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Revisiting the Countercyclicality of Fiscal Policy

João Tovar Jalles, Youssouf Kiendrebeogo, W. Raphael Lam, and Roberto Piazza

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Abstract: This paper provides a novel dataset of time-varying measures on the degree of countercyclicality of fiscal policies for advanced and developing economies between 1980 and 2021. The use of time-varying measures of fiscal stabilization, with special attention to potential endogenity issues, overcomes the major limitation of previous studies and alllows the analysis to account for both country-specific as well as global factors. The paper also examines the key determinants of countercyclicality of fiscal policy with a focus on factors as severe crises, informality, financial development, and governance. Empirical results show that (i) fiscal policy tends to be more counter-cyclical during severe crises than typical recessions, especially for advanced economies; (ii) fiscal counter-cyclicality has increased over time for many economies over the last two decades; (iii) discretionary and automatic countercyclicality are both strong in advanced economies but acyclical (at times procyclical) in low-income countries, (iv) fiscal countercyclicality operates primarily through the expenditure channel, particularly for social benefits, (vi) better financial development, larger government size and stronger institutional quality are associated with larger countercyclical effects of fiscal policy. Our results are robust to various specifications and endogeneity checks.

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WORKING PAPERS

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Contents

I. Introduction

Views on the appropriate fiscal response to adverse events have been reshaped by the experience gained during severe crises. Before the global financial crises, discretionary fiscal responses were deemed too slow or hard to unwind (Blanchard, Dell'Ariccia, and Mauro 2010; Blinder 2016), and automatic stabilizers—built-in mechanism in the budget that raises spending or reduces revenue collection during adverse shocks—were considered sufficient. During the unprecedented global shock of the pandemic, political consensus made it possible to deploy even more rapid, diverse, and novel measures. Fiscal interventions during the global financial crisis shored up private sector balance sheets and stimulated aggregate demand at a time when monetary policy in advanced economies was constrained. These suggest that fiscal policy can be swift and forceful during crises, pointing to a possible greater stabilization role of fiscal policy than in typical recessions.

The experience during recent severe crises have therefore led to a re-assessment of fiscal responses. Policy debate has not only focused on the appropriate size and efficient stabilization mechanism, but also on how to improve the balance between discretionary versus automatic fiscal stabilizers. In the face of increasing constraints on discretionary fiscal policy (from debt sustainability problems, fiscal space limitations, financial market pressures, or the presence of fiscal rules), a reassessment of the balance between discretionary and automatic fiscal stabilization comes timely.

The focus of this paper is the assessment of the degree of fiscal policy counter-cyclicality across time, countries, and crisis episodes and the analysis of its determinants. We say that fiscal is counter-cyclical if the budget balance(-to-GDP ratio) increases when output growth increases and falls when output growth declines. Similarly, looking at the components of the budget balance, we say that government spending (revenue) is more countercyclical if, as a share of GDP, it increases more (less) for any given reduction in GDP growth. Fiscal countercyclicality is an interesting property to study because it is intimately linked to a broader problem, whose full exploration is however beyond the scope of this paper: the ability of fiscal policy to provide macroeconomic stabilization. Fiscal stabilization can work through several different channels. For example, countercyclical "automatic stabilizers" are proactive fiscal tools that automatically smooth economic activity (Baunsgaard and Symansky, 2009; Jalles, 2020).[1] But even passive policies, such as keeping government expenditure fixed in absolute terms independently of the stage of the cycle, are countercyclical by our definition, and can therefore have a stabilizing effect. On the other hand, discretionary fiscal measures can, in some cases, turn out to have a pro-cyclical bias and therefore a destabilizing effect (van den Noord, 2000).

Previous empirical studies recognize the difficulties in providing accurate estimates of fiscal stabilizers, but they also acknowledge the need to have at least approximations of it (Cotis et al., 1997; Auerbach and Feenberg, 2000). This paper tries to answer these questions using a novel empirical strategy and

[1] In other words, by lessening the effects of the liquidity constraints faced by households and alleviating the impact of exogenous shocks to aggregate income on aggregate current consumption and output. Fiscal stabilizers reduce output fluctuations because some components of fiscal accounts react automatically to the cycle, increasing public deficits in recessions and decreasing them in expansions.

estimating time-varying measures of fiscal countercyclicality for an unbalanced panel of advanced and emerging market and developing economies from 1980 to 2021. The use of time-varying measures of fiscal countercyclicality overcomes the major limitation of existing studies assessing the determinants of fiscal stabilization 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) countercyclicality tends to be relatively stronger during severe downturns, especially in advanced economies; (iii) previously estimated countercyclicality coefficients are likely to be lower bounds, (iv) the discretionary and automatic components of the budget balance display countercyclical effects for advanced economies, but are not pinpointed in a statistically significant way for emerging market economies and low-income developing countries, (v) fiscal countercyclicality operates primarily though the expenditure channel, with social security benefits being the most countercyclical component, (vi) financial development, government size and institutional quality matter, particularly for automatic stabilizers.

The remainder of the paper is organized as follows. Section II provides a relevant literature review. Section III presents a conceptual framework and an empirical strategy for estimating the static and time-varying measures of fiscal countercyclicality and analyzing their key determinants. Section IV discusses the main empirical findings and related extensions and results of the robustness checks. The last section concludes.

II. Literature Review

The two major crises of the past decade and a half have led to a re-assessment on the role of fiscal policy in stabilizing output. During the COVID-19 pandemic, fiscal support was swift and impactful. Novel and diverse measures were deployed beyond the automatic stabilizers (IMF 2022, Auerbach et. al. 2022; Bouabdallah et al. 2020). Before the global financial crisis, discretionary fiscal responses were considered too slow or hard to unwind (Blanchard, Dell'Ariccia, and Mauro 2010; Blinder 2016). Automatic stabilizers are often perceived sufficient to deliver timely, targeted, and temporary support and should have those fully operational. Most policies focus on strengthening automatic stabilizers to stabilize cyclical fluctuations.

