The Macroeconomic Effect of Fiscal Announcements: Evidence from Spain

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Abstract

This paper analyzes how fiscal policy announcements and rumors affect the Spanish economy in the short run, with special attention to the informational role of government communication. To this end, I construct two high-frequency fiscal sentiment indices—one for tax announcements and the other for public spending announcements—from a manual classification of press releases between 1996 and 2025. These series are integrated into a BVAR model with standard macroeconomic controls, estimated at both quarterly frequency—in line with the literature on fiscal communication—and monthly frequency, using a proxy for GDP generated through a Kalman filter. This strategy allows us to identify with greater granularity the reaction of the economy to fiscal sentiment shocks.

The results reveal a strong asymmetry: tax announcements generate immediate drops in GDP with no clear effects on tax revenues, suggesting a negative economic impact but low credibility or anticipated adjustments by agents. In contrast, spending announcements induce more persistent expansions, accompanied by an actual increase in spending, pointing to higher credibility and lower barriers to implementation. Moreover, we show that these effects operate mainly through the real channel—economic activity—and not through prices. Finally, the macroeconomic effects are significantly stronger when announcements are followed by swift execution, highlighting the importance of timely implementation in ensuring that fiscal communication translates into real economic impact.

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1 Introduction

Governments frequently signal to the public opinion their intentions about future fiscal policies, with immediate effects on economic activity. Indeed, when governments communicate their fiscal intentions—whether through formal announcements, parliamentary debates or informal signals reported in the press—they are not merely providing technical information about future policy. They are also revealing their assessment of the current and future state of the economy. This informational content can have substantial macroeconomic effects, regardless of whether the announced measures are ultimately implemented (Beetsma et al., 2015; Falagiarda & Gregori, 2015; Dybowski & Adämmer, 2018; Afonso et al., 2020; Hayo & Mierzwa, 2022; Melosi et al., 2022; Ascari et al., 2023; Latifi et al., 2024)

As shown by Melosi et al. (2022), fiscal announcements operate as signals in an environment of imperfect information, where the private sector updates its beliefs not only about the fiscal stance, but also about the underlying economic conditions. These signaling effects are particularly salient in periods of high uncertainty, where the same announcement can either stabilize or destabilize expectations depending on whether it is perceived as a response to adverse conditions or as a proactive policy shift.

We argue that economic agents monitor these governmental signals through the news and adjust their expectations and decisions in the moment the fiscal measure is announced, that is, well before it is eventually passed and comes into effect. Indeed, all changes in fiscal policy come with an implementation lag and are pre-announced[1].

The empirical literature increasingly documents that fiscal announcements—whether related to tax increases, government expenditure cuts or consolidation plans—are sufficient to trigger significant changes in economic activity. For instance, Carbonari et al. (2024) show that announcements of government expenditure-based consolidation plans lead to immediate contractions in GDP, even before the measures are implemented, suggesting that the announcement itself conveys information that influences private sector behavior. Similarly, Latifi et al. (2024) demonstrates that the tone and direction of parliamentary speeches on fiscal matters in Germany significantly affect output, consumption and investment dynamics, confirming that fiscal communication shapes expectations and macroeconomic outcomes well beyond actual policy implementation.

Despite growing interest in the role of fiscal announcements, the empirical literature has important limitations. Existing studies typically focus on (i) isolated and easily identifiable events such as budget speeches (Dybowski and Adämmer (2018)), formal legislative proposals (Hayo and Mierzwa (2022) and Latifi et al. (2024)) or consolidation plans (Romer & Romer, 2010; Mertens & Ravn, 2012; Melosi et al., 2022) leaving aside the broader and more frequent informal signals perceived by households and firms through the media, and (ii) low-frequency data, usually quarterly or annual, which prevents capturing how the continuous flow of fiscal news affects the economy in real time.

This paper fills this gap by introducing a new high-frequency fiscal sentiment index (FSI) for Spain, constructed from manually[2] coded press articles reporting both formal announcements and informal rumors about future fiscal measures. A key feature of our approach is that we build two separate indices, one capturing sentiment related to tax policy and another capturing sentiment on government expenditure, recognizing that their macroeconomic transmission channels differ substantially.

Each index reflects the balance between expansionary and contractionary news reported during a given month. News are classified according to their sign—positive (e.g., tax cuts or government expenditure increases), negative (e.g., tax hikes or government expenditure cuts) or neutral—and then aggregated to form a net sentiment score. Crucially, not all pieces of news are treated equally. We apply a weighting scheme that reflects the institutional relevance of the source, assigning more weight to national government announcements and less to regional, local, or non-binding recommendations, such as those issued by the Bank of Spain, the European Central Bank, opposition parties, etc. This design captures not

[1] In particular, changes in fiscal policy are subject to two lags: an inside lag, due to the political discussion between the initial proposal of a new fiscal measure and its approval; and an outside lag between the legislative approval and its actual implementation (Ascari et al., 2023).

[2] Before deciding to classify one by one the news manually, we studied the success rate of a zero-shot-classification algorithm called joeddav/xlm-roberta-large-xnli, a multilingual version of RoBERTa fine-tuned for NLI (XNLI). Since its success rate, considering this as the difference between the human classification and the one provided by the algorithm, was lower than 80% and since it presented large failures in the classification of a large number of news items, we decided to manually classify the news items by carefully reading each one of them.

only the direction of fiscal communication but also the perceived credibility and salience of each signal by economic agents.

The resulting indices provide a comprehensive picture of the continuous flow of fiscal communication as perceived by the private sector. Although our sentiment indices are constructed at monthly frequency—reflecting the high-frequency nature of news cycles—we aggregate them to quarterly frequency for the main empirical analysis, following the baseline approach used in the macroeconomic literature.

Our contribution is manifold. First, we construct the first high-frequency fiscal sentiment indices for Spain based on press releases, manually coded to capture both formal announcements and informal rumors about fiscal measures. Secondly, we are the first to explicitly differentiate between two dimensions of fiscal sentiment —one referring to taxes and the other to government expenditure— acknowledging that their macroeconomic transmission mechanisms differ substantially. In addition, we introduce a weighting scheme that accounts for the institutional relevance of each source, assigning greater importance to central government announcements relative to regional, municipal or merely advisory statements. Third, we focus on the informational effects of announcements, irrespective of their eventual implementation —a dimension often overlooked in the fiscal literature but central to models with imperfect information (Melosi et al., 2022). Finally, we are the first to complement a standard quarterly SVAR with a separate monthly SVAR, in which economic activity is proxied by a high-frequency GDP estimate derived from a Kalman-filtered dynamic factor model. This parallel high-frequency approach enables a more granular analysis of the dynamic response to fiscal announcements and sheds light on the short-term mechanisms that may underlie the aggregate effects captured by traditional quarterly models.

This approach connects and extends two strands of literature that have remained mostly separate. On one hand, the fiscal news literature focuses on narrative identification of tax and government expenditure shocks based on formal documents (Romer & Romer, 2010; Mertens & Ravn, 2012; Cloyne, 2013; Hayo & Mierzwa, 2022; Carbonari et al., 2024), but typically ignores the broader, informal flow of fiscal information. On the other hand, the literature on economic policy uncertainty develops sentiment indices based on textual analysis (Baker et al., 2016; Cerda et al., 2018; Jirasavetakul & Spilimbergo, 2018; Ghirelli et al., 2019, 2020; Andres-Escayola et al., 2024), but does not isolate fiscal communication from other sources of uncertainty, nor does it distinguish between taxes and government expenditure. Our sentiment indices bridge this gap by providing a targeted measure of fiscal sentiment that captures both formal announcements and informal signals at a high frequency.

Our results reveal a clear asymmetry in how the economy responds to fiscal announcements depending on whether they pertain to taxes or government expenditure. In line with the evidence documented by Latifi et al. (2024) and Dybowski and Adämmer (2018), we find that tax-related announcements trigger an immediate and sharp contraction in economic activity, while announcements about government expenditure produce a more moderate but persistent expansion of GDP. Importantly, we present new evidence that the transmission mechanism operates almost entirely through real activity—via adjustments in output—rather than through prices, as the responses of inflation are negligible in both cases. This pattern is consistent with standard Keynesian models under slack conditions, where demand shocks translate into quantities rather than prices, but it also aligns with the signaling models proposed by Melosi et al. (2022), in which the informational content of fiscal news shifts private sector expectations about future income and demand. Moreover, we document that the negative effects of tax announcements materialize rapidly, suggesting that the adjustment occurs at the moment of the announcement, rather than upon implementation—a result that echoes the findings of Hayo and Mierzwa (2022) for the U.S. and Germany, but now confirmed for the Spanish economy using high-frequency data.

In addition, our analysis sheds light on the credibility and effectiveness of fiscal communication. We show that while government expenditure announcements are rapidly followed by actual increases in government expenditure—confirming their credibility and reinforcing their expansionary impact—tax-related announcements are not followed by corresponding increases in Tax Revenues in the short run. This could be interpreted, on the one hand, as a signal of limited credibility or implementation lags, as suggested by Carbonari et al. (2024). On the other hand, it may reflect anticipatory behavioral responses from firms and households aimed at mitigating future tax burdens, such as intertemporal shifts in consumption, investment postponement or tax base erosion—mechanisms already discussed theoretically in Leeper et al. (2013) and empirically hinted at by Hayo and Mierzwa (2022). Altogether, these results reinforce the idea that fiscal announcements are not innocuous: they generate immediate and economically meaningful effects, even in the absence of policy implementation. By explicitly disentangling tax and government expenditure sentiments, our work provides novel evidence on the asymmetric nature of these effects and

highlights the importance of considering the informational channel in the design and communication of fiscal policy.

The remainder of the paper is structured as follows. Section 2 reviews the related literature. Section 3 describes the construction of the fiscal sentiment indices and the macroeconomic dataset. Section 4 outlines the empirical strategy. Section 5 presents the main results on the macroeconomic effects of fiscal announcements. Section 6 discusses future research avenues. Section 7 concludes.

2 Literature review

Since the beginning of the 20th century, economists began to recognize the importance of impulses and propagation mechanisms in explaining business cycle fluctuations. There is a broad consensus that we should view the shocks we, as economists, "seek to estimate, as the empirical counterparts to the shocks we discuss in our theories, such as shocks to technology, monetary policy, and fiscal policy" (Ramey, 2016, p. 74). In this sense, Ramey (2016) argues that such shocks must satisfy three key characteristics: (i) they should be exogenous with respect to the other current and lagged endogenous variables in the model; (ii) they should be uncorrelated with other exogenous shocks, so that the unique causal effect of each shock can be identified; and (iii) they should represent either truly unanticipated movements in exogenous variables or news about future movements in those variables.

Despite their importance for current macroeconomic policy, there is a certain lack of consensus on the macroeconomic effects of fiscal changes. This stems from the difficulty of identifying fiscal policy shocks that are uncorrelated, and uncontaminated, with other fluctuations, such as economic activity itself (Cloyne, 2013). In order to correctly identify the impact of fiscal shocks on the economy, two main alternatives emerged at the beginning of the century. The first one is the SVAR approach, introduced by Blanchard and Perotti (2002) for the analysis of taxes and later extended to government expenditure by Galí et al. (2007). This approach assume that policy makers do not respond contemporaneously to economic shocks, thus eliminating possible simultaneity. The second method is the Narrative Approach, introduced by Ramey and Shapiro (1998), who, recognizing that policy makers respond contemporaneously to economic shocks, so that the SVAR model estimates are biased, propose to use "the narrative record to construct a direct measure of the policy changes that are uncorrected with other macroeconomic fluctuations" (Cloyne, 2013, p. 1507).

With respect to the SVAR approach two main problem arises, "(i) foresight on the part of private agents, and (ii) foresight on the part of policymakers" (Ramey, 2016, p. 85).

The first problem arises because agents may infer changes in policy before they take place. From a theoretical standpoint, Hansen and Sargent (1991) and Leeper et al. (2013) explain the pitfalls of employing a standard VAR to detect shocks when there is foresight regarding taxes. The later explain that fiscal foresight arises when the information set available to agents differs from that available to the econometrician, with agents basing their decisions on more information than the econometrician possesses. In this case, the problem stems from the econometrician not including in the model the lag between the disclosure of the measure and its actual implementation, leading to a nonfundamental moving average representation. Structural shocks, therefore, cannot be recovered solely from present and past fiscal data—a central assumption in traditional econometric methods—resulting in econometric analyses that do not model foresight obtaining biased estimates of output multipliers for taxes or government expenditure[3].

The second problem arises because policymakers may respond to information unavailable to the private agents, generating endogeneity in the shocks definition because "part of the identified shock may include the endogenous response of policy to expectations about the future path of macroeconomic variables" (Ramey, 2016, p. 86).

The literature shows that this is where "news" can help overcome the foresight problem. In addition to other approaches, such as theoretical restrictions or time-series constraints, the literature recommends explicitly modeling information flows, for example via fiscal news or expectation revisions. This is typically achieved by incorporating news series ("Narrative Approach") into VAR models, creating what has been called Expectational VARs (EVARs) in words of Perotti (2011).

[3] Yang (2005) and Leeper (1989) were the first to quantify, through theoretical models, the substantial distortion in estimated effects of tax changes obtained under the no-foresight assumption.

Using this approach, we highlight the seminal work of Romer and Romer (2010), who constructs a series of narrative tax shocks for the U.S. based on legislative documentation (presidential speeches and congressional reports), with the specific objective of assessing the macroeconomic effects of exogenous tax changes in the post World War II United States. They achieve identification through a two-step examination of the historical record. First, they confirm that the policy documents contain no indication of responding to current or anticipated economic conditions. Second, among the policy changes deemed unrelated to the economic outlook, they distinguish between tax measures intended to reduce the budget deficit and those aimed at promoting long-term growth.

