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Determinants and Effects of Fiscal Counter-Cyclicality

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Abstract

This paper provides a novel dataset of time-varying measures of fiscal counter-cyclicality for an unbalanced panel of advanced and emerging market economies from 1980 to 2014. The use of time-varying measures of fiscal counter-cyclicality overcomes the major limitation of existing studies assessing the determinants and the effects of fiscal counter-cyclicality that rely on cross-country regressions and, therefore, are not able to account for country-specific as well as global factors. The key findings of the paper are as follows: (i) fiscal counter-cyclicality has increased over time for many economies over the last two decades; (ii) fiscal counter-cyclicality is positively associated with financial deepening, the level of economic development, trade openness, government size as well as with political factors; (iii) fiscal counter-cyclicality significantly reduces output volatility. Our results are robust to various specifications and endogeneity checks.

Determinantes y Efectos de la Contraciclicidad Fiscal

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Palabras claves:
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coeficientes cambiantes en el tiempo
mínimos cuadrados ponderados

Resumen

Este documento ofrece un novedoso conjunto de datos con medidas de la contraciclicidad de la política fiscal que son variantes en el tiempo, para un panel desbalanceado de economías avanzadas y emergentes desde 1980 hasta 2014. El uso de medidas fiscales contracíclicas que cambian en el tiempo, supera la principal limitación de los estudios existentes sobre la materia, que usualmente evalúan los determinantes y los efectos de la contraciclicidad fiscal basados en regresiones a través de países y, por lo tanto, no dan cuenta de los efectos específicos por país ni de los efectos globales. Los hallazgos más importantes del trabajo son los siguientes: (i) la contraciclicidad fiscal ha aumentado durante las últimas dos décadas en muchas economías; (ii) la contraciclicidad fiscal está asociada positivamente con la profundización financiera, el nivel de desarrollo económico, la apertura comercial, el tamaño del gobierno, así como con factores políticos; y (iii) la contraciclicidad fiscal reduce significativamente la volatilidad del producto. Nuestros resultados son robustos a varias especificaciones y verificaciones de endogeneidad.

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1. Introduction

Several years after the Global Financial Crisis, economic growth in many advanced and emerging market economies remains well below precrisis rates. Medium-term growth expectations have been steadily revised downwards since 2011, highlighting uncertainties surrounding medium-term growth prospects (IMF 2015). At the same time, public debt-to-GDP ratios have increased in many advanced and emerging market economies, reaching historical high levels in some of them. Against this background, how can fiscal policy contribute to higher medium-term growth?

Since output volatility can negatively affect medium-term growth through its effects on investment and productivity, fiscal policy can foster medium-term growth by reducing aggregate macroeconomic volatility.[1] The idea that fiscal policy can affect productivity growth by operating in a counter-cyclical way has been suggested by Aghion et al. (2005). Their argument is that firms' ability to borrow to finance investment is typically reduced during recessions: to the extent that higher macroeconomic volatility translates into deeper recessions, it will have a negative effect on investment, especially on productivity-enhancing long-term projects (for example, R&D investment) that are more subject to liquidity risks. This prediction finds empirical support in cross-country regressions (Aghion et al. 2005) as well as in studies based on sectoral- (Furceri and Jalles 2016) and firm-level data (Berman et al. 2007).

Fiscal policy has a stabilizing effect on the economy if the budget balance-to-GDP ratio increases when output growth increases and falls when output growth declines: (i) the more countercyclical government spending is, the higher the effect of fiscal stabilization —a relatively high level of government spending when private demand is low will stabilize aggregate demand; (ii) the more pro-cyclical taxes are, the higher fiscal counter-cyclicality will be— if taxes fall more than output, when output falls, then taxes contribute to stabilize household's disposable income.

But how stabilizing is *de facto* fiscal policy and how fiscal counter-cyclicality vary over time, between countries and across phases of the business cycle? Which policy and structural variables determine the effectiveness of fiscal stabilizers? Finally, how much does fiscal counter-cyclicality contribute to lower overall macroeconomic volatility? This paper tries to answer these questions using a novel empirical strategy and estimating time-varying measures of fiscal counter-cyclicality for an unbalanced panel of 61 advanced and emerging market economies from 1980 to 2014. In particular, the contribution of the paper is twofold. First, to the best of our knowledge, this is the first paper that estimates time-varying measures of fiscal counter-cyclicality for a large set of economies, including emerging market ones.[2] Second, we examine the effect of time-varying measures of fiscal counter-cyclicality on output volatility.

The use of time-varying measures of fiscal counter-cyclicality overcomes the major limitation of existing studies assessing the drivers and the determinants of fiscal counter-cyclicality that rely on cross-country regressions and therefore are not able to account for country-specific as well as global factors. The key findings of the paper are as follows: (i) fiscal counter-cyclicality has increased over time for many economies over the last two decades; (ii) fiscal counter-cyclicality is positively associated with financial deepening, the level of economic development, trade openness, government size as well as political constraints on the executive; (iii) fiscal counter-cyclicality significantly reduces output volatility. Since output volatility can negatively affect medium-term growth through its effects on investment and productivity, this result suggest that fiscal counter-cyclicality can foster medium-term growth.

While previous work assessing the determinants and the effects of fiscal counter-cyclicality on output volatility using time-varying measures has only focused on a subset of advanced economies (Aghion and Marinescu 2008), there are several studies in the literature that have performed a similar analysis using cross-country regressions for a large set of advanced and emerging market economies. As for the determinants of fiscal stabilization, government size has typically been found to be the most important driver (Gali 1994; Debrun et al. 2008; Debrun and Kapoor 2011; Furceri 2010; Afonso and Jalles 2013). Another important determinant of fiscal counter-cyclicality is the degree of openness: economies that are more open to trade tend to be more exposed to external shocks and may use more actively fiscal policies in order to provide increased stabilization (Rodrik 1998; Lane 2003). Similarly, capital account openness is found to affect fiscal counter-cyclicality as foreign capital tends to flow in (out) during expansions (recessions), therefore increasing the cost of financing counter-cyclical fiscal policies (Aghion and Marinescu, 2008). Studies have also found higher fiscal counter-cyclicality in more developed countries, as these tend also to be characterized by better institutions (or of higher quality) and by higher levels of financial development (Talvi and Vegh 2005; Frankel et al. 2011; Acemoglu et al. 2013; and Fatas and Mihov 2013).

On the effects of fiscal counter-cyclicality on macroeconomic volatility, while the existing empirical evidence on the links between fiscal counter-cyclicality and growth is mixed, several studies seem to agree that a timely countercyclical response of fiscal policy to (demand) shocks is likely to deliver considerably lower

1 See, for example, Ramey and Ramey (1995) and Imbs (2007) for the empirical evidence on a negative relation between output volatility and growth.

2 Aghion and Marinescu (2008) estimates time-varying measures of deficit counter-cyclicality for an unbalanced panel of 19 advanced economies over the period 1960-2007.

output and consumption volatility (Van den Noord 2000; Kumhof and Laxton 2009; Debrun and Kapoor 2011; Fatas and Mihov 2012).