The countercyclical properties of fiscal policy vary between automatic stabilizers and discretionary policies and across countries. Many studies conclude that the two components (automatic stabilizers and discretionary policy) are not mutually exclusive, although countries that have stronger automatic stabilizers are less likely to enact substantive discretionary fiscal measures during typical recessions (Dolls et al., 2012). Different approaches are often used to estimate the size of automatic stabilizers. One way is to apply the overall cyclical sensitivity of the budget using reduced-form semi-elasticities for revenue and expenditure categories with respect to the output gap (e.g., Girouard and André, 2005; Baunsgaard and Symansky, 2009; Fedelino et al., 2009; Mohl et al., 2019; Mourre and Princen, 2019 and Mourre et al.,

2019).[23] Some studies also use the micro-simulation approach to measure the size of automatic stabilizers of the tax and benefit system by assessing how a hypothetical income shock would affect household disposable income (after taxes and benefits) based on household-level surveys and detailed information of the tax and benefit systems (Pechman, 1973, 1987; Knieser and Ziliak, 2002; Auerbach, 2009; Dolls et al., 2012b). Dolls et al. (2012b) find that automatic stabilizers have absorbed nearly 40 percent of a proportional income shock in the EU countries, compared to 32 percent in the United States, while the stabilizing effects appear much higher during the COVID-19 pandemic if considering the effects of job-retention schemes existing in many EU countries (Lam and Solovyeva, 2022)[4] An alternative approach is to calibrate a general equilibrium macro model to assess the aggregate relationship between the government budget and the output gap, which in turn, provides the basis to assess the size of the automatic stabilizers (Fedelino et al. 2005; Fatas and Mihov, 2012; McKay and Reis, 2016, 2019). This has an advantage to illustrate various channels how automatic stabilizers can reduce economic volatility, including i) the disposable income channel (Brown, 1955); ii) the marginal incentives channel (Christiano 1984); iii) the redistribution channel (Blinder, 1975; Oh and Reis, 2012), iv) and the social insurance (or wealth distribution) channel (Floden, 2001; Alonso-Ortiz and Rogerson, 2010; Challe and Ragot, 2015).[5] Automatic stabilizers are typically stronger and more effective in high-income countries, and in those countries with more developed financial systems and fiscal rules (IMF, 2015). There is evidence of a secular decline in the role of automatic stabilizers in the U.S. since their historical peak in the 1970s (see Auerbach, 2008). But more recent data point an increased role of automatic stabilizers during the pandemic (Bouabdallah et al., 2020).

The literature also finds the role of fiscal stabilization varies and depends on different factors. Seidman and Lewis (2002) present a new design for automatic fiscal policy and use the Fair US quarterly model to test it. They find that during severe downturns, monetary policy alone does not suffice for macroeconomic stabilization. But monetary policy combined with the proposed automatic fiscal policy substantially can reduce the severity of the recession without generating a sizeable increase in public debt. More recently, Jalles (2020) using a panel dataset found additionally that the fiscal response to demand shocks is higher than to supply shocks and that accounting for future expectations about fiscal dynamics enhances the degree of fiscal countercyclicality. Furceri and Jalles (2019) used a difference-in-difference approach to 25

[2] This approach has been widely used by the OECD, the European Commission, and the IMF country teams.

[3] This approach defines automatic stabilizers to be the cyclical component of the budget balance or its elements, that is the automatic/cyclical change in the fiscal position (relative to GDP) resulting from a one percentage point change in the output gap. Semi-elasticities can also be estimated using a regression-based approach, in which case changes in components of the budget balance are regressed on changes in the output gap. While this approach allows for controlling for other factors, it can suffer from the endogeneity of the output gap.

[4] The microeconomic approach, however, has limitations because it only accounts for the direct stabilizing role of the tax and benefit system and does not consider indirect stabilizing effects related to general equilibrium and behavioral responses.

[5] A wide range of shocks have been considered in macro-simulation models: shocks to consumption, income, investment and productivity. Consumption and income shocks are found to have the largest stabilizing effects given their direct association with tax revenue (e. g.; Brunila et al., 2003; Tödter and Scharnagl, 2004; European Commission, 2017b). Also, estimates of automatic stabilizers are typically larger for microeconomic stimulations than for reduced-form macroeconomic models. This difference in the strength of automatic stabilizers is primary explained by the fact that the macro approach accounts for general equilibrium effects arising from behavioral responses of firms, workers and consumers and feedback effect arising from a monetary policy response (Mohl et al., 2019).

industries for 18 advanced economies over the period 1985–2012 to examine the effect of fiscal counter-cyclicality on productive investment. Results show that fiscal counter-cyclicality increases research and development (R&D) expenditure and the share of information, capital, and technology (ICT) capital in industries that are more financially constrained. Furceri, Choi and Jalles (2022) applied a difference-in-difference approach to an unbalanced panel of 22 manufacturing industries for 55 countries to find that the credit constraints channel identifies the best transmission mechanism through which countercyclical fiscal policy enhances growth.

