FISCAL POLICY AND EXTERNAL ADJUSTMENT: WHAT'S COMING?

Online Annex 2.1

Online Annex 2.1. Empirical Analysis: Data Sources, Robustness Checks, and Tests of Changes in Results over Time

Data Sources

The data used in the empirical analysis come from the July 2021 *World Economic Outlook Update*. Additional data sources are as follows: Lane and Milesi-Ferretti (2018) for the net international investment position, Federal Reserve Economic Data for the VIX/VXO, Laeven and Valencia (2020) on the occurrence of financial crises, Gruss and Kebhaj (2019) for the terms-of-trade index, and David and Gonçalves (2019) for the occurrence of sudden stops.

In addition, to implement the narrative approach, the analysis merges existing multi-country narrative databases, includes additional economies, and identifies additional fiscal policy changes up to 2019. For advanced economies, the starting point is the data set of Alesina and others (2018) for 16 Organisation for Economic Co-operation and Development economies for 1978–2014. The analysis adds to this data set The Netherlands, which was included in the earlier data set of Devries and others (2011) up to 2009, on which Alesina and others (2018) builds, and extends the sample for all 17 advanced economies through 2019. For emerging market and developing economies, the starting point is the data set of Carriere-Swallow, David, and Leigh (2021), which includes 14 countries in Latin America and the Caribbean for 1989–2016. It adds to this data set China and India and extends the sample for all 16 emerging market and developing economies through 2019.

Robustness Checks and Extentions

Online Annex Table 2.1.1 presents a set of robustness tests for the impact of fiscal consolidation on the current account balance. It focuses on the results at the three-year horizon ($h = 3$ in equation (2.1) and, for reference, reports the baseline results in column 1.

Online Annex Table 2.1.1

	(1)	(2)	(3)	(4)	(5)		(6)	(7)
Specification	Baseline	Cook's Distance	IV Estimator	AIPW Estimator	AEs	EMDEs	Spending-Based	Tax-Based
$\beta^{h=3}$	0.60***	0.55***	1.11***	1.10***	0.58***	0.67***	0.60***	0.69***
	(0.12)	(0.08)	(0.20)	(0.24)	(0.13)	(0.26)	(0.15)	(0.18)
Observations	1199	1120	724	842	1199	1199	1260	1260
First Stage *F*-statistic			85.22					

Note: The table reports point estimates of a fiscal shock of 1 percent of GDP on the current account balance at the three-year horizon (h=3). All specifications contain a full set of country and time fixed effects. AEs denotes advanced economies; EMDEs denotes emerging market and developing economies. Driscoll-Kraay standard errors are in parentheses for results in columns (1)–(3) and (5)–(7). The Kleibergen-Paap Wald *F*-statistic is reported for the IV (instrumental variable) estimator. For augmented inverse propensity weighted (AIPW) estimator results, propensity scores are based on the saturated probit model as described in the text and empirical sandwich standard errors clustered by country are reported.
*Significant at 10 percent; **significant at 5 percent; ***significant at 1 percent.

The analysis first investigates whether the results are robust to outliers, based on Cook's distance. Observations with a Cook's distance greater than $4/N$ are deleted, where N is the sample size. The removal of outliers does not significantly alter the results (column 2).

Next, the identified narrative fiscal shocks are used as instruments for changes in the cyclically adjusted primary balance, based on the instrumental variable (IV) approach of Ramey and Zubairy (2018). Compared with the baseline, this approach makes it possible to control for measurement errors and to assess the strength of the instrument in capturing exogenous changes in fiscal variables. The first stage is strong, which suggests that narrative shocks are strong instruments for changes in the cyclically adjusted primary balance (as the Kleibergen-Paap Wald *F*-statistics reported in the table exceed the rule-of-thumb value for instrument strength). The second-stage point estimates are significant and larger than in the baseline specification.

To address a potential concern that narrative fiscal shocks may be predictable, based on past developments that could potentially also affect the variable of interest (here, the current account balance), the augmented inverse propensity score weighting estimator proposed for this purpose by Jordà and Taylor (2016) is used. The approach reweights fiscal shocks to put relatively more weight on less predictable adjustment episodes based on the following steps. First, the analysis converts the narrative shock into a binary variable, taking the value 1 when a fiscal consolidation (or treatment) occurs and 0 otherwise. Next, a probit model is run to determine the probability of treatment, based on a vector of macroeconomic variables. For this, a rich set of determinants is used, including past values of the treatment (two lags), the current account balance (two lags), the net international investment position (two lags), the government-debt-to-GDP ratio (two lags), the cyclical component of real GDP, the change in the terms-of-trade index, the lagged VIX/VXO (Chicago Board Options Exchange Volatility Index/Chicago Board Options Exchange S&P 100 Volatility Index), crisis and sudden stop dummies, and country fixed effects.[1] As shown in column 4 of Online Annex Table 2.1.1, after adjusting the baseline specification with the weights obtained from the probit, the augmented inverse propensity score weighting estimator yields a significant and slightly higher point estimate of 1.1 percent, compared with 0.6 percent in the baseline specification. Although the point estimates and standard errors are rescaled to be comparable to the previous shock of 1 percent of GDP, it should be noted that the results are not exactly comparable as the shock was transformed into a binary treatment variable.

