Journal of International Money and Finance 123 (2022) 102602

Contents lists available at ScienceDirect

Journal of International Money and Finance

journal homepage: www.elsevier.com/locate/jimf

The rewards of fiscal consolidations: Sovereign spreads and confidence effects ☆

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International Monetary Fund

ARTICLE INFO

Article history:
Available online 31 January 2022

JEL Classification:
E62
H30
F34

Keywords:
Sovereign spreads
Emerging markets
Fiscal consolidation

ABSTRACT

This paper investigates the effects of fiscal consolidation announcements on sovereign spreads using high frequency data for a panel of 21 emerging market economies during 2000–18. We construct a novel dataset using a global news database to identify the precise announcement date of fiscal consolidation actions. Our results show that sovereign spreads barely decline after fiscal announcements from the executive branch. Nonetheless, spreads decline significantly following news that austerity measures have been approved by the legislature (congress or parliament), particularly in economies with high sovereign spreads, debt levels, and low credit-risk ratings. These effects are even larger in the presence of an IMF program. In addition, we find that consolidation announcements are less contractionary when sovereign spreads decline. The reduction in output is a third of the counterfactual case in which spreads do not respond to announcements. These results show that confidence effects, in the form of lower sovereign spreads, are an important transmission channel of fiscal policy actions. We also find that the role of confidence effects increases with the level of spreads, such that countries with high spread levels stand to benefit the most from putting in place credible austerity packages.

1. Introduction

The macroeconomic effects of fiscal austerity measures have been subject to intense debate in academic and economic policy circles (Alesina et al., 2019). Some even argue that such policies are self-defeating, such that they aggravate economic downturns and lead to a deterioration in fiscal indicators, with little evidence that financial markets reward them. While a large part of this literature has focused on the effects of fiscal adjustment in Advanced Economies (AEs), Emerging market and developing economies (EMDEs) have distinct characteristics that a priori may entail different economic outcomes for the same set of policies (Carriére-Swallow et al., 2021). In particular, EMDEs typically feature higher perceived sovereign default risk and weaker policy credibility, which may imply greater scope for reductions in interest rates on the back of confidence effects following a decisive fiscal consolidation (Blanchard et al., 1990 and Giavazzi and Pagano, 1990).

☆ All authors are at the International Monetary Fund. We would like to thank Mark M. Spiegel, the editor, and an anonymous referee for suggestions that greatly improved the paper. We are also grateful to Ravi Balakrishnan, Marcos Chamon, Roberto Perrelli, Samuel Pienknagura, Jorge Roldós, Frederik Toscani, Susan Yang, and participants at seminars at the Central Bank of Brazil, Central Bank of Colombia, Bank of Mexico, Central Bank of Paraguay, at LACEA, at ITAM, at the University of Sao Paulo, at INSPER and at the IMF for helpful comments.Genevieve Lindow provided excellent research assistance.The views expressed in this paper are those of the authors and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

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https://doi.org/10.1016/j.jimonfin.2022.102602
0261-5606/

This paper investigates the effects of fiscal consolidation announcements on sovereign spreads in EMDEs using high frequency data. We construct a novel dataset using a global news database to identify the precise announcement date of fiscal consolidation actions. Our results show that sovereign spreads barely decline after fiscal announcements from the executive branch. Nonetheless, spreads decline significantly following news that austerity measures have been approved by the legislature (congress or parliament), particularly in economies with high sovereign spreads, debt levels, and low credit-risk ratings. These effects are even larger if the presence of an IMF program. In addition, we also quantify the importance of sovereign spreads in the transmission of fiscal policy actions to economic activity through a panel VAR model.

Empirical evidence quantifying the magnitude of the confidence effects of fiscal policy has been elusive. Several studies based on annual data find that fiscal variables do not significantly affect sovereign spreads once other macroeconomic variables are controlled for (Edwards, 1984; Min, 1998). Nonetheless, some studies do find significant effects of changes of fiscal variables on spreads and the magnitude of these effects tends to vary depending on the fiscal instrument being used (Bernoth and Erdogan, 2012; Akitoby and Stratmann, 2008). Moreover, the literature surveyed in Eyraud et al. (2018) indicates that the use of fiscal rules tends to lower sovereign spreads and decrease their response to fiscal actions, as rules act as a commitment device and signal future policy actions.

The strand of the literature that looks at fiscal consolidation episodes more specifically also suggests mixed results. Baldacci et al. (2008) using a panel of 30 emerging market economies from 1997 to 2007 find that fiscal consolidations narrow credit spreads, especially in countries that experienced prior defaults. Using annual data for a panel of Advanced Economies (AEs), Guajardo et al. (2014) find that consolidations in economies with high-perceived sovereign risk are less contractionary, which constitutes indirect evidence that confidence effects are at play. This finding is broadly confirmed for the sample of Latin American countries analyzed by Carriére-Swallow et al. (2021).

Beetsma et al. (2021) extend the Guajardo, Leigh, and Pescatori data at a monthly frequency and find that fiscal consolidations affect consumer and business confidence negatively. As far as sovereign spreads are concerned, these authors find that long-term interest rates tend to fall, but only with spending-based consolidation announcements during economic downturns. In an approach that is closer ours, de Jong (2018) uses daily data on fiscal announcements for the Netherlands and concludes that announcements indicating an improvement in the fiscal balance significantly lowered sovereign spreads. In contrast, Born et al. (2020) show that in normal times spreads do not respond to changes in government consumption, while the sovereign default premium increases in response to spending cuts during times of fiscal stress.

Disentangling the causal effects of fiscal policy actions is a particularly difficult task. The strategy used to identify exogenous fiscal policy actions has crucial implications for estimates of the effects of consolidations (Guajardo et al., 2014; Riera-Crichton et al., 2016; Ramey, 2016). For example, the use of changes in the cyclically adjusted primary balance to identify fiscal policy shocks includes shifts in fiscal variables unrelated to policy decisions, including those driven by swings in asset or commodity prices, which also affect economic activity. Therefore, it is inadequate to use such shocks to estimate the macroeconomic effects of fiscal policy.

Moreover, shocks recovered from structural VAR models (Blanchard and Perotti, 2002) and the use of real-time forecast errors in fiscal variables (Auerbach and Gorodnichenko, 2013; Furceri and Li, 2017, Born et al., 2020) may also lead to the introduction of measurement error as they may capture changes in non-policy factors. In addition, the timing restrictions that typically underlie the identification of spending shocks in VAR models estimated at a quarterly frequency can also be arbitrary and do not adequately address endogeneity problems.

To circumvent these issues, Beetsma et al. (2021) and de Jong (2018) resort to the use of high frequency data to identify the precise date of fiscal announcements and their effects on bond yields and sovereign spreads. These papers highlight that the use of a high frequency database allows to control for anticipation effects of budgetary implementation and variables that respond quickly to news. In this regard, it is assumed that fiscal policy is unlikely to be adjusted instantaneously to changes in sovereign spreads on the same or previous day. This explanation seems plausible since the design and implementation of fiscal packages typically takes weeks or months. Nevertheless, due to data limitations and the data-intensive nature of this empirical methodology, studies using this approach tend to be country-specific or restricted to small sample of advanced economies.

In this paper, in order to address possible anticipation effects, we also use daily data to investigate how announcements of fiscal consolidations affect sovereign spreads. We construct a database on fiscal austerity announcements for a sample of 21 EMDEs over the period 2000–2018. Our starting point is the dataset of fiscal consolidation episodes documented by Carriére-Swallow et al. (2021) based on a ‘‘narrative” approach for 14 Latin American economies. We enrich Carriére-Swallow et al. (2021)’s dataset further by including 7 additional EMDEs and identifying the specific day in which each consolidation measure is announced by policymakers in each country. This enlarged daily dataset, which is one of the contributions of our paper, is created by compiling news articles from local newspapers contained in the Dow Jones' Factiva online database.

In constructing our list of announcements, we select all news messages referring to official events. These news could, for example, indicate that the president announced austerity measures, that the austerity measures were presented to congress, and that the austerity package received parliamentary approval. It is important to note that the identification approach followed in this paper is different from Carriére-Swallow et al. (2021), consequently we do not rely on an assessment of the motivation for fiscal announcements to determine whether they are ‘‘exogenous” to cyclical considerations.

The resulting daily dataset of fiscal announcements is used in our empirical analysis to investigate the association between austerity measures and movements in sovereign spreads. Firstly, we use the local projection method proposed by Jorda (2005) and estimate the response of J.P. Morgan’s Emerging Market Bond Index (EMBI) spreads to austerity

announcements. Indeed, a more accurate picture of how austerity measures affect spreads can be obtained if we have a more precise (i.e. daily) timing of the release of information of the consolidations. This strategy also allows us to address possible reverse causality issues. For instance, a sudden increase in sovereign spreads could lead policymakers to put in place austerity measures in order to calm financial markets. If these actions are not controlled for in the analysis, one would erroneously conclude that the austerity measures were the culprit to the rise in spreads. Furthermore, the daily frequency of our database allows us to control for anticipation effects of fiscal actions and variables that respond quickly to news, such as sovereign bond spreads, allowing for proper inference if these effects do indeed play a role.

Our findings indicate that fiscal austerity announcements significantly lowered EMBI spreads in our EMDE sample, particularly after parliamentary announcements. In line with previous empirical work on the macroeconomic effect of fiscal actions (see Corsetti et al., 2012; Auerbach and Gorodnichenko, 2013; Ilzetzki et al., 2013), we find that the effects of austerity announcements on sovereign spreads vary with initial conditions. If spreads are high to begin with, debt levels are elevated, or sovereign credit ratings are low, austerity announcements induce a larger reduction in spreads. Spreads also decline in the aftermath of austerity announcements for EMDEs that were undergoing an IMF-supported program. In this regard, while it could be the case that the IMF-supported program boosts the credibility of the adjustment and the likelihood that the measures will be implemented, it could also be possible that the reduction in spreads comes as a result of the perception among investors that the austerity announcements will ensure the approval or continuation of the IMF program. However, we observe that sovereign spreads decline following fiscal consolidation announcements in economies with high sovereign spreads regardless of whether or not countries have an IMF supported program. Results also show that the reductions in sovereign spreads following fiscal actions are larger in economies with elevated debt levels and low credit ratings, as these variables are also commonly used indicators for underlying fiscal vulnerabilities (see, for example, Hadzi-Vaskov and Ricci, 2021).