This strand of the literature also assesses the determinants of fiscal stabilization using time-varying measures focusing on a subset of advanced economies (Aghion and Marinescu, 2008). 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. Concerning the determinants of fiscal countercyclicality, 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 countercyclicality 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 stabilization 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 stabilization 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). Jalles (2018) looking at determinants of fiscal counter-cyclicality found that fiscal rules contribute to its reduction and that the result is especially strong for debt-based rules in advanced economies. Stronger automatic stabilizers are associated with larger government size (Gali, 1994; Rodrik, 1998; Fatas and Mihov, 2001). For instance, Fatas and Mihov (2001) find that one percentage point increase in government size relative to GDP reduces output volatility by eight basis points. However, beyond a certain level, government size may have sizeable efficiency costs.[6]

III. Methodological Framework and Data

A. Methodological framework

Fiscal countercyclicality and stabilization are two distinct but tightly related concepts. In fact, we can think about the degree of fiscal stabilization in terms of the product between the degree of fiscal countercyclicality and the "multiplier" effect of fiscal policy on the real economy. Then, keeping fixed the multiplier effect of fiscal policy, higher fiscal countercyclicality automatically translates into higher fiscal stabilization. This is an argument that has often been adopted in the literature (see the discussion sin Blanchard 1993; Lane, 2002; Fatás and Mihov, 2012).

[6] For a recent contribution on the issue of public sector efficiency see Afonso, Jalles and Venancio (2022).

This section lays out a simple methodological framework that provides an explicit relation between fiscal countercyclicality and fiscal stabilization and presents a precise interpretation of the empirical estimations carried out in the rest of the paper. We begin by presenting a general form for our main estimation equation,

$$f_t = \alpha + \beta x_t + \epsilon_t^f$$

where f_t is a fiscal variable that signal an improvement in public finances (e.g budget balance, fiscal revenues, the negative of government expenditure) and x_t is a measure of economic activity. A second structural equation, the "fiscal multiplier equation", which we do not estimate in this paper, determines the feedback loop between fiscal policy and economic activity

$$x_t = \gamma - \delta f_t + \epsilon_t^x$$

The structural shocks ϵ_t^f and ϵ_t^x are assumed to be uncorrelated with each other and have finite and strictly positive variance σ_f^2 and σ_x^2, respectively. The parameter β in gives the degree of counter-cyclicality of fiscal policy, whereas δ in is the fiscal multiplier. In this paper we maintain the reasonable hypothesis that δ>0. Solving the above system of two equations gives

$$f_t = \frac{\alpha + \beta\gamma + \epsilon_t^f + \beta\epsilon_t^x}{1 + \delta\beta}$$

$$x_t = \frac{\gamma - \delta\alpha - \delta\epsilon_t^f + \epsilon_t^x}{1 + \delta\beta}$$

We define the degree Σ of fiscal policy stabilization as the counterfactual standard deviation of economic activity x_t if $\beta = 0$ (i.e. if fiscal policy were unresponsive to economic conditions) relative to the standard deviation of x_t under given policy parameters β and δ and obtain

$\Sigma = 1 + \delta\beta$

The equation above shows that for a given positive fiscal multiplier ($\delta > 0$), the degree of fiscal stabilization Σ increases with the degree β of counter-cyclicality. An OLS estimate of the main equation defining β (first equation above) suffers from a simultaneous equation bias from the omission of the fiscal multiplier equation. More precisely, for $\delta > 0$ the estimate $\hat{\beta}$ is downward biased

$$\hat{\beta} = \frac{Cov(f_t, x_t)}{Var(x_t)} = \frac{\beta\sigma_x^2 - \delta\sigma_f^2}{\sigma_x^2 + \delta^2\sigma_f^2} < \beta$$

Consider splitting the estimation sample into non overlapping intervals indicated with $T = 1,2, \dots, N$ and assume the volatility of structural shocks and the size of fiscal multipliers are the same across intervals, while the degree of counter-cyclicality β_T is potentially different across intervals. Then, for two distinct intervals T and T' we have $\hat{\beta}_T - \hat{\beta}_{T'} = (\beta_T - \beta_{T'})/(1 + \delta^2\sigma_f^2/\sigma_x^2)$. Therefore, under the described assumption, the change in the (biased) OLS regressors correctly captures the direction of the change of the true parameters.

B. Measuring the Countercyclicality of Fiscal Policy

We translate the main equation defining β in the previous section into an empirical equation by following Blanchard (1993) and using the budget balance BB_{it} (expressed in percent of GDP) in place of f_{it}, where

the additional subscript i is the label that we assign to countries in our panel estimation framework. We also use two alternative measures of economic activity Δy_{it} and OG_{it}

$$BB_{it} = \alpha + \beta^{BB} \cdot \Delta y_{it} + \varepsilon_{it} \quad (1)$$

where $\Delta y_{it}$is the real GDP growth rate (so y_{it} is the log of real GDP). Equation (1) assumes that fiscal policy reacts to any type of economic disturbance that affects the growth rate of the economy.

When evaluating the reaction of fiscal policy, we can distinguish between *discretionary* and the *automatic* components of the fiscal response. This distinction requires decomposing the budget balance into a cyclically adjusted (CAB) and an automatic part.[7] We then estimate the following

$$CAB_{it} = \alpha + \beta^{CAB} \cdot \Delta y_{it} + \varepsilon_{it} \quad (2)$$

$$\beta^{AS} = \beta^{BB} - \beta^{CAB}$$

where β^{CAB} and β^{AS} capture the degree of the countercyclicality attributable to "discretionary" fiscal response and that attributable to automatic stabilizers, respectively. Equations 1 to 3 can also accommodate a time-varying set of regression coefficients:

$$BB_{it} = \alpha_{it} + \beta_{it}{}^{BB} \cdot \Delta y_{it} + \varepsilon_{it}$$

Measures of the *CAB* (and thus of potential output gap) are available in IMF World Economic Outlook database, but mostly for advanced economies and a few emerging markets and low-income countries. Therefore, when we estimate (2) using WEO output gaps, the sample of emerging markets and low-income countries will somewhat limited. The relative paucity of output gap observations is however a problem for the next section, where we look at a relatively large number of determinants of fiscal countercyclicality. In that case, we resort to the Hamilton filtering method to obtain output gaps consistently across a wide set of countries (Borio et al., 2013, 2014).[8] More precisely, the *CAB* is calculated with a general application of a unity elasticity of government revenues (*REV*) to output growth and inelastic expenditure (*EXP*) to growth (Girouard and André, 2005). That is *CAB=REV·[1/(1+OG/100)] - EXP*.