Similarly, Mertens and Ravn (2012), aiming to distinguish between anticipated and unanticipated shocks, construct the narrative record via a timing convention based on announcement and implementation dates. Following the narrative framework of Romer and Romer (2010), they define an anticipated shock when the horizon between announcement and implementation exceeds a threshold (e.g., 90 days or several quarters) and an unanticipated shock when implementation occurs almost immediately. These shock series are incorporated into a proxy-SVAR treating tax liability changes as exogenous, thereby isolating the true surprise perceived by agents. Analogously, Cloyne (2013) compiles all discretionary tax changes and their expected revenue effects in the United Kingdom between 1945 and 2009 using official budget sources, aiming to evaluate the impact of such policy changes on UK output by isolating those not motivated by contemporaneous economic conditions.

Likewise, Guajardo et al. (2014), in order to study the short-run effects of fiscal consolidation, compile a narrative dataset of fiscal policy changes motivated by reducing the budget deficit across OECD countries. Following a similar approach to that of Romer and Romer (2010) and Mertens and Ravn (2012), they examine contemporaneous budget documents and official reports, such as budgets, central bank reports, Convergence and Stability Programs, IMF Recent Economic Developments reports or IMF Staff Reports. "These documents provide evidence of what policymakers believed at the time when policy measures were taken, and provide estimates of the measures' budgetary impacts" (Guajardo et al., 2014, p. 959). Lastly, similar narrative approaches for other countries are followed by Hayo and Uhl (2013) for Germany, Gil et al. (2019) for Spain, Alesina et al. (2015) for 16 advanced economies, Christofzik et al. (2022) for Germany or Hebous and Zimmermann (2018) for the US and the UK.

As discussed in the previous paragraphs, the use of textual sources has proven to be a valuable tool for identifying the precise moment when agents receive new fiscal information, which in turn allows for a more accurate estimation of the effects of anticipated fiscal shocks. However, our work departs partially from this literature, as it does not focus on estimating the impact of implemented fiscal measures, but rather on analyzing the effects triggered by announcements and rumors of potential fiscal decisions—regardless of whether they are eventually enacted.

This distinction is relevant because several studies have documented that both financial markets and real economic variables may respond immediately to the announcement of a fiscal policy, in anticipation of its future implications. Regarding sovereign debt, Falagiarda and Gregori (2015) assess how the credibility of the issuer and the macroeconomic context influence the impact of announcements on sovereign spreads, defined as the differential between the benchmark italian 10-year government bond yield and the German one. To do so, for the period of the Italian sovereign debt crisis (2009–2013), they gather data on fiscal policy communications from the ECB Real Time Information System, which includes public news media releases from agencies such as Bloomberg and Reuters. These announcements are then classified based on whether they signal a fiscal consolidation (that is, a budget-improving action) or conversely, reflect a worsening of the government's budgetary position. Using GARCH models to control for time-varying volatility, they find that only the announcements issued by the technocratic Monti government—whether they signaled budget improvements or deteriorations—had a significant impact on the Italian spread, unlike those of previous governments. Specifically, spreads decreased following consolidation announcements and increased after expansionary ones.

Also for sovereign debt markets, Afonso et al. (2020) analyze how announcements on different fiscal and monetary policies affect debt yield spreads in 10 euro area countries for the period 1999-2016. To do so, they construct a detailed database that combines macroeconomic forecasts from the European Commission, fiscal announcements stemming from the EU fiscal surveillance mechanism-including decisions regarding stability programs and excessive deficit procedures (EDPs)-and ECB monetary policy communiqués, both conventional and unconventional. Fiscal events are divided into two groups: the first

includes press releases reflecting the Commission's assessments of Member States' fiscal sustainability; the second includes announcements linked to EDP decisions already implemented. Through OLS regressions with country fixed effects, they "found that EC releases of the economic forecasts on government debt and budget balance contribute to increase and decrease the spreads respectively. The EC releases of the excessive deficit procedures (EDP) contribute in reducing the yield spreads" (Afonso et al., 2020, p. 2).

In the same vein, Beetsma et al. (2015) explore how fiscal consolidation announcements affect economic confidence in 17 OECD countries between 1978 and 2009. To do so, they construct a monthly database from the annual narrative work of Leigh et al. (2011), identifying for each episode the precise time at which the measure is publicly announced. This dating is obtained through a detailed search in national budget reports, official speeches and media-such as El País in the case of Spain-, as well as in the calendar of economic events of the OECD Economic Surveys. From this information, the authors classify each event as a consolidation on the expenditure or revenue side, and quantify its magnitude relative to GDP. On this monthly basis, they estimate an event study to analyze the evolution of confidence indices before and after the announcement. Their results indicate that consolidation announcements, particularly those based on government expenditure, generate an immediate deterioration in consumer and business confidence, with particularly strong effects in countries with high levels of debt.

Likewise, Dybowski and Adämmer (2018) analyze how presidential speeches on U.S. tax policy may affect economic activity through a sentiment channel. To do so, they construct a new measure that simultaneously captures the salience and tone of tax-related presidential speeches between 1945 and 2016. First, they use a probabilistic correlated topic model (CTM)[4] to identify tax content within more than 89,000 official documents; subsequently, they apply a sentiment analysis based on political dictionaries to classify each speech according to its positive or negative tone. The result is a monthly time series reflecting the intensity and sign of "presidential fiscal sentiment" (TNSM). With this variable they estimate a structural SVAR model that also includes anticipated tax measures and the implicit tax rate. Their results show that fiscal announcements with an optimistic tone generate significant increases in GDP, consumption and private investment. In addition, they find evidence that these effects operate through the expectations channel, as an increase in the NIMT raises the consumer confidence index, which in turn boosts aggregate demand.

For their part, Hayo and Mierzwa (2022) study the effect of legislative announcements of tax changes on economic activity in the United States, Germany and the United Kingdom. To do so, they construct a tax announcement indicator that collects narrative information on tax cuts identified at the time they are formally introduced as legislative proposals in the relevant parliamentary body-such as the US Congress or the German Bundestag-rather than when they are finally passed. Using local projections on quarterly data between 1977 and 2018, the authors estimate the dynamic impact of such announcements on GDP, controlling for the subsequent effect of the actual implementation of the tax cuts. Their results show remarkable cross-country heterogeneity: in the US, tax cut announcements cause a significant and persistent fall in GDP (close to 1 percent), in line with the hypothesis that agents postpone consumption or investment decisions until the measures are implemented; in Germany, the aggregate effect is zero; while in the UK, the announcement generates a temporary rebound in GDP. Moreover, when considering the phase of the business cycle, they find that in Germany and the US the effects are more negative in expansionary periods than in recessions, while in the UK the positive effects are only observed outside recessions.

From a theoretical perspective, Melosi et al. (2022) develop a model in which fiscal announcements act as signals in contexts of imperfect information between the government and the private sector, and where their impact depends on the degree of uncertainty and prior expectations. To test these predictions, they construct a database that combines the Nikkei 225 stock index with thirty-four fiscal packages announced by the Japanese government between 1992 and 2022, identified through press releases published in the Nikkei business daily. From this information, they estimate a structural VAR model in which identification is based on the covariation between stock market movements and revisions in private government expenditure forecasts that imposes a series of sign restrictions. Confirming theoretical predictions, they find that when the announced fiscal package turns out to be larger than anticipated by the market, GDP reacts positively, while in the absence of a surprise, the effects are null or attenuated.

[4] S. Hansen and McMahon (2016a), Azqueta-Gavaldón (2017) and Larsen (2021) also use probabilistic topic models in their respective works. The first ones quantify the impact of communication by central banks, the second creates a news-based Economic Policy Uncertainty index and the third one proposes a novel identification strategy to disentangle different types of uncertainty.

Similarly, Latifi et al. (2024) analyze the macroeconomic effects of fiscal policy announcements in Germany, taking advantage of the institutional framework of the Bundestag. With the aim of constructing a series of quarterly fiscal sentiment indices, the authors use the unsupervised Doc2Vec method to classify all speeches delivered in the Bundestag between 1960 and 2021 as expansionary or contractionary, and as endogenous or exogenous, further distinguishing between those issued by government and opposition parties. From this classification, they estimate a battery of standard BVAR models that include variables such as real government expenditure, real GDP, private consumption, real investment and inflation. The results are consistent with New-Keynesian business cycle models: an unexpected increase in exogenous sentiment towards a more expansionary policy translates into higher levels of government expenditure, consumption, investment and inflation, as well as an expansion of economic activity, a reduction in unemployment and a deterioration of the budget balance. In contrast, endogenous sentiment shocks do not generate significant macroeconomic responses.

Lastly, Carbonari et al. (2024) analyze the effect of fiscal consolidation announcements on economic growth using data from 16 OECD countries between 1981 and 2011. Their approach is based on the dataset constructed by Alesina et al. (2015), to which they apply a mediation analysis to distinguish between direct and indirect effects, using the debt-to-GDP ratio as the mediating variable. Their results show that, while announcements of tax increases do not generate significant effects on growth, announcements of government expenditure cuts do produce a negative impact, largely through their indirect effect via an increase in the debt-to-GDP ratio. This evidence suggests that, once transmission mechanisms are accounted for, government expenditure-based consolidation plans may be more detrimental to growth than revenue-based ones.

With respect to fiscal uncertainty indices constructed through news measures, although they do not focus specifically on fiscal announcements but on general political uncertainty, they share certain similarities with the sentiment indices created in this paper. In this regard, the seminal paper is that of Baker et al. (2016). The authors develop the Economic Policy Uncertainty Index (EPU) by an automated (manually audited) count of newspaper articles that simultaneously contain three types of terms: one related to the economy ("economic" or "economy"), one to uncertainty ("uncertain" or "uncertainty") and one to public policy (such as "congress", "deficit", "federal reserve", 'regulation' or "white house"). Applying this criterion to ten reference newspapers in the United States since 1985, the authors construct a monthly index that reflects the intensity of political uncertainty perceived by the media. They then extend the methodology to eleven other economies and to historical periods since 1900, restricting press coverage to two newspapers per country for Europe. In empirical terms, they find that increases in political uncertainty anticipate declines in investment, employment and industrial production both in the United States and in an international panel. In the U.S. case, shocks equivalent to the observed increase in EPU between 2006 and 2012 are associated with a maximum fall of 6 percent in investment and 1.1 percent in industrial production.

Subsequently, Ghirelli et al. (2019) improve, for Spain, the methodology of Baker et al. (2016) by including a larger press coverage (from 2 to 7 newspapers, incorporating economic media), a broader set of keywords and a longer period of analysis, since 1997. The results show that the new index provides a more consistent chronology of episodes of economic uncertainty and that uncertainty shocks generate significant declines in GDP, consumption and investment, unlike the original index, whose effects were virtually nil. Andres-Escayola et al. (2024) extend this literature by analyzing two key methodological issues: (i) whether using local or foreign press affects the results (they conclude that it does not), and (ii) the importance of the breadth of media coverage. They show that using only one newspaper can bias the results, while broadening the coverage improves the robustness of the index and its estimated macroeconomic effects.

For emerging economies such as Chile, Cerda et al. (2018) suggest that the effects of uncertainty may be more persistent and severe than in advanced economies. The authors construct the first news-based economic uncertainty index for Chile, applying the methodology of Baker et al. (2016) to the newspaper El Mercurio between 1993 and 2015. Their empirical analysis shows that uncertainty shocks lead to sharp and persistent declines in GDP, investment and employment, particularly affecting private and mining investment. Building on this literature, Jirasavetakul and Spilimbergo (2018) develop an EPU index for Turkey based on foreign press sources, arguing that international perceptions are particularly relevant for the Turkish economy. Through a difference-in-differences strategy that exploits sectoral heterogeneity in investment irreversibility, they show that policy uncertainty leads to substantial declines in investment and leverage, especially in sectors with higher sunk costs. These findings reinforce the idea that the macroeconomic effects of policy uncertainty are particularly severe in emerging economies with

high external exposure.

Similar results are found by Ghirelli et al. (2020), who construct an EPU index for seven Latin American countries using the Spanish press as a source, which makes it possible to generate homogeneous and comparable measures between countries. They apply an automated count of terms related to economics, politics, uncertainty and the corresponding country on seven Spanish newspapers. Using this index, they show that uncertainty shocks generate significant drops in GDP, exports and direct investment from Spain to the region. In addition, they find that uncertainty in Latin America also negatively impacts the Spanish economy through the trade and financial channel.

This paper makes three main contributions to the literature presented in previous paragraphs. First, it is the first to construct a fiscal sentiment index that systematically distinguishes between tax and public expenditure measures, which allows for a differentiated assessment of the impact of each type of fiscal signal. Second, unlike previous approaches based on official documents, surveys or aggregate uncertainty indicators, this study directly uses press news content to capture both formal announcements and credible rumors, weighting their importance according to the institutional level of the issuer. Third, the paper offers an unprecedented insight into the impact of fiscal announcements by pairing this new index with a high-frequency estimate of economic activity, which allows us to observe more precisely the immediate effects of fiscal communication on GDP at monthly frequency.

3 Dataset

This section describes the dataset used to estimate the macroeconomic effects of fiscal sentiment. Section 3.1 begins by outlining the construction of the sentiment indices—Tax Sentiment, which captures announcements related to tax policy, and Government Expenditure Sentiment, which reflects signals concerning government expenditure—our main explanatory variable, based on a comprehensive reading and classification of fiscal news obtained from national newspapers. Section 3.1.1 details the query design and source selection using the *Factiva* database. Section 3.1.2 outlines the preprocessing steps, including filtering irrelevant content and cleaning the text corpus. Section 3.1.3 discusses our choice not to distinguish between cyclical and structural announcements. Section 3.1.4 presents the scoring criteria and the aggregation method used to construct the monthly sentiment index.