If austerity announcements are capable of lowering borrowing costs, particularly for countries with high-perceived sovereign risk, they could free up resources for consumption and investment, thus mitigating the contractionary effects of fiscal consolidations.[1] We analyze whether confidence plays a role in the transmission of fiscal policy shocks by estimating the relationship between fiscal actions, sovereign spreads and economic activity in a panel vectorautoregression (PVAR) framework. Given that dummy variables may not be suited for a VAR type of analysis (Dueker, 2005), we construct a continuous variable of fiscal policy actions by augmenting our fiscal announcements database with information on the actions' size (as a share of GDP). To study the importance of the reduction in spreads in attenuating the recessive effects of austerity measures, we build a counterfactual scenario using the methodology proposed by Bernanke et al. (1998), Sims and Zha (2006), Kilian and Lewis (2011), and Bachmann and Sims (2012). To capture the idea that the magnitude of the effect of fiscal announcements on spreads is larger in economies with high-perceived sovereign risk, we condition the impulse responses to depend on the level of sovereign spreads.

In the specification with no interaction terms, spreads decline by about 50 basis points in response to a fiscal consolidation announcement of 1 percentage point of GDP and economic activity declines by almost 3 percent in a 12 month window. In the counterfactual scenario, in which spreads do not respond to the shock, the decline in economic activity is 20 percent larger. The difference between the two scenarios is statistically significant but economically small. However, initial conditions matter. If the coefficients of the PVAR are allowed to vary depending on the size of the EMBI spreads, we find that fiscal austerity shocks result in a significantly larger reduction in sovereign risk and are less contractionary. For economies with spreads at or above the 75th percentile of the distribution, for example, a fiscal announcement shock reduces spreads by 100 basis points in a 12 month window. In the counterfactual scenario, where the response of EMBI spreads is zeroed out, the reduction in economic activity is broadly 30 percent larger.

With these estimates at hand, the generality of these findings is illustrated with simulations of the share of accumulated responses of industrial production in the counterfactual and baseline scenarios across the whole distribution of sovereign spreads. We find that the contractionary impact on economic activity is more mitigated (as a result of lower sovereign risk) in countries with high default premiums, which is direct evidence that confidence affects are at play following credible fiscal austerity announcements.

The remainder of the paper is structured as follows. Section 2 describes our database. Section 3 presents the empirical strategy and findings on the effects of fiscal announcements on sovereign spreads. Section 4 describes the PVAR framework, the construction of the counterfactual scenario, and the findings regarding the importance of lower sovereign borrowing costs on economic activity. Section 5 concludes.

2. Data

This section discusses the construction of a new database of consolidation announcements that allows us to explore high frequency (i.e.daily) data. Using this approach, we are able to pin down the precise date in which a specific announcement was made and subsequently explore the association between consolidation announcements and movements in sovereign spreads, which is an advantage relative to the existing datasets of fiscal consolidations that typically present data at an

[1] Guajardo et al. (2014), for instance, find that in a panel of advanced economies that consolidations in economies with high-perceived sovereign risk are less contractionary. There is also indicative evidence to that effect in the sample of EMDEs analyzed in Carriére-Swallow et al. (2021).

annual frequency. By analyzing the effects of fiscal actions over a narrow window around the announcement, it is possibly to mitigate some of the endogeneity problems in the literature dealing with the effects of fiscal consolidations. Furthermore, the daily frequency of our database allows us to control for anticipation effects of fiscal actions and variables that respond quickly to news, such as sovereign bond spreads. We also present some descriptive statistics on EMBI spreads and provide the start and end dates of IMF supported programs for the countries in our sample.

2.1. Fiscal austerity announcements

We compile a large dataset of fiscal consolidation announcements based on news articles from a variety of domestic sources contained in the Dow Jones' Factiva online database for 21 EMDEs over the period 2000 to 2018. Typically, we rely on information from the country's main economics and financial newspaper outlets. We searched the Factiva database for news articles containing keywords such as: "fiscal consolidation"; "fiscal adjustment"; "austerity"; "tax reform"; "tax adjustment"; "spending cuts"; "budget cuts", among others, in each of the 21 countries in the sample. Our sample is based on the availability of English, Spanish, or Portuguese versions of news articles. We rely solely on translations done by the source outlet. Subsequently, we use the text mining package "tm" in R (Feinerer et al., 2008) to construct spreadsheets containing the publication dates, the headlines, and first paragraph of the different news articles. As a next step we manually check each article for relevance to the subject at hand (i.e. fiscal consolidation announcements) and to whether the announcement was made by the executive (i.e. president or finance minister) or legislative (congress or parliament).

Once an article is deemed to be relevant, we proceed to carefully read it to determine whether it constitutes a fiscal consolidation action deemed to be relevant to be included in the database. It is important to note that we only include in the database announcements that represent a net fiscal consolidation, that is an improvement in the fiscal balance.[2] For example, announcements of tax increases that are fully offset by expenditure increases are not included. Furthermore, we also discard fiscal measures that are estimated to be revenue neutral, such as measures that simply shift the tax burden across tax payers or tax hikes that are introduced to compensate for cuts elsewhere. Moreover, we cross-checked the announcements identified in this manner against the information contained in the database constructed by Carriére-Swallow et al. (2021) and in IMF's Article IV consultation staff reports.

In total, we identified 453 announcements (Table 1). There are more announcements from the executive office (355) than from congress (98). The large difference between these two types of announcements is due to the fact that fiscal consolidation packages typically are revised several times before they are presented to congress, and in some cases, due to lack of congressional support, the proposals do not even make it to congress. Announcements are evenly spread over the sample period, although there is some clustering around 2002–2004 (Fig. 1). This coincides with the fact that several countries in our sample were under (or in negotiations towards) an IMF supported program. EMBI spreads also peaked across some of the countries in our sample during those years.

2.2. EMBI spreads and IMF supported program dates

We take daily data for sovereign bond spreads for 21 emerging market economies, for the period January 3 2000 – December 31 2018, using the JP Morgan's Emerging Market Bond Index – Global database. This spread is measured by an index that includes sovereign and quasi-sovereign (guaranteed by the sovereign) instruments that satisfy certain liquidity criteria in their trading. The spread of an instrument (bond) is calculated as the premium paid by an emerging market over a U.S. government bond with comparable maturity features. A country's spread index is then calculated as the average of the spreads of all bonds that satisfy the inclusion criteria, weighted by the market capitalization of the instruments. One of the benefits of such an index is that the time series are continuous, without breaks as bonds mature. We rely on stripped spreads, which excludes collateral and guarantees from the calculation. The data is retrieved from Datastream. We abstain from expanding the sample coverage by including other sovereign measures, such as CDS spreads or bonds denominated in other currencies than US dollars, in order to maintain a homogeneous measure throughout our analysis and limit data transformations to the minimum.

Table 2 provides basic descriptive statistics for the EMBI spreads, measured in basis points. This measure of sovereign default premium varies considerably across our sample, with the lowest realizations of spreads being negative for some European economies while the highest realization exceeding several percentage points in many Latin American economies. For the latter, peaks in the sovereign spreads are clustered around 2001–03 and 2008, that is the onset of the global financial crisis. Spreads have also been very volatile for several countries in our sample across time, which is a reflection of the fiscal and financial stress that these economies experienced in the last two decades. In this regard, most of the economies in our sample had recourse to the IMF for financial assistance or to buttress buffers. Many of these IMF supported programs were conditioned on governments agreeing to adjust their economic policies to overcome the problems that led it to seek financial aid. In this regard, participation in an IMF supported program could lower a countries risk perception, which in turn will be reflected in a reduction in sovereign spreads. The IMF program dates are obtained from the IMF's Monitoring of Fund Arrangements (MONA) database.

[2] When possible, we also obtain the size of the fiscal action (as a share of GDP).

Table 1
Number of fiscal austerity announcements, 2000–18.

Country	Total	Executive	Congress
ARG	9	4	5
BOL	15	10	5
BRA	37	32	5
CHL	48	36	12
COL	34	24	10
CRI	22	17	5
DOM	21	15	6
ECU	38	34	4
GTM	20	17	3
HUN	16	15	1
IND	13	12	1
IDN	7	5	2
JAM	18	17	1
LAT	5	3	2
MEX	27	17	10
PRY	18	12	6
PER	45	32	13
POL	25	24	1
SVK	12	11	1
ZAF	5	5	0
URY	18	13	5

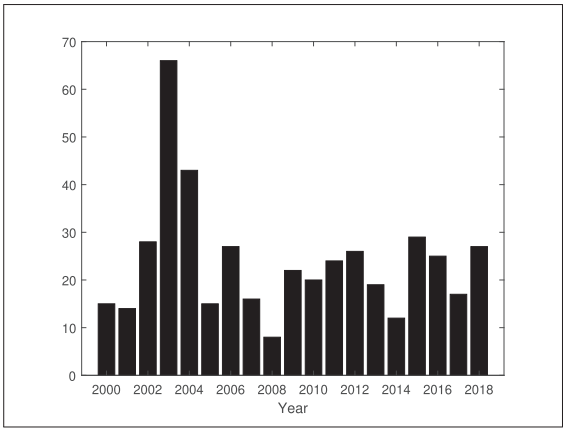

Fig. 1. Number of consolidation announcements by year.