The remainder of the paper is organized as follows. In Section 2, a framework for measuring fiscal counter-cyclicality is presented. Sections 3 and 4 develop the empirical strategies to analyze the determinants and the effects of fiscal counter-cyclicality, respectively. The last section concludes and discusses some policy implications.

2. Measuring Fiscal counter-cyclicality

2.1 Conceptual Framework

Fiscal policy has a stabilizing effect on the economy if the budget balance-to-GDP ratio increases when output growth increases and falls when output growth declines: (i) the more countercyclical government spending is, the higher the effect of fiscal stabilization —a relatively high level of government spending when private demand is low will stabilize aggregate demand; (ii) the more pro-cyclical taxes are, the higher fiscal counter-cyclicality will be— if taxes fall more than output, when output falls, then taxes contribute to stabilize household's disposable income.[3]

Assessing the degree of fiscal counter-cyclicality in each country *i* implies estimating the response of the budget balance to changes in economic activity:

$$b_i = \alpha_i + \beta_i \Delta y_i + \varepsilon_i \quad (1)$$

where b is the budget balance-to-GDP ratio, Δy is a measure of changes in economic activity—proxied by GDP growth—and β measures the degree of fiscal counter-cyclicality, with larger values of the coefficient denoting higher counter-cyclicality.[4]

We then generalize equation (1) by introducing the assumption that the regression coefficients may vary over time:

$$b_{it} = \alpha_{it} + \beta_{it} \Delta y_{it} + \varepsilon_{it} \quad (2)$$

In particular, the coefficients α and β is assumed to change slowly and unsystematically over time its conditional expected value to be equal to its past value. The change of the coefficient β is denoted by $v_{i,t}$, which is assumed to be normally distributed with expectation zero and variance σi[2:5]

$$\beta_{it} = \beta_{it-1} + v_{it} \quad (3)$$

Equation (2) and (3) are jointly estimated using the Varying-Coefficient model proposed by Schlicht (1985, 1988). In this approach the variances σ_i^2 are calculated by a method-of-moments estimator that coincides with the maximum-likelihood estimator for large samples (see Schlicht, 1985; Schlicht, 2003; Schlicht and Ludsteck, 2006 for more details).[6] The model described in equation (2) and (3) generalizes equation (1), which is obtained as a special case when the variance of the disturbances in the coefficients approaches to zero.

As discussed by Aghion and Marinescu (2008), this method has several advantages compared to other methods to compute time-varying coefficients such as rolling windows and Gaussian methods. First, it allows using all observations in the sample to estimate the degree of fiscal counter-cyclicality in each year—which by construction is not possible in the rolling windows approach. Second, changes in the degree of fiscal counter-cyclicality in a given year come from innovations in the same year, rather than from shocks occurring in neighboring years. Third, it reflects the fact that changes in policy are slows and depends on the immediate past. Fourth, it reduces reverse causality problems when fiscal counter-cyclicality is used as explanatory variable as the degree of fiscal counter-cyclicality depends on the past.

2.2 Fiscal counter-cyclicality over time

We now report the average level and the time path of the coefficient of fiscal counter-cyclicality estimated in equation (2) and (3) for a sample of 61 advanced and emerging market economies, for which we have estimates of fiscal counter-cyclicality for at least 20 years (Figure 1).

As a first observation, it is worth nothing that the time-average fiscal counter-cyclicality coefficient is positive (about 0.25-0.3), which is consistent with the fact that the budget balance is generally counter-cyclical (Lane 2003; Aghion and Marinescu 2008). Second, the degree of fiscal counter-cyclicality has increased over time (Figure 1), for both advanced and emerging market economies (Figure 2), with the pattern holding for most countries

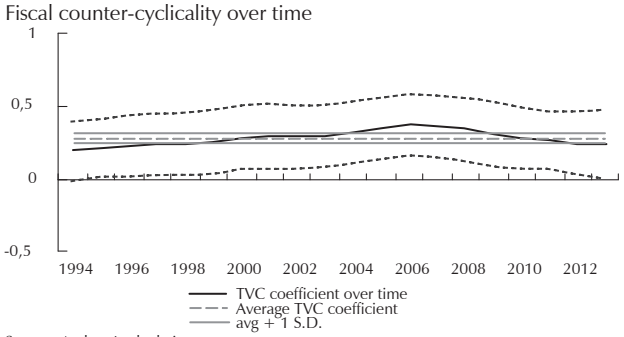
3 In principle, one should adjust the budget balance and taxes by the marginal propensity to consume out of disposable income, which is typically less than one. Moreover, in a dynamic setting, measuring the impact of fiscal policy on aggregate demand requires looking not only at the current budget balance but also at future anticipated deficits and at the level of the stock of public debt (Blanchard and Summers, 1984 and Blanchard, 1985).

4 Data for the budget balance-to-GDP ratio are taken from the IMF WEO database. We consider GDP growth instead of the output gap to capture the response of the budget balance not only to demand shocks but also to supply ones.

5 In Table A1 of the Appendix we show that this assumption is satisfied.

6 The approach proposed by Schlicht (2003) is very similar to that used by Aghion and Marinescu 2008. The main difference is in the computation of the variances σ^2. Aghion and Marinescu (2008) uses the Markov Chain Monte Carlo (MCMC) method to approximate these variances, while Schlicht (2003) uses a method-of-moments estimator.

Figure 1
Fiscal counter-cyclicality over time



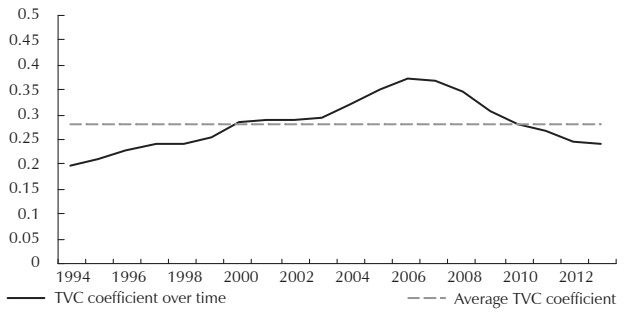
Source: Authors' calculations.

within each group (Figure 3). In particular, the degree of fiscal counter-cyclicality has increased for 41 out of 61 countries in the sample.

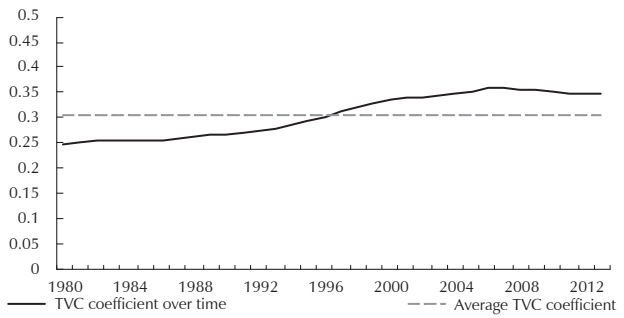
However, while the increase in advanced economies has occurred mostly during the 80s and the 90s, in emerging market economies fiscal counter-cyclicality has increased in the late 90s-early 2000s. Interestingly, fiscal counter-cyclicality seems also to increase during recessions, particular during financial crises (Figure 4).

