Planning Ahead: Measuring Fiscal Cyclicality Through News

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Abstract

I contribute to a literature on fiscal cyclicality by measuring ex-ante and contemporaneous budget responses to the business cycle separately. This is accomplished by measuring the effects of output growth and prior ex-ante news on the fiscal balance using an instrumental variables approach. I find that the response of the fiscal balance to ex-ante news varies depending on the news window used. Industrial economies appear to respond with robust countercyclicality to news occurring between the October months of the preceding two years, while middle-income developing economies seem to respond countercyclically to news occurring between the April months of the preceding and current years.

Introduction

A substantial literature exists concerning fiscal cyclicality, particularly with regards to its variation between industrial and developing countries. While earlier papers like those of Gavin and Perotti and Kaminsky et. al. found that fiscal policy was often procyclical in developing countries, Jaimovich and Panizza, by addressing reverse-causality concerns using an instrumental variables approach, found that fiscal policy appears to be countercyclical across both industrial and developing economies.[1] [2] [3]

Much of this literature, including Jaimovich and Panizza's paper, measures fiscal cyclicality as the effect of a business cycle indicator (e.g. output growth or output gap) on a fiscal indicator (expenditures, taxes, or balance). [4] A positive association between the business cycle indicator and the fiscal balance (revenues minus expenditures) is interpreted as evidence of countercyclical fiscal policy, while a negative association is interpreted as fiscal procyclicality and the absence of a strong association is interpreted as fiscal acyclicality.

This approach, however, conflates deliberate legislative budget changes with adjustments from countercyclical automatic stabilizers. These distinct components of fiscal policy can potentially have different cyclical trends. In a recession, for example, stabilizers will behave countercyclically with reductions in tax revenues and increases in outlays to social insurance programs. The government, however, may still choose to budget procyclically by cutting discretionary expenditures or increasing tax rates. This heterogeneity isn't discernible by measuring the response of a fiscal indicator to the contemporaneous business cycle, as one component will dominate or the two will negate each other.

In this paper I propose a partial solution, separating the effects of forward-looking budgeting behavior from the fiscal balance's real time response to the business cycle. Reasoning that present news shocks about future output inform ex-ante government budget planning but not the future behavior of automatic stabilizers, I measure the response of the fiscal balance to not only contemporaneous output growth but also to prior news shocks regarding the given period.

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[1] Michael Gavin and Roberto Perotti, "Fiscal Policy in Latin America," NBER Macroeconomics Annual 12 (1997), 30.

[2] Graciela L. Kaminsky, Carmen M. Reinhart, and Carlos A. Végh, "When It Rains, It Pours," NBER Working Paper Series, National Bureau of Economic Research (September 2004): 31-32, accessed October 6th, 2020, https://economics.yale.edu/sites/default/files/files/WorkshopsSeminars/Macroeconomics/kaminsky-050329.pdf.

[3] Dany Jaimovich and Ugo Panizza, "Procyclicality or Reverse Causality?" RES Working Papers 1029, Inter-American Development Bank (2007), accessed October 6th, 2020, https://core.ac.uk/download/pdf/205402414.pdf.

[4] Ibid.

Empirical strategy

I augment the baseline specification used by Jaimovich and Panizza as follows: [5]

$$FB_{i,t} = \beta_0 + \beta_1 * News(t)_{i,t-1} + \beta_2 * GDPGR_{i,t} + \beta_3 \Delta TOT_{i,t} + \beta_4 FB_{i,t-1} + \varepsilon_{i,t}$$

$X_{i,t}$ denotes the value of variable X for country i in year t. In my baseline analysis, $News(s)_{i,t}$ is defined as the change in the IMF World Economic Outlook (WEO)'s forecast for country i's output growth in year s between its October reports in years t and $t-1$. As in Jaimovich and Panizza, FB is the fiscal balance, $GDPGR$ is output growth, and TOT is terms of trade (in percentage points).