2.3. Reverse causality and anticipation effects

A concern for the questions that we try to address would be whether the fiscal announcements themselves are driven by changes in sovereign spreads within the time horizon considered in our main analysis. Clearly, increases in spreads could lead to fiscal consolidation efforts and some of the episodes documented in Carriére-Swallow et al. (2021) are linked to the desire of policy makers to reduce debt levels (which are linked to debt servicing costs). In this case, it might be possible that estimates of the effects of fiscal announcements on spreads would be biased towards finding no effect or even positive effects.

Nonetheless, it is important to bear in mind that differently from most of the literature on the macroeconomic effects of fiscal consolidations, our analysis uses high frequency (daily) data. Given time lags in the elaboration and implementation of fiscal policy, as well as political economy constraints, it is sensible to assume that announcements are unlikely to respond to changes in spreads within the same day (or even week or month) for identification purposes.[3] This assumption is also supported by the data, which shows that there is no significant link between announcements of any of the types and changes in spreads in periods preceding them within a 30-day window (Results are available from authors upon request).[4]

[3] Leeper et al. (2013), document that the lag between when a policy is initially announced to when the legislation is approved ranges from a couple of months to several years.

[4] This result is obtained from estimating a panel regression of the fiscal announcements (total, by the executive and by congress) on lagged changes in sovereign spreads. All estimated coefficients for lagged changes in spreads are neither statistically nor economically significant.

Table 2
Descriptive statistics of EMBI spreads and IMF program dates, 2000–18.

Country	Initial date	min	max	mean	std	year max	IMF program date
ARG	1/3/00	185	7,222	1,572	1,860	2002	2/4/98-3/10/00; 3/10/00-8/31/03; 9/20/03-1/5/06; 6/20/18-6/19/21
BOL	11/30/12	38	380	244	70	2013	9/18/98-6/7/02; 4/2/03-3/31/06
BRA	1/3/00	133	2,451	426	344	2002	12/2/98-3/31/05
CHL	1/3/00	52	411	148	57	2009	
COL	1/3/00	95	1,076	312	189	2002	12/20/99-12/19/02; 1/15/03-11/2/06; 5/11/09-5/24/20
CRI	7/31/12	210	605	390	74	2016	4/11/09-7/10/10
DOM	11/30/01	122	1,785	487	298	2008	8/29/03-1/30/08; 11/9/09-3/8/12
ECU	1/3/00	337	5,069	1,057	780	2008	4/19/00-12/31/01; 3/21/03-4/20/04
GTM	12/29/12	156	374	237	40	2016	4/1/02-3/31/03; 6/18/03-3/15/04; 4/22/09-10/21/10
HUN	1/3/00	25	758	178	144	2012	11/6/08-10/5/10
IND	10/31/12	96	377	173	52	2013	
IDN	5/28/04	136	1,143	269	124	2008	8/25/98-12/31/03
JAM	10/31/07	256	1,190	508	178	2008	2/4/10-5/3/12
LAT	8/31/12	9	273	98	51	2012	12/10/99-4/9/01; 4/20/01-12/19/01;12/23/08-12/22/11
MEX	1/3/00	89	627	237	83	2008	7/7/99-11/30/00; 4/17/09-11/28/19
PRY	2/28/12	167	420	257	45	2016	12/15/03-11/30/05; 5/31/06-8/31/08
PER	1/3/00	91	901	277	176	2001	6/24/99-2/6/01; 3/12/01-1/18/02; 2/1/02-2/29/04; 6/9/04-8/16/06; 1/26/07-2/28/09
POL	1/3/00	16	401	131	74	2008	5/6/09-5/5/10; 7/2/10-11/12/17
SVK	8/30/13	-2	182	61	36	2013	
ZAF	1/3/00	50	805	231	100	2008	
URY	5/31/01	103	1,982	344	276	2002	3/29/99-3/28/00; 5/31/00-3/31/02; 4/1/02-3/31/05; 6/8/05-12/27/06

Another important issue for the interpretation of our main results is the presence of anticipation effects regarding the policy announcements, that is if agents react even before official announcements are made. As in Beetsma et al. (2021), we address possible anticipation effects by using media reports to identify the exact date of a fiscal announcement and assess daily financial price movements around these events.

Despite the high frequency identification, it is possible that information on fiscal consolidation measures is diffused well-before the official announcement, even if details on the exact nature of the measures is imprecise and uncertain. Indeed, media coverage of a fiscal consolidation measure sometimes predates its official announcement, which may lead to a distortion in terms of the true timing of fiscal shocks to the extent that agents respond to anticipated changes in revenues and public spending. As a consequence, our results on the effects of announcements on spreads could be reflecting different degrees of "surprise" by economic agents.

Given that in our dataset we trace the progression of fiscal actions, from their initial proposal from the executive office until their final approval by parliament, our proposed analytical framework accounts for possible market anticipation effects. For instance, if the approval of a fiscal action is anticipated before being signed into law, then spreads are not likely to react to news of parliamentary approval. More generally, by timing fiscal plans to the exact moment of their announcement in our data set, we can take explicit account of the anticipation effects during the plan's proposal and approval phases.

In addition, to further assess whether anticipation effects are present within the window considered in our analysis, we estimate whether changes in spreads at a given time ($\Delta r_{i,t}$) are related to subsequent fiscal announcements, denoted D_{t+h} (up to thirty days in advance), controlling for fixed effects and past changes in spreads. More specifically, we estimate the following regressions for all announcements and for announcements by Congress only, where α_i and γ_t are country and time fixed effects, respectively:

$$\Delta r_{i,t} = \alpha_i + \gamma_t + \beta_1 D_{t+1} + \beta_2 D_{t+5} + \beta_3 D_{t+10} + \beta_4 D_{t+15} + \beta_5 D_{t+30} + \sum_{m=1}^{5} \rho_m \Delta r_{i,t-m} + \varepsilon_{i,t} \quad (1)$$

The results presented in Table 3 do not indicate that anticipation of fiscal actions are playing a systematic role in explaining spread movements in our analysis time window. The coefficients for future announcements dates are not statistically significant in any of the specifications considered.

3. The effects of austerity announcements on sovereign spreads

In this section we present the core results of the paper. The analysis uses the local projections method (LP) proposed by Jorda (2005), to estimate changes in EMBI spreads following austerity announcements made by either the executive or legislative branches of government or both. Throughout this section, we present the whole 30-day dynamic response of spreads, not just a point estimate, since movements in spreads need to be somewhat persistent for them to be economically significant. Throughout the section we highlight the importance of controlling for the conditions in which the austerity announcements take place, in particular the level of sovereign spreads and whether countries are under an IMF supported program.

Table 3
Anticipation effects: all announcements and announcements by congress.

	All Announcements			
	Δr_t	Δr_t	Δr_t	Δr_t
Δr_{t-1}	0.026	0.026	0.026	0.026
	(0.023)	(0.023)	(0.023)	(0.023)
Δr_{t-2}	0.011	0.011	0.011	0.011
	(0.010)	(0.010)	(0.010)	(0.010)
Δr_{t-3}	0.018***	0.018***	0.018***	0.018***
	(0.006)	(0.006)	(0.006)	(0.006)
Δr_{t-4}	0.010	0.010	0.010	0.010
	(0.007)	(0.007)	(0.007)	(0.007)
Δr_{t-5}	−0.000	−0.000	−0.000	−0.000
	(0.006)	(0.006)	(0.006)	(0.006)
D_{t+1}	−0.659	−0.655	−0.644	−0.640
	(0.518)	(0.520)	(0.517)	(0.514)
D_{t+5}	0.186	0.188	0.197	0.208
	(0.271)	(0.271)	(0.271)	(0.273)
D_{t+10}		−0.151	−0.143	−0.120
		(0.174)	(0.177)	(0.180)
D_{t+15}			−0.517	−0.505
			(0.550)	(0.553)
D_{t+30}				−0.622
				(0.408)
Observations	106,839	106,734	106,629	106,314
R-squared	0.140	0.140	0.140	0.140
Country FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
	Announcements by Congress			
	Δr_t	Δr_t	Δr_t	Δr_t
Δr_{t-1},	0.026	0.026	0.026	0.026
	(0.023)	(0.023)	(0.023)	(0.023)
Δr_{t-2}	0.011	0.011	0.011	0.011
	(0.010)	(0.010)	(0.010)	(0.012)
Δr_{t-3}	0.018***	0.018***	0.018***	0.018***
	(0.006)	(0.006)	(0.006)	(0.006)
Δr_{t-4}	0.010	0.010	0.010	0.010
	(0.007)	(0.007)	(0.007)	(0.008)
Δr_{t-5}	−0.000	−0.000	−0.000	−0.000
	(0.006)	(0.006)	(0.006)	(0.007)
D_{t+1}	−1.970	−1.956	−1.985	−1.975
	(1.259)	(1.251)	(1.265)	(1.257)
D_{t+5}	−1.006	−0.999	−0.992	−0.955
	(0.757)	(0.753)	(0.739)	(0.720)
D_{t+10}		−0.538	−0.534	−0.504
		(0.321)	(0.317)	(0.316)
D_{t+15}			−0.260	−0.211
			(0.965)	(0.977)
D_{t+30}				−1.796
				(1.389)
Observations	106,839	106,734	106,629	106,314
R-squared	0.140	0.140	0.140	0.140
Country FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

3.1. Local projection model

The LP framework is flexible enough to accommodate a panel structure and does not constrain the shape of the impulse response functions, and is therefore less sensitive to mispecification when compared to a traditional VAR model. Auerbach and Gorodnichenko (2013), Jorda and Taylor (2016), Ramey and Zubairy (2018), as well as Born et al. (2020) among others, rely on local projections while analyzing the macroeconomic effects of fiscal policy. However, most of these papers focus on the effects of fiscal policy changes on economic activity.