In Section 3.2, we turn to the estimation of a proxy for monthly GDP growth, which is obtained via a dynamic factor model following the MiPred methodology. We present both the dataset and the econometric specification, and show that the estimated factor closely tracks official GDP dynamics. This high-frequency estimate of aggregate economic activity is essential, as it allows us to assess the impact of government announcements on the economy with greater temporal granularity.

Moreover, in Section 3.3 we describe the remaining macroeconomic variables used in our BVAR model: Tax Revenues, Government Expenditure, and the Harmonized Consumer Price Index (HCPI). These controls, help isolate the independent effect of fiscal sentiment shocks and reduce the risk of omitted variable bias in our time-series models. Finally, in Section 3.4 we describe the procedure to construct our quarterly dataset using the monthly variables.

3.1 Tax and Government Expenditure Indices

We first proceed to the explanation of the fiscal sentiment indices. Our aim is to translate qualitative news about fiscal policy into a single continuous measure that captures both the nature and the direction of government announcements. To do this, we first download news items that report government announcements. After some preprocessing steps we manually give a score to each of the news according to their nature ("up"$= 1$, "down"$= -1$ or "neutral"$= 0$) and give different weights according to the level of jurisprudence ("national"$= 1$, "regional"$= 0.6$, "recommendation"$= 0.2$ or "municipal"$= 0.1$). Lastly, the simple average of the score of all announcements for each month yields our sentiment indices. This process is done separately for both tax and government expenditure news so that we obtain one tax sentiment index for taxes and another for Government Expenditure.

As briefly discussed in the introduction, before deciding to classify the news manually one by one, we studied the success rate of a zero-shot classification algorithm called joeddav/xlm-roberta-large-xnli, a

multilingual version of RoBERTa tuned for NLI (XNLI)[5]. We detected that the model failed not only in ironic or subtly nuanced cases, but even in news with content perfectly clear to any human reader. In fact, we observed an error rate of more than 20% over the total number of articles evaluated, which made clear the unreliability of the zero-shot approach for our purpose. We therefore opted for an exhaustive manual review to ensure the quality and consistency of the index.

Section 3.1.1 describes our text data (Factiva query), the selection of sources, and time span. Section 3.1.2 details the manual discard of off-topic articles and specific text data preprocessing steps needed for later. Section 3.1.3 explains why in our work we do not distinguish between cyclical and structural announcements. Finally, Section 3.1.4 explains our classification (increase vs. decrease and level of jurisprudence), the construction of the sentiment indices, and its aggregation into a monthly series.

3.1.1 Newspapers as a source of governnamental signaling

National newspapers act as a privileged channel for the dissemination of government intentions and decisions on fiscal matters. By publishing immediately and widely both official announcements and the intentions of those with the power to make or influence fiscal policy, be it on taxation or government expenditure, these newspapers make it possible to track in real time when and how fiscal measures are communicated to the public. This includes both the implementation of concrete policies (for example, "a tax cut" or "a government expenditure increase") and more tentative signals such as plans, evaluations, or debates from government bodies.

One convenient way to obtain these announcements reported in the news is through the Factiva database. Tables 3 and 4 in the Appendix display the Boolean queries submitted to Factiva for tax and government expenditure news, respectively. We combine the proximity operator `w/5` or `w/10` with `OR` to capture every sentence in which the Spanish executive (Government, Presidency or Council of Ministers) *announces, studies, approves or discards* tax- or expenditure-related actions: from "raising VAT" or "abolishing exemptions" to "increasing social government expenditure" or "cutting defense budgets".

Even though we restrict both searches to high–circulation national newspapers[6] we take into account the advise of Andres-Escayola et al. (2022), who point out that relying on a single newspaper can introduce bias due to incomplete or politically skewed coverage, while using a broad set of newspapers leads to more robust and representative indicators (Tables 3 and 4 display the sources used). In total, we recover 5,298 articles for taxes and 6,106 articles for government expenditure covering the period 1966–2025. Each PDF contains a mix of metadata, headline, and body text, plus auto-generated footers that we remove in the next step.

3.1.2 Corpus and text-preprocessing

Before manually tagging each of the news items, we proceed to a reading of each of them to ensure their strict relevance to Spanish fiscal policy. In doing so, we excluded the following: articles that mention taxes or government expenditure without being government announcements while focusing on other policies such as unemployment rates, articles dealing with economic growth, consumer confidence, broader economic trends, coverage of fiscal events outside Spain (e.g. bilateral or EU-wide treaties), regional newsletters, event announcements or promotional content (e.g. sponsored supplements or advertorials), and exact or near-exact duplicates that appeared in multiple media or editions. After this review the corpus of news items on tax announcements is reduced to 3,200 while the corpus of news items on government expenditure announcements is reduced to 2,131.

Finally, we convert each master PDF into individual news items using `PyMuPDF`, a Python library. First, we scan for the tag "Document X" inserted by Factiva, splitting the PDF by document. Second, for each item we extract metadata—publication date and source—by locating the word-count line (e.g. "1,234 words"), the next valid date, and the first non-boilerplate line that is not a time-stamp, page counter, or language marker. Third, we clean the body: we drop everything up to and including the string "All rights reserved" or "Todos los derechos reservados", remove duplicate or empty lines, strip out any footer

[5]This algorithm is based on Natural Language Inference (NLI): for each news item, it generates a set of hypotheses (e.g., "announce a tax increase" vs. "announce a tax cut") and calculates the probability that the text implies, contradicts or is neutral with respect to each hypothesis. XLM-RoBERTa-large-XNLI is pre-trained on huge volumes of multilingual text and tuned on the XNLI corpus (750 000 premise or hypothesis pairs in 15 languages), which allows it to classify zero-shot without the need for labeled examples in our domain.

[6]From the Factiva search we did not obtain any news from television or radio media and therefore we omit them throughout the rest of the paper.

artifacts matching patterns such as "©", "Page 3 of 142", URLs, and encoding glitches, and then re-join the remaining lines into a single text string. This yields a clean headline and continuous body per article.

3.1.3 The distinction between cyclical and structural fiscal announcements

A common concern in the literature when identifying fiscal shocks is the need to separate measures that respond to the state of the business cycle from those that are unrelated to the current or future state of the economy. As Romer and Romer (2010) argue "because the factors that give rise to tax changes are often correlated with other developments in the economy, disentangling the effects of the tax changes from the effects of these underlying factors is inherently difficult. There is pervasive omitted variable bias in any regression of output on an aggregate measure of tax changes" (Romer & Romer, 2010, p. 763). Similarly, Blanchard et al. (2013) highlights the non-invertibility problems that arise in VAR models due to signal contamination when agents respond to information containing noise. In both cases, and also in Guajardo et al. (2014), S. Hansen and McMahon (2016b), Mertens and Ravn (2012) or Cloyne (2013) the technique that allows the correct identification of the fiscal shock of interest is the creation of indicators that contain only fiscal actions orthogonal to the economy's path, i.e. fiscal actions unrelated to the current state of the economy.

However, the literature discussed in the previous paragraph refers to that related to the identification of fiscal shocks, that is, it focuses on the analysis of the impact of tax or government expenditure changes, using the news as an instrument to correctly identify the shock of interest. Our work focuses on analyzing the impact of the policy announcement, leaving aside its implementation.

Among the limited literature that focuses on analysing the impact of the mere announcement of fiscal policy using news-based indicators, there is not that much agreement on whether one should distinguish between cyclical or structural announcements. Latifi et al. (2024) study the impact of fiscal announcements by constructing a sentiment index using all parliamentary speeches in the German Bundestag between 1960 and 2021 in order to quantify the tone of the fiscal debate and decompose it into expansionary and contractionary content. Using the arguments of Romer and Romer (2010) they also classify speeches as reflecting either exogenous or endogenous fiscal policy motives, using topic modeling. Similarly, Dybowski and Adämmer (2018), who study the impact of presidential tax communication on economic activity by constructing a measure that capture the salience and tone of U.S. presidential tax communication, argue that "by controlling for tax foresight, we ensure that we do not capture a confounded tax expectation effect but a residual effect stemming from (positive) presidential tax policy news" (Dybowski & Adämmer, 2018, p. 523). Finally, Melosi et al. (2022), for Japan, compare the impact on the stock prices of three exogenous announcements of large increase in government expenditure (one of those for example is the successful bid to host the 2020 Olympics with the announcement of large public investment projects) versus the impact on the same stock prices of thirty- four supplementary fiscal policy measures that the Prime Minister's Office announced outside the regular budget cycles that are consider as endogenous announcements.

In the remainder of this section we will argue why in this paper we will not distinguish between cyclical and structural announcements in order to construct our tax and government expenditure sentiment measures.

First, the distinction between cyclical and structural motives is seldom observable at the time of the announcement. Press releases and media coverage typically lack clear statements about whether a fiscal measure is a temporary stabilizer or a long-run reform. In fact, policymakers themselves often frame short-term measures in structural terms to signal commitment, or vice versa. As a result, what matters for the private sector is not the actual intention behind a policy, but the information inferred from its public communication. Trying to classify announcements as structural ex ante imposes an artificial dichotomy that may not align with agents' perceptions, especially when expectations are formed in real time. This issue is less problematic in studies based on legislative proposals, such as Hayo and Mierzwa (2022) or Latifi et al. (2024), where policy documents are more likely to state explicitly their economic rationale—be it deficit reduction, demand stabilization or growth promotion. However, even in those cases, the ultimate motivation of the government is rarely verifiable with certainty, and strategic framing may obscure the true drivers behind the proposed measures.

Second, from an information-theoretic standpoint, the idea that agents can distinguish noise from genuine news ex ante contradicts models of limited information. In Blanchard et al. (2013), agents form expectations based on imperfect signals, which means their behavior—and, by extension, macroeconomic

outcomes—responds to the entire signal, not just to its verifiable "true" component. Therefore, even if an announcement later turns out to be a cyclical adjustment, its immediate impact stems from how it was interpreted when released. The relevant shock, in this view, is the perceived change in policy, not its ex-post classification. "Policy announcements are typically hard to anticipate both in their nature, that is whether they are government expenditure- or tax-based, and in their size. This unpredictability makes such announcements similar to an exogenous treatment, which is suitable for conducting a causal analysis" (Carbonari et al., 2024, p. 3).

Third, filtering out so-called cyclical announcements risks underestimating the real-world informational content of fiscal policy communication. Measures justified by deteriorating macro conditions—e.g., "temporary VAT cuts to counter falling consumption"—still convey forward-looking signals about the government's fiscal stance, credibility, and willingness to act. Ignoring these announcements would amount to discarding relevant variation in expectations formation and may bias empirical estimates downward or even reverse their sign.

From an econometric perspective, applying a structural-vs-cyclical filter based on contemporaneous macro conditions may inadvertently introduce bad control bias. If the classification criterion uses outcomes (e.g., recession episodes) that are themselves affected by the sentiment index or correlated with unobserved shocks, this violates the exogeneity assumption and induces post-treatment conditioning. In time series terms, such filtering can generate endogenous sample selection, which biases impulse-response functions and attenuates the dynamic propagation of fiscal news shocks. Moreover, the sentiment index is used as an external instrument (or shock series) in a BVAR framework identified via recursive ordering; forcing an orthogonality condition ex ante can undermine the very shock variation we aim to exploit.

This critique becomes even more relevant when adapted from the original concerns of Romer and Romer (2010) to the domain of fiscal announcements. One might argue, by analogy, that "because the factors that give rise to tax announcements are often correlated with other developments in the economy, disentangling their effects is inherently difficult; there is pervasive omitted variable bias in any regression of output on an aggregate measure of fiscal announcements". While this logic is internally coherent, it misrepresents the nature of the shock being studied. In contrast to legislated tax changes, tax announcements—especially those disseminated via the press—are not instruments of policy implementation but of information revelation. What matters is how agents interpret the signal at the time it is released, not whether the signal is structurally exogenous in the Romer sense. Therefore, the objection loses force when the treatment is not a fiscal action per se but a shift in expectations caused by public communication. Moreover, the inclusion of controls for actual fiscal variables and macro indicators in the empirical specification (such as government expenditure, revenues, and inflation) helps address the concern that announcements might merely proxy for underlying economic conditions.

Moreover, the empirical tradition that separates structural from cyclical fiscal shocks often relies on institutional documentation or insider knowledge (e.g., Joint Committee on Taxation reports in Romer and Romer (2010)). This level of access is not available in the context of press-based sentiment indices, especially for real-time high-frequency analysis. Attempting a similar classification in the absence of such documents would introduce subjective bias and reduce replicability.

Finally, our approach shares conceptual similarities with the Fiscal Policy Uncertainty Index introduced by Baker et al. (2016), which captures the level of uncertainty surrounding fiscal policy based on the frequency of newspaper articles containing terms related to uncertainty, fiscal issues, and policy. Just like their index, our sentiment indices does not aim to distinguish whether the underlying news reflects structural or cyclical fiscal motives. Instead, it captures the informational flow received by agents at the time the news is published—regardless of whether the fiscal measure is ultimately implemented or whether it responds to business cycle conditions. In this sense, our sentiment indices can be interpreted as a measure of fiscal policy signals—both in the form of concrete announcements and rumors—that shape private sector expectations in real time, in a way that is closer to the literature on uncertainty shocks than to the identification of exogenous fiscal policy actions as done in the narrative approach. This further justifies our choice not to apply an ex-ante filter based on structural versus cyclical classifications, since what matters for macroeconomic dynamics is the informational content perceived by agents, not the ex-post classification of the fiscal measure.

In this dissertation, all announcements and rumors are treated as potentially informative shocks. By not conditioning on an ex-post label of "structural" or "cyclical," the sentiment index captures the full

range of signals received by economic agents and allows for a more realistic identification of fiscal news shocks.

