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The Rewards of Fiscal Consolidation: Sovereign Spreads and Confidence Effects

by Antonio C. David, Jaime Guajardo, and Juan F. Yépez

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The Rewards of Fiscal Consolidation: Sovereign Spreads and Confidence Effects[§]

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Abstract

This paper investigates the effects of fiscal consolidation announcements on sovereign spreads in 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 decline significantly following news that austerity measures have been approved by the legislature (congress or parliament), in periods of high sovereign spreads or in countries under an IMF program. In addition, consolidation announcements are less contractionary when sovereign spreads decline, with the reduction in output being half of the counterfactual case in which spreads do not respond to announcements. These results constitute direct evidence that confidence effects, in the form of lower sovereign spreads, are an important transmission channel of fiscal shocks. 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

Following a period of low interest rates, in the wake of the global financial crisis and the collapse in commodity prices, public debt stocks have rapidly increased across emerging market and developing economies (EMDEs). More recently, amid a more challenging external environment, financial markets' perception of credit risk in EMDE's has deteriorated (Figure 1). This has precipitated many policymakers in these economies to announce austerity measures aimed at putting debt on a downward trajectory and improving confidence in the sovereign, as measured by sovereign bond spreads. EMDEs typically feature higher perceived sovereign default risk and weaker policy credibility, which implies greater scope for reductions in interest rates on the back of confidence effects following a decisive fiscal consolidation (Blanchard, 1990 and Giavazzi and Pagano 1990).

Figure 1: EMBI Global Spread, 2007-18
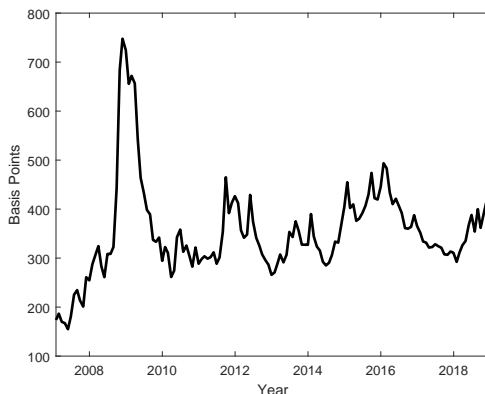
Nevertheless, empirical evidence quantifying the magnitude of the confidence effects of fiscal policy has been elusive. Studies based on annual data typically find that fiscal variables do not significantly affect spread movements once other macroeconomic variables are controlled for (Edwards, 1994; Min, 1998). Nonetheless, some studies do find significant effects of changes of fiscal variables on spreads (Bernoth and Erdogan, 2012; Akitoby and Stratmann, 2008). Studies surveyed in Eyraud et al. (2018) indicate that that the use of fiscal rules tends to lower sovereign spreads and decrease their response to fiscal variables, 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, Gupta and Mati (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. For a panel of Advanced Economies (AEs), Guajardo,

Leigh, and Pescatori (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 Carrière-Swallow, David, and Leigh (2018). Beetsma et al. (2015) 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. de Jong (2018), using daily data on fiscal announcements for the Netherlands, concludes that announcements indicating an improvement in the fiscal balance significantly lowered sovereign spreads. In contrast, Born, Müller, and Pfeifer (2019) 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 Leigh, and Pescatori, 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, Müller, and Pfeifer, 2019) 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. (2015) 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. In this regard, the assumption that fiscal policy is unlikely to be adjusted instantaneously to changes in sovereign spreads on the same or previous day is more plausible, since the design and implementation of fiscal packages typically takes weeks or months. Nevertheless, due to data restrictions and the data-intensive nature of this empirical approach, these studies are country specific or restricted to small sample of advanced economies .

In this paper, 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

David and Leigh (2018) based on a "narrative" approach for 14 Latin American economies. We enrich David and Leigh (2018)'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 David and Leigh (2018), 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 Jordà (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.

Our findings indicate that fiscal austerity announcements significantly lowered EMBI spreads in our EMDE sample , particularly after parliamentary announcements on final agreements. In line with previous empirical work on the macroeconomic effect of fiscal actions (see Corsetti at al., 2012; Auerbach and Gorodnichenko, 2013; Ilsetzki et al., 2013), we find that the effects of austerity announcements on sovereign spreads depend on initial conditions. If spreads are high to begin with, austerity announcements induce a significantly larger reduction in spreads. Spreads also decline significantly 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 the case 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.