The benchmark specification for different horizons $(h = 0, .., 30)$ in days is as follows:

$$r_{i,t+h} - r_{i,t-1} = \alpha_{i,h} + \gamma_{t,h} + \beta_h D_{i,t} + \delta X_{i,t} + \varepsilon_{i,t+h}, \quad (2)$$

where $r_{i,t+h}$ denotes the EMBI sovereign spreads in basis points; $D_{i,t}$ is a dummy variable representing whether a fiscal consolidation announcement took place or not[5]; and h denotes the time horizon considered. X_{it} denotes a vector which contains seven lags of daily changes in EMBI spreads. The specification also includes country $(\alpha_{i,h})$ and time $(\gamma_{t,h})$ fixed effects to capture time-invariant country features and shocks that are common across countries (such as changes in U.S. interest rates, for example), respectively. The impulse responses are constructed based on the estimated β_h coefficients at each horizon. The 90 percent confidence bands are based on the respective estimated standard errors.

Another advantage of the LP method in estimating the effects of fiscal consolidations is its flexibility in dealing with non-linearities and state dependency (Ramey and Zubairy, 2018). Hence, in addition to the benchmark regression presented in Eq. (2), we will explore specifications that condition the response of spreads on the following scenarios: (*i*) the consolidation announcements are made in episodes of high fiscal stress (when the EMBI spread levels are high); (*ii*) when a country was under an IMF supported program; and (*iii*) the combination of scenarios (*i*) and (*ii*).[6]

The typical state-dependent specification will take the following form:

$$r_{i,t+h} - r_{i,t-1} = S^{j}_{i,t-1}\left[\alpha^{j}_{i,h} + \gamma^{j}_{t,h} + \beta^{j}_{h} D_{i,t} + \delta^{j} X_{i,t}\right] + (1 - S^{j}_{i,t-1})\left[\alpha^{j}_{i,h} + \gamma^{j}_{t,h} + \beta^{j}_{h} D_{i,t} + \delta^{j} X_{i,t}\right] + \varepsilon_{i,t+h}. \quad (3)$$

The indicator variable $S^{j}_{i,t-1}$ takes the value of 0 or 1 depending on the state-dependency j being considered, with j = {scenario (*i*), scenario (*ii*), scenario (*iii*)}. For scenario (*i*), $S^{level}_{i,t-1}$ takes the value of 1 if the EMBI spread is at or above the 75th percentile of the sample distribution (420 basis points). In scenario (*ii*), $S^{IMF}_{i,t-1}$ takes the value of 1 if the country is under an IMF supported program. Given that countries could put in place adjustment packages as a pre-condition of IMF support, the indicator variable also takes the value of 1 for the year before the board approval date of the IMF program. Finally, for scenario (*iii*), the indicator variable $S^{level,\,IMF}_{i,t-1}$ equals to 1 if both indicator variables $S^{level}_{i,t-1}$ and $S^{IMF}_{i,t-1}$ equal to one.

3.2. Results

Fig. 2 reports impulse responses obtained from Eq. (2). The shaded regions indicate 90 percent confidence intervals based on Driscoll and Kraay (1998) standard errors that are robust with respect to heteroskedasticity as well as serial and cross-sectional dependence. The figure displays the cumulative change in EMBI spreads, measured in basis points, after a fiscal consolidation announcement. When considering all announcements (right-hand-side panel), we find that austerity announcements tend to reduce spreads in our sample of EMDEs, however the effect is economically small (a reduction of around 5 basis points after 30 days) and barely significant in a statistical sense.

Once we split the announcements between government branches, we observe that spreads come down significantly only after announcements related to the approval of measures by congress (right-hand-side panel). Once congress agrees on a consolidation package, spreads are reduced significantly, by around 14 basis points within a 30 day window after the announcement. On the other hand, spreads barely decline in the aftermath of fiscal consolidation news from the executive branch. These results suggest that confidence in the sovereign improves only if policymakers are able to successfully pass the austerity measures through congress. Furthermore, the economically and statistically significant reduction of sovereign spreads in the aftermath of legislative news eases somewhat concerns about possible anticipation effects, as these results go against the bias from agents pricing these actions before official announcement.[7]

Fig. 3 shows the impulse responses obtained from estimating the state-dependent version of the model (Eq. 3) for scenario (*i*), that is when we differentiate the responses according to the level of the EMBI spreads. As previously discussed, higher perceived sovereign default risk imply that there is greater scope for reduction in interest rates due to confidence effects following a credible fiscal consolidation (Blanchard 1990 and Giavazzi and Pagano 1990). This is evident in our results with the differences relative to the baseline specification being rather stark.

Following a fiscal consolidation announcement, and irrespective of which branch of government makes the announcement, spreads decline by about 20 points in the two weeks following the announcement. However, it is still the case that in a 30 day window, the reduction in spreads is more persistent and significantly larger when the fiscal news come from congress reaching 37 basis points (right-hand-side panel, in all panels the shaded area indicates the 90 percent confidence interval around the impulse response conditioning on high levels of spreads). On the other hand, the difference in the responses of EMBI spreads between the baseline and scenario(*i*) is small at the end of the 30 day horizon when the announcements come from the executive.[8]

[5] We consider different windows around the announcement date for the construction of the dummy variable i.e. one day after and two days after with very similar results.

[6] In the next sub-section we instead interact the announcement dummy with the continuous spread measure itself as well as other variables that could affect the change in spreads.

[7] If these fiscal actions are anticipated by markets, then spreads should not react to their announcement. Also, if the approved action deviates from markets' expectations, spreads could even increase after the announcement.

[8] We also look at the responses of countries with low sovereign spreads, below the 25th percentile of the sample distribution, and the effects of announcements on spreads are not significant for all branches of government. The results are not shown, but are available upon request.

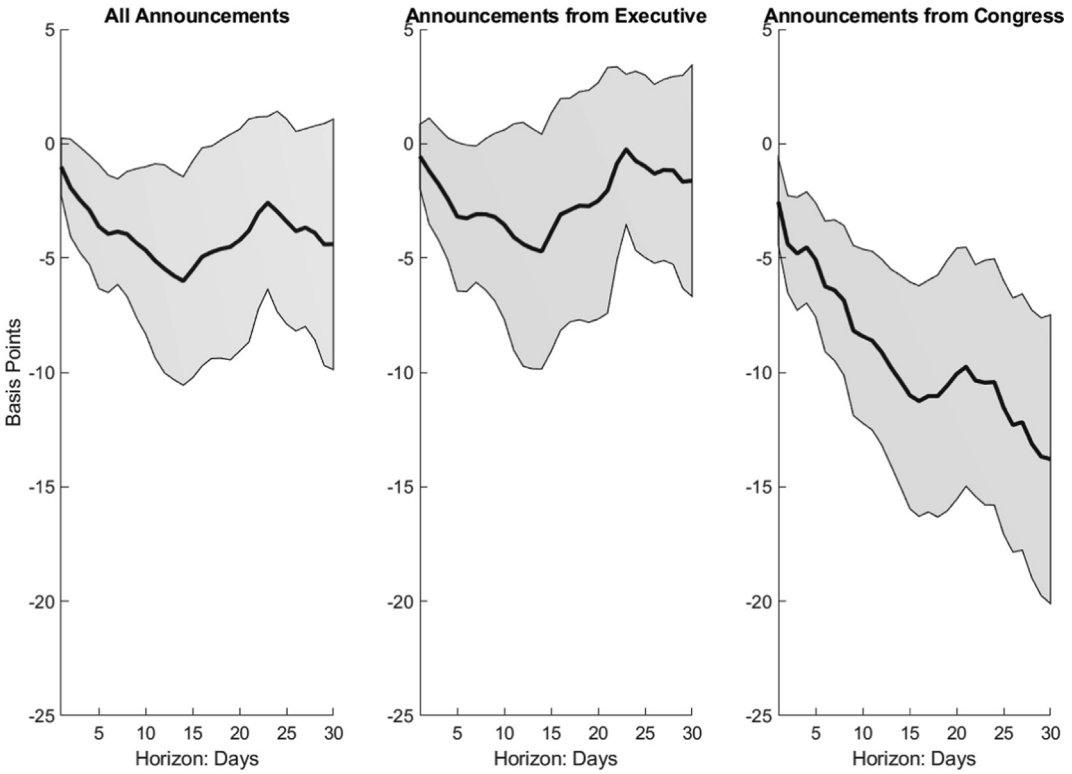

Fig. 2. Effects of Austerity Announcement on EMBI Spreads. Note: Solid black lines represent OLS point estimates. The shaded regions indicate 90 percent confidence intervals based on Driscoll-Kraay (1998) standard errors.