Figure 2
Fiscal counter-cyclicality over time

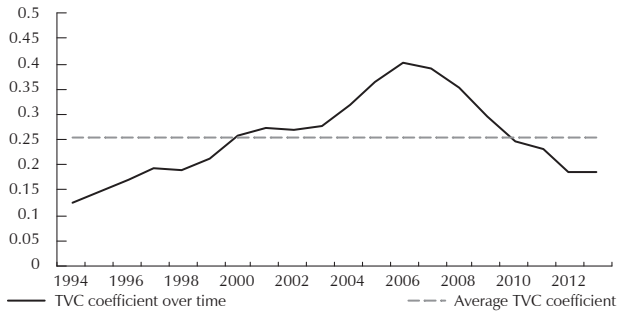
A. Overall, 1994-2013



B. Advanced Economies, 1980-2013



C. Emerging Market Economies, 1994-2013

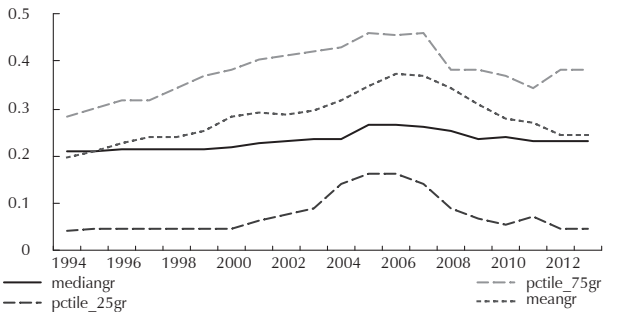


Note: Figure displays the time profile of the TVC coefficient estimates for the entire sample, and two income groups, Advanced and Emerging Market Economies. A) includes 18 countries with at least 34 observations; B) contains 61 countries with at least 20 observations; C) contains 25 countries with at least 20 observations; D) contains 36 countries with at least 20 observations.

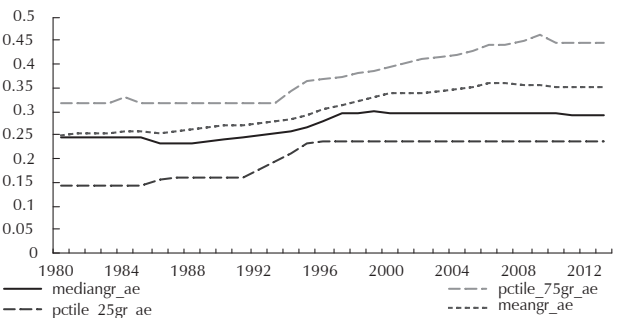
Source: Authors' calculations.

Figure 3
Fiscal counter-cyclicality over time, within sample

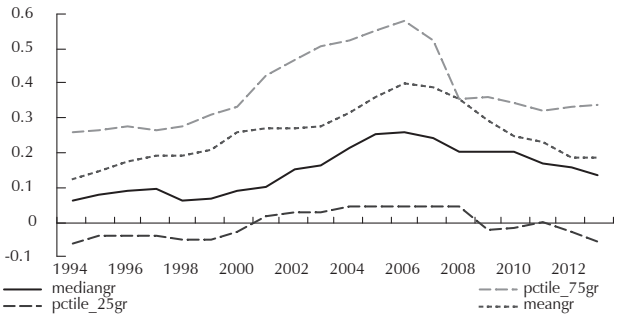
A. Overall, 1994-2013



B. Advanced Economies, 1980-2013



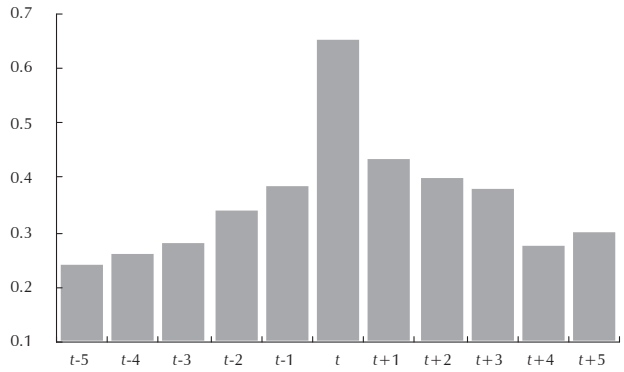
C. Emerging Market Economies, 1994-2013



Note: Figure displays the time profile of the TVC coefficient estimates for the entire sample, and two income groups, Advanced and Emerging Market Economies. A) includes 18 countries with at least 34 observations; B) contains 61 countries with at least 20 observations; C) contains 25 countries with at least 20 observations; D) contains 36 countries with at least 20 observations.

Source: Authors' calculations.

Figure 4
Fiscal counter-cyclicality during financial crises



Note: Figure displays the average value of the TVC coefficient estimates from 5 years prior to the beginning of a given financial crises ("t") to five years after it began. In each of the three panels averages were computed over a balanced sample.
Source: Authors' calculations.

3. Determinants of Fiscal Stabilization

3.1 Empirical Methodology

This section tests the importance of various macroeconomic and political factors in affecting the degree of fiscal stabilization. For this purpose, the following regression is estimated on a balanced sample of 61 countries for which we have estimates of fiscal counter-cyclicality for at least 20 years:

$$\beta_{it} = \delta_i + \gamma_t + \theta' X_{it} + \in_{it} \quad (4)$$

Where δi are country-fixed effects to capture unobserved heterogeneity across countries, and time-unvarying factors such as geographical variables which may affect the degree of fiscal counter-cyclicality (Afonso et al. 2010); γ_t are time-fixed effects to control for global shocks; and $\boldsymbol{X}_{it}$ is a vector of time-varying macroeconomic and political variables:[7]

Macroeconomic variables:

- *Real GDP per capita*: it is expected that fiscal counter-cyclicality is higher in more developed countries, as those tend to be also characterized by a better quality of institutions (Talvi and Vegh 2005).
- *Financial development* —proxied by the credit— to-GDP ratio: a higher level of financial development positively influences the ability of the government to borrow during downturns, and therefore it is expected to increase fiscal counter-cyclicality (Aghion and Marinescu 2008).
- *Trade openness*—proxied by ratio of total exports and imports in GDP: more open economies tends to be more exposed to external shocks and therefore may use more actively fiscal policies in order to provide stabilization (Rodrik 1998; Lane 2003).
- *Capital account openness*—proxied by the Chinn-Ito index of capital account openness: foreign capital to is likely to flow in (out) during expansions (recessions), therefore increasing the cost of financing countercyclical fiscal policies (Aghion and Marinescu 2008).
- *Government size*—proxied by government expenditure-to-GDP ratio: as discussed in Fatas and Mihov, (2013) and Debrun and Kapoor (2011), government size can be considered as a proxy of fiscal counter-cyclicality under the assumption of unitary elasticity of taxes to GDP. Therefore, it is expected that fiscal counter-cyclicality tends to be a positive function of the size of the government.
- *Financial crises*—based on the Leaven and Valencia (2010) dataset: the effect of financial crises on fiscal counter-cyclicality is ambiguous a priori. On the one hand, governments would be willing to run expansionary fiscal policies to offset the contractionary effects of the crises. On the other hand, the cost of financing countercyclical fiscal policies may increase during crises, particularly in countries with high debt levels.