C. Determinants of Fiscal Countercyclicality

This section describes the empirical approach to assess the determinants of the coefficients β of countercyclicality obtained in Section III.A. The size of fiscal stabilization coefficients is related to various macroeconomic, structural, institutional and political factors. For this purpose, the following regression is estimated based on an unbalanced sample of all countries that have estimates of fiscal stabilization

[7] When examining the cyclical properties of the budget balance, it is common to separate into the cyclical balance and the cyclically-adjusted balance (Galí and Perotti 2003). Changes in the cyclical balance give an estimate of the budgetary impact of aggregate fluctuations through the induced changes in tax bases and certain mandatory outlays (that is, automatic stabilizers). Subtracting the cyclical balance from the overall budget balance would be the cyclically-adjusted balance.
[8] For surveys on potential output estimation methods see for example Ladiray et al. (2003); Horn et al. (2007); Bassanetti et al. (2010); Anderton et al. (2014); Alichi et al. (2017).

coefficients for at least 20 years (that is, at least since 2002 onwards for 20 continuous observations of β coefficients, calculated with Hamilton filtered output gaps):

$$\hat{\beta}_{it} = \delta_i + \gamma_t + \boldsymbol{\theta}'\boldsymbol{X_{it}} + \varepsilon_{it} \quad (3)$$

where δ_i are country-fixed effects to capture unobserved heterogeneity across countries, and time-unvarying factors such as geography which may affect the degree of fiscal stabilization; 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 described below (Furceri and Jalles, 2018; Jalles, 2020).

Since the dependent variables in equation (3) are based on estimates, the regression residuals consist of two components: (i) sampling error (the difference between the true value of the dependent variable and its estimated value), and (ii) the random shock that would have been obtained even if the dependent variable had been observed directly. Correcting for (i) would help us reduce the overall noise and thus increase the statistical significance of our estimates. To this end, we employ a Weighted Least Squares (WLS) approach. Specifically, the WLS estimator assumes that the errors ε_{it} in equation (3) are distributed as $\varepsilon_{it} \sim N(0, \frac{\sigma^2}{s_i})$, where s_i are the estimated standard deviations of the fiscal stabilization coefficient for each country i, and σ^2 is an unknown parameter. To reduce the potential bias from the reverse causality, all the explanatory variables in the regression enter the specification with one lag.

Macroeconomic and structural variables $\boldsymbol{X_{it}}$:[9]

- Real GDP per capita: the counter-cyclicality of fiscal policy is expected to be higher in more developed countries because those countries tend to have better quality institutions (Talvi and Vegh 2005) and larger automatic stabilization in the budget given more progressive tax systems and stronger social protection systems.

- Inflation: As a proxy for macroeconomic stability, inflation is expected to be lower in more stable countries. Fiscal policy is likely to be less active in a stable macroeconomic environment. However, this view is only valid when the causality runs from inflation to fiscal policy. One could argue that active fiscal policy is needed to produce low and stable inflation. For instance, Fatás and Mihov (2012) found that the response of fiscal policy to cyclical fluctuations was relatively stronger in the post-1990 period when inflation was low and stable in most countries.

- Financial development—a higher level of financial development positively could influence the ability of the government to borrow during downturns, and therefore could increase the counter-cyclicality of fiscal policy (Aghion and Marinescu 2008). Financial development is proxied by the credit-to-GDP ratio in the regressions.

[9] Table A1 in the appendix summarizes the variables definition.

- Trade openness—more open economies tend to be more exposed to external shocks and therefore may use more actively fiscal policy in order to provide stabilization (Rodrik 1998; Lane 2003). Trade openness is proxied by the ratio of total exports and imports to GDP in the regressions.

- Capital account openness—foreign capital is likely to flow in (out) during economic expansions (recessions), therefore increasing the cost of financing countercyclical fiscal policies (Aghion and Marinescu, 2008). The regressions use the Chinn-Ito index of capital account openness (Chinn and Ito, 2006).

- Government size—as discussed in Debrun and Kapoor (2011) and Fatas and Mihov (2013), government size can be considered as a proxy of fiscal counter-cyclicality under the assumption of unitary elasticity of taxes to GDP. The counter-cyclicality of fiscal policy tends to be a positive function of the size of the government. Government size can alternatively be measured by the size of the social expenditures in percent of GDP. Social spending is a key component of public spending and is also critical component of automatic stabilization, particularly in OECD countries (Darby and Melitz, 2008).

- Financial crises—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 highly-indebted countries. The sign and magnitude of the coefficient on financial crises would depend on which force dominates. Data on financial crises are based on the dataset in Leaven and Valencia (2018).

- Pandemics – Pandemics have historically affected the stance of fiscal policy. Governments typically become fiscally aggressive in their effort to address any economic fallout from pandemics. For instance, Ma et al. (2020) study six modern health crises and find that countries that respond to pandemic shocks with higher government expenditures, especially on health care, tend to experience relatively stronger economic recovery. A dummy variable is included.