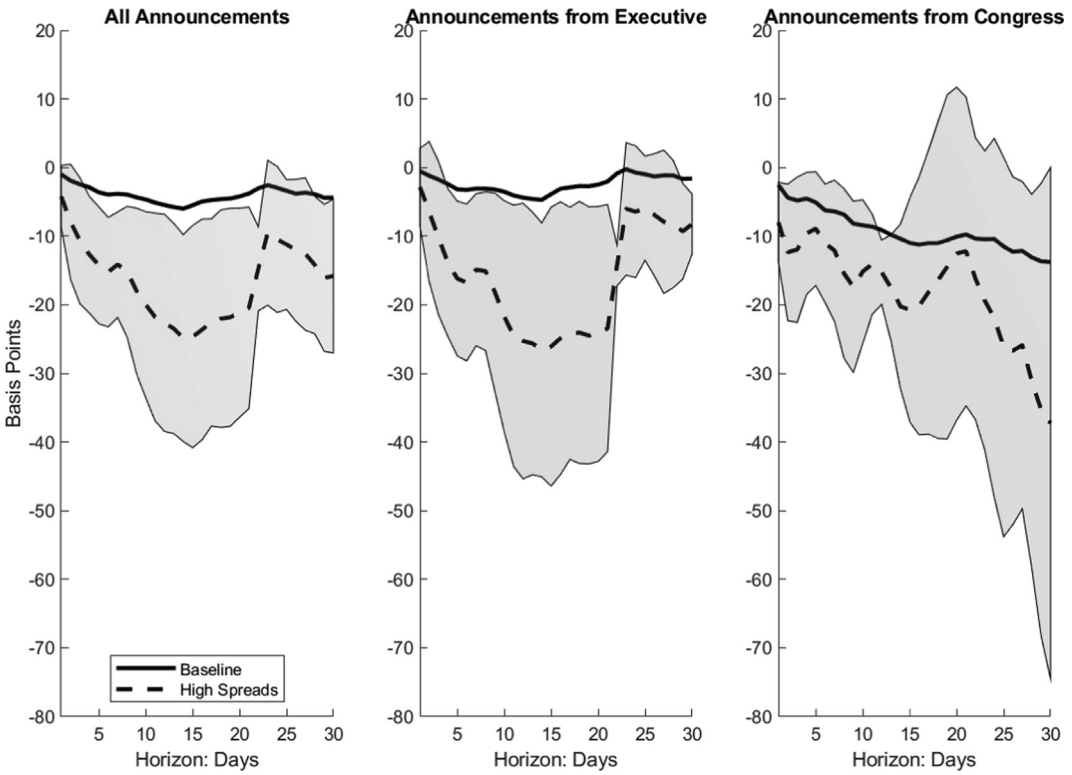

Fig. 3. Effects of Austerity Announcements on Spreads, Scenario (i). Note: Solid and dashed black lines represent OLS point estimates. The shaded regions indicate 90 percent confidence intervals based on Driscoll-Kraay (1998) standard errors.

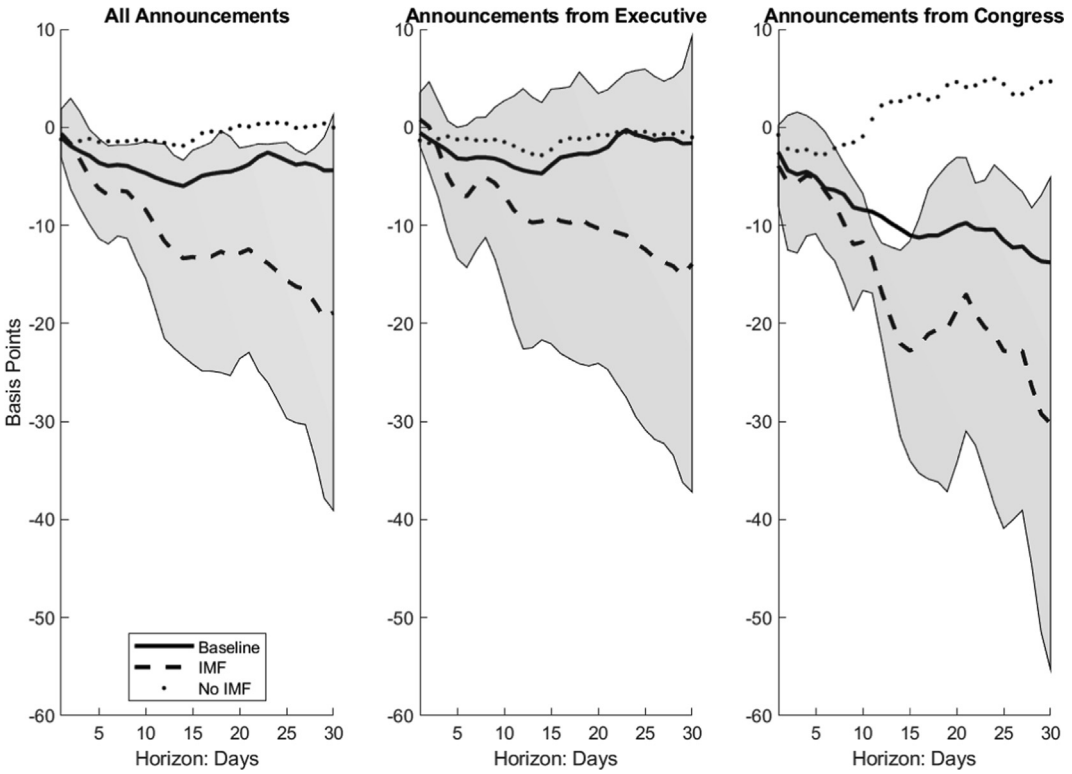

Fig. 4. Effects of Austerity Announcements on Spreads, Scenario (ii). Note: Solid, dotted, and dashed black lines represent OLS point estimates. The shaded regions indicate 90 percent confidence intervals based on Driscoll-Kraay (1998) standard errors.

Fig. 4 shows the effects of consolidation announcements in scenario (*ii*) when the responses of sovereign spreads are conditioned on whether a country is under an IMF supported program when the announcement is made.[9] It is clear from the results that having and IMF program is a key factor for sovereign spreads to decrease following the announcement of austerity measures. The reduction in spreads is larger and more persistent, as compared to the baseline scenario and against announcements that were made without IMF program support. As it was the case in the results presented previously, the reduction in spreads is larger if the announcements are made by the congress (reaching 30 basis points).[10] However, under this specific state-dependency framework, it is not possible to distinguish whether the improvement in investor confidence came as a result of the market's expectation regarding the likelihood of approval or continuation of an IMF program, rather than the consolidation announcements per se.

Hence, in order to assess whether having an IMF program is a necessary condition for spreads to decline following austerity announcements, and whether investors are reacting to the fiscal measures and not the perceived approval or continuation of an IMF-supported program, we compare the response of spreads during episodes of high perceived sovereign default risk, conditioning on participation in an IMF program. Fig. 5 presents the results of scenario (*iii*), where it is evident that spreads decline when announcements are made in episodes of high level of perceived risk, regardless of IMF program participation.

For all types of announcements, the reduction is larger and more significant as compared to the baseline scenario. Furthermore, the difference in the reduction in spreads 30 days after announcements with and without IMF-supported programs is negligible when we look at all announcements or announcements made by the executive branch. Nevertheless, the reduction in spreads following the approval of austerity packages by congress is larger and more persistent for episodes when countries have elevated sovereign spreads and were under an IMF agreement. Given that we are considering a double state-dependency, estimates are less precise and the presented confidence bands are quite wide (the shaded area in the figure represents the 90 percent confidence interval around the impulse response for announcements when an IMF program is in place and spreads are high).

[9] It is important to note that in our sample, only 4 countries (Chile, India, Slovak Republic, and South Africa) did not have a program supported by the IMF between 2000 and 2018.

[10] The shaded area reflects the 90 percent confidence interval around the impulse response conditioned on an IMF-supported program being in place.

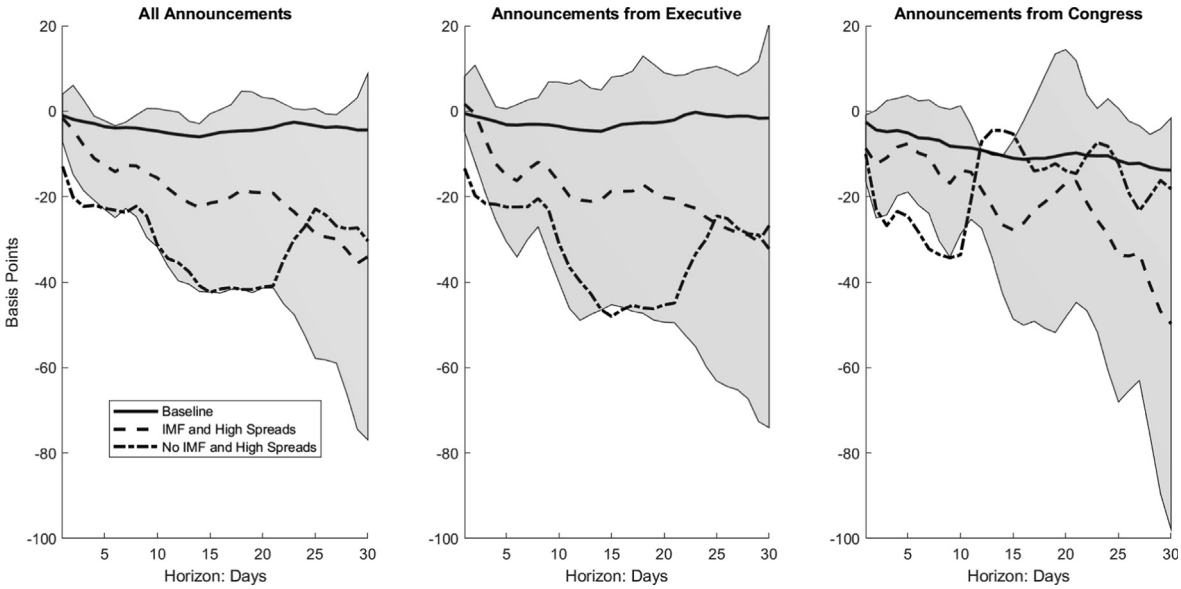

Fig. 5. Effects of Austerity Announcements on Spreads, Scenario (iii). Note: Solid, dashed, and dotted-dashed black lines represent OLS point estimates. The shaded regions indicate 90 percent confidence intervals based on Driscoll-Kraay (1998) standard errors.