3.1.4 Giving score to each of the news item and obtaining the Tax and Government Expenditure Sentiment Indices

Each article is read and classified manually. First, we determine the direction of the fiscal announcement. News reporting an increase in taxes or government expenditure are assigned a value of $+1$, those reporting reductions receive a -1, and those that are ambiguous, neutral, or reflect a combination of offsetting measures are coded as 0. This classification is done independently for tax-related and government expenditure-related articles. To ensure consistency, we adopt a conservative approach: unless the language clearly signals a net fiscal expansion or contraction, the article is classified as neutral.

Second, we assign a jurisdictional weight to each news item depending on the scope of the policy actor. Articles referring to national-level decisions receive full weight ($w = 1$), while those referring to regional governments are weighted less ($w = 0.6$), and those reflecting proposals or announcements from local (municipal) authorities receive a minor weight ($w = 0.1$). Items that merely suggest recommendations or general opinions without any legislative or executive backing, like proposals of the Bank of Spain, the European Commission, the opposition parties, the European Central Bank... are treated as low-salience signals and assigned an intermediate weight ($w = 0.2$).

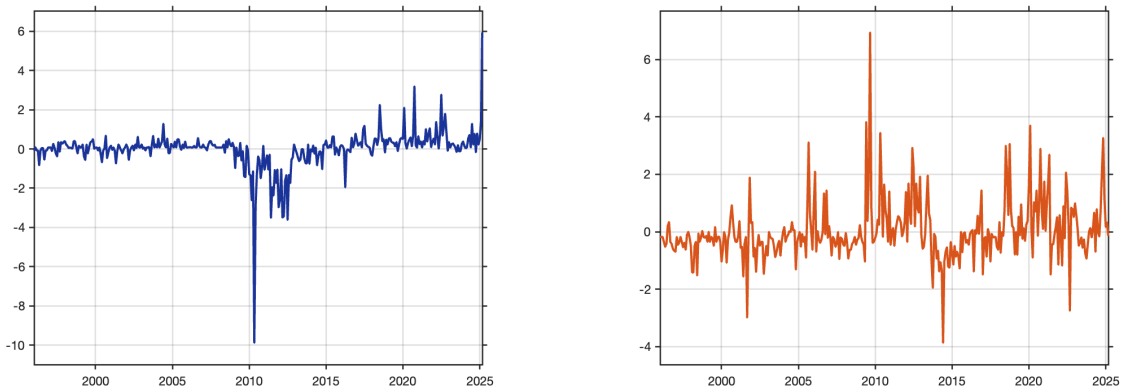
The score of each new is then given by the direction of the fiscal announcement times the jurisdictional weight. The last step is to aggregate article-level fiscal sentiment scores to a monthly index in order to obtain our monthly sentiment indices. To do this, we simply calculate the weighted average

$$FSI_t = \frac{\sum_{i \in t} w_i \, FSI_i}{\sum_{i \in t} w_i}$$

where w_i reflects the article's scope (national = 1, regional = 0.6, recommendation = 0.2, municipal = 0.1). Based on that, an increase in the sentiment indices indicates that, on average that month:

- There is more presence of news implying tax increases for the Tax Sentiment and more presence of news reporting government expenditures increases for the Government Expenditure Sentiment, or
- Less presence of news implying tax decreases for the Tax Sentiment and less presence of news implying tax increases for the Government Expenditure Sentiment.

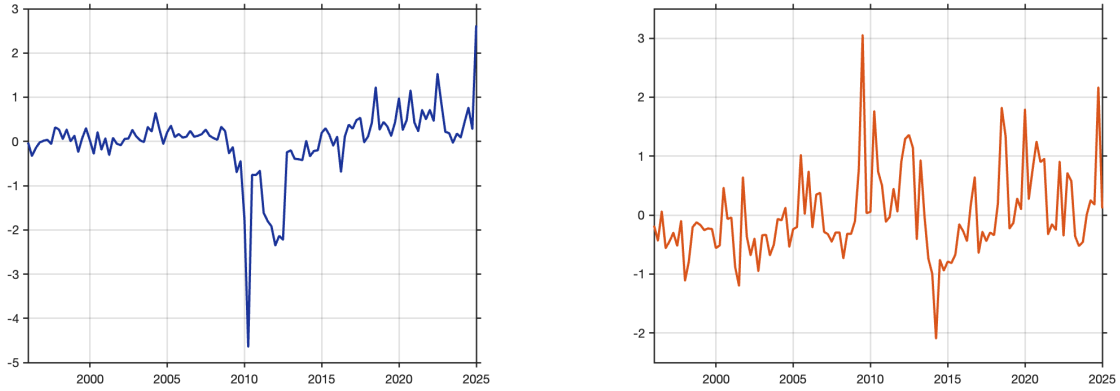
To illustrate the resulting indices, Figure 1 displays the monthly evolution of the sentiment indices for both government expenditure (left panel) and taxes (right panel). Moreover, Figure 2 shows the quarterly sentiment indices, constructed as the simple average of the monthly values corresponding to each quarter. Positive values in any of the two indicate months dominated by expansionary announcements (e.g., government expenditure hikes or tax increases), while negative values correspond to contractionary signals (e.g., government expenditure reductions or tax cuts).



(a) Government Expenditure Sentiment Index

(b) Tax Sentiment Index

Figure 1: Monthly Fiscal Sentiment Index for Government Expenditure and Taxes



(a) Government Expenditure Sentiment Index

(b) Tax Sentiment Index

Figure 2: Quarterly Fiscal Sentiment Index for Government Expenditure and Taxes.

3.2 Monthly GDP growth rate proxy

To estimate the short-run dynamics of economic activity in Spain we construct a high-frequency proxy of monthly GDP growth using a linear dynamic factor model (DFM) following, almost exactly, the MiPred model proposed by Cuevas et al. (2015) but estimated by Bayesian methods.

3.2.1 Indicators needed for the estimation

The MiPred model, which is fully replicable, as it uses only free information available to the general public, follows a stepwise procedure when selecting the final set of indicators, as suggested in Camacho and Quiros (2011). Since our fiscal sentiment indicators only captures news from 1996 onwards, we restrict the estimation of the proxy for the monthly GDP growth rate (factor) to the same sample period, January 1996 to March 2025. Following Maximo et al. (2015) all variables are seasonally adjusted in order to avoid noise induced in the estimation buy raw data. The final set of indicators, that correspond to the main dimensions of GDP (supply, demand, income), are displayed in the first panel of Table 1.

Since our dataset contains both monthly and quarterly indicators, we have to deal with an unbalanced dataset problem. Following the MiPred model and Mariano and Murasawa (2003) we do the following: "we substitute the missing observations with extractions from a random normal distribution. We then estimate a Kalman filter where the row that corresponds to the missing observations is multiplied by 0 and we add a noise".

Table 1: Monthly Indicators Used to Estimate GDP Growth Factor

Indicator	**Unit**	**Source**
Credit to companies and households deflated by CPI	Deflated Value Index	Bank of Spain
Imports of goods deflated by the unit value index	Deflated Value Index	Ministry of Economy
Large companies sales. Deflated total sales	Deflated Value Index	Tax State Agency (AEAT)
Large companies sales. Deflated compensation of employees	Deflated Value Index	Tax State Agency (AEAT)
Industrial Production Index	Volume Index	National Statistical Institute
Social security system: registered works	Thousand people	Ministry of Economy
Employed Labor Force Survey	Thousand people	Ministry of Economy
Apparent consumption of cement	Thousand tons	Ministry of Economy
Quarterly GDP growth rate	Growth rate	National Statistical Institute

3.2.2 Econometric approach

Our variable of interest, namely the factor of the system $f_{j,t}$, is estimated by means of a linear one-factor model adapted to operate with unbalanced data panels, as in our case. Formally, the observed growth rate $z_{i,j,t}$ for each monthly indicator i in month j of the quarter t is assumed to be generated by a common factor $f_{j,t}$ (interpreted as a proxy of the monthly GDP growth rate) plus an idiosyncratic component $u_{i,j,t}$:

$$z_{i,j,t} = \lambda_i f_{j,t} + u_{i,j,t}$$

where loadings λ_i measure the sensivity of the growth signal of each indicator with respect to changes in factor (Camacho & Quiros, 2011). With respect to the two quarterly indicators, following Mariano and Murasawa (2003), we rely on the relationship between the quarterly indicators and the monthly activity through time aggregation:

$$y_{i,t} = \frac{1}{3}f_{j,t} + \frac{2}{3}f_{j,t-1} + f_{j,t-2} + \frac{2}{3}f_{j,t-3} + \frac{1}{3}f_{j,t-4} + u_{i,t}$$

where we observe $y_{i,t}$ every third period (quarterly indicator) and never observe the common factor $f_{j,t}$. The dynamics of the common factor follow an AR(2) process:

$$f_{j,t} = \phi_1 f_{j-1,t} + \phi_2 f_{j-2,t} + e_{f,t}, \quad e_{f,t} \sim \mathcal{N}(0, \sigma_f^2)$$

Each idiosyncratic component $\varepsilon_{i,t}$, for quarterly variables, and $u_{i,j,t}$, for monthly variables, follows an AR(2) process:

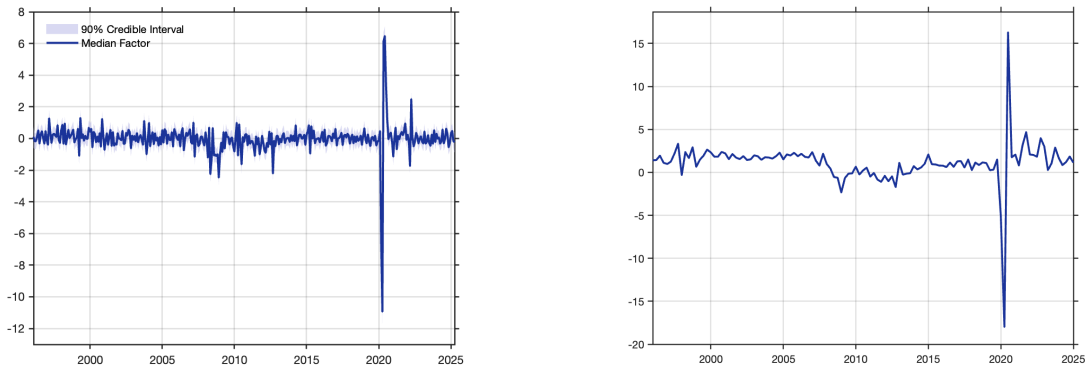
$$\varepsilon_{i,t} = \psi_{i1}\varepsilon_{i,t-1} + \psi_{i2}\varepsilon_{i,t-2} + u_{i,t}, \quad u_{i,t} \sim \mathcal{N}(0, \sigma_i^2) \text{ for } i = 1, 2$$
$$u_{i,j,t} = \psi_{i1}u_{i,j-1,t} + \psi_{i2}u_{i,j-2,t} + u_{i,j,t}, \quad u_{i,j,t} \sim \mathcal{N}(0, \sigma_i^2) \text{ for } i = 2, 3, 4, 5, 6, 7$$

The model is estimated using Bayesian techniques with conjugate priors on all parameters: normal priors for the AR coefficients ϕ and ψ, inverse-gamma priors for variances σ^2, and normal priors for the factor loadings λ_i. We fix the number of monthly variables at $M = 7$ and quarterly variables at $Q = 2$, in line with the setup in MiPred. We retain 800 posterior draws after a 200-draw burn-in phase. The estimation combines a Kalman smoother for the latent factor with a Gibbs sampler that iteratively updates parameters conditional on the current draw of the factor. Specifically, each iteration samples:

1. The latent factor $f_{j,t}$ using a simulation smoother.
2. AR coefficients (ϕ_1, ϕ_2) for the factor via Bayesian regression.
3. Factor loadings λ_i for each indicator.
4. Idiosyncratic AR(2) parameters ψ_{i1}, ψ_{i2} and variances σ_i^2.

Finally, the estimated factor, that can be seen in Figure 3, is obtained as the median across posterior draws and exported for further analysis. Although it is not obtained in the same exact way as the quarterly GDP estimator offered by the INE, and therefore does not reflect exactly the same it exhibits high co-movement with the official quarterly GDP growth rate, validating its relevance as a proxy for macroeconomic conditions.

Figure 3: Monthly vs. Quarterly GDP growth rate.



(a) Estimated Monthly GDP growth rate

(b) Quarterly GDP growth rate

3.3 The control variables

Beyond the Tax and Government Expenditure Sentiment Indices and the proxy for the GDP growth rate, we incorporate three additional macroeconomic variables into our empirical model: Tax Revenues, Government Expenditure, and the Harmonized Consumer Price Index (HCPI). These variables serve as controls to better isolate the independent effect of fiscal sentiment shocks on economic activity. All three are transformed into monthly and quarterly series and seasonally adjusted prior to estimation.

First, Tax Revenues correspond to the sum of direct taxes, indirect taxes and taxes on specific consumption, as published in the monthly public accounts of the Spanish Treasury. Secondly, from the same source, Government Expenditure is measured by the total non-financial payments executed by the Central Government. Lastly, we include the Harmonized Consumer Price Index (HCPI) collected from Eurostat[7].

Why include these controls in the VAR?

From a methodological standpoint, including these macro-fiscal variables helps mitigate omitted variable bias in the VAR estimation. Fiscal sentiment shocks are constructed from news reporting on intentions and expectations, not necessarily from actual fiscal implementation. If the sentiment index simply proxies for upcoming changes in revenues or expenditures, failing to control for these observables would lead to an overstatement of the causal role of sentiment. By conditioning the VAR on actual government revenues and government expenditure, we isolate the pure effect of communication, distinct from budgetary execution.