Political variables:

- *Constraints on the executive*: the main variables used are those proposed by Acemoglu et al. (2013) and Fatas and Mihov (2013). The first (*constraints*) captures potential veto points on the decisions of the executive. The second (*polconv*) captures not only institutional characteristics in the country but also political outcomes as its value is adjusted when, for example, the president and the legislature are member of the same party. In addition, we use dummies for the presence of expenditure, taxes and debt rules. As documented by Fatas and Mihov (2013), constraints on the executive are likely to reduce spending volatility and positively influence fiscal stabilization.
- *Elections*—based on dummies for the occurrence of executive and legislative elections: during elections politicians may be tempted to change spending and taxes for electoral reasons and not necessarily for macroeconomic stabilization purposes (Drazen 2000; Persson and Tabellini 2000).
- *Other political variables*: margin of majority, proportional representations and parliamentary regimes.

Since the dependent variable in equation (4) is based on estimates, the regression residuals can be thought of as

7 See the Appendix for sources, definitions and descriptive statistics of these variables.

having two components. The first component is sampling error (the difference between the true value of the dependent variable and its estimated value). The second component is the random shock that would have been obtained even if the dependent variable was observed directly as opposed to estimated. This would lead to an increase in the standard deviation of the estimates, which would lower the *t*-statistics. This means that any correction to the presence of this un-measurable error term will increase the significance of our estimates. To address this issue, equation is estimated using Weighted Least Squares (WLS). Specifically, the WLS estimator assumes that the errors ϵ_{it} in equation (1) are distributed as $\in_{it} \sim N(0, \sigma^2/s_i)$, where *sit* are the estimated standard deviations of the fiscal counter-cyclicality coefficient for each country *i*, and σ^2 is an unknown parameter that is estimated in the second-stage regression. Finally, in order to reduce reverse causality, all the macroeconomic variables enter the specification with one lag.[8]

3.2 Results

Table 1 presents the results obtained by estimating equation (4) using different econometric specifications. The coefficients associated with the various determinants typically exhibit the expected sign and confirm the conjectures discussed above.

Starting with the set of macroeconomic variables, we find that fiscal counter-cyclicality is robustly and positively associated with the level of financial development, with an increase of 10 percentage points in the credit-to-GDP ratio increasing the degree of fiscal counter-cyclicality by about 0.2-0.3 (i.e. by about ¾ -1 standard deviation). We also find that more developed and open to trade economies tend to have a larger degree of fiscal counter-cyclicality. Similarly, countries with larger government are also able to provide more stabilization, even though the magnitude is not economically significant: an increase of 10 percentage points in the government expenditure-to-GDP ratio increases fiscal counter-cyclicality only by about 0.05. Finally, we find that fiscal counter-cyclicality does not increase during financial crises once other macroeconomic variables are controlled for.[9]

Looking at the political variables, we find that constraints on the executive (*constraint* and *polconv*) are robustly and significantly associated with fiscal countercyclicality. The results are consistent with the evidence provided in Fatas and Mihov (2013) and Lane (2003), who find that more constraints on the executive tend to reduce government spending volatility and positively influence overall fiscal stabilization. In contrast, all the other political variables, as well as dummies for fiscal rules, are not statistically significant.

At the same time, some of these covariates tend to have different effects across country groups (Table 2 and 3). For example, while trade and capital account openness are negatively correlated with fiscal counter-cyclicality in advanced economies (as found by Aghion and Marinescu 20008), they are positively associated with fiscal counter-cyclicality in emerging market economies. Similarly, government size tends to have larger effect in advanced than in merging market economies, while the opposite is true for financial development.

As a robustness check, we replicated the results for the full specification by alternatively excluding country and/or time fixed effects. The results reported in Table 4 confirm the statistical significance of the macroeconomic variables. In addition, while constraints on the executive remain statistically significant across all specifications, we also find that some of the political variables that were not significant before in the baseline regression now become significant when country- and/or time-fixed effects are omitted. In particular, both proportional representation and expenditure rules turn out to be negatively and statistically significantly associated with fiscal counter-cyclicality across the various specifications II-IV.

4. Effects of Fiscal Stabilization

4.1 Empirical Methodology

This section examines the effect of fiscal counter-cyclicalityon output voliatility. For this purpose, the following regression is estimated based on a balanced sample of 61 countries for which we have estimates of fiscal counter-cyclicalityfor at least 20 years:

$$S_{it} = \delta_i + \gamma_t + \vartheta\beta_{it} + \pi' Z_{it} + \in_{it} \quad (5)$$

where β_{it} is the measure of fiscal counter-cyclicality estimated in the previous section for country *i* at time *t*; δ_i are country-fixed effects to capture unobserved heterogeneity across countries, and time-unvarying factors such a geographical variables which may affect the degree of fiscal counter-cyclicality and output volatility; γ_t are time-fixed effects to control for global shocks.[10] S_{it} denotes output volatility—measured by the absolute value of output gap— in country *i* at time *t*. The reason we use as baseline the absolute deviation of output gap is that this measures is available at yearly frequency and therefore allows to maximize the number of observations in our

8 Similar results are obtained using contemporaneous regressors (Table A4).

9 The results, not reported here but available upon request, suggest that fiscal counter-cyclicality increases during banking crises but declines during currency and sovereign debt crises.

10 Data for output gap are taken from the IMF WEO. Since this measure is sensitive to variations in potential growth, we check the robustness of our results to alternative measure in the next subsection.

Table 1
The determinants of fiscal counter-cyclicality

	(I)	(II)	(III)	(IV)	(V)	(VI)
Credit to GDP (*t*–1)	0.0285***	0.0299***	0.0285***	0.0265***	0.0266***	0.0292***
	(4.9883)	(5.1180)	(4.9283)	(4.4760)	(4.4589)	(4.8660)
GDP per capita (*t*–1)	0.1840***	0.1767***	0.1737***	0.1888***	0.1762***	0.1644***
	(4.2328)	(3.9331)	(3.9594)	(4.3247)	(3.9893)	(3.7060)
Trade openness (*t*–1)	0.1213***	0.1129***	0.1125***	0.1254***	0.1162***	0.1187***
	(3.0063)	(2.6907)	(2.7799)	(3.0938)	(2.8550)	(2.9143)
Capital account openness (*t*–1)	0.0053	0.0073	0.0041	0.0066	0.0051	0.0058
	(1.0222)	(1.3561)	(0.7872)	(1.2497)	(0.9457)	(1.0723)
Government expenditure to GDP (*t*–1)	0.0053**	0.0052**	0.0050**	0.0050*	0.0048*	0.0052**
	(2.1380)	(2.0481)	(2.0207)	(1.9616)	(1.8940)	(2.0116)
Executive constraints			0.0245***		0.0233***	
			(3.3180)		(3.1308)	
Parliamentary regime			-0.0519		-0.0513	-0.0346
			(-1.5517)		(-1.5271)	(-1.0641)
Presidential election held			-0.0021		-0.0022	0.0024
			(-0.1543)		(-0.1573)	(0.1758)
Legislative election held			-0.0010		-0.0014	-0.0017
			(-0.1236)		(-0.1688)	(-0.2050)
Proportional representation			-0.0294		-0.0302	-0.0371
			(-1.0670)		(-1.0866)	(-1.3236)
Margin of majority			-0.0474*		-0.0477*	-0.0417
			(-1.6138)		(-1.6030)	(-1.3683)
Financial crises		0.0109				
		(0.6442)				
Expenditure rule				-0.0154	-0.0174	-0.0184
				(-0.9860)	(-1.1041)	(-1.1646)
Revenue rule				0.0338	0.0257	0.0298
				(1.5973)	(1.2106)	(1.4063)
Debt rule				-0.0206	-0.0153	-0.0103
				(-1.3218)	(-0.9796)	(-0.6526)
Political constraints						0.1060***
						(2.5962)
Country f. e.	Yes	Yes	Yes	Yes	Yes	Yes
Time f. e.	Yes	Yes	Yes	Yes	Yes	Yes
N	929	929	929	929	929	929
R^2	0.7372	0.7353	0.7422	0.7385	0.7431	0.7421

