic of the meda**	**Source**	**Special features**	**Met-hod**	**Main result of media**
Ehrmann and Fratzscher (2007)	Asset prices	1997-2004 Euro area, UK, USA	Central bank speeches on monetary policy	1 newswire agency	Tighter vs. looser monetary policies	EJ	For ECB and Fed, policy predictability and market responsiveness are good
Tetlock (2007)	Stock investor sentiment	1984-1999 USA	Debt, stock and bond markets	Daily columns in 1 newspaper	Positive vs. negative news	ML, EJ	Media is a solid proxy for asset values and near-future market volatility
Beetsma et al. (2013)	Interest rates, public debt	2007-2012 GIIPS, six EU countries	General macro-economic and financial news	Euro-intelligence newsletter	Good vs bad news (budget tightening or loosening)	Lex	More (bad) news drives up domestic interest rates in countries in crisis
Buechel (2013)	CDS and bond yields	2009-2011 GIIPS, DE, FR, ECB.	Commitment to support/save GIIPS countries	Statements by high-ranking officials	Dovish vs. hawkish statements	Lex	Communications by larger EU countries and EU institutions affect bond spreads the most
Mohl and Sonder-mann (2013)	Bond yields	2010-2011 EU countries	Statements by officials on EFSF, bailouts, restructuring	4 newswire agencies	Comparing statements on fiscal policies / measures	Lex	Political communications during financial crisis mattered
Gade et al. (2013)	Bond yields	2009-2011 EMU countries	Communication on deficit, debt, Euro crisis	4 newswire agencies	Positive vs. negative news	Lex	Only certain types of communications have an effect on bond spreads
Dergiades et al. (2014)	Bond yields	2010-2013 GIIPS, FR, NL	European sovereign debt crisis	Social media + Google searches	Employs search engine data	Lex	Abnormal stock returns are driven by negative news on GIIPS
Ehrmann et al. (2014)	Euro area exchange rate	2009-2011 EMU countries	National / ECB / EU monetary measures	1 newswire agency	Controversy + negative vs. positive tone	Lex, EJ	Policy announcements affect exchange rate more than macro-economy
Apergis et al. (2016)	Credit defaults swaps	2009-2012 GIIPS, BE, DE, FR, NL, UK	European sovereign debt crisis	Newswire messages	Counting words (not articles)	Lex	Negative announcements cause negative bond yield spill-overs to other countries

Haupenthal and Neuenkirch (2016)	Stock investor sentiment	2015 EL, DE, EMU	Grexit, sovereign debt crisis.	1 newswire agency	Positive vs. negative news + different spokespersons	Lex, EJ	News on Grexit directly led to raise or fall of stock returns (depending on tone of the news)
Peterson and Sattler (2018)	Investor confidence	2000-2016 GIIPS countries	Statements by presidents and finance ministers	1 newswire agency	Expansionary / contractionary policy statements	Lex	Political polarisation affects market confidence in finance minister announcements
Wolfinger et al. (2018)	Bond yields	2007-2016 12 (non-) EMU countries	EU, Euro area, country-specific economic issues	TV news	Protagonists, tonality, topic and source	Lex, EJ	More news on Eurozone reduces yield spreads, especially country-specific good news
Afonso et al. (2019)	Bond yields	1999-2016 *data varies 10 euro-area countries	Macro-economic, fiscal, monetary policies	ECB announcements	Type of announcements: interest rate or monetary policy	EJ	The effects of ECB/EC announcement differ when looking at effects on bond yields spreads
Shapiro et al. (2019)	Macro-economic/ consumer sentiment	1980-2015 *monthly USA	General financial and economic topics	16 major newspapers	Coded on a positive - negative scale	Lex, ML, EJ	Daily news sentiment index accurately predicts the next day's consumer sentiment
Fraccaroli et al. (2020)	Price stability, unemployment	1999-2019 Euro area, UK, USA	Price stability, monetary, unemployment hearings.	Parliament hearings of central bank officials	Intensity over time + hawkish vs. dovish sentiment	Lex	Central bank hearings on relevant policies, bad tone associated with rise in unemployment

Impact of media visibility on politics							
Paper	**Context**			**Media qualifiers**			
Meyer (2004)	Policy-makers' support for the SGP	Two weeks in 2001-2002 DE, IE	EU fiscal rules	2 newspapers in each country	Pro-EU or nationalistic frame	EJ	Recommendations were given considerable media attention and induced governments to justify themselves
O'Malley et al. (2014)	Election results	3 weeks in 2002 + 2007 + 2011 IE	Political parties, elections and economic policies	4 newspapers	Politically driven or economic policy driven	Lex, EJ	In elections during crises, media and voters focus more on (economic) policy

							messages
Vliegenthart et al. (2016)	Attention for issue in parliament	1995-2011 *monthly Eight EU countries	Political, economic and financial topics	Newspaper articles, radio shows	News articles coded by hand and linked to one political topic	Lex, EJ	The effect of media is stronger in single-party governments. Media affects political agenda more than vice versa
Barnes and Hicks (2017)	Support for austerity measures	2010-2015 UK	Fiscal consolidation	2 newspapers	Correspondence with fiscal, macro, austerity, or debt.	Lex	Support for austerity directly associates with what newspaper people get their news from

3. BUILDING A MEDIA VISIBILITY INDICATOR

This chapter presents the dataset and the methodology used to identify relevant media articles on fiscal rules.