- Share of agriculture value added and informality – The value-added share of the agricultural sector captures the extent of economic modernization. The more this share is the least the economy is modernized. Least modernized economies tend to have higher share of the labor force employed in rural areas. We expect fiscal policy in agriculture-oriented economies to be less countercyclical than in modern economies. Thus, the share of agricultural value added is expected to affect fiscal countercyclicality coefficients negatively. Likewise, informality captures the degree of economic modernization. It is strongly correlated with the share of agriculture value added. As such, informal economies tend to display lower countercyclical forces.[10] As such fiscal policy in informal economies is likely to be less countercyclical compared to formal and modern economies. We expect the coefficient on informality from Equations 5a and 5b to be negative and statistically significant. The informality data are taken from Elgin et al (2021).

[10] Those economies are particularly prone to tax evasion and non-compliance.

- Fiscal space – the availability of budgetary resources for a government to service its financial obligations affects its ability to deploy countercyclical fiscal policy. Fiscal space is expected to be positively associated with fiscal stabilization coefficients. Kose et al. (2020) provide a cross-country Database of Fiscal Space, which covers 202 countries over the 1990–2020 period and contains a variety of proxies for fiscal space. Two alternative proxies, namely general government gross debt and fiscal balance, both as ratios to average tax revenues, are used for robustness check.

- Fiscal rules. The operation of fiscal rules may affect fiscal stabilization coefficients by improving the strength of fiscal institutions (Davoodi and others 2022; IMF 2022).[11] The transmission mechanism could be through discretionary policy changes, automatic stabilizers or a combination of both. We include a dummy indicating the existence of fiscal rules as an additional regressor.

Institutional and Political variables:

- Democracy and governance. More democratic regimes tend to have higher degree of political and economic freedom, which in turn provides greater ability of the economy to adjust and improves the conduct of discretionary fiscal policy. This implies that higher degree of the democracy index could have a positive effect on the counter-cyclicality of fiscal policy.

- Constraints on the executive branch of the government: The estimation uses the main variables in Acemoglu et al. (2013) and Fatas and Mihov (2013). The first (*constraints*) captures potential veto points on the decisions of the executive branch of the government. The second (*polconv*) captures not only institutional characteristics in the country but also adjusts for political outcomes when, for example, the president and the legislature are members of the same party. Dummy variables for the presence of expenditure, taxes and debt rules are also included. As documented by Fatas and Mihov (2013), constraints on the executive branch are likely to reduce spending volatility and influence positively the size of fiscal stabilization.

- Elections—during elections politicians are more likely to ease spending and taxes for electoral reasons and not necessarily for macroeconomic stabilization purposes (Drazen 2000; Persson and Tabellini 2000). Dummy variables are included for the occurrence of executive and legislative elections:

- Other political variables: margin of majority, proportional representations and parliamentary regimes.

- Corruption. Corruption introduces important distortions in economic decisions, which could reduce the ability of governments to adjust to economic shocks, thus undermining the response of fiscal balances to the cycle and to fiscal policy. In addition, corruption introduces constraints in the policymaking process, which could lead to delays or lags in decision and implementation in fiscal policy. Thus, corruption is expected to influence negatively the degree of counter-cyclicality of fiscal policy.

[11] The operation of escape clauses, by adding more flexibility, is likely to further improve countercyclicality.

IV. Empirical Results

A. Degree of fiscal countercyclicality across countries and over time

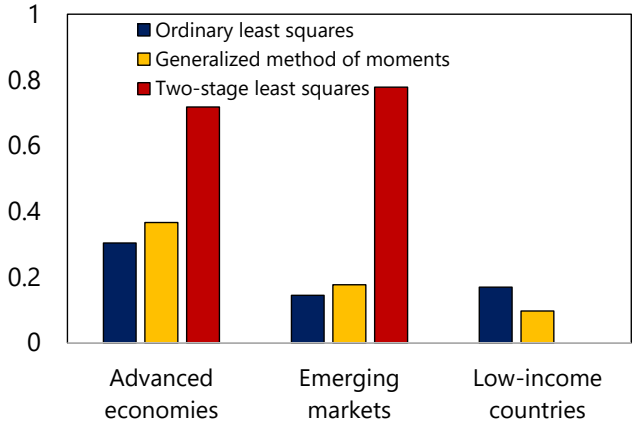
We first present our empirical results of equation (1) for three income groups: advanced economies (AEs), emerging market economies (EMs) and low-income countries (LICs). Our sample covers about 190 countries during the period of 1980-2021 on an annual basis. Table 1 shows that, on average across countries, fiscal policy has behaved countercyclically in all income groups during the period considered. The degree of counter-cyclicality is increasing with the level of economic development, with advanced economies and emerging markets economies having higher estimated coefficients, compared to low-income countries. Non-commodity exporting EMs behave very similarly to non-commodity exporting LICs. In fact, excluding commodity exporters (specification 7, Table 1) suggests that fiscal stabilization coefficients are the highest among AEs at 0.3, while the magnitudes are only about half at 0.14 and 0.17 for EMs and LICs, respectively.

Table 1. Overall Fiscal Countercyclicality, 1980-2021

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Not excluding commodity exporters			Excluding commodity exporters			
Sample	AE	EM	LIC	AE	EM	LIC	Commodity exporters
Real GDP Growth	0.2981***	0.2998***	0.1332**	0.3036***	0.1442***	0.1695***	0.2694***
	(0.050)	(0.055)	(0.051)	(0.050)	(0.039)	(0.059)	(0.076)
Observations	1,274	2,735	1,653	1,156	1,770	1,161	1,575
No. of countries	37	93	56	34	61	39	52
R-squared	0.6099	0.2751	0.2494	0.5655	0.3739	0.1952	0.3066

Note: Robust standard errors are shown in parenthesis clustered at the country level. Symbols *, **, *** denote the statistical significance at the 10, 5 and 1 percent levels, respectively. The constant terms and the country and time fixed effects are included in the regressions but not shown in the table.