Results for Sample Splits

To investigate how the effects of fiscal policy on the current account have changed over time, the baseline equation (2.1) can be reestimated by considering two sample periods: the period prior to the global financial crisis (before 2009) and the period starting in 2009. The equation estimated takes the following form:

$$\Delta y_{i,t:t+h} = \alpha_i^h + \alpha_t^h + \beta_1^h \Delta F_{1,i,t:t+h} + \beta_2^h \Delta F_{2,i,t:t+h} + \gamma^h X_{i,t} + e_{i,t}^h , \qquad (2.1.1)$$

where $\Delta F_{1,i,t:t+h}$ denotes narrative fiscal shocks in the first sample (1978–2009) and $\Delta F_{2,i,t:t+h}$ denotes narrative fiscal shocks in the second sample (2010–19). Tests for the equality of the two

[1]The cyclical component of real GDP is computed using an HP filter (λ = 100), following Jordà and Taylor (2016). The terms-of-trade index is from the updated database of Gruss and Kebhaj (2019). The VXO is a proxy for global risk appetite and is a measure similar to the VIX. Crisis dummies are from Laeven and Valencia (2020), and the sudden stop dummy is from David and Gonçalves (2019).

coefficients of interest reveal that they are statistically distinguishable at conventional levels, with *p*-values reported in Online Annex Figure 2.1.1. The results suggest that there is evidence of a larger effect of fiscal consolidation on the current account after the global financial crisis. Reestimating equation (2.1.1) with different components of aggregate demand as the dependent variable, we find significantly larger effects of fiscal consolidations in the most recent decade on real investment and real GDP (over the three- to five-year horizon). The effect of fiscal consolidations on the real effective exchange rate is not statistically distinguishable over the two sample periods.

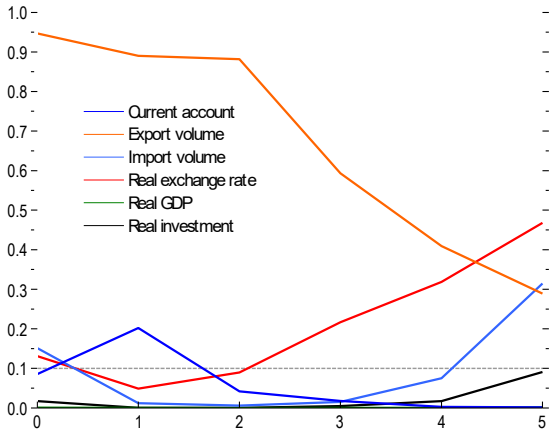
To investigate how the results differ for advanced economies and emerging market and developing economies, the analysis reestimates equation (2.1.1) but with $\Delta F_{1,i,t:t+h}$ denoting narrative fiscal shocks for the first group of economies and $\Delta F_{2,i,t:t+h}$ denoting narrative fiscal shocks for the second group of economies. As shown in column 5 of Online Annex Table 2.1.1, the estimated response of the current account balance is larger for emerging market and developing economies but also less precisely estimated and not statistically distinguishable from the result for advanced economies.

To investigate whether spending- and tax-based adjustments have different effects on the current account, equation (2.1.1) is separately estimated using narrative shocks that are spending-based and tax-based. Here, spending-based adjustments are defined as those in which the budgetary impact of spending changes are greater than those of tax changes. The results, reported in columns (6) and (7) of Online Annex Table 2.1.1, suggest that both tax-based and spending-based fiscal consolidations raise the current account balance by the same magnitude as the baseline specification. Overall, while the size of the effect of fiscal consolidations on the

Online Annex Figure 2.1.1. Pre– and Post–Global Financial Crisis Samples: Test for Difference in Estimated Responses (*p*-value for null hypothesis of equality in estimated responses)

(Percent; years on x-axis)

Pre– and post–GFC estimated impulses are statistically distinguishable over most time horizons for the current account, GDP, real investment, and real imports.

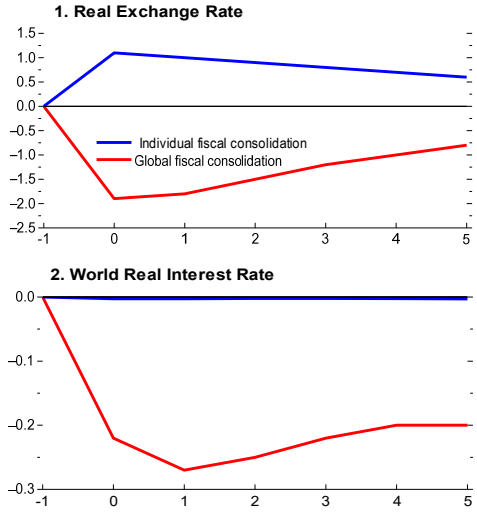


Source: IMF staff calculations.
Note: The figure reports the *p*-value of tests for statistical distinguishability of estimated impulse responses shown in Figure 2.3. Dashed line indicates 10 percent significance level. GFC = global financial crisis.

Online Annex Figure 2.1.2. Impact on Real Exchange Rate and on World Real Interest Rate

(Percent of GDP; G20 Model simulations)

When all economies implement fiscal consolidation at the same time, the exchange rate depreciates by less or even appreciates, for an individual economy, and the global real interest rate declines.



Source: IMF, G20 Model simulations.
Note: *X*-axis units are years, where $t = 0$ denotes the year of consolidation.

current account is larger in the aftermath of the global financial crisis, these results suggest that the effect does not differ between advanced and emerging market economies and are not based on the composition of the fiscal adjustment.

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