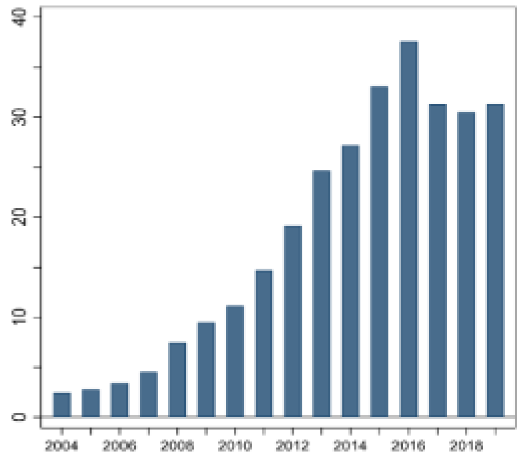
Database

We use a large dataset to analyse the reporting on fiscal rules and fiscal councils in the media. We use the metadata data created by the Commission's Europe Media Monitor. The EMM, started in 2002 as a scientific research project to support the Commission in its media monitoring activities, was developed and is maintained by the Text and Data Mining Unit in the Directorate for Competences of the European Commission's Joint Research Centre in Ispra. The main purpose of the EMM is to provide monitoring of a large (but selected) set of electronic media, to categorise articles and apply language technology tools for several purposes, such as extracting quotes or applying sentiment analysis. The system currently monitors almost 11,000 sources to explore around 300,000 articles a day published on the internet.

We exceed current practices by analysing almost 300 million news items from different media sources. While the existing indicators on media visibility are based on the judgement of a small number of experts, we set-up an indicator based on a very large sample. We collect daily data from sources in all 27 Member States and the United Kingdom. The dataset consists of metadata extracted from news sources on a daily basis over 2004-2019 period. After filtering the dataset for relevant geographical coverage and sources, we obtain news items corresponding to almost 300 million news items (Graph 1). This corresponds to about 50,000 articles in the EU on average per day over the past 16 years. The number of articles per year has increased over time, which reflects the fact that the EMM started as a rather small database and has steadily evolved over time.

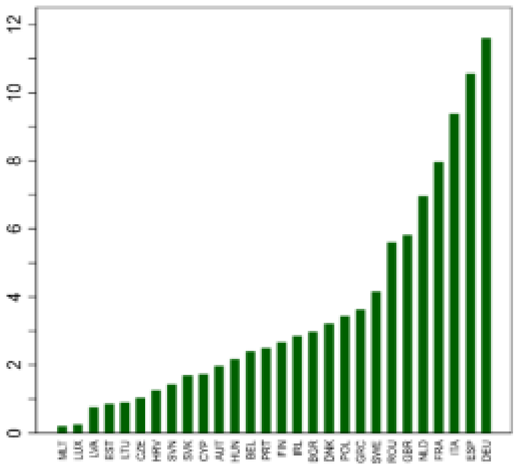
The distribution of articles across Member States broadly corresponds to the population share of EU countries (Graph 2). We find the highest number of articles in high-population countries (DE, ES, FR and IT) and the smallest numbers in low-population countries (LU, MT). Overall, the selection broadly corresponds to the population share of Member States, indicating that the database dataset covers a solid representation of media presence in EU countries.

Graph 1. **Total number of news items from the EMM database *(in millions, EU, 2004-2019)***



Source: Commission services based on the Europe Media Monitor database.

Graph 2. **Distribution of news items across countries *(in % of total number of articles)***



Source**:** Commission services based on the Europe Media Monitor database

Methodology used

The media visibility indicator corresponds to the ratio of articles on fiscal rules divided by the total number of articles in the dataset. This is a straightforward indicator of frequency. Its statistical significance is guaranteed by the diversity and very large size of the dataset, as mentioned earlier. Since the amount of data and sources available in the monitored by EMM database has changed over time, we define our main indicator as the share of articles divided by the total number of media sources per day.

We apply a text mining approach to find the number of occurrences of keywords related to fiscal rules in a large amount of media sources. Due to the sheer amount of articles, a thorough assessment of each article based on expert judgement lies beyond the realm of possibility. We therefore apply state of the art text mining techniques ([53]). These have been frequently applied in the literature to assess central bank communication.

We identify relevant articles on fiscal rules using a lexicon approach. We employ a lexicon approach to select relevant news media articles on fiscal rules. In doing so, we identify 23 keywords representing articles on fiscal rules (Annex 1). We use a relatively comprehensive lexicon to avoid missing an important dimension of the discussion on fiscal rules. Some of the keywords are intentionally technical, since they rule out the possibility of identifying false positive hits. Overall, we verified the strength of our keywords by conducting several careful sample checks. We revised or deleted keywords that gave no or little relevant results.

We also search for articles on independent fiscal institutions (IFIs). As explained above, media visibility is key for independent institutions, since it can both reinforce the IFI's legal and financial independence and alleviate the 'opportunistic debt bias' ([54]). Therefore, it is relevant to see how well the reporting on fiscal rules by fiscal councils is covered in the media. We search for articles containing at least once the word strings 'fiscal council', 'independent fiscal institution' or the name of one of the independent fiscal institutions, including the 'European Fiscal Board'.

To allow for the largest possible coverage of keywords in the media, we translate our keywords into 22 EU official languages ([55]). This allows us to assess all major media outlets in the Member States, not just the English language sources. Fiscal experts and native speakers from the European Commission checked the translation of keywords.

Our lexicon approach is robust to grammatical cases and spelling. For the main list of EU fiscal rule keywords, we account for this in all languages by using 'wildcards', which are characters that could stand for letters and therefore account for different spellings or cases ([56]). We also adjusted for the capitalisation of letters, allowing us to include both capitalised and non-capitalised words ([57]).

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[53] ECFIN analysts, in cooperation with JRC analysts, also considered using a machine learning approach, mainly to more easily identify different emotions or sentiments in the news articles on a large scale. However, machine learning is still a relatively new approach compared to using a carefully constructed lexicon. Although scholars are starting to use machine learning for fiscal policy analysis (Baret and Papadimitrou, 2019), the reliability of this method is not yet rigorously tested in relation to financial news sentiment.

[54] The 'opportunistic debt bias' occurs when incumbent policy makers spend additional public funds when they are in office in an effort to appear more competent to the public.

[55] The following official languages are not included in our search: Irish/Gaelic, Luxembourgish and Maltese. We instead looked at the official language(s) that media use most frequently at the national level. For Luxembourg, this is German and French. For Ireland and Malta this is English (Special Eurobarometer 386). Minority languages (such as Basque, Catalan, Galician and Scottish Gaelic) have also not been included.