If austerity announcements are capable of lowering borrowing costs, particularly for countries with high-perceived sovereign risk, they could free up

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resources for consumption and investment, thus mitigating the contractionary effects of fiscal consolidations.[1] We analyze whether sovereign spreads play a role in the transmission of fiscal policy shocks to economic activity by embedding the announcement dates in a panel vector autoregression (PVAR) along with changes in EMBI spreads and industrial production using monthly data. 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), Killian 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 EMBI spreads.

In the specification with no interaction terms (unconditioned), spreads decline by 40 basis points in response to a fiscal announcement and industrial production declines by around 1 percent in a 12 month window. In the counterfactual scenario, in which spreads do not respond to the shock, the decline in industrial production is 30 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 60 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 even 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 announcement.

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.

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[1]Guajardo, Leigh, and Pescatori (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 Carrière-Swallow, David, and Leigh (2018).

2   Data

This section of the paper 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 the one-day movements in sovereign spreads, which is an advantage relative to the existing datasets of fiscal consolidations that typically present data at an 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. 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, Hornik, and Meyer, 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 announcements 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. 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 David and Leigh (2018), including the endogenous policy actions described in the footnotes of that paper.

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 (Figure 2). 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.

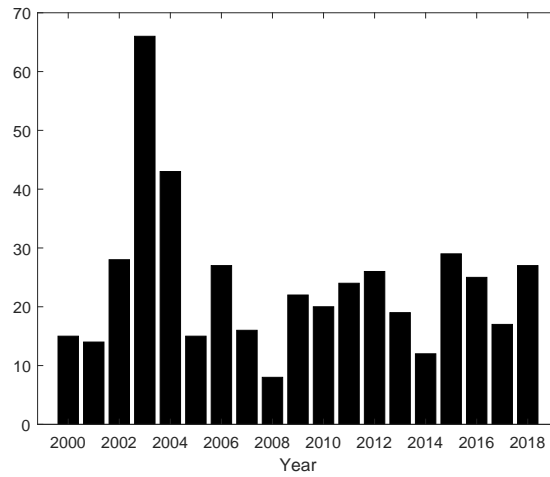Figure 2: Number of Consolidation Announcements by Year

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

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.

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

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 Jordà (2005), to project daily changes in EMBI spreads following austerity announcements made by either the executive or legislative branches of government. 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, namely the level of sovereign spreads and whether countries are under an IMF supported program.

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 misspecification. Auerbach and Gorodnichenko (2013), Jordà and Taylor (2016), Ramey and Zubairy (2018), as well as Born, Müller, and Pfeifer (2019) among others, also rely on local projections while analyzing fiscal policy. Their focus, however, is on the effects of fiscal policy changes on economic activity.

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

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

where $r_{i,t+h}$ denotes the EMBI sovereign spreads in basis points; $D_{i,t}$ is a dummy variable representing the onset of a fiscal consolidation announcement, taking the value of 1 in the day of the announcement and zero otherwise; 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 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 Equation (1), 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).

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

$$r_{i,t+h} - r_{i,t-1} = S_{i,t-1}^{j} \left[\alpha_{i,h}^{j} + \gamma_{t,h}^{j} + \beta_{h}^{j} D_{i,t} + \delta^{j} X_{i,t} \right] +$$
$$(1 - S_{i,t-1}^{j}) \left[\alpha_{i,h}^{j} + \gamma_{t,h}^{j} + \beta_{h}^{j} D_{i,t} + \delta^{j} X_{i,t} \right] + \varepsilon_{i,t+h}. \quad (2)$$

The indicator variable $S_{i,t-1}^{j}$ 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), $S_{i,t-1}^{level}$ 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), $S_{i,t-1}^{IMF}$ takes the value of 1 if the country is under an IMF supported program. Given that countries could put in place adjustment programs before 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 $S_{i,t-1}^{level, IMF}$ equals to 1 if both indicator variables $S_{i,t-1}^{level}$ and $S_{i,t-1}^{IMF}$ equal to one.