Note: Results obtained by estimating equation (4). t-statistics in parentheses based on clustered robust standard errors. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.

sample. To check the robustness of the results, we look at alternative measures typically used in the literature such as the standard deviation of the output gap or GDP growth. However, a problem with these measures in specification at yearly frequency is that they yield errors that are serially correlated within countries. We mitigate this concern when we consider 5-year non-overlapping panels.

In order to reduce endogeneity due to omitted variables that may simultaneously affect output volatility and fiscal stabilization, we include in the specification a set of control variables ($\boldsymbol{Z}_{it}$) that have been found in the literature and in the previous section to be relevant: (i) trade openness; (ii) capital account openness; (iii) credit-to-GDP ratio; (iv) GDP per capita; (v) GDP growth; (vi) population; and (vii) government size. Moreover, all the macroeconomic variables enter the specification with one lag to minimize reverse causality. Equation (5) is estimated by Ordinary Least Squares (OLS) with robust clustered standard errors.

4.2 Results

We start with a parsimonious specification of equation (5), using only country- and time-fixed effects as control variables. The results reported in Column I of Table 5 suggest that fiscal counter-cyclicality reduces output

Table 2
The determinants of fiscal stabilization – Advanced Economies

	(I)	(II)	(III)	(IV)	(V)	(VI)
Credit to GDP (*t*–1)	-0.0005	0.0014	-0.0026	-0.0007	-0.0042	-0.0042
	(-0.1092)	(0.2820)	(-0.4741)	(-0.1360)	(-0.7235)	(-0.7131)
GDP per capita (*t*–1)	0.1733***	0.2092***	0.1670***	0.1708***	0.1688***	0.1828***
	(7.2038)	(8.3246)	(6.4987)	(7.1167)	(6.5941)	(7.1486)
Trade openness (*t*–1)	-0.0181	-0.0429**	-0.0256	-0.0066	-0.0147	-0.0127
	(-0.9324)	(-2.0215)	(-1.3275)	(-0.3315)	(-0.7494)	(-0.6383)
Capital account openness (*t*–1)	-0.0056**	-0.0064***	-0.0055**	-0.0039*	-0.0037	-0.0046*
	(-2.5433)	(-2.8009)	(-2.4573)	(-1.7445)	(-1.5903)	(-1.9574)
Government expenditure to GDP (*t*–1)	0.0094***	0.0087***	0.0092***	0.0094***	0.0092***	0.0093***
	(8.5337)	(7.3593)	(8.3093)	(8.3785)	(8.2363)	(8.1716)
Executive constraints			-0.0305***		-0.0305***	
			(-3.3319)		(-3.3420)	
Parliamentary regime			0.0627***		0.0658***	0.0320**
			(3.6648)		(3.8644)	(2.3187)
Presidential election held			0.0045		0.0045	0.0050
			(0.6376)		(0.6416)	(0.7023)
Legislative election held			-0.0001		-0.0001	0.0002
			(-0.0492)		(-0.0251)	(0.0739)
Proportional representation			-0.0159		-0.0088	-0.0078
			(-1.0851)		(-0.5932)	(-0.5216)
Margin of majority			0.0024		0.0013	0.0066
			(0.1387)		(0.0760)	(0.3786)
Financial crises		-0.0017				
		(-0.1792)				
Expenditure rule				-0.0027	-0.0025	-0.0030
				(-0.5268)	(-0.4993)	(-0.5890)
Revenue rule				0.0175***	0.0179***	0.0177***
				(2.7916)	(2.8712)	(2.8037)
Debt rule				-0.0082	-0.0071	-0.0079
				(-1.3577)	(-1.1862)	(-1.2872)
Political constraints						-0.0155
						(-0.6580)
Country f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Time f.e.	Yes	Yes	Yes	Yes	Yes	Yes
N	489	489	489	489	489	489
R^2	0.9618	0.9637	0.9633	0.9626	0.9641	0.9632

Note: Results obtained by estimating equation (4). t-statistics in parentheses based on clustered robust standard errors. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.

volatility. In particular, results suggest that an increase of 0.5 in our measure of fiscal counter-cyclicality (about 2 standard deviations) reduces output volatility by about ½ percentage point. In order to limit reverse causality, we re-estimate this specification using the lag of fiscal counter-cyclicality. The results reported in Column II of Table 5 are similar and not statistically significantly different. Results are robust when the controls variables discussed above are included in the specification (Columns III-VI of Table 5), with that the effect of fiscal counter-cyclicality actually increasing, even though differences with respect to baseline estimates are not statistically significant. Among the control variables, we find that credit-to-GDP is positively associated with output volatility; while larger countries tend to be characterized by lower output volatility (this result is consistent with Furceri and Karras 2007). Interestingly, some of the variables such as trade openness, GDP per capita and government size—which are typically found to be associated with output volatility in cross-countries studies (for example, Fatas and Mihov 2001; Debrun and Kapoor 2011)—are not statistically significant in our case. The reason for this relates with the inclusion of country-fixed effects which purge most of their variability. Indeed, they turn out to be significant when equation (5) is re-estimated by excluding country fixed effects (Columns II-III of Table 6).