3.3. Other factors influencing fiscal announcement effects

Several papers have found that country-specific fundamentals are key drivers of spreads, in particular a country's debt-to-GDP ratio and credit risk rating (see Edwards, 1985(Edwards, 1985), Jaramillo and Tejada, 2011, Jaramillo and Weber, 2013). Also, as shown in the previous section, the size of the response of spreads to fiscal news varies with the sovereign spread level. Therefore, we extend the analysis presented in the previous subsection to assess how these vulnerabilities influence the effect of fiscal consolidation news on sovereign spreads. We do so by modifying the baseline specification in Eq. (2) by conditioning the response of sovereign spreads on the previous year level of the general government debt-to-GDP ratio, sovereign credit risk rating, and sovereign spreads. The equation is modified as follows:

$$r_{i,t+h} - r_{i,t-1} = \alpha_{i,h} + \gamma_{t,h} + \beta_{1,h} D_{i,t} + \beta_{2,h} Z_{i,t} + \beta_{3,h} D_{i,t} * Z_{i,t} + \delta X_{i,t} + \varepsilon_{i,t+h}, \quad (4)$$

for which $Z_{i,t}$ is the vulnerability variable (with a value corresponding to the one prevailing in the previous year), i.e., the sovereign spread level, the debt-to-GDP ratio or the sovereign credit risk rating. The debt-to GDP ratio corresponds to the general government gross debt and is obtained from the IMF's *World Economic Outlook*. The sovereign credit risk variable is the Oxford Economics credit rating index constructed out of sovereign credit ratings from the three major credit rating agencies, Fitch, Moody's and Standard Poor's.[11] We use the one year lag value of these variables to avoid possible endogeneity issues and because these variables are likely correlated with the other regressors.

Results are presented in Table 4 for estimates at 1 and 15 days (i.e., h = 1 and h = 15) after the announcement of fiscal related news from congress.[12] Results suggest that indeed the impact of fiscal consolidation news is larger in economies with elevated vulnerabilities. In line with the results presented in the previous sub-section, news of congress approving a fiscal consolidation package lead to a larger reduction in spreads for economies with a higher level of sovereign spreads. For a country with EMBI spread levels above the 75th percentile of the sample distribution, spreads would decline by around 20 basis points two weeks after announcement. Results of broadly similar magnitude are observed for countries above the 75th percentile of the sample distribution of the debt-to-GDP ratio and credit rating. However, the coefficient of the interaction term of the announcement dummy with the credit rating variable is not statistically significant two weeks after the fiscal announcement. Our preference in using the EMBI spread level rather than credit ratings in the scenario analysis presented in the previous subsection is driven by the former being forward-looking and continuous, while changes in the latter are discrete and often based on information that has already found its way into the prices.

In summary, in this section we have provided evidence that fiscal consolidation announcements, particularly if made by congress in a country with elevated vulnerabilities (e.g., high sovereign spreads or debt levels), have been successful in ameliorating default risk perceptions. In the next section we present results that will shed light on the implications of increased investor confidence, in the form of lower external borrowing costs, on economic activity.

[11] We invert the original index, which ranges from 0 to 20, such that a value of 0 corresponds to the highest possible rating level and is assigned to a country that has an AAA rating from all three credit rating agencies. Hence, an increase in the index corresponds to a deterioration of the credit rating.

[12] As shown in the previous sub-section, results are more significant (economically and statistically) for fiscal related news from to the legislative body.

Table 4
Underlying factors behind effects of fiscal announcements on spreads.

VARIABLES	Z = Spreads Level *t = 1*	Z = Spreads Level *t = 15*	Z = Debt/GDP *t = 1*	Z = Debt/GDP *t = 15*	Z = Credit Rating *t = 1*	Z = Credit Rating *t = 15*
Announcement (D)	2.258	−2.812	6.178**	11.306***	8.911*	9.749
	(1.670)	(5.531)	(2.209)	(2.636)	(4.553)	(9.026)
Vulnerability (Z)	−0.001***	−0.022***	−0.034	−0.556**	-0.341	−5.470**
	(0.000)	(0.003)	(0.035)	(0.241)	(0.232)	(2.604)
Interaction (D*Z)	−0.007*	−0.025***	−0.147***	−0.484***	−0.754***	−1.314
	(0.003)	(0.009)	(0.042)	(0.143)	(0.263)	(1.102)
Observations	104,411	104,096	102,345	102,030	95,372	95,057
R-squared	0.145	0.179	0.146	0.171	0.172	0.195
Country FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
Dependent variable	Δ Spreads	Δ Spreads	Δ Spreads	Δ Spreads	Δ Spreads	Δ Spreads

Note: Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

4. Assessing the transmission channels: fiscal announcements, confidence, and economic activity

The literature suggests that fiscal consolidations could be less contractionary (or even in some cases expansionary) if they help to reduce borrowing costs by dissipating doubts about the financial solvency of the government (Guajardo et al., 2014). Therefore, one would expect that consolidations that were preceded by periods of high perceived sovereign risk could lead to smaller output losses. Giavazzi and Pagano (1990) were among the first to highlight the importance of increased confidence in the sovereign in the transmission of fiscal policies. The argument was that a drastic fiscal adjustment – capable of sharply reducing long-term interest rates – tends to generate an increase in consumer and investor confidence. This could potentially offset the direct recessionary effect of tax hikes and spending cuts on aggregate demand, therefore mitigating the decline in economic activity.

Several authors have highlighted the key role played by private sector confidence in influencing business cycle fluctuations and in the transmission of fiscal shocks to the real economy (Bachmann and Sims, 2012 and the references therein). Yet, the quantification of the benefits of lowering borrowing costs in the fiscal transmission mechanism has attracted surprisingly little attention. Another contribution of this paper is to fill this gap by showing whether fiscal announcements that successfully lower sovereign spreads also lead to smaller output losses.

4.1. Identifying the effects of austerity announcement: A panel VAR approach

Following Burnside et al. (2004); Cavallo (2005), we embed the fiscal announcement in a VAR model. Given that dummy variables may not be suited for a VAR-type of analysis (Dueker, 2005), we construct a continuous variable of fiscal policy actions by augmenting our fiscal announcements database with the actions' size (measured as a share of GDP). This information was obtained whenver possible from the original press articles, the database constructed by Carriére-Swallow et al. (2021) and from IMF's Article IV consultation staff reports.

The model for our panel of 21 EMDEs (PVAR) consists of three variables: the fiscal consolidation announcements; EMBI spreads; and an index of economic activity. All variables are included at a monthly frequency. The daily fiscal consolidation announcements are aggregated to the monthly frequency, which reduces the problem of potential anticipation effects, because fiscal news that are leaked to the media and the official release of fiscal news are more likely to occur in the same period. The fiscal news variable enters the system in levels and as a percent of GDP. The EMBI spreads are the average over the month. For the index of economic activity, we rely on industrial production or other monthly economic activity volume indicators.[13] All economic activity indicators are seasonally adjusted and obtained from Haver Analytics.

Following Blanchard and Perotti (2002), it is common in the literature on the macroeconomic effects of fiscal shocks based on VAR models at a quarterly frequency to impose the restriction that output or other variables of interest react immediately to fiscal policy shocks, whereas fiscal policy does not react on impact to other shocks in the system. This identifying assumption is the standard Cholesky decomposition with the fiscal policy variable ordered first in the VAR. It is usually justified by delays in the legislative system that would prevent the contemporaneous reaction of fiscal variables. This timing restriction is more plausible at a monthly frequency considered here. It is important to note that endogeneity concerns and anticipation efefcts might still not be fully addressed by this restriction given the well-documented procyclicality of fiscal policy in EMDEs (Frankel et al., 2013) i.e. announcements could be motivated by persistently deteriorated economic conditions. Nevertheless, most of these effects should be captured through the dynamics in the system, even if the reaction within the month of the announcement is restricted.

To fix ideas, the panel VAR system can be written as (abstracting from the country-specific intercepts) as:

[13] With the exception of Jamaica where we use a monthly interpolation of the quarterly GDP series.

$$\begin{pmatrix} 1 & 0 & 0 \\ a_{i,2,1} & 1 & a_{i,2,3} \\ a_{i,3,1} & a_{i,3,2} & 1 \end{pmatrix} \begin{bmatrix} D_{i,t} \\ \Delta r_{i,t} \\ \Delta y_{i,t} \end{bmatrix} = \sum_{j=1}^{p} A_{i,j} \begin{bmatrix} D_{i,t-j} \\ \Delta r_{i,t-j} \\ \Delta y_{i,t-j} \end{bmatrix} + \begin{bmatrix} \varepsilon_{i,t}^{1} \\ \varepsilon_{i,t}^{2} \\ \varepsilon_{i,t}^{3} \end{bmatrix} \tag{5}$$

where $D_{i,t}$ is the fiscal announcement as a share of GDP, $\Delta r_{i,t}$ is the monthly change in EMBI spreads, and $\Delta y_{i,t-j}$ is the log change in the monthly economic activity indicator. The lag length is denoted by p. The structural shocks are denoted by $\varepsilon_{i,t}^{k}$ with $k \in [1, 2, 3]$. The austerity announcement shock is denoted by $\varepsilon_{i,t}^{1}$.

Conceptually, fiscal announcements affect output directly in two ways: contemporaneously through $a_{i,3,1}$ and dynamically through the relevant coefficients in the $A_{i,j}$ matrices. But there are also indirect effects of fiscal actions to the extent that fiscal announcements move spreads contemporaneously (through $a_{i,2,1}$) and in turn spreads impact output (through $a_{i,3,2}$). Moreover, spreads can serve as a propagation mechanism for fiscal shocks if they respond to fiscal announcements at any horizon and the coefficients for lagged values of spreads in the output equation are significant.

Our objective is to statistically isolate the role of changes in sovereign spreads in mitigating the effects of austerity announcements on economic activity. To do so, we follow the methodology put forward by Bachmann and Sims (2012) and "shut off" the indirect channels described previously. In practical terms, we do so by constructing a hypothetical impulse response of output to an austerity announcement by holding the changes in EMBI spreads fixed at zero at all forecast horizons.[14] Using this "counterfactual" analysis we compare this hypothetical response of output to the actual response, hence allowing us to quantify how important are changes in sovereign borrowing costs as a transmission mechanism of fiscal consolidation news.