3.2   Results

Figure 3 reports impulse responses obtained from equation (1). The shaded regions indicate 90 percent confidence intervals based on Driscoll-Kraay (1998) standard errors that are robust with respect to heteroskedasticity as well as serial and cross-sectional correlation. The figure displays the cumulative change in EMBI spreads, measured in basis points, after a fiscal consolidation announcement. We find that austerity announcements tend to reduce spreads in our sample of EMDEs, however the effect is economically small (a reduction of 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. Once congress agrees on a consolidation package, spreads are reduced significantly, by around 15 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.

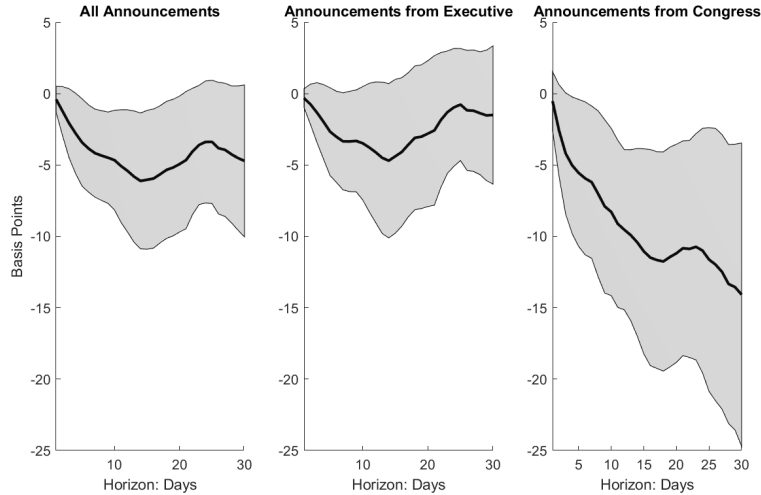Figure 3: Effects of Austerity Announcement on EMBI Spreads

Figure 4 shows the impulse responses obtained from estimating the state-dependent version of the model (equation 2) 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 more than 15 basis 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. On the other hand, the difference in the responses of EMBI spreads between the baseline and scenario (i) is small and not statistically significant at the end of the 30 day horizon when the announcements come from the executive.[2]

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[2]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.

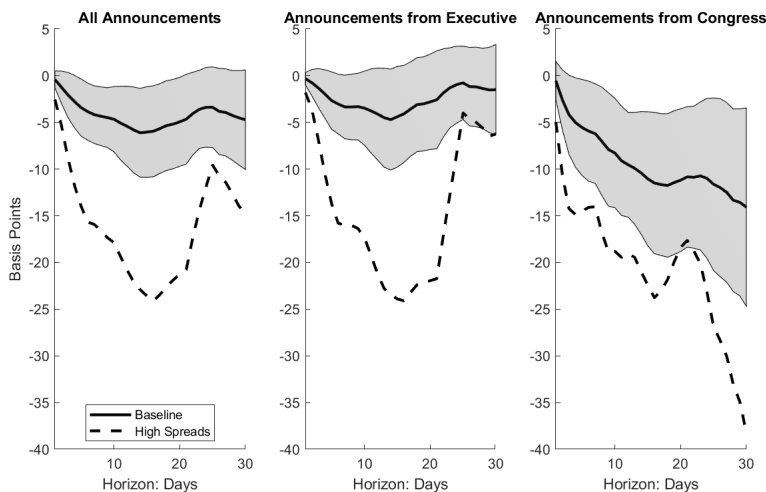Figure 4: Effects of Austerity Announcements on Spreads, Scenario (i)

Figure 5 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.[3] 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 significantly larger if the announcements are made by the congress. 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 test 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 program, we compare the response of spreads during episodes of high perceived sovereign default risk, conditioning for participation in an IMF program. Figure 6 present the results of scenario (iii), where 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 after 30 days after announcements with and without IMF assistance is negligible when

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[3]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.

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.