Moreover, controlling for inflation (HCPI) is essential to avoid misattributing macroeconomic responses. A sentiment shock occurring in a deflationary environment might elicit different household and firm behavior than one occurring during inflationary pressure. In a standard VAR, not controlling for this price environment would conflate the information effect of the shock with its price-level context. This is particularly important given the growing literature that links inflation expectations with fiscal news sensitivity (e.g., Davig & Leeper, 2011; Coibion et al., 2020).

Finally, including these controls allows us to test the robustness of our findings. If the GDP response to fiscal sentiment shocks persists even after controlling for revenues, expenditures, and inflation, this lends credibility to the interpretation that announcements convey real information that shapes expectations, rather than merely anticipating future policy actions.

Final Dataset

The final set of variables used in the VAR models presented in Section 4.1 is collected in the following table. The graphs of the respective variables can be seen in the Appendix, in Figure 7.

Table 2: Final set of indicators

Indicator	Unit	Source
Fiscal Sentiment Index (FSI)	Standardized index (z-scores)	Own elaboration (see Section 3.1)
GDP growth rate	Monthly growth rate (%)	Own elaboration (see Section 3.2)
Tax Revenues	Monthly growth rate (%)	Tax State Agency (AEAT)
Government Expenditure	Monthly growth rate (%)	Tax State Agency (AEAT)
Harmonized Index of Consumer Prices (HICP)	Monthly growth rate (%)	Eurostat

3.4 Constructing the quarterly dataset

In order to estimate the quarterly baselines models presented in Section 5, we transform all monthly variables into quarterly frequency following a simple aggregation rule. For the sentiment indices, both Tax Sentiment and Expenditure Sentiment, and the Harmonized Index of Consumer Prices (HICP), we compute the arithmetic average of the three monthly observations within each quarter.

Regarding Tax Revenues and Government Expenditure, we adopt an additive aggregation criterion, summing the monthly values within each quarter. This is standard practice when dealing with flow variables expressed in levels or monetary terms, ensuring that the quarterly figure accurately reflects the total fiscal activity over the period. Lastly, for GDP growth, we directly use the official quarterly growth rates

[7]These three series are seasonally adjusted using a two-step filtering procedure implemented in MATLAB. First, we apply a 13-term moving average to estimate the trend and detrend the original series. Then, we apply a Henderson filter combined with seasonal S(3×3) and S(3×5) filters, following the classical decomposition approach. Seasonal indices are computed separately for each month using historical patterns, and asymmetric weights are used to correct for end-of-series bias. This procedure ensures that cyclical dynamics are not contaminated by predictable seasonal effects. The final seasonally adjusted series is saved and used in estimation.

published by the National Statistics Institute (INE), rather than aggregating our monthly GDP proxy.

Figure 2 displays the Tax and Government Expenditure Sentiment indices, while in the Appendix, Figure 8 shows the remaining variables referenced in this section.

4 Empirical strategy

We now present the empirical strategy followed in this paper to estimate the macroeconomic effects of changes in fiscal sentiment. To do so, we use a standard SVAR model[8], augmented with our sentiment series to quantify average effects[9]. Section 4.1 presents the benchmark VAR specification and discusses the main estimation choices, including prior selection and model structure. Section 4.2 details our identification strategy, which relies on a recursive Cholesky decomposition.

In total, we estimate four different baseline models: a monthly BVAR with the fiscal Government Expenditure Sentiment index, its quarterly frequency equivalent, a monthly model with the Tax Sentiment index, and its quarterly counterpart. This strategy allows us to compare the macroeconomic effects of tax announcements both at high frequency and at a frequency more common in the literature.

4.1 SVAR model

The first step in our empirical analysis is the estimation of a reduced-form Vector Autoregressive (VAR) model to assess the macroeconomic effects of fiscal sentiment shocks

$$y_{t,j} = A_{1,j}y_{t-1,j} + \cdots + A_{p,j}y_{t-p,j} + u_{t,j}, \tag{1}$$

where $y_{t,j}$ is a $K \times 1$ vector of endogenous variables, with $j \in (Taxes, Expenditure)$, $A_{i,j}$ are coefficient matrices, and $u_{t,j} \sim \mathcal{N}(0, \Sigma_j)$ is the vector of reduced-form innovations, where Σ is the variance-covariance matrix with $E(u_{t,j}u_{t,j}) = \Sigma_j$. We further assume no correlation between the residuals at all leads and lags.

The baseline specification includes three endogenous variables: standardized fiscal sentiment for either taxes or expenditure, $FSI_{t,j}$, growth rate of seasonally adjusted fiscal revenues or expenditure, ΔFR_t for $j = Taxes$ and ΔFE_t for $j = Expenditure$, and the GDP growth rate, ΔGDP_t. Therefore, in our baseline specification y_t is as folllows

$$y_{t,j} = \begin{bmatrix} FSI_{t,j} & \Delta FR_t & \Delta GDP_t \end{bmatrix} \text{ for } j = Taxes$$
$$y_{t,j} = \begin{bmatrix} FSI_{t,j} & \Delta FE_t & \Delta GDP_t \end{bmatrix} \text{ for } j = Expenditure$$

Then, we extend the model by including the growth rate of Harmonized Consumer Price Index (CPI), $\Delta HPCI_t$ and the other fiscal variable, expenditures in the case of the Tax Sentiment Index and revenues in the case of the Government Expenditure Sentiment Index. Hence, in our extended specification the vector of endogenous variables is as follows

$$y_{t,j} = \begin{bmatrix} \Delta HPCI_t & \Delta FE_t & FSI_{t,j} & \Delta FR_t & \Delta GDP_t \end{bmatrix} \text{ for } j = Taxes$$
$$y_{t,j} = \begin{bmatrix} \Delta HPCI_t & \Delta FR_t & FSI_{t,j} & \Delta FE_t & \Delta GDP_t \end{bmatrix} \text{ for } j = Expenditure$$

Both, the baseline and the augmented VAR models, are estimated using Bayesian methods[10] as implemented in the BEAR toolbox[11], treating the model's coefficients as random variables and deriving their posterior distributions through Markov Chain Monte Carlo sampling. We compare results across two widely used priors—Minnesota and Normal-Wishart—and across different lag specifications, finding very similar outcomes in all cases.

As mentioned earlier, we propose to "orthogonalize" the reduced-form errors by Cholesky decomposition in order to obtain a recursive structural model. Section 4.2 explains, in detail, the economic intuition underlying the short-run restrictions imposed in order to recover the true structural shocks.

[8] We follow the conventional notation used in Kilian and Lütkepohl (2017).

[9] Future research, as explained in Section 6, will explore different methodologies.

[10] We estimate the model with 12 lags for monthly frequency and 4 for quarterly frequency, using a Minnesota prior (results are robust to different lags and to different prior specifications). Following standard practice, we set overall tightness to 0.2, cross-variable weight to 0.5, lag decay to 2, and the AR coefficient to 0.8, which allows us to capture persistence without overfitting.

[11] The BEAR toolbox is a "comprehensive (Bayesian Panel) VAR toolbox for forecasting and policy analysis" developed by the European Central Bank.

4.2 Identification

Considering the K-dimensional time series $y_{t,j}$, the structural-form VAR model with p lags can be written as

$$B_{0,j}y_{t,j} = B_{1,j}y_{t-1,j} + \cdots + B_{2,j}y_{t-p,j} + w_{t,j} \tag{2}$$

where $y_{t,j}$ is the $K \times 1$ vector of endogenous variables, $w_t \sim N(0, \Sigma_w)$ is the mean zero serially uncorrelated structural error term with $\Sigma_w = E(w_t w_t') = I_K$ being the variance-covariance matrix normalized to the identity, and the B_0 is the non-singular matrix governing the contemporaneous interaction between the model variables.

From Kilian and Lütkepohl (2017) we know that standard estimation methods allows us to obtain consistent estimates of the reduced-form parameters in equation 1. From this estimates we can recover the structural-form parameters of equation 2 by imposing exclusion restrictions on selected elements of B_0^1 by forcing these elements to be zero. One can do so by applying a Cholesky decomposition, which is only appropriate if the recursive structure, that is, imposing a particular causal chain, can be justified on economic grounds.

Our objective in this section is to justify the recursive identification proposed in the present work. For this purpose we draw on the extensive literature on the identification of exogenous fiscal policy shocks proposed by Blanchard and Perotti (2002) and later applied by Galí et al. (2007), Ramey (2011), Born and Müller (2012), Auerbach and Gorodnichenko (2012), Ilzetzki et al. (2013), Blanchard et al. (2013), Ramey and Zubairy (2018) and Latifi et al. (2024), among others.

Identification in the model with Tax Sentiment

We order sentiment after inflation and Government Expenditure, but before Tax Revenues and GDP growth, both in the quarterly and monthly models. Hence, a change in Tax Sentiment could contemporaneously affect either Tax Revenues or GDP growth, but we do not allow for contemporaneous effects of Tax Revenues or GDP growth on Tax Sentiment. The assumption that the sentiment index is exogenous can be justified by recalling that it is constructed in such a way that it only reflects news about future government plans, or at most, fiscal changes implemented in the very last days of the previous month with no possible time for these to be implemented during the current month. Crucially, it does not incorporate information about earlier fiscal implementations or current economic conditions.

As will be the case with the sentiment index of government expenditure, a potential concern is that since policy makers have instruments to know the current state of the economy, they can announce tax or government expenditure changes based on the state of the economy, which would invalidate the hypothesis that sentiment is not affected by the economic situation. In order to refute this argument, we propose the following. First, our identification does not require independence from the state of the economy in general, but only contemporaneous exogeneity. That is, we allow for the tax/government expenditure stance to be influenced by medium-term developments in the economy, but assume that variations in GDP growth within the same month (quarter) do not affect the content of the tax sentiment we capture.

Second, while it is true that governments have inside information on the current state of the economy, this usually refers to partial or preliminary indicators, rather than official indicators such as the INE's quarterly publication. More importantly, many decisions or statements that feed into the sentiment index respond to political dynamics or parliamentary negotiations, and not necessarily to an up-to-date technical diagnosis of the economic cycle.

Finally, it should be stressed that our sentiment index does not incorporate news on measures already implemented, nor reports on budget execution. It is limited to forward-looking announcements or statements, often of a vague or exploratory nature. This feature considerably reduces the risk that changes in the index are mediated by economic shocks already observed by the authorities. We therefore consider it reasonable to maintain the assumption of contemporaneous exogeneity of the tax/government expenditure sentiment index with respect to monthly GDP growth.

Identification in the model with Government Expenditure Sentiment

In this specification, we order Government Expenditure Sentiment after inflation and Tax Revenues, but before actual government expenditure and GDP growth, both in the quarterly and monthly models.

This implies that Government Expenditure Sentiment shocks can contemporaneously affect Government Expenditure and output, but the fiscal sentiment cannot be contemporaneously driven by the business cycle, as we have argued in the previous paragraph.

5 Macroeconomic Effects of Fiscal Sentiment

After constructing the fiscal sentiment indices from press reports, this section examines their macroeconomic effects using a BVAR model with recursive identification, as previously explained. The analysis focuses on assessing how GDP, inflation and public accounts react to fiscal announcements, distinguishing between tax and government expenditure measures. In addition to quantifying the aggregate impact, the transmission channels and the temporal dynamics of the responses are explored. The presentation of results is organized around four key questions: (i) does the impact vary according to the type of announcement; (ii) to what extent are credibility expectations influenced; (iii) does the speed of implementation matter and; (iv) is the effect transmitted mainly via prices or quantities? To capture both immediate reaction and subsequent evolution, impulse-response functions are estimated at monthly and quarterly frequency.

5.1 Asymmetric impact of tax announcements: taxes vs. government expenditure

To assess whether the macroeconomic impact of fiscal announcements varies according to their nature-impositive or government expenditure-we estimate the response of real GDP to shocks in each of the fiscal sentiment indices separately. Figure 4 shows the impulse-response functions derived from the BVAR model at both monthly and quarterly frequencies.

The results reveal a clear and robust asymmetry[12]. Negative shocks to the Tax Sentiment index, i.e., announcements that anticipate tax hikes, generate a significant contraction of GDP. The effect is immediate and short-lived: it reaches its minimum value around three or four months after the shock in the monthly model, with a drop of around 0.06 percentage points in the monthly GDP growth rate, and presents a larger magnitude in the quarterly model, around 0.3 percentage points in the quarterly GDP growth rate, with a partial reversal from the second year onwards. This pattern is consistent with the idea that fiscal announcements in the tax area act as credible signals of fiscal consolidation, leading to a negative revision of disposable income and future demand expectations by households and firms. As a consequence, immediate adjustments in economic activity are observed. This mechanism is consistent with the results of the literature on anticipated fiscal shocks, which have documented contractionary effects when agents believe that the measures will be implemented in the short term (Beetsma et al., 2015; Dybowski & Adämmer, 2018; Hayo & Mierzwa, 2022).