To perform this counterfactual analysis, we need to impose more structure in the model. While the timing assumption that government consolidation announcements do not react within a month to changes in sovereign spreads or output is sufficient to identify $a_{i,2,1}$ and $a_{i,3,1}$, an additional restriction is required to identify $a_{i,3,2}$ and $a_{i,2,3}$. We assume that $a_{i,2,3} = 0$, which amounts to using a Cholesky decomposition of the system, with the changes in the EMBI spreads ordered second and output ordered third. This in turn means that $\varepsilon_{i,t}^{2}$ and $\varepsilon_{i,t}^{3}$ denote a sovereign spread shock and a residual output shock, respectively.

Once the restriction has been imposed on $a_{i,2,3}$ and the impact matrix $(A_{i,0})$ is inverted, the structural form of the system specified in (5) above can be written as (again abstracting from country-specific intercepts)

$$Y_{i,t} = \sum_{j=1}^{p} A_{i,0}^{-1} A_{i,j} Y_{i,t-1} + A_{i,0}^{-1} \varepsilon_{i,t} \tag{6}$$

where $Y_{i,t} = [D_{i,t}\, \Delta r_{i,t}\, \Delta y_{i,t}]\prime$. This can be written more compactly in companion matrix form as a VAR(1) by defining $Z_{i,t} = [y_{i,t} y_{i,t-1} \ldots y_{i,t-p}]'$

$$Z_{i,t} = \Lambda_i Z_{i,t-1} + A_{i,0}^{-1} \varepsilon_{i,t}, \text{ where } \Lambda = \begin{bmatrix} A_{i,0}^{-1}A_{i,1} & A_{i,0}^{-1}A_{i,2} & \ldots & A_{i,0}^{-1}A_{i,p} \\ I & 0 & \ldots & 0 \\ 0 & I & \ldots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & \ldots & I & 0 \end{bmatrix}.$$

The impulse response for variable k to a fiscal announcement at horizon $h = 1, \ldots, H$ is denoted by:

$$IRF_k(1,h) = \Lambda_i^{h-1} A_{i,0}^{-1}(k, 1). \tag{7}$$

That is, the impulse response of the variable k to an austerity announcement will be in the k^{th} row and first column, for $h = 1, \ldots, H$.[15]

The construction of the counterfactual scenario consists in holding the responses of EMBI spreads to a fiscal consolidation announcement fixed at zero:

$$IRF_2(1,h) = 0. \tag{8}$$

A hypothetical sequence of EMBI spread shocks, $\varepsilon_{i,t}^{2}$, is constructed so as to force (8) to hold at each forecast horizon h. On impact (i.e. h = 1) this requires that $\varepsilon_{i,t}^{2} = a_{i,2,1}$, or in matrix notation

$$A_{i,0}^{-1}(2,1) + A_{i,0}^{-1}(2,2)\varepsilon_{i,t}^{2} = 0$$

Therefore the required EMBI shock on h = 1 is

[14] This approach is similar to the methodology used, for example, by Bernanke et al. (1998), Sims and Zha (2006), and Kilian and Lewis (2011) to understand the role of the systematic component of monetary policy in the transmission of shocks.

[15] This representation also requires augmenting both the $A_{i,0}^{-1}$ and $\varepsilon_{i,t}$ with $(k+1) \times p$ rows or columns of zeros for the matrix multiplication to work, given the dimension of $Z_{i,t}$,which is $(p+1) \times (k+1)$.

$$\varepsilon_{i,1}^2 = -\frac{A_{i,0}^{-1}(2,1)}{A_{i,0}^{-1}(2,2)}. \tag{9}$$

The required values for subsequent EMBI spread innovations can be recursively estimated as:

$$\varepsilon_{i,h}^2 = \frac{IRF_2(1,h) + \sum_{j=1}^{h-1} \Lambda_i^{h-j} A_{i,0}^{-1}(2,1)\varepsilon_{i,j}^2}{A_{i,0}^{-1}(2,2)},$$

for $h = 2, \ldots, H$. The modified impulse responses of the variables in the system to the fiscal consolidation announcement shocks are computed as:

$$\widetilde{IRF}_k(1,h) = IRF_k(1,h) + \sum_{j=1}^{h} \Lambda^{h-j} A_{i,0}^{-1}(2,1)\varepsilon_{i,j}^2, \tag{10}$$

for $k = 1, 2, 3$.

The difference between $IRF_i(1,h)$ and $\widetilde{IRF}_i(1,h)$ will provide a measure of how important is the reduction of sovereign spreads in the transmission of austerity announcement on economic activity.

In the previous section we highlighted the importance of vulnerability conditions, mainly the level of EMBI spreads, in analyzing the effects of fiscal consolidation announcements. We perform a similar analysis in this section by allowing the coefficients in the $A_{i,j}$ matrix to vary depending on the level of spreads:

$$A_{i,j} = \beta_{i,j} + \varsigma_{i,j} * EMBI\,level_{i,t} \tag{11}$$

for j = 1,. . .,p. Impulse responses are estimated for the full empirical distribution of EMBI spread levels (see Towbin and Weber, 2013 for a discussion of PVARs with interaction terms). Each equation of the system is estimated using ordinary least squares (OLS), allowing for country fixed effects with 6 lags, following the Schwartz Criterion. As the impulse responses are non-linear functions of the OLS estimates, the procedure employs Runkle (1987) bootstrapping method to adjust for the fact that the data is in a panel format and to make use of the interaction terms. We apply the following algorithm for statistical inference:

1. Estimate the PVAR(p) in Eq. (6) and generate 1,000 bootstrap replications $\hat{A}_i$ using Eq. (11) and the values of the selected values for the levels of the EMBI spreads in month t.[16]
2. After the first period is simulated for all variables in the system, interact the variables with the interaction terms in (11) and then repeat step 1 for t = 2,. . .,T and i = 1,. . .,N, where T is the sample length and N is the number of countries.
3. The artificial sample, together with the interaction variables, are then used to re-estimate the coefficients of the system. IRFs are computed 1,000 times for each generated variable k^* to the first structural shock (that is the fiscal news) at horizon $h = 1, \ldots, H$.
4. Construct 1,000 adjusted impulse responses holding the EMBI spreads changes fixed at zero at each horizon h.
5. Finally, the bootstrap simulations are used to calculate the empirical distribution for the difference between the baseline and counterfactual scenarios. 90 percent confidence intervals are drawn from the simulated estimates.

4.2. Results

As it was shown in the previous section, sovereign spreads decline significantly and more persistently after the announcements are made by congress. Since in this section we are interested in quantifying the importance of the reduction in spreads in limiting output losses following the announcement of austerity measures, we analyze the effects of announcements from the legislative branch.[17] The solid lines in Fig. 6 plot the cumulative unconstrained impulse response to an austerity announcement in a 12 month window. To derive the estimated impulse response function of EMBI spreads and output to the onset of the announcement of a fiscal consolidation package, we simulate the estimated version of (6) in response to a consolidation news equivalent to one percentage point of GDP. In line with the results presented earlier, sovereign spreads decline immediately following the announcement, around 20 basis points one month after the announcement. However statistical significance is somewhat weak. Output contracts by around 3 percent 6 months after the announcement and stabilizes thereafter. The cumulative response of output is significantly different from zero from the fourth month onward.

The dashed lines in the figure show the hypothetical impulse responses holding the response of the EMBI spreads fixed at zero. The contraction in output is indeed larger at most horizons if the announcements do not affect spreads, suggesting the positive role that higher confidence on the sovereign has in the transmission of fiscal policy announcements. The difference

[16] Bootstrapping for the panel was done by generating initial conditions separately for each country as in Runkle (1987), but sampling from the entire panel vector of residuals. This was done to account for possible cross-country correlations.

[17] We analyzed also the response to the announcements from the executive, but results are not significant and the difference between the baseline and counterfactual scenarios is negligible. Results are available from the authors upon request.

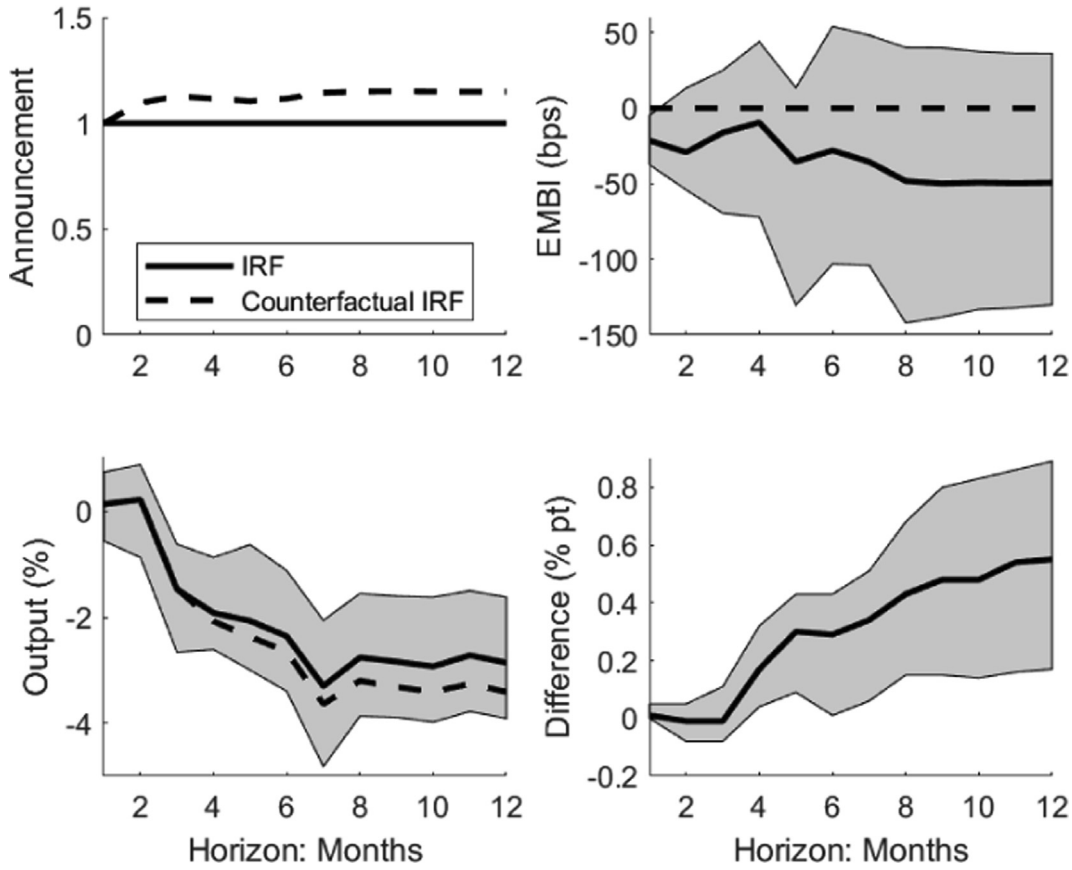

Fig. 6. Cumulative Effects of Fiscal Consolidation Announcements. Note: Solid lines represent the impulse responses from the baseline PVAR. The dashed lines are the counterfactual impulse responses. The shaded regions indicate 90 percent confidence intervals.

between the response of output in the baseline and counterfactual scenarios is significantly different than zero, however it is economically small (around 0.6 percentage points in a 12 month window). That is, the reduction in output is 20 percent larger in the counterfactual scenario.