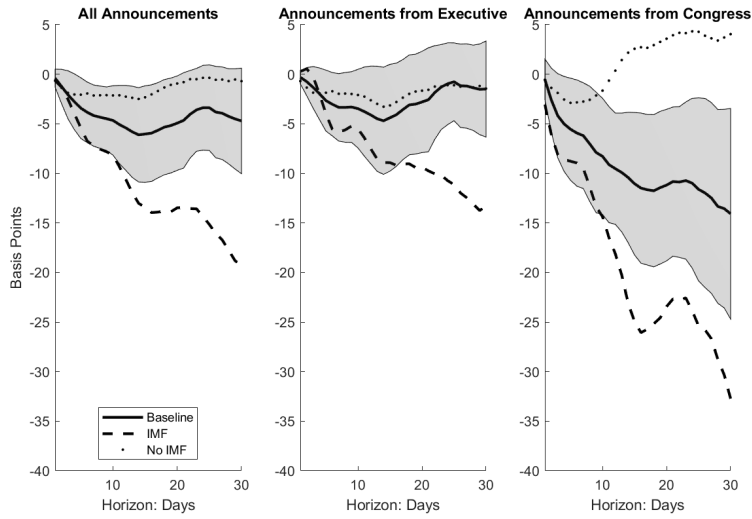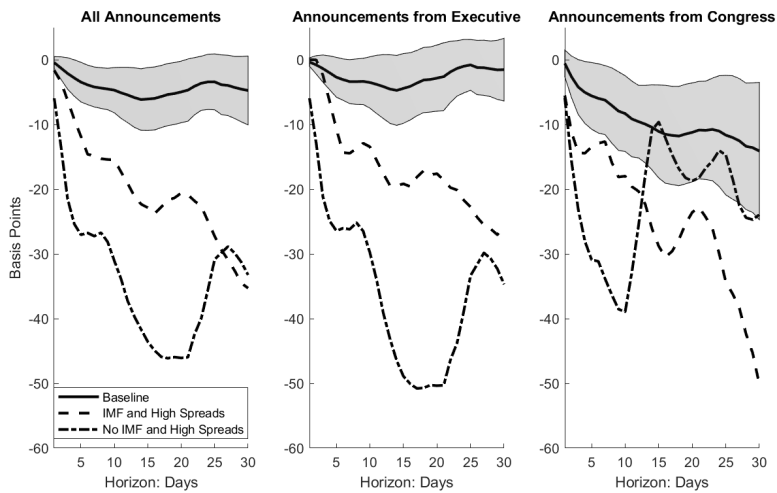Figure 5: Effects of Austerity Announcements on Spreads, Scenario (*ii*)

Figure 6: Effects of Austerity Announcements on Spreads, Scenario (*iii*)

In summary, in this section we have provided evidence that fiscal consolidation announcements, particularly if made by congress in episodes when sovereign spreads are elevated, 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.

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, Leigh, and Pescatori, 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 (see for example 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. One of the main contributions 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 shocks: a panel VAR approach

Following Burnside, Eichenbaum, and Fisher (2004); and Cavallo (2005), we embed the fiscal announcement dates in a VAR model. The model for our panel of 21 EMDEs (PVAR) consists of three variables: the austerity announcement dates; EMBI spreads; and an index of economic activity. All variables are included at a monthly frequency. The fiscal consolidation announcements enter the system as a dummy variable that equals one in the month of the announcement. 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.[4] 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 might still not be fully addressed by this restriction given the well-documented procyclicality of fiscal policy in EMDEs (Frankel, Végh, and Vuletin, 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:

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

where $D_{i,t}$ are the fiscal announcement dates, $\Delta r_{i,t}$ 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

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

announcement by holding the changes in EMBI spreads fixed at zero at all forecast horizons.[5]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 announcement shocks.

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 (3) above can be written as (again abstracting from country-specific intercepts)

$$Y_{i,t} = \sum_{j=1}^{p} A_{i,0}^{-1} A_{i,j} Y_{i,t-1} + A_{i,0}^{-1} \varepsilon_{i,t} \tag{4}$$

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

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

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

$$IRF_k(1, h) = \Lambda_i^{h-1} A_{i,0}^{-1}(k, 1). \tag{5}$$

That is, the impulse response of the variable k to an austerity announcement shock will be in the kth row and first column, for $h = 1, \ldots, H$.[6]

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

$$IRF_2(1, h) = 0. \tag{6}$$

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[5]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.