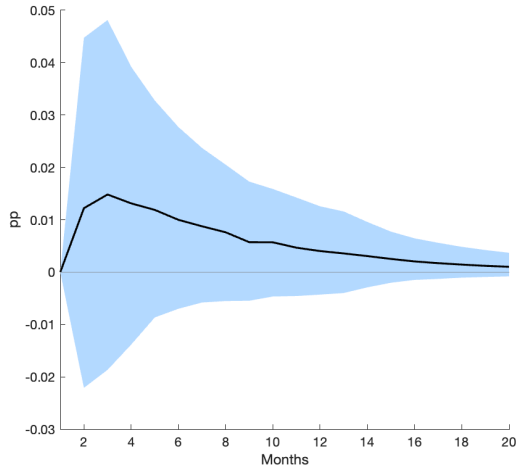
On the contrary, positive shocks in the Government Expenditure Sentiment index, linked to announcements of increased government expenditure, induce a softer but also more persistent GDP expansion. The impact is positive in both specifications, with a magnitude close to 0.15 percentage points in the quarterly model, and a more gradual profile in the monthly model. This effect reflects the nature of the transmission channel: government expenditure announcements anticipate increases in future aggregate demand, stimulating economic activity through consumption and investment. The credibility of these measures and the lower political friction for their immediate implementation may explain, in part, their ability to sustain growth for several quarters. These results are consistent with the findings of Latifi et al. (2024), who shows that expansionary fiscal sentiment shocks, especially those perceived as exogenous, induce significant increases in consumption, investment, and economic activity in Germany, as well as with the evidence of Dybowski and Adämmer (2018) and Melosi et al. (2022) for the U.S. and Japan.

When comparing both effects, a clear asymmetry emerges: announcements related to government expenditure have a smaller expansionary impact in terms of magnitude than the contractionary effect triggered by tax-related announcements, but they exhibit greater persistence over time. The drop in GDP following Tax Sentiment shocks is sharper yet short-lived; by contrast, the expansionary response to Government Expenditure Sentiment shocks unfolds more gradually but is sustained across several quarters. This asymmetry aligns with a clear economic rationale: contractionary effects operate partly through defensive mechanisms (such as the anticipation of lower disposable income, precautionary behavior, and

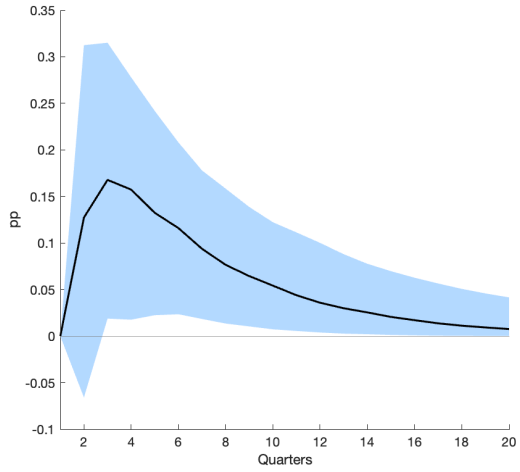
[12]The reported IRFs are those obtained in the model in which we include economic activity, the sentiment index and the corresponding fiscal measure (tax revenue or government expenditure). These results are robust to (i) the inclusion of the remaining control variables, (ii) different priors in the estimation and, (iii) inclusion of different lags.

a decline in consumption and investment), which tend to be rapid and severe, whereas expansionary effects are transmitted more gradually, depending on the execution of government expenditure and its multiplication within the economic circuit. Moreover, the institutional[13] and political[14] margin for implementing government expenditure increases is often greater and more immediate than that required for tax hikes, which may also help explain the greater persistence of the expansionary effect.

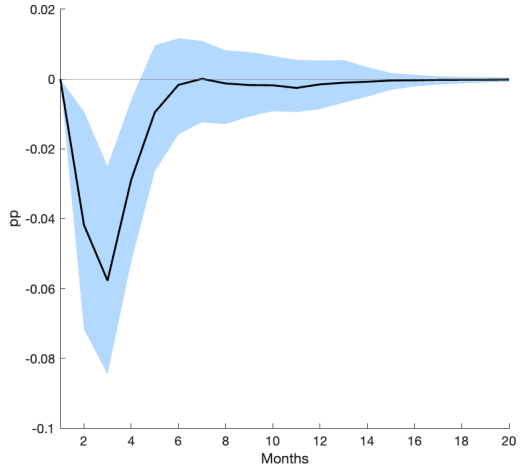
(a) Government Expenditure Sentiment – Monthly



(b) Government Expenditure Sentiment – Quarterly



(c) Tax Sentiment – Monthly



(d) Tax Sentiment – Quarterly

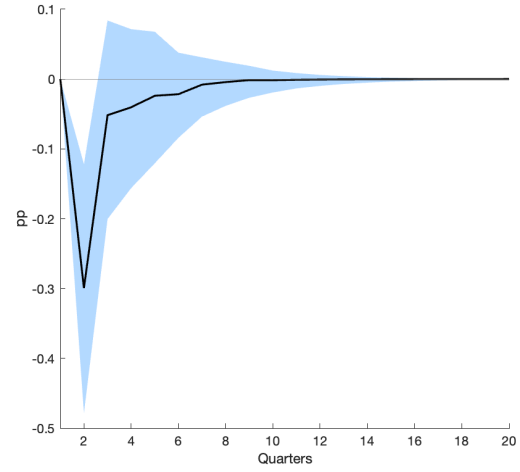


Figure 4: Impulse Response Functions of GDP to shocks in sentiment indices. The first row displays responses to Government Expenditure Sentiment shocks, and the second row to Tax Sentiment shocks. Each column shows monthly (left) and quarterly (right) horizons.

5.2 The credibility of the announced fiscal policy

To assess the credibility of announced fiscal policy, we analyze the response of Tax Reveneues and Government Expenditure to shocks in each of the indices separately. Figure 5 shows the impulse-response

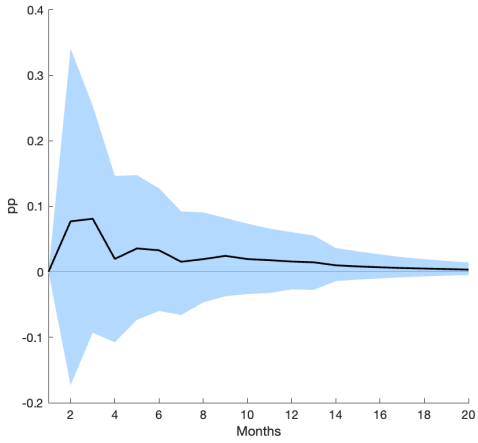
[13] In Spain, the creation or modification of taxes necessarily requires formal legislation, in accordance with the principle of tax legality established in Article 133.1 of the Constitution and Article 8 of the " Ley General Tributaria". This implies that any tax increase must go through a complete legislative process, including parliamentary majority, mandatory reports, and legal deadlines. In contrast, government expenditure—once authorized in the "Prespuestos Generales del Estado"—can be adjusted more flexibly. "Ley 47/2003, General Presupuestaria", allows modifications through extraordinary credits, supplements, or transfers (Articles 50 to 55), which can be activated by the Council of Ministers without requiring a new law. This difference in legal requirements contributes to the perception that government expenditure announcements are more executable than tax measures.

[14] From a political perspective, tax hikes tend to face greater social opposition than government expenditure measures, since their costs are immediately perceived by citizens, whereas the benefits of government expenditure are usually more diffuse and popular. This makes it harder to secure parliamentary agreements for tax reforms, especially in contexts of political fragmentation or electoral pressures.

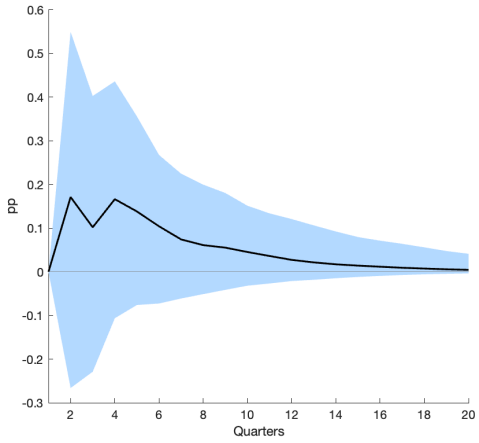
functions derived from the BVAR model[15] at both monthly and quarterly frequencies.

The responses of Tax Revenues to shocks in the Tax Sentiment index show a clear and immediate drop in both monthly and quarterly frequency. That is, tax hike announcements do not translate into revenue increases in the short term. However, our baseline estimate, the quarterly model, shows a sustained recovery from the second quarter onwards, indicating that the positive effects on revenue may materialize with some delay. The initial drop could be interpreted, in a first reading, as a sign of low credibility of the announcements or as a reflection of institutional difficulties for their effective implementation. In other words, agents may not perceive these announcements as a reliable signal of imminent changes in fiscal policy. This interpretation is consistent with the idea that tax increases face greater political, administrative and social obstacles than government expenditure measures, which limits their immediate enforceability.

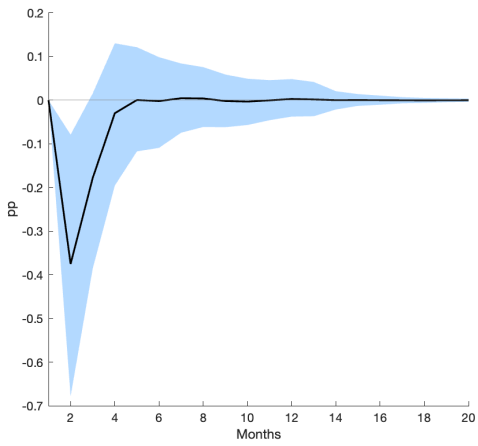
(a) Government Expenditure – Monthly



(b) Government Expenditure – Quarterly



(c) Tax Revenues – Monthly



(d) Tax Revenues – Quarterly

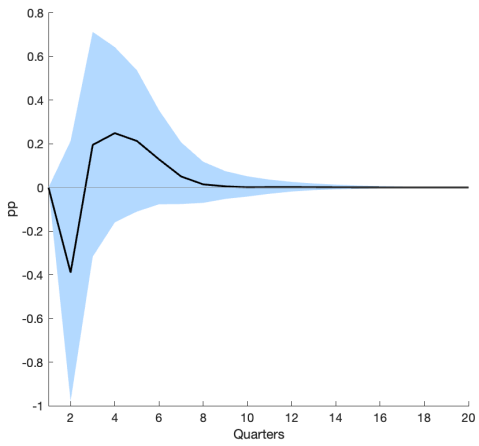


Figure 5: Impulse Response Functions of Government Expenditure and Tax Revenues to shocks in sentiment indices. The first row displays responses of Government Expenditure to Government Expenditure Sentiment shocks, and the second row responses of Tax Revenues to Tax Sentiment shocks. Each column shows monthly (left) and quarterly (right) horizons.

A second interpretation is that the announcements are perceived as credible, but they trigger anticipatory adjustment responses by economic agents, aimed at mitigating the expected impact of a higher tax burden. These behaviors may include tax planning strategies, postponement of economic decisions, partial relocation of activity or greater recourse to the informal economy, which could temporarily erode the tax base. From this perspective, the observed drop in revenues would not reflect a lack of credibility,

[15]The vector of endogenous variables is composed by: HCPI, Fiscal Revenues, Government Expenditure, GDP and the respective sentiment index. Results are robust to different lags and prior specifications.

but rather the distorting effects that agents themselves anticipate in the face of a more demanding tax environment.

The recovery observed in the quarterly pattern from the second quarter onwards reinforces this hypothesis. The pattern suggests that, although fiscal announcements generate immediate frictions, these tend to dissipate as the measures are effectively implemented, once the necessary legislative and administrative procedures are overcome. The absence of this rebound in the monthly specification may be due to the limitation of the model to capture longer-term dynamics, or to the higher noise associated with high frequency.

On the other hand, government expenditure responses to positive shocks in the Government Expenditure Sentiment index, i.e., to announcements of government expenditure increases, are clearly positive in both monthly and quarterly frequency, although with a moderate magnitude and a somewhat more transitory dynamic. This result reinforces the idea that government expenditure measures are not only perceived as more credible, but also face fewer institutional restrictions for their execution in the short term.

5.3 Announcing without executing: the costs of fiscal inaction

A relevant dimension for the effectiveness of the announced fiscal policy is the time lag between the moment of the announcement and its effective implementation. The question is whether fiscal measures should be implemented immediately or whether their mere announcement already produces sufficient effects on the economy. To examine this question, we compare the dynamics of GDP in the face of shocks to fiscal sentiment indices, both tax and government expenditure, by assessing the speed, magnitude and persistence of the observed responses. Figure 4 collects the relevant impulse-response functions, already discussed in Section 5.1.

In the case of announcements related to tax increases (Tax Sentiment), the reaction of GDP is rapid and intense. Impulse-response functions show steep declines concentrated in the first months or quarters after the shock, with a partial reversal thereafter. These dynamics suggest that economic agents adjust their decisions almost immediately after the announcement, anticipating a reduction in their disposable income. In this context, if the actual implementation of the fiscal measure is delayed, the economy will have already assumed the cost in terms of activity without having yet generated the expected revenues from the State. This lag between anticipated impact and actual implementation implies a temporary inefficiency: the economy is penalized before triggering any improvement in the fiscal balance. Consequently, the evidence supports the hypothesis that, at least in the tax area, announcing without executing quickly can be counterproductive, by amplifying uncertainty and eroding the credibility of economic policy.

In contrast, announcements linked to government expenditure (Government Expenditure Sentiment) induce a more gradual profile in the GDP response. Although the initial effect is positive, its persistence depends critically on the actual materialization of government expenditure. This suggests that, in this case, the announcements act more as a catalyst of expectations than as an autonomous boost to activity. If government expenditure is not executed in subsequent periods, the expansionary effect tends to be diluted. This logic is consistent with the operational functioning of government expenditure, which is usually deployed through programs, investments or transfers with a budget execution distributed over time. Therefore, although the temporary margin for maneuver may be somewhat greater than in the case of taxes, here too sustained implementation is key to maintaining the expansionary effect.

In short, yes, it is better to announce and implement quickly, especially in the case of tax announcements, where the economy reacts immediately and strongly. If it is announced and not implemented quickly, much of the adjustment will already have occurred in expectations, but the economy will not see the expected offsetting effects (in revenues or in fiscal balance). On the other hand, for government expenditure announcements, implementation may be slightly more gradual, but it is still key to sustaining the expansionary effect over time.