Fig. 7 shows the results of the conditioned model, where we allow the coefficients of the PVAR to vary depending on the level of EMBI spreads as described in (11). For periods of high perceived sovereign risk, defined to be at or above the 75th percentile of the empirical distribution, spreads significantly decline in the aftermath of the announcements by around 100 basis points in a 12 month window. However, the consolidation announcement is also typically followed by a large and protracted output loss (of around 4 percent). On the other hand, austerity announcements do not seem to have a significant effect on spreads in periods of low perceived sovereign risk (that is, when the level of EMBI spreads are below the 25th percentile of the sample distribution).

The difference in the responses between the baseline and the counterfactual scenario (which is denoted by the dashed lines) is rather stark in episodes of high perceived sovereign risk. Holding the response of sovereign spreads fixed at zero would be equivalent of having a fiscal shock that is 40 percent more intense than in the baseline. As it would be expected, the hypothetical response of output differs the most from the actual output response at longer horizons. The difference in the decline of output following the announcements is large and significantly different from zero, with the reduction in the actual response being almost 30 percent lower than the counterfactual response. Taken at face value, these results constitute direct evidence that confidence effects, in the form of lower sovereign spreads, are an important transmission channel of fiscal shocks and can reduce the drag on economic activity in the aftermath of fiscal consolidation measures.

With these estimates at hand, the generality of the findings presented above can be illustrated with simulations of the accumulated responses of output under different scenarios. Fig. 8 presents the ratio of the counterfactual to the baseline output response for different percentiles of the EMBI distribution considering the effects of a generic fiscal consolidation package. The solid line in the Figure shows that the contribution of increased investor confidence (in the form of lower sovereign spreads) increases with the level of the EMBI spreads. In other words, countries with higher spread levels stand to benefit the most from putting in place credible austerity packages. Moreover, it is interesting to note that the slope of the output response curve depicted in the Figure becomes steeper above the 75th percentile, suggesting that the role of confidence effects is even larger in these instances.

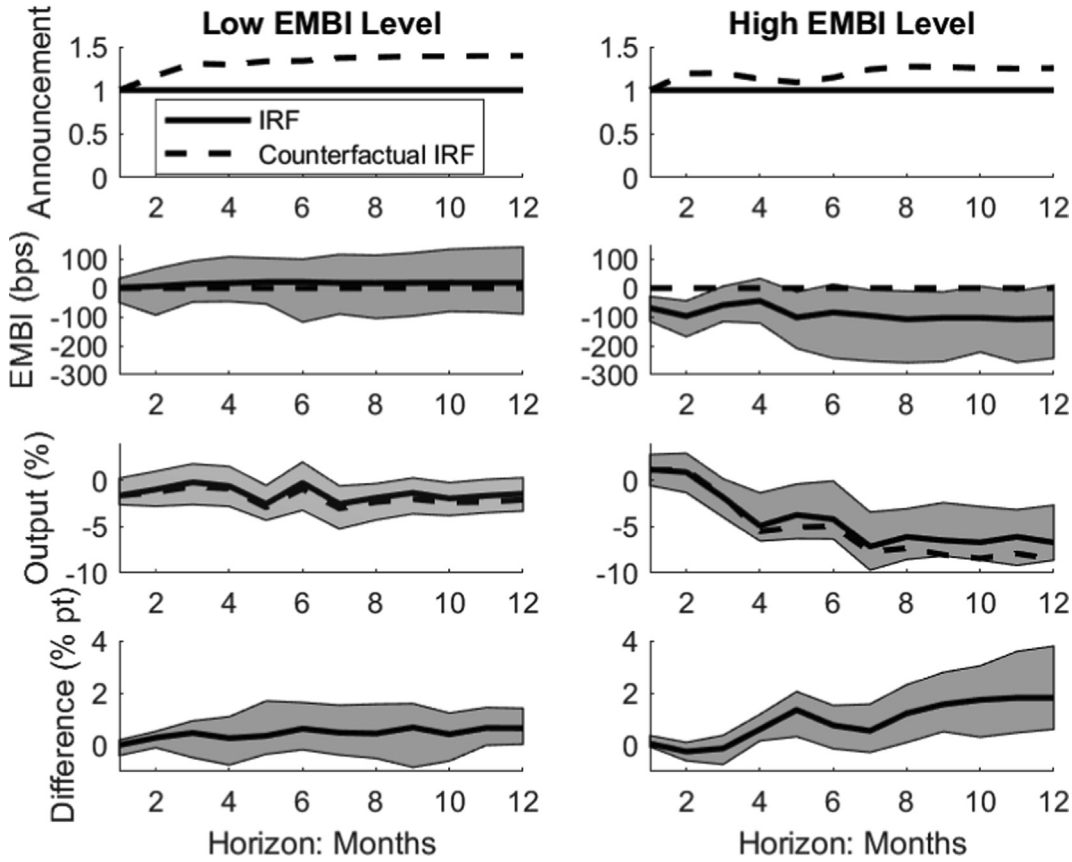

Fig. 7. Cumulative Effects of Fiscal Consolidation Announcements, Conditioned Model. Note: Solid lines represent the impulse responses from the baseline PVAR. The dashed lines are the counterfactual impulse responses. The shaded regions indicate 90 percent confidence intervals.

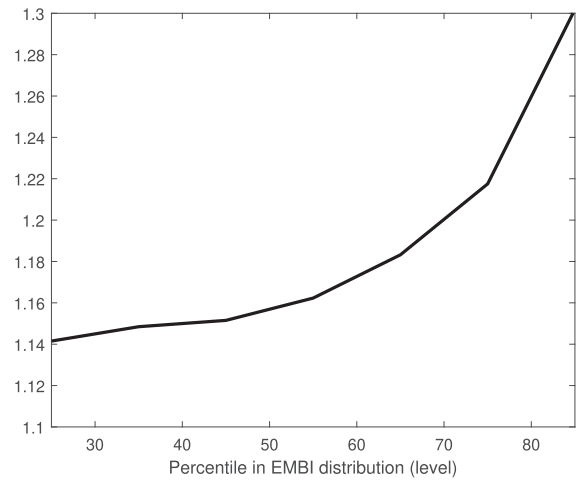

Fig. 8. Ratio of the the Response of Output in Counterfactual Relative to Baseline Scenario.

5. Conclusion

In this paper, we investigated the effect of fiscal consolidation announcements on perceived sovereign default risk, as measured by the EMBI spreads. In doing so, we made three distinct contributions to the existing literature. First, we put together a new dataset on fiscal consolidation announcements for a sample of 21 EMDEs since the early 2000's using local

newspaper articles. The daily frequency of our database allows us to control for anticipation effects of fiscal actions and variables that respond quickly to news, such as sovereign bond spreads, allowing for proper inference if these effects do indeed play a role.

As a second contribution, we show that fiscal announcements aiming at an improvement in the budget balance tend to reduce spreads when congress is the government body making these announcements. This result highlights that investors mainly react to austerity proposals only after these proposal are approved by the legislature. It also turns out that the level of perceived vulnerabilities are crucial for the effects of consolidation announcements on spreads. In particular, the reduction in spreads following austerity announcements is larger and more persistent if they occur in periods of elevated sovereign spreads, high debt levels, and/or when economies are under (or in the process of achieving) an IMF-supported program.

Our third contribution is to show that the approval of austerity packages by congress in periods of increased sovereign risk does pay off. We show that the reduction in spreads in these circumstances leads to substantial reductions in output losses from fiscal consolidations compared to the counterfactual. That is, if confronted with a situation of severe fiscal stress, credible consolidation efforts do get rewarded by financial markets. These confidence effects are crucial in lowering the drag on economic activity in the aftermath of fiscal austerity measures. Furthermore, we show that the role of confidence effects increases with the level of spreads, that is countries with high spread levels stand to benefit the most from putting in place credible austerity packages.

Overall, our results stand in stark contrast with the findings reported by Born et al. (2020) for a sample of 38 countries. These authors conclude that reductions in government spending increase sovereign default premiums in times of fiscal stress, while they lead to reductions in spreads in "good" times. Therefore, it appears that Born, Muller, and Pfeifer's conclusions are not robust to the use of alternative identification strategies that consider actual policy announcements and explore timing restrictions at a higher frequency rather than forecast error shocks. In turn, our results also suggest a less fatalist view for policy makers, pointing that austerity measures and the accompanying sacrifices and unpopularity may induce important rewards even in the short to medium term. Our paper also opens up a number of avenues that could be pursued in future research, including the exploration of alternative sources of state-dependency for the response of spreads to fiscal announcements and the relevant transmission channels (such as the cyclical position of the economy).

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