[6]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 $(p+1) \times (k+1)$.

A hypothetical sequence of EMBI spread shocks, $\varepsilon_{i,t}^2$, is constructed so as to force (6) 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

$$\varepsilon_{i,1}^2 = -\frac{A_{i,0}^{-1}(2,1)}{A_{i,0}^{-1}(2,2)}. \tag{7}$$

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:

$$I\tilde{R}F_k(1,h) = IRF_k(1,h) + \sum_{j=1}^{h} \Lambda^{h-j} A_{i,0}^{-1}(2,1)\,\varepsilon_{i,j}^2, \tag{8}$$

for $k = 1, 2, 3$.

The difference between $IRF_i(1,h)$ and $I\tilde{R}F_i(1,h)$ 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 initial conditions, mainly the level of EMBI spreads, in analyzing the effects of fiscal consolidation announcement. 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:

$$A_{i,j} = \beta_{i,j} + \varsigma_{i,j} * EMBI\ level_{i,t} \tag{9}$$

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 equation (4) and generate 1,000 bootstrap replications $\hat{A}_i$ using equation (9) and the values of the selected values for the levels of the EMBI spreads in month t.[7]

2. After the first period is simulated for all variables in the system, interact the variables with the interaction terms in (9) 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 announcement shock) 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 section 3, 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.[8] The solid lines in Figure 7 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 (4) in response to the dummy variable with the fiscal announcement dates assuming the value of 1 on impact and zero thereafter. In line with the results presented earlier, sovereign spreads significantly decline immediately following the announcement, around 20 basis points on impact. However the confidence bands widen after three months, with the response becoming not significantly different from zero. Output contracts by around 1 percent 6 months after the announcement and stabilizes thereafter. The cumulative response of output is significantly different from zero from the sixth month onward.

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[7]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.

[8]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.

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 announcements regarding fiscal policy changes. The difference between the response of output in the baseline and counterfactual scenarios is significantly different than zero, however it is economically small (around 0.3 percentage points in a 12 month window).

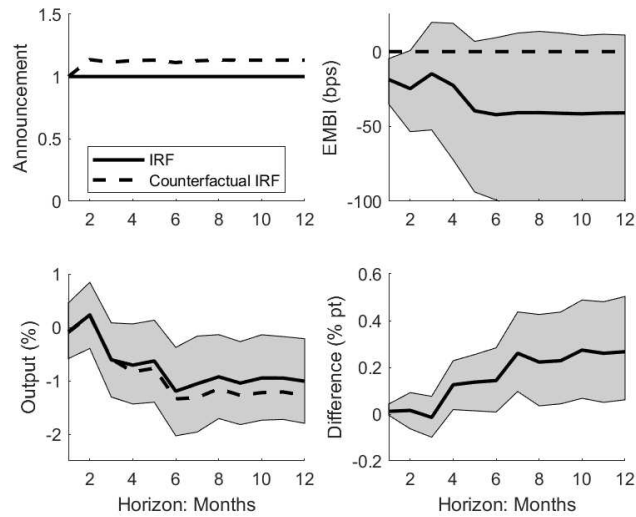Figure 7: Cumulative Effects of Fiscal Consolidation Announcements from Congress

Figure 8 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 (9). 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 50 percent more intense than in the baseline. As it would be expected, the hypothetical response of

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output differs the most from the actual output response, particularly 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 50 percent lower than the counterfactual response. On its face, 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.