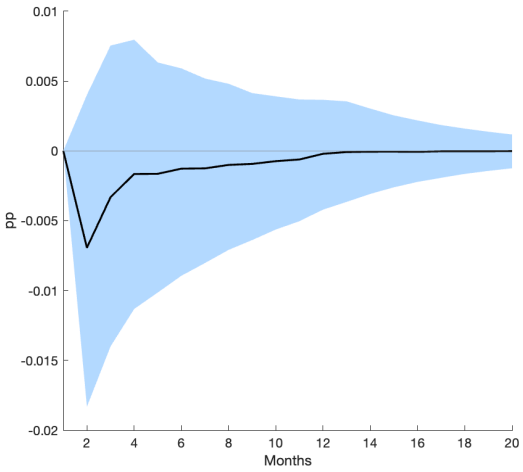
5.4 Prices or quantities? The channel of transmission of fiscal announcements

A central issue in understanding the effectiveness of fiscal announcements is to determine whether their effect is channeled mainly through quantities, that is, the level of economic activity, or through prices via inflation. To address this question, we estimate impulse-response functions of real GDP and the

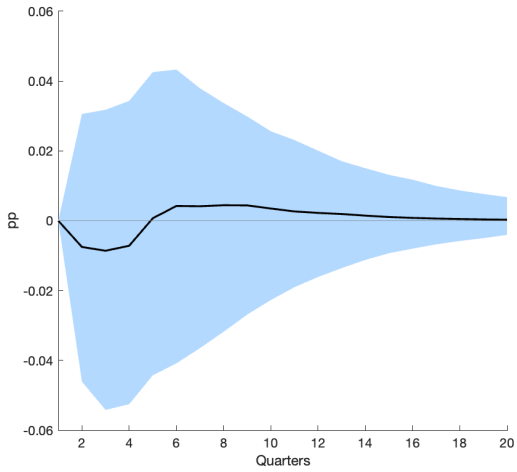
Harmonized Index of Consumer Prices (HICP) to shocks in fiscal sentiment indices. Figure 6 presents the results for the HCPI[16], while Figure 4 shows the results for GDP, already analyzed in Section 5.1.

The responses of GDP and HIPC to shocks in Tax Sentiment suggest that the transmission operates more clearly via quantities than via prices. In both models—monthly and quarterly—the impact on inflation is practically nil, with small and not very persistent responses. In contrast, GDP, as we discussed in Section 5.1 shows significant and rapid declines, especially noticeable in the quarterly model, suggesting that tax hike announcements generate a contraction in economic activity in the short term. This pattern is consistent with standard economic logic: anticipation of higher tax burdens reduces consumption and investment, which directly impacts output and aggregate demand. Moreover, tax announcements are not direct cost shocks to firms (as would be, for example, a rise in energy prices), but operate mainly on disposable income and government expenditure decisions, which explains why prices hardly react at all. It is also likely that in the context analyzed there are levels of idle capacity or sufficient margins in companies, which makes it possible to absorb demand adjustments without the need to pass them on to prices.

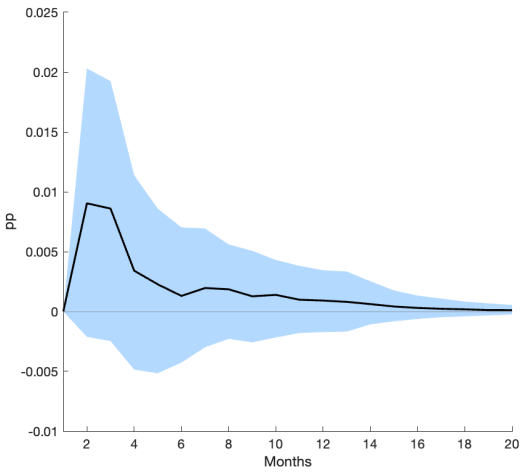
(a) Government Expenditure Sentiment – Monthly



(b) Government Expenditure Sentiment – Quarterly



(c) Tax Sentiment – Monthly



(d) Tax Sentiment – Quarterly

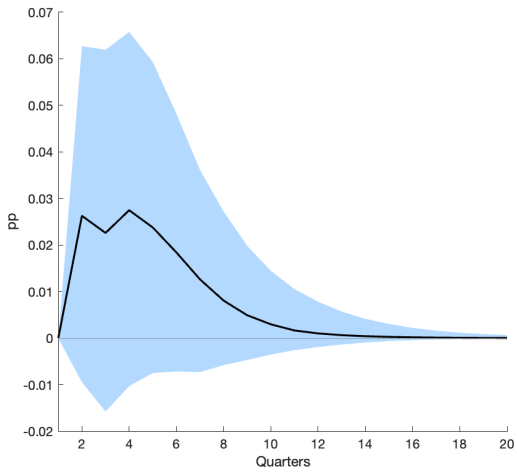


Figure 6: Impulse Response Functions of HCPI to Fiscal Sentiment Shocks. The first row displays responses to government expenditure sentiment shocks, and the second row to tax sentiment shocks. Each column shows monthly (left) and quarterly (right) horizons.

A similar dynamic is observed in the case of shocks to Government Expenditure Sentiment, although with the opposite sign. In this case, both at monthly and quarterly frequency, GDP responses are clearly positive, showing an immediate expansionary effect which, although it tends to dissipate, is

[16]The vector of endogenous variables is composed by: HCPI, Fiscal Revenues, Government Expenditure, GDP and the respective sentiment index. Results are robust to different lags and prior specifications.

significant in the first periods. In contrast, the impact on inflation is very small or practically nil. This is consistent with the idea that announcements of higher government expenditure act directly on aggregate demand, stimulating private consumption, investment and, where appropriate, employment, but without generating inflationary pressures in the short term. This behavior is to be expected in environments where there is still underutilized productive capacity or unemployment, which allows the increase in demand to translate into more production rather than price increases. In short, in the case of both tax and expenditure announcements, the evidence suggests that the transmission of fiscal policy is channeled mainly through adjustments in real quantities (GDP) and not through prices.

6 Future research

This paper contributes to the growing literature on the macroeconomic effects of fiscal communication by documenting that fiscal announcements and rumors, as perceived through the media, exert a significant and immediate impact on economic activity. However, the analysis developed here represents only a first step in understanding how fiscal signals influence the economy. Several relevant avenues for future research naturally emerge from our findings and from the limitations inherent in the empirical approach.

6.1 State-dependent effects

A natural extension of the present work is to explore whether the effects of fiscal announcements depend on the state of the economy. Standard linear models, as the one estimated in Section 4.1, impose constant effects over time, implicitly assuming that the transmission of fiscal signals is invariant across business cycle conditions. However, both theoretical arguments and recent empirical evidence suggest that fiscal policy—and by extension, fiscal communication—may exert asymmetric effects depending on whether the economy is in an expansion or a recession (for example, Auerbach and Gorodnichenko (2012), Caggiano et al. (2015), and Ramey and Zubairy (2018)). To address this issue, the current work incorporates a LSTAR framework, which allows the propagation of fiscal sentiment shocks to vary nonlinearly with the state of the economy. Specifically, as explained in the Appendix, the transition function is governed by the GDP monthly growth rate, enabling the model to differentiate between low-growth (recessionary) and high-growth (expansionary) regimes. This part of the analysis is already at an advanced stage. The remaining step involves translating the current frequentist estimation into a Bayesian framework, which will allow for a more accurate characterization of uncertainty and greater robustness of the results.

Moreover, while the LSTAR approach allows us to capture regime-switching dynamics based on the state of the economy, it does so under the assumption that the nonlinearities are smooth and monotonic. Preliminary data based on our current LSTAR model-estimated in a frequentist framework, and pending estimation by Bayesian methods-suggest that the macroeconomic impact of fiscal signals is not only nonlinear, but may also be highly state-dependent, with potentially larger effects during deep recessions or large expansions. Investigating this would require moving beyond the LSTAR framework towards models that allow for abrupt regime changes (e.g., Markov-Switching VARs) or for richer transition functions that accommodate multiple dimensions of economic slack, financial stress, or uncertainty.

6.2 Asymmetric Effects: Good News vs. Bad News

Future research could go one step further by formally testing whether the responses to positive and negative announcements are themselves asymmetric. The goal is to test whether the response to expansionary fiscal signals differs not only from contractionary signals in general, but also whether such asymmetries are amplified or mitigated depending on whether the economy is in a recession or an expansion.

6.3 Announcement vs. Implementation

A natural question that arises is how the effects of fiscal announcements compare with those of actual policy implementation. One might be tempted to address this question by directly comparing the estimates obtained in this paper with those of previous studies that focus on implementation shocks. However, such a comparison is not trivial. First, the vast majority of existing estimates refer to the United States, the United Kingdom or other countries with different institutional frameworks, which limits the external validity of the comparison. Second, the results are highly model-dependent: differences in identification strategies, control variables, data frequency or definitions of shocks may lead to substantial divergences in the estimated multipliers. Therefore, establishing a meaningful comparison would require replicating the narrative approach for Spain by constructing a comprehensive narrative base, in the style of Romer

and Romer (2010) or Mertens and Ravn (2012), that codifies the fiscal measures actually enacted, their exact implementation schedule and their impact. Then, both announcement and implementation shocks should be estimated within a common empirical framework, ideally with the same VAR structure and the same set of controls.

6.4 External validity and cross-country applications

The approach developed in this paper, as well as the research avenues proposed for the future, could be extended—with varying degrees of difficulty—to other countries. Applying this framework to different institutional contexts would allow testing whether the macroeconomic effects of fiscal announcements are context-dependent or generalizable. In addition, cross-country comparisons could provide valuable information on how institutional factors-such as fiscal credibility, media influence, or debt sustainability-influence the transmission of fiscal signals.

7 Conclusions

This paper proposes a novel empirical framework to study the macroeconomic effects of fiscal announcements, incorporating both formal signals and informal rumors regarding future tax and spending measures. In contrast to the existing literature, which has focused primarily on effective shocks identified through official documents or institutional speeches (Romer & Romer, 2010; Mertens & Ravn, 2012; Melosi et al., 2022), our approach is based on the hypothesis—inspired by imperfect information models such as Melosi et al. (2022)—that economic agents update their expectations at the time of the announcement, rather than at the time of implementation. To capture this informational dimension, we construct the first high-frequency fiscal sentiment index for Spain, being the first to rely on manually coded press articles, distinguishing between tax-related and spending-related measures, and weighting each news item according to its level of jurisdiction and credibility. This approach overcomes the limitations of studies focused exclusively on discrete events or low-frequency data (Carbonari et al., 2024; Latifi et al., 2024), offering a more continuous and granular view of the fiscal communication flow. Finally, we complement the quarterly analysis with a monthly version of the model, incorporating a monthly GDP proxy built using a Kalman filter, which allows us to assess with greater precision the immediate effects of fiscal announcements through a monthly SVAR.

The results confirm that fiscal announcements generate significant and immediate macroeconomic effects, even in the absence of effective implementation. In particular, announcements of increased public spending induce a persistent expansion of GDP, while news about tax increases tend to have contractionary effects, visible from the moment of the announcement. This transmission asymmetry is robust in both monthly and quarterly models and reflects fundamental differences in transmission channels: while spending directly strengthens aggregate demand, taxes seem to affect intertemporal consumption and investment decisions through expectations channels, as already suggested by Hayo and Mierzwa (2022) and Leeper et al. (2013). Crucially, we show that the transmission channel is via economic activity and not via prices.

The impact of fiscal announcements hinges on their credibility. Tax hikes often fail to raise revenues in the short run, suggesting either low credibility or anticipatory adjustments by agents seeking to avoid future burdens. In contrast, spending announcements lead to a modest but immediate rise in actual expenditure, indicating greater credibility and fewer implementation barriers.

Lastly, we show that the macroeconomic effects are stronger when announcements are followed by rapid execution. Delays between communication and implementation reduce effectiveness, especially for tax measures, where the economy adjusts swiftly upon announcement. Timely implementation reinforces credibility and ensures that fiscal communication translates into real economic impact.

This analysis opens multiple avenues for future research. In particular, it is crucial to explore whether the effects of fiscal announcements depend on the state of the business cycle, using nonlinear frameworks such as STAR or regime switching models. It is also relevant to distinguish between the impact of good and bad news, and to directly compare the effects of announcements with those of actual policy implementation. Replicating this approach in other countries would also allow us to assess the role of institutions, fiscal credibility and the media context in the transmission of these signals. All this would contribute to a better understanding of the role of fiscal communication as an economic policy tool.