[56] For instance, we use program% to cover articles on program, programs, programme and programmes. This is called 'stemming' and is a common practice for lexicon-based text mining, see Hotho et al. (2005): 25.

[57] We did so by using solely non-capitalised letters in the EMM syntax, allowing the EMM system to pick up both capitalised and non-capitalised versions of the words.

4. STYLISED FACTS ON MEDIA VISIBILITY

This chapter presents some stylised facts of our media visibility indicator.

There are considerable differences concerning the use of relevant keywords in the media. Graph 3 is a word cloud, which shows the frequency of occurrences of a fiscal-rule-related keyword, proportionate to the size of the letter. As described in the previous chapter, we consider an article to discuss fiscal rules if the extracted metadata contains at least one keyword of our lexicon. We find that our keywords are used to differing degrees. The keywords 'Stability and Growth Pact' and 'fiscal rule' come up the most, closely followed by 'stability program', 'draft budgetary plan' and 'excessive deficit procedure'. By contrast, keywords that are more technical occur less frequently.

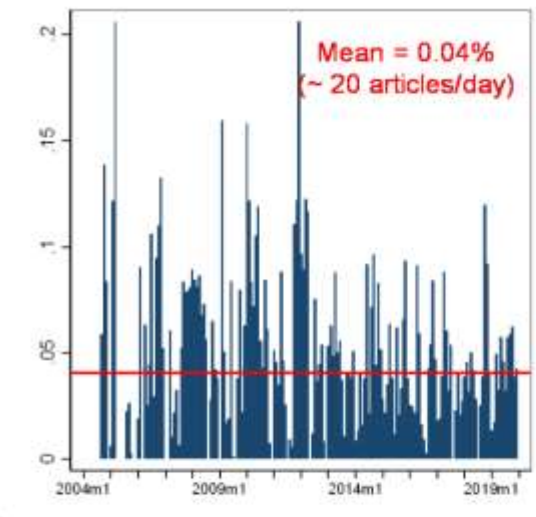
Graph 3. **Word cloud fiscal rules keywords**

Source: Commission services based on the Europe Media Monitor database.

Articles on fiscal rules have received considerable attention in the media (Graph 4, Table 2). We identify almost 120,000 articles in our dataset covering metadata from about 290 million articles. This corresponds to around 0.04% of the total amount of articles or an average of about 20 articles a day in the EU over the past 16 years.

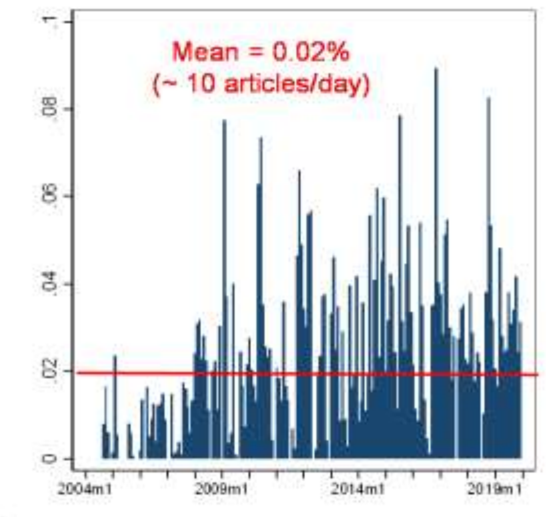
Fiscal councils have become more visible in the media over time (Graph 5, Table 2). The reporting on fiscal councils appears to have increased over time. This can be explained by the larger number of fiscal councils being established since 2010. In total, we find more than 55,000 articles on fiscal councils. This corresponds to about 0.02% of the total amount of articles or an average of 10 articles a day.

Graph 4. **Media visibility over time – fiscal rules *(in % of total articles, EU)***



Source: Commission services based on the Europe Media Monitor database.

Graph 5. **Media visibility over time – fiscal councils *(in % of total articles, EU)***



Source: Commission services based on the Europe Media Monitor database.

Reporting on fiscal rules and fiscal councils happens more frequently in nationwide than in regional media outlets (Table 2). We find that national media outlets, on average, report relatively more on fiscal rules than big regional media outlets. A plausible explanation is that regional media tend to focus more on local news, whereas national media more frequently report on national and international events.

Table 2. **Number of articles on fiscal rules and fiscal councils**

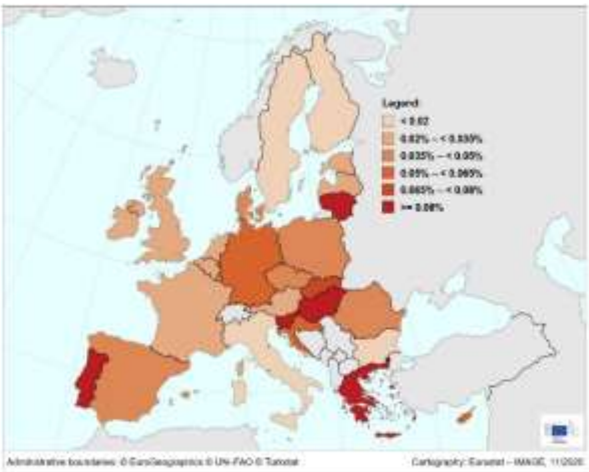
	Total articles	Articles on fiscal rules		Articles on fiscal councils	
	Total	Total	Share	Total	Share
	(in mio.)	*(in articles)*	*(in %)*	*(in articles)*	*(in %)*
Full sample	289.8	119,813	0.041	55,383	0.019
- National media	209.7	92,294	0.044	43,045	0.021
- Regional media	80.1	27,519	0.034	12,338	0.015
Top 5 newspapers	39.2	16,698	0.043	8,344	0.021

Source: Commission services based on the Europe Media Monitor database.

The intensity of the reporting on fiscal rules differs strongly across Member States (Graph 6). It does not appear to follow a clear geographical pattern. It appears relatively strong in some southern (EL, PT) and eastern (HU, LT, SI) European countries.