Figure 8: Cumulative Effects of Fiscal Consolidation Announcements from Congress, Conditioned Model
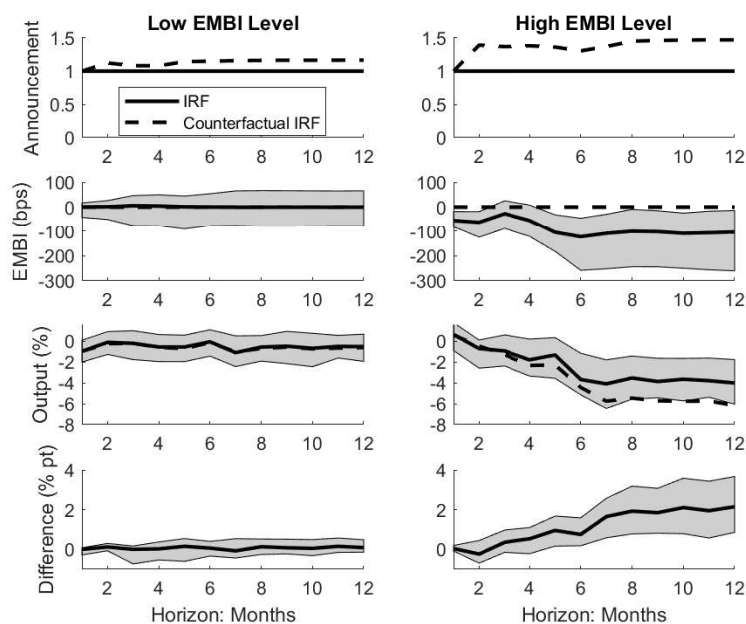

With these estimates at hand, the generality of the findings presented above can be illustrated with simulations of the accumulated responses of output under different scenarios. Figure 9 presents the ratio of the counterfactual to the baseline output response for different percentiles of the EMBI distribution under two distinct scenarios: the "baseline" scenario considering the effects of a generic fiscal consolidation package described in Figure 8 (solid line) and a scenario in which the consolidation announcement takes place in the context of an IMF-supported program (dashed line). The solid line in Figure 9 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.

Furthermore, as illustrated by the dashed line in Figure 9, the increased importance of confidence effects with higher levels of spreads becomes even more pronounced under IMF-supported programs. Under this scenario, the change in the slope of the line at high spread levels is remarkable. Overall, while the results do not point to "expansionary" fiscal consolidations, the contraction in GDP is clearly less pronounced when sovereign spreads are high, especially if the country is undertaking an IMF-supported adjustment program.

Figure 9: Ratio of the the Response of Output in Counterfactual Relative to Baseline Scenario
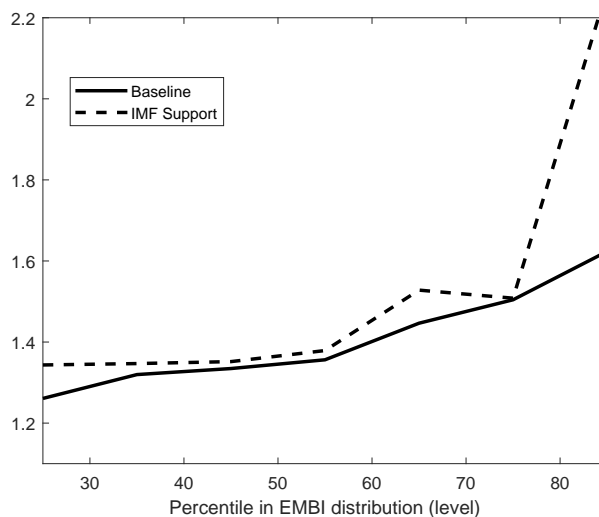
5 Conclusion

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. An analysis of this new dataset allows us to establish some interesting findings: (i) that having a consolidation package approved by congress has been a difficult endeavor for many governments in these economies; (ii) that consolidation packages tend to occur during episodes of high global or regional financial stress; and (iii) that consolidation efforts frequently coincided with periods when countries had an agreement for IMF program assistance.

As a second contribution, we show that fiscal announcements aiming at an improvement in the budget balance tend to reduce spreads, particularly 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 initial conditions are crucial for the effects of consolidation announcements on spreads. In particular, the reduction of spreads following austerity announcements is significantly larger and more persistent if they occur in periods of elevated sovereign spreads or when economies are under (or in the process of achieving) an IMF 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 (i.e. countries with high spread levels stand to benefit the most from putting in place credible austerity packages), especially if the country is undertaking an IMF-supported adjustment program.

Overall, our results stand in stark contrast with the findings reported by Born, Müller, and Pfeifer (2019) 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, Müller, 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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