Figure 1. Addressing Potential Endogeneity in Estimating Fiscal Countercyclicality Coefficients

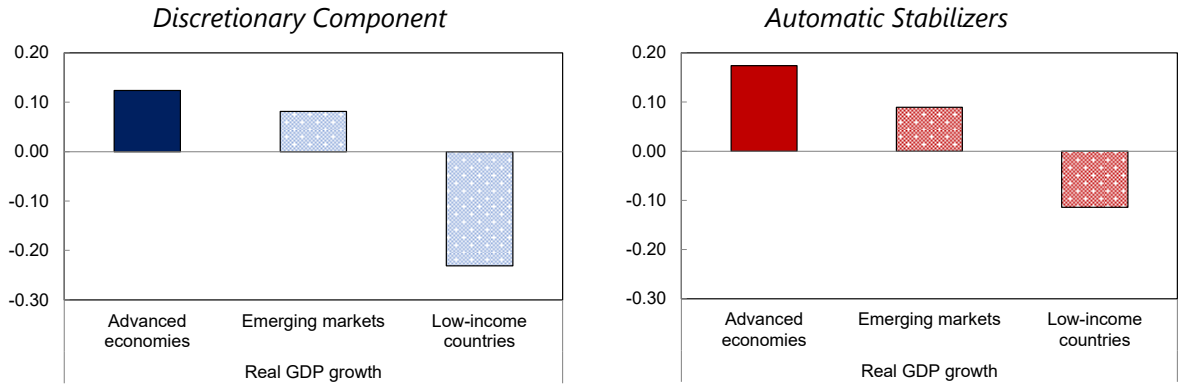


Note: OLS, GMM and TSLS estimations by income group using as instrument the lag of growth rate and the contemporaneous and lagged growth of main trading partners. Missing bars denote insignificant coefficients.

As discussed in section III.A we should expect OLS estimates in Table 1 to be downward biased. To address endogeneity problems, we compared the results Table 1 to those obtained using Generalized Method of Moments (GMM) and Two-Stage Least Squares (TSLS). For this purpose, two estimation types of instrumental variables are considered: (i) lagged real GDP growth and (ii) contemporaneous and lagged growth rate of main trading partners.[12] Results in Figure 1 confirm that, with the exception of LICs, point estimates are higher once we attempt to correct for endogeneity, especially when using TSLS.

Next, we present our estimation results for equation (2). Figure 2 shows that a one percentage point growth rate change in AEs generates an increase in the automatic part of the budged balance equal to 0.17 percentage point of GDP, compared to an increase of 0.12 points for the discretionary part. The coefficients for two components, albeit not statistically significant individually, are similar in the case of EMs, while the point to a procyclical behavior for LICs. [13]

Figure 2. Components of Fiscal Countercyclicality, 1980-2021



Note: Panel regressions are estimated in an unbalanced sample across income groups. The left chart uses the cyclically adjusted budget balance (CAB) from the IMF WEO as dependent variable, which is regressed against real GDP growth. The right chart uses the difference between the overall budget balance and the CAB (devoted to automatic stabilizers) as the dependent variable. Lighter bars denote statistically insignificant coefficient estimates at the 10 percent level. Country and time fixed effects are included in the regression but not shown in the figure. Robust standard errors clustered at the country level.

To provide a more refined picture than Table 1 on how the degree of the countercyclicality varies across countries, in Figure 3 we estimate (1) for each country individually (only countries with at least 20 continuous observations enter the regression). The results confirm that the average degree of fiscal countercyclicality in AEs (at 0.4) is greater than that of EMEs and LICs (0.3 and 0.19, respectively). In addition, the dispersion across countries tends to be larger in EMs, with a greater density toward the lower half of the distribution, while the distribution is tilted to the higher end for advanced economies. In addition, to explore the countercyclicality over time, we estimate the panel (1) over 10-year rolling

[12] We also use an alternative external instrument, namely the change in the export price index (Ilzetzki and Vegh, 2008). The results are similar to those obtained from (i) and (ii).

[13] The overall procyclically for LICs that emerges from Figure 2 contrasts from the countercyclicality shown in Table 1. This apparently contrasting conclusion is due to a different samples the two exercises.

windows (Figure 4).[14] Our estimation results also point to a slow upward trend of the countercyclicality of fiscal policy since 1990, with a more notable upward movement during 2000-10 (confirming Furceri and Jalles 2018 that showed data only until 2014). The median countercyclicality of fiscal policy rose from 0.15 in 1990 to 0.25 in 2019, before jumping to around 0.3 in 2020 at the peak of the pandemic.

Figure 3. Distribution of Fiscal Counter-cyclicality Coefficients by Income Groups

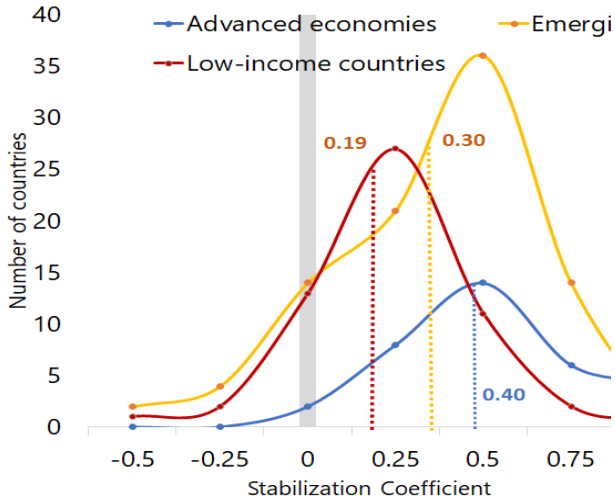
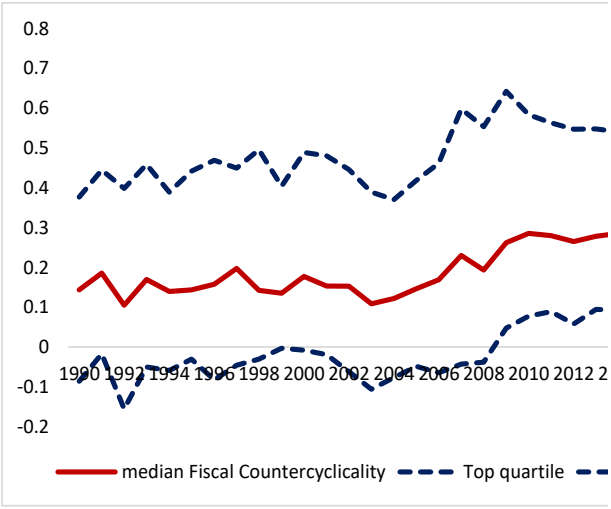