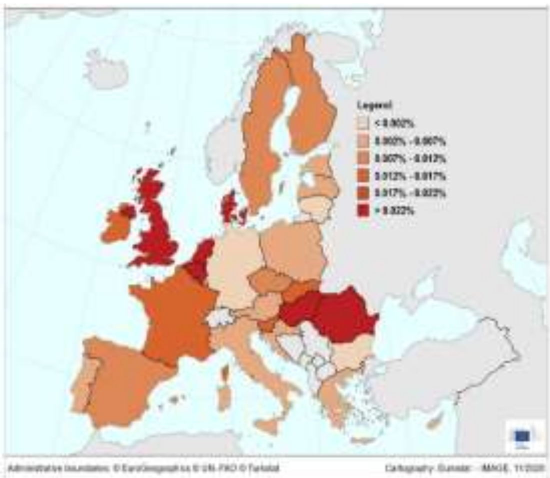
Media visibility of fiscal councils appears to be highest in countries with a long tradition of IFIs, captured by their seniority (Graph 7). The media visibility of fiscal councils tends to be most intense in the Netherlands, Belgium, the United Kingdom and Denmark. These countries all have well-developed IFIs that were created before the EU initiatives to incorporate and broaden the role of IFIs in fiscal governance at EU level. This finding is in line with the assumption that the visibility and effectiveness of fiscal councils does not take effect immediately, but slowly increases over time.

Graph 6. **Heat map for the intensity of the discussion on fiscal rules *(2004-2019)***



Source: Commission services based on the Europe Media Monitor database.

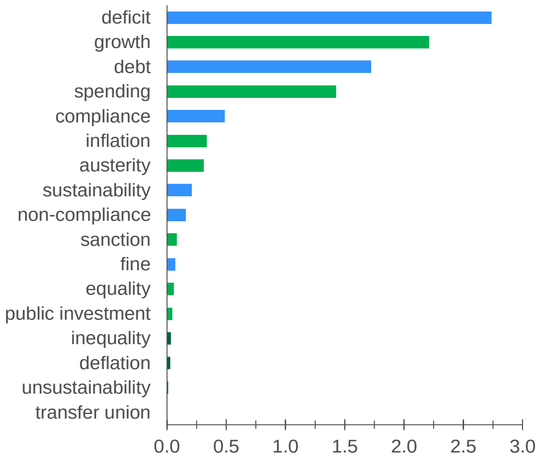
Graph 7. **Heat map for the intensity of the discussion on fiscal councils *(2004-2019)***



Source: Commission services based on the Europe Media Monitor database.

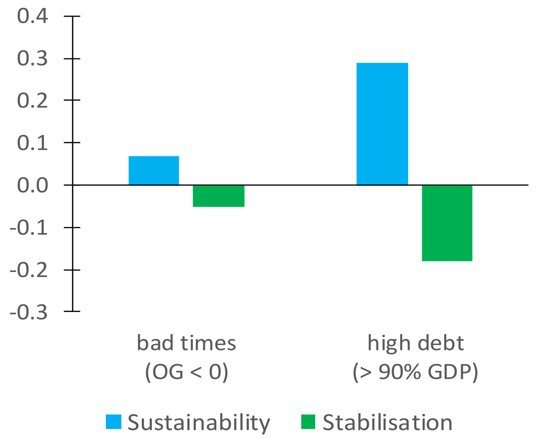
The media reporting appears to reflect different views and perspectives regarding the main objective of fiscal rules (Graph 8). We analysed what other words are used in articles on fiscal rules. We find that many articles discuss the sustainability dimension of fiscal rules. This is shown by the use of keywords such as debt, sustainability, compliance with rules or fines. At the same time, many articles appear to reflect upon the stabilisation dimension using words such as growth or public investment. A significant share of articles put the discussion on fiscal rules in the broader context of inequality.

Graph 8. **Other keywords used in articles on fiscal rules *(average occurrence per article)***



Source: Commission services based on the Europe Media Monitor database.

Graph 9. **Focus of media under certain conditions *(vs. average occurrence per article)***



Source: Commission services based on the Europe Media Monitor database.

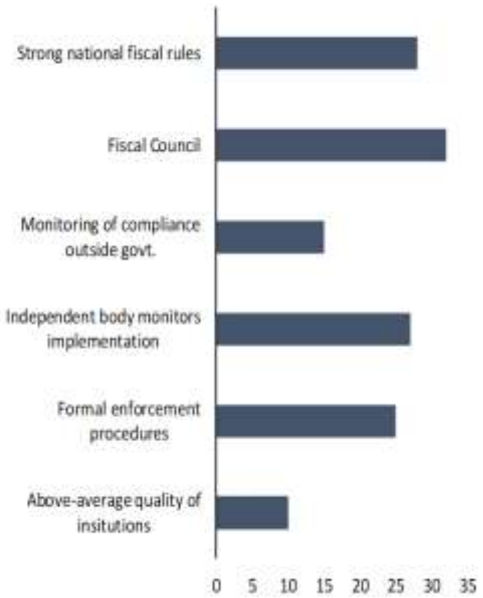
The media appears to shift its focus to the importance of fiscal rules for sustainable of public finances during economically bad times and periods of high public debt (Graph 9). When public debt is high or economic times are bad, we observe that the media reporting appears to give more attention to the sustainability dimension of public finances. By contrast, we find that during good economic times or periods of low public indebtedness, the media reporting tends to give more attention to the stabilibisation over the sustainability dimension.

The media visibility of fiscal rules appears higher in countries with sound fiscal institutions (Graph 10).[58] Results show that the number of articles on fiscal rules increases in countries after they establish a fiscal council (+30%) as well as in countries with a strong design of national fiscal rules (+26%), IFIs monitoring compliance (+26%) and strong formal enforcement procedures (+24%).