The interpretation of β_1 is analogous to that of β_2. A positive estimate shows that a positive (negative) adjustment to the forecast is associated with an expansion (contraction) of the fiscal balance, which indicates countercyclical fiscal behavior. Likewise, a negative estimate indicates fiscal procyclicality and an estimate near zero indicates fiscal acyclicality.

Simultaneity concerns are immediately apparent in this specification. Assuming that fiscal policy affects contemporaneous output, $FB_{i,t}$ should also be a determinant of $GDPGR_{i,t}$. Following Jaimovich and Panizza's approach, I instrument output growth in country i on a weighted average of output growth in country i's export destinations: [6]

$$Nbr_{i,t} = \overline{\left(\frac{EXP}{GDP}\right)}_i \sum_j w_{ij,t} GDPGR_{j,t}$$

$\overline{\left(\frac{EXP}{GDP}\right)}_i$ is exports as a percentage of output averaged over all years for which country i has observations in my dataset and $w_{ij,t}$ is the share of country i's exports sold to country j in year t. The introduction of my news indicator raises simultaneity concerns as well. While country i's budget planning for year t may be informed by economic news represented by $News(t)_{i,t-1}$, the forecast update may in turn be informed by news about country i's budget planning. In order to address this issue, I adjust Jaimovich and Panizza's instrument for use with $News(t)_{i,t-1}$:

[5] Ibid.
[6] Ibid.

$$NbrNews(t)_{i,t-1} = \overline{\left(\frac{EXP}{GDP}\right)}_i \sum_j w_{ij,t-1}\, News(t)_{j,t-1}$$

Data

In attempting to replicate Jaimovich and Panizza's results, I adopt the set of countries and categories used in their analysis. Due to differences in data availability, however, my sample ranges from 1993 – 2019 whereas Jaimovich and Panizza's sample ranges from 1970 – 2003. [7]

As stated before, forecast data are acquired from the IMF WEO's database. Fiscal balance, output growth, and terms of trade data are from the World Bank's World Development Indicators Databank. Export data are from the IMF's Direction of Trade Statistics (DOTS) database.

Results

Table 1 shows that as in Jaimovich and Panizza's analysis, the fiscal balance's response to contemporaneous output growth is positive and significant across all categories except for low-income developing countries. Reassuringly, the magnitudes of these estimates are resemble those of their counterparts produced in Jaimovich and Panizza's paper with the exception of the low-income developing group. This offers further evidence that fiscal adjustments are countercyclical with respect to the contemporaneous business cycle.

The fiscal balance's response to ex-ante budget planning, on the other hand, is only positive for industrial countries and middle-high income developing countries, and only significantly so for the former. Estimates are negative for middle-low income developing countries, low-income developing countries, and developing countries as a whole. None of these estimates are significant, however.

It should also be noted that the first-stage F-statistics for the joint significance of the instruments in the low-income developing countries regression do not meet the Staiger and Stock rule-of-thumb and are in fact quite low. [8] [9] As such, the estimates for this regression, particularly the large effects of the ex-ante news shock and GDP growth, should be taken with a grain of salt. The F-statistic for the news shock in the middle-low income developing group is slightly below 10 as well.

[7] Ibid.

[8] Staiger and Stock suggest this F-statistic should be at least 10.

[9] D. Staiger and J. H. Stock, "Instrumental Variables Regression with Weak Instruments," *Econometrica* 65, no. 3 (May 1997): 557-586, accessed October 6th, 2020, https://www.jstor.org/stable/2171753.