Figure 4. Interquartile Range of Time-Varying Fiscal Countercyclicality



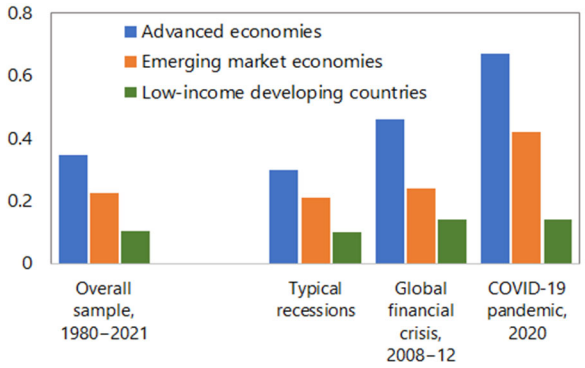
Sources: Authors' estimates.

In the final part of this section, we concentrate on the potential asymmetry of the degree of countercyclicality during recessions compared to the overall average sample. To this end, we group recessions into three categories: (i) typical recessions, which refer to periods when an individual country's growth is below the country's own average of the previous three years; (ii) global financial crisis (2008-10); and (iii) the COVID-19 pandemic (2020-21). The first panel of Figure 5 shows that fiscal policy tends to be more countercyclical during severe crises than in normal recessions. This was particularly the case during the GFC and the COVID-19 pandemic. The second panel of Figure 5 provides another way to look at this conclusion by calculating the share of countries in each income group that have displayed a larger countercyclical coefficient during each specific episode relative to their own average coefficient over the entire time span. More than 70 percent of AEs conducted a more aggressive countercyclical fiscal policy during the GFC and COVID-19 pandemic than in a typical recession. The majority of countries in EMs and LICs also put out stronger countercyclical responses during those crises than in a typical.

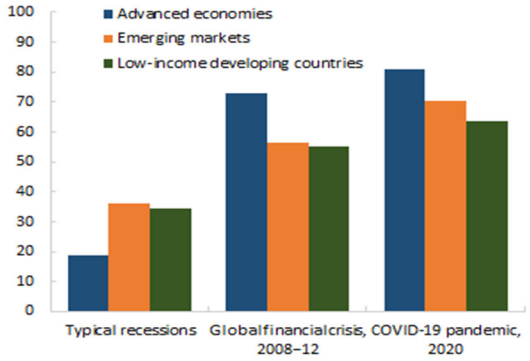
[14] The first 10 years of the sample (1980-89) were therefore discarded.

Figure 5. Fiscal Countercyclicality in Large Crises

a) Average time-varying countercyclical coefficients



b) Share of countries with larger countercyclical fiscal policies in each episode (percent)



Source: Authors' estimates.

B. Fiscal stabilization: getting granular on budget components

In this section we re-estimate equation (1) separately for the revenue and expenditure components of the budget balance (expressed in percent of GDP). The specification is similar to Darby and Melitz (2008) that examines how the government budget and its composition respond to the output gap for 21 OECD countries during 1982-2003. The specification includes revenue components excluding grants, such as total revenue, income taxes, individual income taxes, corporate income taxes, taxes on goods and services, and taxes on international trade. On the expenditure side, the components in the specification include total primary expenditure, public investment, compensation of employees, public spending on goods and services, and social security benefits.

Table 2. Countercyclical Properties of Government Revenues

Specification	(1)		(2)		(3)		(4)		(5)		(6)	
Regressors	Total revenue		income taxes		individual income taxes		corporate income taxes		taxes on goods and services		taxes on international trade and transactions	
	β^{BB}	β^{CAB}	β^{BB}	β^{CAB}	β^{BB}	β^{CAB}	β^{BB}	β^{CAB}	β^{BB}	β^{CAB}	β^{BB}	β^{CAB}
Real GDP growth	0.034*	-0.035	0.009	-0.030***	-0.002	-0.018***	-0.011	-0.036***	0.024***	-0.019**	0.010	-0.014
	(0.020)	(0.023)	(0.011)	(0.011)	(0.003)	(0.006)	(0.009)	(0.010)	(0.008)	(0.009)	(0.010)	(0.009)
Constant	11.029***	10.911***	4.798***	4.748***	4.249***	4.087***	2.533***	2.562***	6.073***	5.945***	5.158***	5.244***
	(1.374)	(1.253)	(0.719)	(0.697)	(0.902)	(0.742)	(0.330)	(0.323)	(0.970)	(0.988)	(1.868)	(1.838)
Observations	4,393	4,393	4,085	4,085	2,664	2,664	2,716	2,716	3,948	3,948	3,906	3,906
No. of countries	164	164	150	150	103	103	106	106	147	147	146	146
R-squared	0.074	0.087	0.062	0.081	0.077	0.116	0.056	0.068	0.143	0.158	0.075	0.072

Note: Each dependent variable is expressed as a ratio to GDP. Results are obtained by estimating equation (5a) using the Weighted Least Squares method. Standard errors in parentheses are based on clustered robust standard errors. Symbols ***, **, * denote statistical significance at 1,5,10 percent levels, respectively.