The reporting on fiscal rules tends to be also more frequent during bad economic times (Graph 11). Our results show that media visibility increases during challenging fiscal and economic times. In particular, we identify more articles on fiscal rules during the Great Recession of 2008-2012 (+40%), EU/IMF economic adjustment programmes (+40%) or excessive deficit procedures (+38%).

[58] Note: Strong national fiscal rules defined as countries based on the fiscal rules strength index (European Commission), existence of fiscal council, monitoring of compliance outside government, independent body monitoring implementation and formal enforcement procedures (all from IMF); quality of institutions (World Bank) above average.

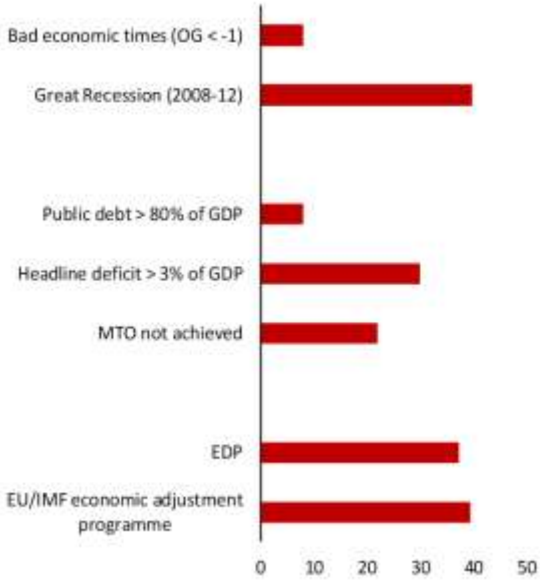
Graph 10. **Increase in news articles on fiscal rules for institutional factors *(in % compared to non-event)***



Note: Strong national fiscal rules defined based on the fiscal rules strength index (European Commission), existence of fiscal council, monitoring of compliance outside government, independent body monitoring implementation and formal enforcement procedures (all from IMF); quality of institutions (World Bank).

Source: Commission services based on the Europe Media Monitor database.

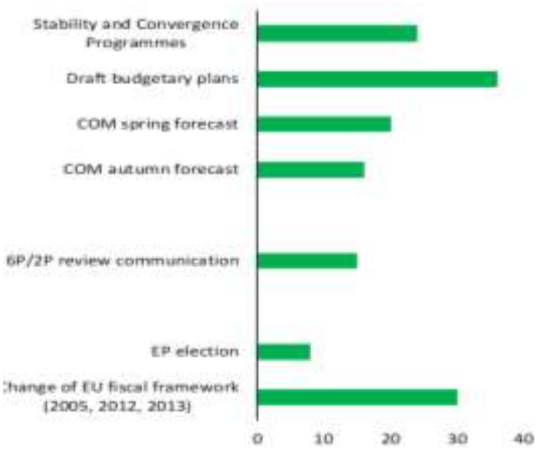
Graph 11. **Increase in news articles on fiscal rules for economic events (in %, compared with non-event)**



Source: Commission services based on the Europe Media Monitor database.

The amount of news articles on fiscal rules increases considerably around the release of fiscal documents by the European Commission (Graph 12). The results demonstrate increased reporting around the time of release of the Draft Budgetary Plans (+35%), the Commission assessment of the Stability and Convergence Programmes (+25%) and the European Commission spring forecasts (+20%). Furthermore, around European Parliament elections we only see a relatively small rise in the intensity of reporting on fiscal rules (+8%), which may be driven by the small sample size.

Graph 12. **Increase in news articles on fiscal rules for economic events (in %, compared with non-event)**



Source: Commission services based on the Europe Media Monitor database.

5. EMPIRICAL ANALYSIS

This chapter tries to identify a causal relationship between media visibility and the effectiveness of EU fiscal rules using an empirical analysis.

For this purpose, we include our media visibility indicator in a panel regression model for EU Member States and the UK in 2004-2019. We measure the effectiveness of fiscal rules using an indicator for the numerical compliance with EU fiscal rules. We identify media visibility of fiscal rules using our new indicator presented in the previous chapter. We also control for the relevant drivers of the compliance with fiscal rules in line with the literature. To better capture the information available to policy-makers at that time, the analysis is based –as far as possible– on real-time data from past Commission AMECO data vintages. More technical details on the regression approach are explained in chapter 5.2.

5.1. KEY VARIABLES

How to measure the effectiveness of EU fiscal rules?

We assess the effectiveness of fiscal rules using an indicator of numerical compliance with EU fiscal rules. The compliance indicators measure the annual deviation in per cent of GDP of each EU fiscal rule: the debt, deficit, expenditure and balanced budget rules. A negative value indicates a shortfall vis-à-vis the target or reference value implied by our definition of the rule, while a positive value refers to an outcome exceeding the target or the reference value. We would like to stress that our numerical compliance indicator does not have official or legal status. The official assessment of compliance can be seen as supplementing the numerical indicators with judgements in the form of 'overall assessment', where relevant factors are considered in a non-mechanical way. Nevertheless, the numerical compliance indicator still represents the key rationale of EU fiscal rules as set out in primary and secondary EU legislation and it is used in the related literature ([59]).

The numerical compliance indicators are defined as follows ([60]):

- *Structural balance rule* ([61]): a negative (positive) sign means that the country's fiscal effort, as measured by the change in the structural balance, falls below (exceeds) the pure matrix requirements ([62]) or that the country is below its medium-term objective (MTO).
- *Expenditure rule*: a negative (positive) sign means that the annual 10-year average rate of nominal potential growth falls below (exceeds) the growth rate of net expenditure growth. We measure potential growth and net expenditure growth rate in line with the EU expenditure benchmark ([63]).
- *Headline deficit rule*: a negative (positive) sign means that the headline balance is worse than (better than) a deficit of 3% of GDP.
- *Debt rule*: for countries with a debt-to-GDP ratio above 60%, a negative (positive) sign means the actual debt-to-GDP ratio is greater than (lower than) the one required by the (backward-looking) 1/20 debt reduction rule. For countries with debt-to-GDP ratio below 60% of GDP, the sign is

[59] See, e.g., Reuters (2019), Larch and Santacroce (2020).