Table 3
The determinants of fiscal stabilization – Non-Advanced Economies

	(I)	(II)	(III)	(IV)	(V)	(VI)
Credit to GDP (*t*–1)	0.0360**	0.0685***	0.0473***	0.0312**	0.0409***	0.0429***
	(2.5746)	(3.3551)	(3.2317)	(2.1890)	(2.7610)	(2.8707)
GDP per capita (*t*–1)	0.2653***	0.2824**	0.1695*	0.2787***	0.1869**	0.1786**
	(3.2172)	(2.2006)	(1.9474)	(3.3556)	(2.1540)	(2.0493)
Trade openness (*t*–1)	0.1286	0.0519	0.1328*	0.0322	0.0033	0.0057
	(1.5631)	(0.4057)	(1.6058)	(0.3533)	(0.0360)	(0.0626)
Capital account openness (*t*–1)	0.0234**	0.0096	0.0206*	0.0250**	0.0193	0.0182
	(2.0775)	(0.5478)	(1.7563)	(2.0737)	(1.5644)	(1.4795)
Government expenditure to GDP (*t*–1)	0.0045	0.0047	0.0015	0.0067	0.0047	0.0050
	(0.9025)	(0.6679)	(0.2874)	(1.2387)	(0.8090)	(0.8599)
Executive constraints			0.0139		0.0129	
			(1.1589)		(1.0089)	
Parliamentary regime			-0.0861		-0.1190	-0.1083
			(-0.7948)		(-1.1016)	(-1.0238)
Presidential election held			0.0029		0.0104	0.0159
			(0.1076)		(0.3856)	(0.5850)
Legislative election held			-0.0034		-0.0073	-0.0085
			(-0.1512)		(-0.3269)	(-0.3769)
Proportional representation			-0.0463		-0.0777	-0.0860*
			(-0.9200)		(-1.5269)	(-1.6755)
Margin of majority			-0.2034***		-0.2294***	-0.2164***
			(-3.4749)		(-3.8235)	(-3.4867)
Financial crises		0.0124				
		(0.2523)				
Expenditure rule				-0.0942*	-0.1453**	-0.1330*
				(-1.6229)	(-2.1656)	(-1.9436)
Revenue rule				0.0052	0.0309	0.0551
				(0.0502)	(0.2761)	(0.5217)
Debt rule				-0.1019*	-0.1358**	-0.1270**
				(-1.8818)	(-2.4172)	(-2.2287)
Political constraints						0.0965
						(1.2578)
Country f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Time f.e.	Yes	Yes	Yes	Yes	Yes	Yes
N	388	388	388	388	388	388
R^2	0.6214	0.5934	0.6395	0.6282	0.6505	0.6511

Note: Results obtained by estimating equation (4). *t*-statistics in parentheses based on clustered robust standard errors. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.

To account for the possibility that the relation between fiscal counter-cyclicality and output volatility has changed over time, we extend equation (5) by interacting the measure of fiscal counter-cyclicality with dummies for pre- and post-2000s, respectively:

$$S_{it} = \delta_i + \gamma_t + \vartheta^1 D^{post\text{–}2000s}\beta_{it} + \vartheta^2 D^{pre\text{–}2000s}\beta_{it} + \pi' Z_{it} + \in_{it} \qquad (6)$$

The results obtained estimating equation (6) indeed suggests that the effect of fiscal counter-cyclicality on output volatility has increased over time (Column I, Table 7). Moreover, looking at the effect in the pre- and post-2000s periods and between advanced and emerging market economies, it seems that most of the increasing effect of fiscal counter-cyclicality on output volatility stems from the increase in fiscal counter-cyclicality in emerging market economies in the 2000s (Column II, Table 7). These results are consistent with the increase in the fiscal counter-cyclicality coefficient observed in many countries, particularly in emerging markets since the 2000s (Figure 1).[11]

11 Similar results are obtained if we split the time sample in two equal periods.

Table 4
Determinants of Fiscal counter-cyclicality, alternative specifications

	(I)	(II)	(III)	(IV)
Credit to GDP (*t*–1)	0.0266***	0.0103***	0.0070	0.0167***
	(4.4589)	(2.7439)	(1.5137)	(3.2251)
GDP per capita (*t*–1)	0.1762***	0.0228***	0.0260***	0.0954***
	(3.9893)	(4.3173)	(4.3644)	(2.8242)
Trade openness (*t*–1)	0.1162***	0.1027***	0.0944***	0.0899**
	(2.8550)	(7.2485)	(6.2870)	(2.4565)
Capital account openness (*t*–1)	0.0051	0.0014	0.0031	0.0005
	(0.9457)	(0.2654)	(0.5460)	(0.0982)
Government expenditure to GDP (*t*–1)	0.0048*	0.0052***	0.0046***	0.0036
	(1.8940)	(3.8320)	(3.1396)	(1.4908)
Executive Constraints	0.0233***	0.0236***	0.0202***	0.0265***
	(3.1308)	(3.7227)	(3.1041)	(3.6316)
Parliamentary regime	-0.0513	0.0388*	0.0512**	-0.0526
	(-1.5271)	(1.8966)	(2.1614)	(-1.5891)
Presidential election held	-0.0022	0.0000	0.0042	-0.0029
	(-0.1573)	(0.0002)	(0.1975)	(-0.2178)
Legislative election held	-0.0014	-0.0090	-0.0103	-0.0010
	(-0.1688)	(-0.7358)	(-0.8055)	(-0.1294)
Proportional representation	-0.0302	-0.0803***	-0.0831***	-0.0452*
	(-1.0866)	(-5.8236)	(-5.8118)	(-1.6835)
Margin of majority	-0.0477*	-0.1220***	-0.1508***	-0.0384
	(-1.6030)	(-3.2449)	(-3.8349)	(-1.3625)
Expenditure rule	-0.0174	-0.0679***	-0.0702***	-0.0310**
	(-1.1041)	(-3.5348)	(-3.5085)	(-2.0425)
Revenue rule	0.0257	0.1145***	0.1140***	0.0234
	(1.2106)	(4.7537)	(4.6558)	(1.1159)
Debt rule	-0.0153	-0.0105	-0.0079	-0.0350**
	(-0.9796)	(-0.7400)	(-0.4733)	(-2.5525)
Country f. e.	Yes	No	No	Yes
Time f. e.	Yes	No	Yes	No
N	929	929	929	929
R^2	0.7431	0.3196	0.3318	0.7331

Note: Results obtained by estimating equation (4). *t*-statistics in parentheses based on clustered robust standard errors. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.

Table 5
The effect of fiscal counter-cyclicality on output volatility

	(I)	(II)	(III)	(IV)	(V)	(VI)
Fiscal counter-cyclicality(*t*)	-1.117 *** (-2.88)		-1.481 *** (-2.85)		-1.383 ** (-2.47)	
Fiscal counter-cyclicality (*t*–1)		-1.421 *** (-3.51)		-1.814 *** (-3.29)		-1.665 *** (-2.89)
Trade openness (*t*–1)			-0.010* (-1.73)	-0.012* (-1.82)	-0.010 (-1.50)	-0.011 (-1.58)
Capital account openness (*t*–1)			0.074 (0.76)	0.075 (0.77)	0.113 (1.01)	0.119 (1.07)
Credit to GDP (*t*–1)			0.009** (2.65)	0.009** (2.65)	0.007* (1.84)	0.007** (1.82)
GDP per capita (*t*–1)			-0.335 (-0.72)	-0.385 (-0.81)	0.284 (0.37)	0.254 (0.33)
GDP growth (*t*–1)					-0.005 (-0.11)	-0.007 (-0.17)
Log population (*t*–1)					-4.636 ** (-2.11)	-4.573 ** (-2.08)
Government expenditure to GDP (*t*–1)					0.033* (1.67)	0.032 (1.66)
Country f. e.	Yes	Yes	Yes	Yes	Yes	Yes
Time f. e.	Yes	Yes	Yes	Yes	Yes	Yes
N	1039	1023	823	811	689	689
R^2	0.32	0.33	0.36	0.35	0.39	0.39

Note: Output volatility measured as the absolute value of the output gap. Results obtained by estimating equation (5). *t*-statistics in parentheses based on clustered robust standard errors. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.