Appendix

Search summaries from Factiva

Table 3: Search Summary from *Factiva* for Tax Sentiment

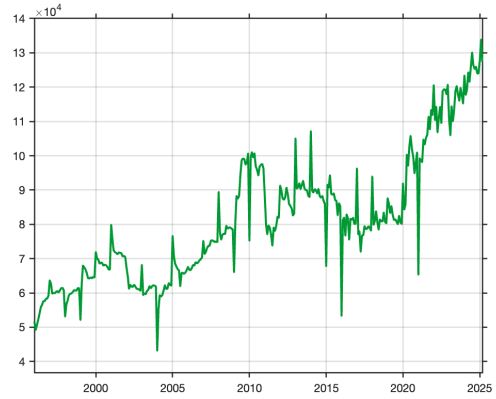
Search summary	
Text	((Gob* OR Hacienda* OR Presid*n* OR ministr* OR ministerio* OR "ministro de economía" OR vicepresident* OR "Consejo de ministros") w/5 (de OR procur* OR pretend* OR anuncia* OR informa* OR comunica* OR propone* OR estudia* OR considera* OR evalua* OR prepara* OR planea* OR "project" OR "propuesta de" OR aprobar* OR acordar* OR acceder* OR alargar* OR agregar* OR eleva* OR alza* OR incrementa* OR sube* OR baja* OR rebaja* OR reduce* OR supr* OR elimina* OR disminu* OR "alivio fiscal") w/10 (impuest* OR imposición OR tasa* OR grava* OR fiscalidad OR tributo* OR "carga fiscal" OR "reforma fiscal" OR "contribución especial" OR "medidas fiscales")
Date	All Dates
Source	El Mundo (Spain, Spanish Language) OR El País – Nacional (Spain, Spanish Language) OR Cinco Días (Spain, Spanish Language) OR El Economista (Spain, Spanish Language) OR Expansión (Spain, Spanish Language) OR ABC (Spain, Spanish Language) OR El Español.com (Spain, Spanish Language) OR El Confidencial (Spain, Spanish Language) OR La Vanguardia (Catalonia, Spanish Language) OR elDiario.es (Spain, Spanish Language) OR La Razón (Spain, Spanish Language) OR 20Minutos (Spain, Spanish Language)
Results Found	5 298

Table 4: Search Summary from *Factiva* for Government Expenditure Sentiment

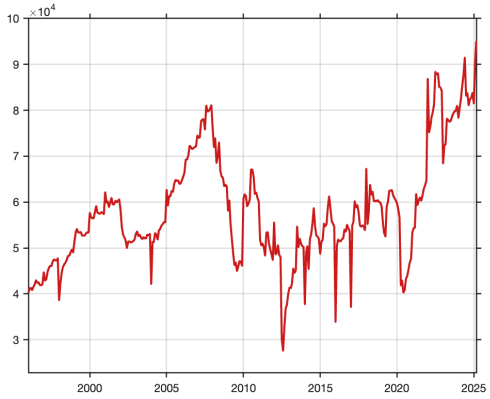
Search summary	
Text	((Gob* OR Hacienda* OR Presiden* OR ministr* OR ministerio* OR "ministr* de economía" OR vicepresiden* OR "Consejo de ministros") W/10 (dese* OR procur* OR pretend* OR anuncia* OR informa* OR comunica* OR propone* OR estudia* OR considera* OR evalúa* OR debat* OR plane* OR suger* OR discut* OR "en estudio" OR "en revisión" OR "en evaluación" OR exami* OR explora* OR introduc* OR implementa* OR aprueba* OR impuls* OR baraja* OR plantea* OR analiza* OR impulsa* OR "apunta a" OR presupuest* OR preten* OR podría OR potencial OR posible OR "proyect* de" OR "propuesta de" OR aprueba* OR acordar* OR acuerd* OR alarg* OR agregar* OR eleva* OR alza* OR incrementa* OR subi* OR baja* OR ajust* OR recort* OR rebaja* OR reduc* OR supr* OR elimina* OR disminu* OR "alivio fiscal" OR critic*)) W/10 (gasto* OR "gasto público" OR "gasto social" OR "gasto en defensa" OR "gasto en educación" OR "gasto sanitario" OR "gasto en pensiones" OR "aumento del gasto" OR "reducción del gasto" OR "recorte del gasto" OR "ajuste del gasto" OR "presupuesto de gasto" OR "incremento del gasto" OR "disminución del gasto" OR "plan de gasto" OR "expansión fiscal" OR "consolidación fiscal" OR "inversión pública")
Date	All Dates
Source	El Mundo (Spain, Spanish Language) OR El País – Nacional (Spain, Spanish Language) OR Cinco Días (Spain, Spanish Language) OR El Economista (Spain, Spanish Language) OR Expansión (Spain, Spanish Language) OR ABC (Spain, Spanish Language) OR El Español.com (Spain, Spanish Language) OR El Confidencial (Spain, Spanish Language) OR La Vanguardia (Catalonia, Spanish Language) OR elDiario.es (Spain, Spanish Language) OR La Razón (Spain, Spanish Language) OR 20Minutos (Spain, Spanish Language)
Results Found	6 106

Monthly variables excluding Fiscal Sentiment

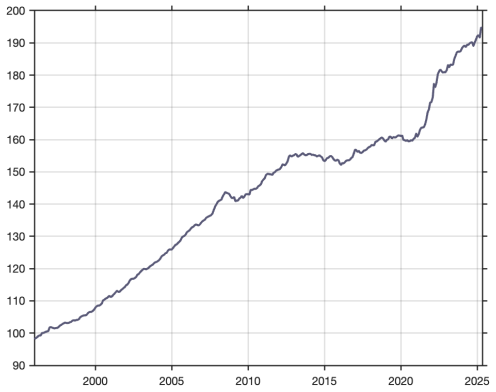
Panel (a) plots seasonally adjusted government expenditure, panel (b) shows Tax Revenues in the same format, panel (c) displays the Harmonized Index of Consumer Prices (1996=100), and panel (d) plots the estimated monthly GDP growth rate. These series are described in Section 3.3.



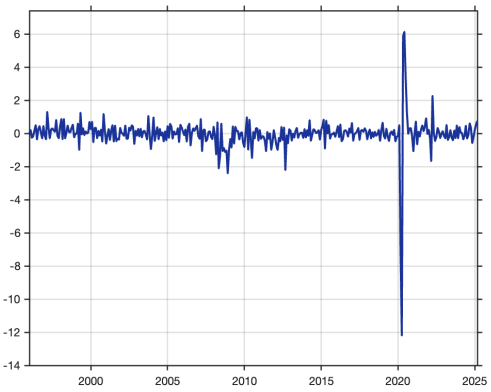
(a) Government expenditure



(b) Tax Revenues



(c) HCPI



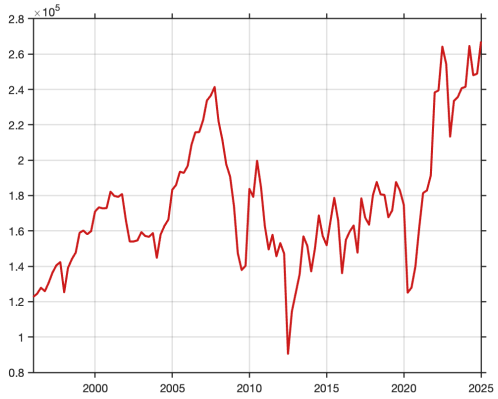
(d) Monthly GDP growth rate

Figure 7: Monthly variables excluding Fiscal Sentiment

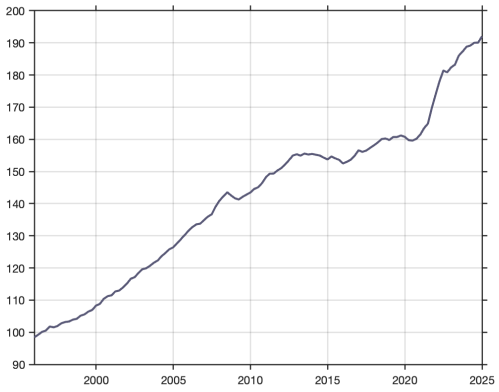
Quarterly variables excluding Fiscal Sentiment

Panel (a) plots seasonally adjusted government expenditure, panel (b) shows Tax Revenues in the same format, panel (c) displays the Harmonized Index of Consumer Prices (1996=100), and panel (d) plots the estimated monthly GDP growth rate. These series are described in Section 3.4.

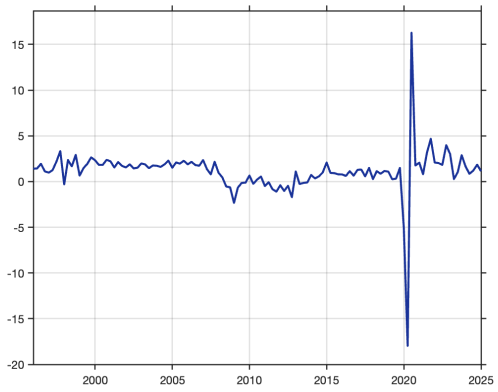
(a) Government expenditure



(b) Tax Revenues



(c) HCPI



(d) Quarterly GDP growth rate

Figure 8: Quarterly variables excluding Tax and Expenditure Sentiment

LSTAR model

In order to study the state-dependent effect of fiscal announcements, both tax and government expenditure, it is necessary to introduce a new type of models, the so-called LSTAR models. The linear specification explained in Section 4.1 imposes the restriction that fiscal policy has the same effect in all states of the economy, which is likely to be too strong an assumption. Therefore, the second step in our empirical analysis is to explore whether the economic impact of fiscal news announcements depends on the state of the economy—specifically, whether it is in a phase of expansion or recession. For this purpose, we estimate a Logistic Smooth Transition Regression (LSTAR) model in the spirit of Granger and Teräsvirta (1993) and van Dijk et al. (2002), which allows for a nonlinear adjustment between two extreme regimes: recession and expansion. Unlike models with discrete regime shifts, the STAR framework accommodates a continuum of intermediate states, enabling us to capture episodes where the economy is transitioning or where the prevailing regime is not clearly defined.

Let us write our STAR model as

$$y_{t,j} = a'_{1,j} x_{t,j} + a'_{2,j} x_{t,j} F(y_{t-d,j}, c_j, \gamma_j) + \varepsilon_{t,j} \tag{3}$$

where $x_{t,j} = (1, y_{t-1,j}, \ldots, y_{t-p,j})'$ is the vector of endogenous variables, with $j \in (Taxes, Expenditure)$, $a_i = (a^0_{i,j}, a^1_{i,j}, \ldots, a^p_{i,j})'$ for $i \in (1, 2)$ are regime-specific coefficient matrices, and $\varepsilon_{t,j} \sim iidN(0, \Sigma_\varepsilon)$. The transition between regimes is governed by the logistic function

$$F(y_{t-d,j}, c_j, \gamma_j) = \frac{1}{1 + e^{-\gamma_j (y_{t-d,j} - c_j)}},$$

where the threshold c_j and the smoothness parameter γ_j are estimated jointly with the regime coefficients, and d is set to 3 to allow the transition to depend on recent monthly dynamics without being too sensitive to noise in a single observation.

Identification and Generalized Impulse Response Functions

Unlike standard linear VARs, LSTAR models imply a nonlinear and state-dependent response to shocks. In such frameworks, the impact of a shock may vary depending on the regime in which it occurs and may propagate differently across states, violating the assumptions underlying conventional impulse response analysis. Standard IRFs assume linearity, symmetry, and time-invariant propagation mechanisms, and are derived under the premise that shocks affect the system independently of the prevailing economic conditions. These assumptions, however, break down in nonlinear settings—making traditional IRFs potentially misleading or invalid, as stressed by Koop et al. (1996). Lastly, as argued by Caggiano et al. (2015, p. 757), we must compute GIRFs "to take into account the interaction between the evolution of the variables in the vector $y_{t,j}$ and the transition variable", the GDP growth rate in our application. Therefore, following previous work, we estimate Generalized Impulse Response Functions (GIRFs).

GIRFs, as introduced by Koop et al. (1996), characterize the dynamic response of a nonlinear system to shocks by comparing conditional expectations of future outcomes under different innovation paths. Specifically, the GIRF measures the expected effect of a one-time shock on the future evolution of the system, relative to a baseline in which no such shock occurs, both conditional on the same initial state. This contrasts with traditional IRFs, which typically assume linearity and deterministic post-shock paths. In the GIRF framework, the trajectory of the system is simulated multiple times, integrating over future stochastic innovations to capture the full distribution of possible outcomes. Formally, the GIRF at horizon h, conditional on information $\mathcal{I}_t$ and a structural shock of size δ at time t, is defined as

$$\text{GIRF}(h, \delta, \mathcal{I}_{t,j}) = \mathbb{E}[y_{t+h,j} \mid \varepsilon_t = \delta, \mathcal{I}_t] - \mathbb{E}[y_{t+h,j} \mid \mathcal{I}_{t,j}], \tag{4}$$

where ε_t is the innovation vector and $\mathcal{I}_t$ includes both the regime and the past history of the process. Thus, GIRFs are, in general, dependent on the initial conditions, the magnitude of the shock, and the nonlinear structure of the system.

Importantly, as Koop et al. (1996) emphasize, "unlike the orthogonalised impulse responses obtained using a Cholesky factorization, the generalized impulse response functions are unique and are not affected by reordering of the variables in the set of endogenous variables" and they "reduce to the traditional impulse responses produced by a Cholesky factorization only in the case of a diagonal covariance matrix" (Koop et al., 1996, p. 134). This approach has been extended to nonlinear and regime-switching environments in fiscal applications by Caggiano et al. (2015), who use GIRFs to capture state-dependent effects

without relying on orthogonalized shocks in the nonlinear stage of their analysis, and also by Auerbach and Gorodnichenko (2012).

Our estimation closely follows the simulation-based approach in Caggiano et al. (2015). From an observed historical state (e.g., a recession), we simulate the model forward over a 30-month horizon under two scenarios: one baseline, and another with a +1 unit shock to fiscal sentiment in the first period. This process is repeated 1,000 times using stationary bootstrap resampling of residuals to construct confidence bands. Notably, this simulation-based technique does not rely on any recursive ordering of variables nor on structural decompositions of the residuals, unlike standard VAR-based IRFs.[17]

[17] Following the GIRF methodology proposed by Koop et al. (1996) and implemented in fiscal policy contexts by Caggiano et al. (2015) and Auerbach and Gorodnichenko (2012), we estimate regime-dependent impulse responses by simulating the model forward from an observed state. For each selected period t, we compute two counterfactual paths over a 30-month horizon: one baseline, and another with a +1 unit shock to the fiscal sentiment innovation in period $t+1$. Both trajectories reflect regime-switching dynamics through the estimated transition function $F(z_t, c, \gamma)$. We repeat this procedure 1,000 times and report the median and interquartile range of the resulting generalized impulse response functions.

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