[60] For a broadly similar definition, see Larch and Santacroce (2020).

[61] The deviation to the structural balance rule is calculated as the difference between the change in the structural balance and the fiscal adjustment requirement of the fiscal framework following the so-called matrix.

[62] The matrix of requirements was introduced in 2015 to modulate the requested fiscal adjustment across the economic cycle and the level of debt (Vade Mecum, 2019).

[63] PFR (2019), Vade Mecum (2019).

positive and measures the distance to the 60% reference value. This is a mechanical and simplified version of the debt reduction benchmark of the SGP.

Our compliance indicators depart from the simplifying assumptions used in the literature in two respects. First, we take into account that the EU fiscal rules have changed over time. In particular, the structural balance rule was modified in 2005 (mainly by introducing a country-specific MTO) and in 2015 (mainly by modulating the required fiscal adjustment around the economic cycle and public debt in the context of introduction of the matrix of requirements). Second, we assess the numerical compliance with EU fiscal rules in real time using AMECO data from past Commission spring forecast reports. This ensures that our assessment is not biased by ex-post revisions, which were not known to policymakers at that given point in time ([64]).

5.2. EMPIRICAL SPECIFICATION

We use a panel regression approach to assess the impact of media visibility on the effectiveness of EU fiscal rules (a similar set-up is chosen as in European Commission, 2020c). The analysis concentrates on up to 28 EU Member States (i) and 16 years (t), covering the period 2004 to 2019. We primarily use real-time data from past Commission spring forecast vintages ([65]).

The specification looks as follows:

$$compliance_{i,t-1}^{SF\,t} = \beta_1 compliance_{i,t-2}^{SF\,t} + \beta_2 media_{i,t-2} + \beta_3 X_{i,t-1} + \theta_t + \vartheta_i + u_{i,t}$$

where the dependent variable corresponds to the numerical compliance with the EU fiscal rules, i.e. the numerical deviation from the fiscal target or reference value. We distinguish between compliance with the four types of EU rules, i.e. structural balance, expenditure, deficit and debt rule (see description in the main text). A positive coefficient corresponds to an over-achievement of the fiscal rule, while a negative coefficient means an under-achievement.

Our variable of interest is the media visibility of fiscal rules. We use the indicator of media visibility as presented in Chapter 3. Since most of the other variables used in our analysis are only available on an annual basis, we also annualise our media visibility indicator.

We control for a wide range of relevant independent variables. The literature has identified several drivers of compliance with fiscal rules ([66]). These drivers relate in particular to (i) the design of fiscal rules and institutions, (ii) the macroeconomic conditions, in particular the economic cycle and (iii) political economy factors (see chapter 5.2 for a detailed description).

We include a set of relevant independent variables to prevent an omitted variable bias. They are referred to by the economic literature as relevant determinants of fiscal performance. The expected sign with respect to compliance is shown in brackets, while +/- corresponds to a fostering/weakening compliance ([67]).

- *Persistence* (+): Experience in the fiscal surveillance framework points to some degree of path dependency.

[64] Cimadomo (2012).

[65] Cimadomo (2012, 2016).

[66] Reuter (2019), Larch and Santacroce (2020), Larch et al. (2020), Thygesen et al. (2019), De Jong & Gilbert, (2020).

[67] Note that most papers assess the impact of the explanatory variables on the level of the cyclically-adjusted budget balance not the fiscal effort; see in particular Checherita-Westphal and Zdarek, 2017 and Golinelli and Momigliano, 2006).

- *Economic cycle* (+/-): Evidence shows procyclicality of fiscal effort, but also for rules that constrain stock variables rather than flow variables ([68]), higher compliance of nominal rules when growth and inflation rise ([69]).
- *Fiscal rules and institutions* (+): A stronger national fiscal framework tends to improve compliance with rules. Evidence shows that countries in excessive deficit procedure appear to improve compliance with fiscal rules ([70]). Compliance is supposed to be higher in countries with a long tradition of monitoring by fiscal councils ([71]).
- *Political economy channel*: Compliance appears to be weaker in election years or if there is less fragmentation or decentralisation ([72]).
- *Country and time-fixed effects*: The specification includes time-fixed effects (θ) and country-fixed effects (ϑ) to capture systematic differences across Member States and time, while u represents an error term.

We use an interaction model to test if the impact of media visibility has become stronger since the setting up of fiscal councils:

$$\begin{aligned} compliance_{i,t-1}^{SF\,t} &= \beta_1 compliance_{i,t-2}^{SF\,t} + \beta_2 media_{i,t-2} + \beta_3 fiscal\ council_{i,t} \cdot media_{i,t} \\ &+ \beta_4\, fiscal\ council_{i,t} + \beta_5 X_{i,t-1} + \theta_t + \vartheta_i + u_{i,t} \end{aligned} \tag{2}$$

where the fiscal council variable is a dummy variable, equal to 1 if a fiscal council exists. From equation (2) we can derive the marginal effect: it measures how a change of the media visibility impacts compliance with fiscal rules since the fiscal council came into existence:

$$\frac{\partial\ compliance}{\partial\ media} = \beta_2 + \beta_3\ fiscal\ council_{i,t}$$

In the interaction model the impact on compliance is depending on the dummy variable 'fiscal council'. The marginal effect is defined as $\beta_2 + \beta_3$ if the dummy variable is equal to 1 and it simplifies to β_2 in if the dummy is 0 ([73]).

5.3. MAIN FINDINGS

The key findings of our regression approach can be summarised as follows (Table 3):

- *The compliance with EU fiscal rules seems to be path dependent.* The results show that compliance with the EU fiscal rules in the previous years has an impact on compliance in the current year. This holds irrespective of the EU fiscal rule considered.
- *The business cycle matters.* We find that numerical compliance with the structural balance and expenditure rule deteriorates if the economic conditions improve. This points to the procyclicality of the fiscal effort, which has been shown in previous studies ([74]). An improving economic

[68] Reuter, 2019

[69] Larch & Santacroce, 2020

[70] Thygesen et al, 2019

[71] Reuter, 2019

[72] Reuter, 2019

[73] For the specification and interpretation of interaction terms see Brambor et al., 2006, Braumoeller, 2004

[74] PFR (2019).

situation does not have an impact on the deficit and debt rules, probably as the looser fiscal effort offsets the favourable cyclical effect.