Robustness checks

To check the robustness of our results we re-estimated equation (5) using alternative measures of output volatility: (i) the standard deviation of the output gap computed over a five-year rolling window; (ii) the standard deviation of GDP growth computed on a five-year rolling window.[12] The results presented in Columns I-III of Table 5, confirm that the fiscal counter-cyclicality reduces output volatility. In addition, the results are also robust when we estimate equation (5) on a five-year panel dataset using standard deviations computed on non-overlapping five-year windows.

12 The use of the standard deviation computed on a five-year rolling window in the yearly dataset yields errors that are serially correlated within countries, we control for this possible bias by clustering the errors at the country level.

Table 6
The effect of fiscal counter-cyclicality on output volatility, alternative specifications

	(I)	(II)	(III)
Fiscal counter-cyclicality(*t*)	-1.383** (-2.47)	-1.204*** (-3.91)	-1.062*** (-3.42)
Trade openness (*t*–1)	-0.010 (-1.50)	0.003** (2.48)	0.003** (2.44)
Capital account openness (*t*–1)	0.113 (1.01)	0.031 (0.45)	-0.027 (-0.46)
Credit to GDP (*t*–1)	0.007* (1.84)	0.001 (0.33)	0.002 (1.02)
GDP per capita (*t*–1)	0.284 (0.37)	-0.114*** (-2.86)	-0.107*** (-2.74)
GDP growth (*t*–1)	-0.005 (-0.11)	-0.035 (-0.96)	-0.027 (-0.97)
Log population (*t*–1)	-4.636** (-2.11)	0.009 (0.16)	0.013 (0.24)
Government expenditure to GDP (*t*–1)	0.033* (1.67)	-0.017** (2.42)	-0.013** (1.96)
Country f. e.	Yes	No	No
Time f. e.	Yes	Yes	No
N	689	689	689
R^2	0.39	0.17	0.06

Note: Output volatility measured as the absolute value of the output gap. Results obtained by estimating equation (5). *t*-statistics in parentheses based on clustered robust standard errors. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.

Given that out measure of fiscal counter-cyclicality is based on estimates, we further check the robustness of our results by estimating equation (5) with WLS, giving more weights to observations for which the degree of fiscal counter-cyclicality is estimated more precisely. This procedure yields a larger effect of fiscal counter-cyclicality on output volatility (Column II, Table 8). In particular, an increase of 0.5 (about 1 standard deviation) reduces output volatility by about 1 percentage point.

A concern estimating equation (5) using OLS is that the results may be subject to reverse causality since governments concerned with output volatility could arguably adjust their fiscal behaviors to provide more stabilization. While in principle this issue is likely to not be relevant in our case, as our measure of fiscal counter-cyclicality depends on the past, we check the robustness of our results using an IV approach. Following Fatas and Mihov (2001, 2013), we select instruments capturing institutional and political characteristics of the countries likely to be correlated to our measure of fiscal counter-cyclicality but presumably not directly related to output volatility. Based on the results presented in

Table 7
The effect of fiscal counter-cyclicality on output volatility, across time and country samples

	(I)	(II)
Fiscal counter-cyclicality(*t*)* Post 2000	-2.275*** (-3.58)	
Fiscal counter-cyclicality(*t*)* Pre 2000	-0.633 (-1.14)	
Fiscal counter-cyclicality(*t*)* Post 2000*Advanced Economies		-4.231*** (-2.57)
Fiscal counter-cyclicality(*t*)* Pre 2000*Advanced Economies		-2.669* (-1.72)
Fiscal counter-cyclicality(*t*)* Post 2000*Emerging Market Economies		-1.924*** (-3.09)
Fiscal counter-cyclicality(*t*)* Pre 2000* Emerging Market Economies		0.402 (0.51)
Country f. e.	Yes	Yes
Time f. e.	Yes	Yes
N	689	689
R^2	0.39	0.39

Note: Measure I= absolute value of the output gap; Measure II= standard deviation of the output gap on a five-year window; Measure III= standard deviation of GDP growth on a five-year window. Results obtained by estimating equation (6). t-statistics in parentheses based on clustered robust standard errors. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.

Table 8
The effect of fiscal counter-cyclicality on output volatility, alternative measures and data frequency

	Annual			5-year average		
	(I)	(II)	(III)	(IV)	(V)	(VI)
Fiscal counter-cyclicality(t)	-1.383 ** (-2.47)	-0.708 *** (-2.03)	-0.006 ** (-2.01)	-1.284 ** (-2.06)	-1.305 *** (-2.06)	-0.017 ** (-2.07)
Country f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Time f.e.	Yes	Yes	Yes	Yes	Yes	Yes
N	689	669	686	284	266	279
R^2	0.39	0.60	0.57	0.49	0.56	0.54

Note: Measure I= absolute value of the output gap; Measure II= standard deviation of the output gap on a five-year window; Measure III= standard deviation of GDP growth on a five-year window. Results obtained by estimating equation (5). t-statistics in parentheses based on clustered robust standard errors. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.

the previous section, we alternatively use the constraints on the executive variables (*constraint* and *polconv*) as instruments. Another instrument considered is the lags of fiscal stabilization. The results reported in Column III-IV of Table 9 confirms that fiscal counter-cyclicality reduces output volatility, with the effect being slightly higher (although not statistically different) than the one obtained with OLS. In addition, the Kleibergen-Paap test confirms the validity of the instruments.

Table 9
The effect of fiscal counter-cyclicality on output volatility, alternative estimators

	(I) OLS	(II) WLS	(III) IV1	(IV) IV2
Fiscal counter-cyclicality(t)	-1.383** (-2.47)	-2.533*** (-2.93)	-1.731*** (-2.66)	-1.922*** (-2.88)
Country f. e.	Yes	Yes	Yes	Yes
Time f. e.	Yes	Yes	Yes	Yes
Kleibergen-Paap p-value			0.00	0.00
N	689	689	670	675
R^2	0.39	0.36	0.37	0.42

Note: Output volatility measured as the absolute value of the output gap. Results obtained by estimating equation (5). IV1= lagged fiscal counter-cyclicality and political constraints as instruments; IV2= lagged fiscal counter-cyclicality and polconv as instruments t-statistics in parentheses based on clustered robust standard errors. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.

5. Conclusion and Policy Considerations

Several years after the Global Financial Crisis growth in many advanced and emerging market economies remains well below precrisis rates. Medium-term growth expectations have been steadily revised downward since 2011, highlighting uncertainties surrounding medium-term growth prospects (IMF, 2015). At the same time, public debt-to-GDP ratios have increased in many advanced and emerging market economies, reaching historical high levels in some of them. Against this background, how can fiscal policy contribute to higher medium-term growth?

Fiscal policy can influence medium-term growth through its support to macroeconomic stability. Using time-varying estimates of fiscal counter-cyclicality the paper find that fiscal policy by acting counter-cyclically can significantly reduce output volatility. In particular, our results suggest that an increase of 0.5 in the coefficient of fiscal counter-cyclicality (about 2 standard deviations) reduces output volatility by about ½-1½ percentage points. Back-to-the-envelope calculations—based on Ramey and Ramey (1995) estimates—suggests that an increase of 0.5 in the coefficient of fiscal counter-cyclicality increases medium-term growth by about ¼-½ percentage point.