Table 1 : Cyclical Determinants of Fiscal Balance

	Industrial	Developing	Developing, Middle-High Income	Developing, Middle-Low Income	Developing, Low Income
News	1.142*	-0.0821	0.155	-0.325	-68.41
	(0.488)	(0.285)	(0.114)	(0.366)	(5065.2)
GDP Growth	0.597***	0.361***	0.276***	0.449***	-27.11
	(0.0664)	(0.0741)	(0.0614)	(0.0707)	(2171.3)
Δ Terms of Trade	0.0626	0.0500**	0.0876***	0.00147	-1.199
	(0.0370)	(0.0157)	(0.0245)	(0.00851)	(94.28)
Lagged Balance	0.515***	0.502***	0.624***	0.583***	2.252
	(0.0538)	(0.0529)	(0.0418)	(0.0873)	(150.2)
1st stage F (News)	20.90	23.21	19.23	9.198	4.114
1st stage F (GDP)	17.87	56.81	62.65	27.46	1.415
N	418	1243	513	389	341

Cluster-robust standard errors reported. All regressions use country fixed effects.
* p < 0.05, ** p < 0.01, *** p < 0.001

Conscious of differences in the budget planning timetables of different countries, I repeat this exercise using a different news window. Here, the ex-ante news shock for year t is the change in the IMF WEO year t output forecast from April of year $t-1$ to April of year t. The foreign news shocks used in the construction of the news instrument are adjusted accordingly. As shown in Table 2, the p-values of contemporaneous GDP growth's effects have been reduced for every group except for the low-income group, although their directions largely remain the same. It appears that allowing the news window to overlap with the target year allows the news shock to account for some of the fiscal balance variation attributed to GDP growth in Table 1's results.

Changing the news window has also drastically altered the trends exhibited by the estimates of the news coefficient in each group. Estimates are now positive across all groups except for low-income developing economies. The news coefficient for industrial economies has decreased and lost statistical significance, signaling that budget planning in this group responds more robustly and countercyclically to news occurring in the baseline window. Also, the news coefficient for the developing middle-low income group has increased to become significantly positive. Together with the increase in the news coefficient of middle-high income developing countries, this suggests that middle-income developing economies respond more countercyclically to news occurring in the April-to-April news window.

As before, the fact that the first stage F-statistics for the low-income developing group are below 10 for both endogenous regressors urges caution in interpreting its second stage coefficient estimates.

Table 2 : Cyclical Determinants of Fiscal Balance, April-to-April News Window

	Industrial	Developing	Developing, Middle-High Income	Developing, Middle-Low Income	Developing, Low Income
News	0.185	0.0788	0.257	0.269***	-3.325
	(0.179)	(0.117)	(0.140)	(0.0630)	(6.312)
GDP Growth	0.394*	0.303*	0.0496	0.259**	5.345
	(0.162)	(0.154)	(0.146)	(0.0909)	(7.386)
Δ Terms of Trade	0.0424	0.0515**	0.0913***	0.00535	0.0671
	(0.0398)	(0.0169)	(0.0259)	(0.00684)	(0.0536)
Lagged Balance	0.598***	0.498***	0.638***	0.552***	0.161
	(0.0492)	(0.0541)	(0.0514)	(0.0683)	(0.264)
1^{st} stage F (News)	11.94	49.37	52.12	25.23	6.267
1^{st} stage F (GDP)	17.21	51.32	44.78	25.23	6.627
N	419	1268	519	401	348

Cluster-robust standard errors reported. All regressions use country fixed effects.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Conclusion

While the evidence provided by this exercise does not paint as explicit a picture as Jaimovich and Panizza's original paper, enough has been demonstrated to suggest that ex-ante budgeting should be considered separately from other determinants of fiscal indicators in measuring the cyclicality of fiscal policy among different countries. The analysis using the October-to-October news window demonstrated that despite the countercyclicality of the fiscal balance's response to the contemporaneous business cycle across all countries in my sample, the response of ex-ante budgeting to news varied across groups and exhibited indeterminate cyclicality in all but the industrial economies. The analysis using the April-to-April news window then suggested that the effect of GDP growth on the fiscal balance can partially be

explained by news occurring in the early months of the year and that middle-income developing countries respond with stronger countercyclicality to ex-ante news in this period.

The change in the news coefficient by country group resulting from use of different news windows is also cause for further study. Countries of different development levels appear to respond more countercyclically to ex-ante news in different parts of the year. This may be a result of differences in the budgeting timetable and process between industrial and developing countries, for which my findings offer motivation for further study.

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