- *The quality of fiscal rules improves compliance.* A better design of national fiscal rules –as classified in the Commission's fiscal rules strength index– fosters the compliance with EU fiscal rules. This potentially means that increased national ownership of fiscal rules, through an overall more robustly built national fiscal framework, is supportive of the compliance with EU rules.
- *The existence of an EU/IMF adjustment programme improves compliance.* Our evidence shows that the economic adjustment programmes improved the compliance with the expenditure and deficit rule.
- *Political economy plays a role.* We find that election years are associated with a looser compliance with the expenditure and structural balance rules, but not with the deficit and debt rules. One explanation could be that governments try to stimulate the economy in election years with expansionary fiscal policy, but within their respective fiscal space (thus not breaching the deficit rule). This reduces the compliance with the structural balance and expenditure rules. At the same time, economic stimulus may facilitate the immediate compliance with the nominal rules. [75]

Table 3. **Panel regression results**

	Dependent variable: Deviation from ...			
	structural balance rule	expenditure rule	deficit rule	debt rule
	(1)	(2)	(3)	(4)
Dependent variable (t-1)	0.186**	0.221***	0.594***	0.883***
	(2.252)	(2.961)	(6.733)	(11.086)
D.output gap (t-1)	-0.200***	-0.706***	0.069	0.425
	(-2.710)	(-4.118)	(1.272)	(1.507)
Implicit interest rate (t-1)	-0.159	0.413	-0.371**	0.500**
	(-1.231)	(1.168)	(-1.999)	(2.052)
EU/IMF adjustment programme (t-1)	1.369***	3.331***	1.181	-2.004
	(3.497)	(4.544)	(1.260)	(-1.420)
Fiscal rules strength index (t-1)	0.134*	0.103*	0.084*	0.086
	(1.729)	(1.906)	(1.945)	(1.469)
Election year (t-1)	-0.003*	-0.015**	-0.004	0.007
	(-1.993)	(-2.249)	(-0.981)	(1.257)
Media visibility top-5 news (t-1)	**2.566****	**3.692***	**1.126***	**1.125**
	(2.210)	**(1.898)**	**(1.862)**	**(0.379)**
Observations	380	392	392	391
Number of countries	28	28	28	28
Wald country dummies (p-value)	0	0	0	0
Long-term impact media (size)	3.153	4.738	2.774	9.61
Long-term impact media (p-value)	0.039	0.071	0.076	0.054
Hansen (p-value)	0.586	0.442	0.878	0.559
Number of instruments	32	32	32	32

Note: Panel estimations using the FD-GMM estimator, where lagged dependent variable, output gap and media variable are treated as endogenous.

Source: Commission services.

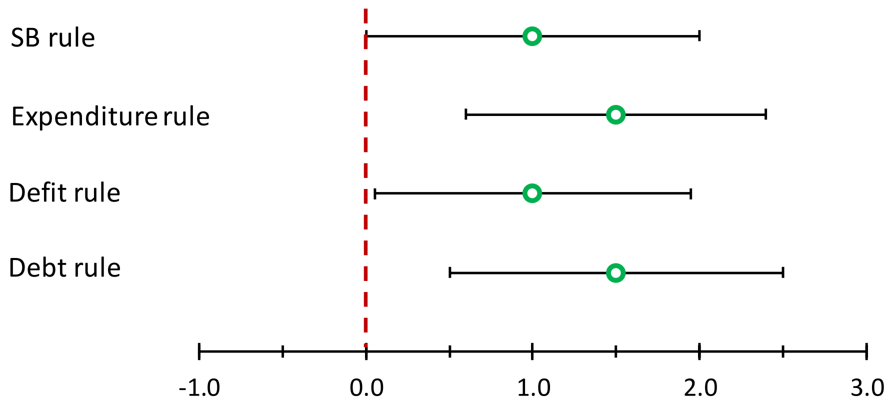
[75] The following variables were tested but turned out not to be significant and were therefore omitted from the final regression table: left- vs. right-wing party affiliation of the ruling government, degree of federalism and type of electoral system.

Most importantly, we find that media visibility tends to foster numerical compliance with EU fiscal rules (Table 3). Our evidence shows that a higher degree of media visibility tends to increase the numerical compliance with fiscal rules. This finding holds for all fiscal rules apart from the debt rule. Note that country-specific effects cannot explain these findings, since the specification includes country-fixed effects. We also try to address the challenge of reverse causality by including internal instruments in the GMM specification

Media visibility from nationwide media sources appears to be more important than from regional sources. We assess the impact of media visibility on different media sources. We find that media visibility of fiscal rules in nationwide media sources appears to have a significant impact on compliance. By contrast, we cannot find any significant impact of media reporting from regional sources.

Articles highlighting the benefits of fiscal rules for sustainable public finances have a particular strong impact on the compliance with EU fiscal rules (Graph 13). Our evidence shows that articles that refer more often to sustainability appear to have a greater impact on the compliance with EU fiscal rules than articles referring to the need for macroeconomic stabilisation.