A key question is then how can fiscal counter-cyclicality be improved, particularly in countries with high debt-to-GDP levels? While a large body of the literature has typically found that government size is the main determinant of fiscal stabilization, the results presented in this paper suggest that other macroeconomic policies and political characteristics can affect fiscal counter-cyclicality for a given government size. In particular, our results suggest that in addition to political constraints, policies aimed at fostering financial deepening, the level of economic institutions (proxied by GDP per capita) and trade openness can significantly increase the stabilization role of fiscal policy.

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Appendix

Table A1
Tests for autocorrelation and normality of the error terms of equation (2)

	Autocorrelation	Normality
Wooldridge test for autocorrelation (F-test)	1.489 (0.22)	
Joint Normality test based on Skewness and Kurtosis (Chi square-test)		2.40 (0.30)

Note: p-values in parenthesis.
Source: Authors' calculations.

Table A2
Variables, definitions and sources

Variables	Definition	Source
Credit to GDP	Domestic credit to private sector refers to financial resources provided to the private sector by financial institutions (in percent of GDP)	World Bank, World Development Indicators
GDP per capita	Real gross domestic product divided by population	World Bank, World Development Indicators
Trade openness	Exports plus imports over GDP	IMF, International Financial Statistics

Table A2
Variables, definitions and sources (continued)

Variables	Definition	Source
Capital account openness	KAOPEN is an index measuring a country's degree of capital account openness	Chinn-Ito Index of Financial Openness
Government expenditure to GDP	Total government expenditure to GDP ratio	IMF, International Financial Statistics
Executive constraints	This variable refers to the extent of institutionalized constraints on the decision-making powers of chief executives, whether individuals or collectivities.	Polity IV Project
Parliamentary regime	Parliamentary, Assembly-elected President, or Presidential.	Polity IV Project
Presidential election held	Takes value 1 if there was an executive election in this year.	Polity IV Project
Legislative election held	Takes value 1 if there was a legislative election in this year	Polity IV Project
Proportional representation	Takes value 1 if candidates are elected based on the percent of votes received by their party and/or if our sources specifically call the system "proportional representation". "0" otherwise.	Polity IV Project
Margin of majority	This is the fraction of seats held by the government.	Polity IV Project
Financial crises	Dummy variable taking value 1 when a banking or currency or debt crisis occurs.	Laeven and Valencia (2010)
Expenditure rule	Takes the value 1 when an expenditure rule is in place	IMF Fiscal Rules Dataset http://www.imf.org/external/datamapper/FiscalRules/map/map.htm
Revenue rule	Takes the value 1 when a revenue-based rule is in place	IMF Fiscal Rules Dataset http://www.imf.org/external/datamapper/FiscalRules/map/map.htm
Debt rule	Takes the value 1 when a debt rule is in place	IMF Fiscal Rules Dataset http://www.imf.org/external/datamapper/FiscalRules/map/map.htm
Political constraints	POLCON index takes into account the number of veto points faced by the executive power, as well as the distribution of political preferences across different branches of government.	Political Constraint Dataset, Henisz (2000)
Population	Total population	World Bank, World Development Indicators

Source: Authors' calculations.

Table A3
Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Fiscal counter-cyclicality	1156	0.240	0.275	-0.929	1.481
Credit to GDP	1229	12.147	2.942	-2.364	20.903
GDP per capita	1335	10.818	2.028	6.415	16.130
Trade openness	1172	0.741	0.512	0.101	4.380
Capital account openness	1181	0.652	1.539	-1.855	2.455
Government expenditure to GDP	1335	16.207	5.664	3.814	43.813
Executive constraints	1295	5.851	1.812	1	7
Political Constraints	1330	0.594	0.264	0	0.894
Parliamentary regime	1335	0.638	0.481	0	1
Presidential election held	1335	0.081	0.274	0	1
Legislative election held	1335	0.251	0.434	0	1
Proportional representation	1335	0.728	0.445	0	1

Table A3
Descriptive Statistics (continued)

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Margin of majority	1335	0.616	0.168	0.117	1
Financial crises	1210	0.052	0.234	0	1
Expenditure rule	1335	0.127	0.333	0	1
Revenue rule	1335	0.059	0.237	0	1
Debt rule	1335	0.265	0.441	0	1
Population	1276	49.802	158.049	0.218	1241.492

Source: Authors' calculations.

Table A4
The determinants of fiscal stabilization – Contemporaneous regressors

	(I)	(II)	(III)	(IV)	(V)	(VI)
Credit to GDP	0.0395***	0.0586***	0.0391***	0.0378***	0.0375***	0.0414***
	(6.2159)	(7.4011)	(6.0887)	(5.7471)	(5.6629)	(6.2399)
GDP per capita	0.1428***	0.1536**	0.1344***	0.1484***	0.1367***	0.1221**
	(2.9353)	(2.5441)	(2.7395)	(3.0267)	(2.7595)	(2.4559)
Trade openness	0.0592	0.0134	0.0550	0.0590	0.0555	0.0515
	(1.4028)	(0.2636)	(1.2951)	(1.3872)	(1.2897)	(1.1912)
Capital account openness	0.0095*	0.0053	0.0077	0.0111*	0.0086	0.0091
	(1.7161)	(0.8320)	(1.3693)	(1.9394)	(1.4701)	(1.5666)
Government expenditure to GDP	0.0026	0.0007	0.0028	0.0021	0.0025	0.0027
	(1.0044)	(0.2249)	(1.0644)	(0.7811)	(0.9254)	(0.9633)
Executive constraints			0.0287***		0.0280***	
			(3.6553)		(3.5338)	
Parliamentary regime			-0.0791**		-0.0798**	-0.0609*
			(-2.1370)		(-2.1432)	(-1.6839)
Presidential election held			-0.0052		-0.0053	0.0014
			(-0.3551)		(-0.3615)	(0.0931)
Legislative election held			-0.0039		-0.0043	-0.0047
			(-0.4528)		(-0.5031)	(-0.5400)
Proportional representation			-0.0447*		-0.0468*	-0.0584**
			(-1.6106)		(-1.6658)	(-2.0456)
Margin of majority			-0.0780**		-0.0782**	-0.0702**
			(-2.4691)		(-2.4345)	(-2.1378)
Financial crises		0.0309				
		(1.4313)				
Expenditure rule				-0.0084	-0.0141	-0.0146
				(-0.5243)	(-0.8552)	(-0.8832)
Revenue rule				0.0227	0.0145	0.0183
				(1.0291)	(0.6542)	(0.8278)
Debt rule				-0.0174	-0.0104	-0.0033
				(-1.0704)	(-0.6348)	(-0.1958)
Political constraints						0.1257***
						(3.0148)
Country f. e.	Yes	Yes	Yes	Yes	Yes	Yes
Time f. e.	Yes	Yes	Yes	Yes	Yes	Yes
N	929	929	929	929	929	929
R^2	0.7317	0.7352	0.7400	0.7324	0.7405	0.7394

Note: Results obtained by estimating equation (4). In parentheses are robust standard errors clustered at the country level. ***, **, * denote significance at 1,5,10 percent level, respectively.
Source: Authors' calculations.