Graph 13. **Impact of media visibility of fiscal councils on the compliance with fiscal rules**

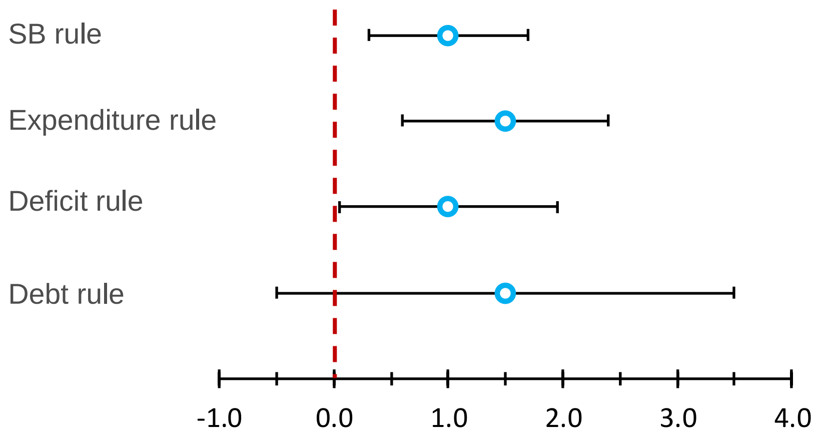


Note: Reading example: More reporting on fiscal rules focusing on sustainability appears to have a positive and significant impact on numerical compliance with the expenditure rule. The findings are derived based on panel estimations using the FD-GMM estimator, where lagged dependent variable, output gap and media variable are treated as endogeneous. The chart shows the impact of media visibility on articles focusing on sustainability view, which were derived from an interaction model as described in chapter 5.2. Green circles show the size of its impact, while the whiskers point to the confidence band at 90%. * means significant at the 10% level.

Source: Commission services.

The media visibility of fiscal councils appears to have also fostered the compliance with EU fiscal rules (Graph 14). We find evidence that the media visibility of fiscal councils also fosters the compliance with EU fiscal rules.

Graph 14. **Impact of media visibility of fiscal councils on compliance with fiscal rules**



Note: Reading example: The existence of a Fiscal Council appears to reinforce the positive impact of media visibility on numerical compliance with EU fiscal rules. The findings are derived based on panel estimations using the FD-GMM estimator, where lagged dependent variable, output gap and media variable are treated as endogeneous. The chart shows the impact of media visibility of fiscal councils since their existence, which were derived from an interaction model as described in chapter 5.2. Blue circles show the size of its impact, while the whiskers point to the confidence band at 90%.

Source: Commission services.

Our findings are robust to a range of sensitivity tests. We conduct a range of robustness checks cutting across several dimensions. We find that our main findings are robust to (i) modifications of the dependent variables, (ii) sets of independent variables, (iii) the use of datasets (real-time vs. ex post) and (iv) estimation techniques (GMM vs. LSDVc estimator).

Some caveats remain. In particular, like for every cross-country panel approach, the results reveal relationships, which are valid only on average across Member States, but may differ from one Member State to another.

6. CONCLUSIONS

Media visibility can help strengthen the effectiveness of fiscal rules. In particular, media visibility of fiscal rules can foster transparency, contribute to a more informed debate and act as a reputational enforcement device. The Commission and the IMF consider media visibility to be an important dimension in their indicators measuring the strength of the fiscal framework.

However, a high-quality assessment of media visibility of fiscal rules has not been hitherto available. Media visibility of fiscal rules has so far only been assessed based on surveys from a limited number of experts. This made it harder to specify the intensity or nature of the discussion on EU fiscal rules in a Member State. By contrast, there are much more sophisticated assessments of media visibility in the field of central bank communication.

We create a new, consistent and objective indicator for the intensity of the reporting on fiscal rules analysing almost 300 million articles. We explore for the first time a large sample of the Europe Media Monitor, a large Commission monitoring platform. This allows us to assess the media visibility of fiscal rules and fiscal councils in 27 Member States between 2004 and 2020 and the United Kingdom – then a member of the EU. We use a text mining approach on about 300 million articles for news on fiscal rules. In total, we identify about 120,000 articles on fiscal rules, corresponding to about 20 articles in the EU on average per day. Our numerical indicator allows us to measure the intensity of media coverage more closely, without making recourse to judgement.

We find that media visibility of fiscal rules is higher in countries with well-developed fiscal institutions, during bad economic times and close to the release of key fiscal policy news by the Commission. First, media reporting increased by up to 30% in countries with well-developed fiscal institutions, such as the existence of fiscal councils. Second, we find that the media covers more news on fiscal rules in bad economic times. The cyclical impact of media visibility could complement the usual explanations for 'higher deficit bias in good times'. Poorer media visibility exercises lower pressure to build buffers where economic conditions are more favourable. Third, we find that there was a marked increase in news close to the time of Commission releases of important fiscal policy news, such as the stability and convergence programmes, the 'six-pack' / 'two-pack' review, economic forecasts and draft budgetary plans.

We find that the effect of media visibility on the numerical compliance with fiscal rules is facilitated by long-standing fiscal councils. We find that Member States with a longer tradition of independent monitoring and visible fiscal councils see a more lively discussion on fiscal rules. This finding seems to be in line with earlier evidence by the IMF that the visibility and monitoring strength of fiscal councils slowly increases over time.

New empirical evidence suggests that media visibility tend to contribute to more effective fiscal rules and higher compliance with them. New evidence from panel regressions shows that media visibility appears to have fostered the numerical compliance with EU fiscal rules. Media from nationwide sources appears more effective than regional media. The creation of fiscal councils appears to have fostered media reporting on fiscal rules.

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ANNEX - List of keywords used in the text mining exercise

Keywords fiscal rules

balanced budget rule
convergence program
corrective arm
debt reduction benchmark
debt rule
deficit rule
draft budgetary plan
excessive deficit procedure
expenditure rule
fiscal country -specific recommendation
fiscal governance
fiscal rule
fiscal surveillance
general escape clause
medium -term budgetary objective
national fiscal framework
preventive arm
revenue rule
schwarze null
significant deviation procedure
stability and convergence program
stability and growth pact
stability program

Keywords Fiscal Councils

Name national fiscal council
european fiscal board
fiscal council
independent fiscal institution

Keywords context words

austerity
compliance
debt
deficit
deflation
equality
fine
growth
inequality
inflation
non-compliance
public investment
sanction
spending
sustainability
transfer union
unsustainability

Graph 10. **List of keywords**

Source: Commission services based on Europe Media Monitor database.

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