Empirical results show that both government revenues and expenditures as a share of GDP act countercyclically (Column 1 of Tables 2 and 3).[15] For example, a one percentage-point increase in real GDP growth is estimated to increase the revenue ratio by 0.034 percentage points and decrease the expenditure ratio by 0.2 percentage point of GDP. This is entirely driven by the strong response of taxes on goods and services to changes in GDP. Also, discretionary tax policy is typically procyclical, as estimates of β^{CAB} are negative and statistically significant for all tax items. The countercyclicality of fiscal policy therefore operates primarily through the expenditure side, even though the sub-component of investment spending is slightly pro-cyclical. As expected, spending components that have built-in automatic stabilizers, such as social security benefits, operate more countercyclically.

Table 3. Countercyclical Properties of Government Expenditures

Specification	(1)	(2)	(3)	(4)	(5)	(6)
Regressors	Total spending	Investment spending	Compensation of employees	Spending on Goods & Services	Social benefits	Social security benefits
Real GDP growth	-0.193***	0.020*	-0.038***	0.007	-0.035***	-0.047**
	(0.065)	(0.011)	(0.014)	(0.013)	(0.013)	(0.019)
Constant	25.775***	3.489***	10.662***	5.443***	2.856**	3.648***
	(3.208)	(0.502)	(2.048)	(0.454)	(1.102)	(1.290)
Observations	5,021	8,258	4,593	4,291	3,664	2,632
No. of countries	178	173	171	163	140	97
R-squared	0.084	0.020	0.070	0.020	0.223	0.193

Note: Each dependent variable is expressed as a ratio to GDP. Results are obtained by estimating equation (5a) using the Weighted Least Squares method. Standard errors in parentheses are based on clustered robust standard errors. Symbols ***, **, * denote statistical significance at 1,5,10 percent levels, respectively.

C. Determinants of fiscal stabilization

To understand the main determinants of the degree of countercyclicality of fiscal policy, we carry out the estimation of equation (3), where the coefficients of countercyclicality are estimated according to (1). In terms of estimation methodology, the regression follows Furceri and Jalles (2018) using an unbalanced sample of countries that have at least 20 years of consecutive observations via a weighted least squares estimator.

Results suggest that coefficients associated with the various determinants are economically significant and typically exhibit the expected signs (Table 4). The levels of financial and economic development, government size and institutional quality all matter for determining the degree of countercyclicality of fiscal policy. For example, a one percentage point increase in the ratio of credit to GDP is associated with an increase in the fiscal countercyclicality coefficient ranging between 0.14-0.24 points (i.e. by about 1/4 standard deviation). Increasing real GDP per capita by one dollar leads to an improvement of the fiscal

[15] Estimating an Error Correction Model (ECM) would be useful for differentiating between the short- and long-run elasticities of budget components. But results from unit-root tests suggest that most variables are stationary and therefore that estimating an ECM is not warranted in this setting.

stabilization coefficient that ranges between 0.09-0.16 points.[16] Government size proxied by total government expenditure ratio to GDP is significant, in line with previous results in the literature. Higher debt levels is associated with an increase in the size of the fiscal stabilization coefficients. The fiscal countercyclicality coefficient increase by 0.02 and 0.05, respectively for additional one percentage point increase in the gross debt ratio. With regard to institutional quality, increasing the margin of majority index by 1 point is associated with 0.06-0.1 percentage points increase in the fiscal countercyclicality coefficient. Similarly, this coefficient increases by 0.06-0.1 for each 1-point reduction in the government fractionalization. Both these variables point to political cohesion as a key factor for enhanced countercyclicality in line with the evidence provided in Fatas and Mihov (2013) and Lane (2003). These authors found that more constraints on the executive branch of the government tend to reduce government spending volatility and positively influence overall fiscal countercyclicality. In contrast, other political variables including measures of informality, corruption and governance, are not statistically significant. Finally, banking crises are positively related to fiscal countercyclicality.

Table 4. Key Determinants of the Countercyclicality of Fiscal Policy, 1990-2021

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Credit to GDP (t-1)	0.240***	0.239***	0.140***	0.234***	0.263***	0.212***	-0.054	0.173*	0.209***
	(0.038)	(0.038)	(0.040)	(0.047)	(0.039)	(0.039)	(0.144)	(0.097)	(0.043)
GDP per capita (t-1)	0.097**	0.119**	0.139**	0.161***	0.073	-0.004	-0.193*	0.159	0.000
	(0.045)	(0.047)	(0.069)	(0.062)	(0.047)	(0.066)	(0.103)	(0.143)	(0.062)
Agriculture value added (t-1)	0.158	0.081	1.008***	0.290	0.018	-0.137	0.658**	1.197**	-0.112
	(0.165)	(0.155)	(0.223)	(0.356)	(0.168)	(0.165)	(0.300)	(0.473)	(0.154)
Trade openness (t-1)	-0.002	-0.005	-0.066	0.051	0.052**	0.033*	0.092	0.169*	0.043*
	(0.022)	(0.025)	(0.051)	(0.063)	(0.023)	(0.021)	(0.061)	(0.095)	(0.023)
Capital account openness (t-1)	0.008	-0.002	0.044	-0.134**	0.017	-0.015	0.027	-0.093	-0.016
	(0.045)	(0.045)	(0.047)	(0.053)	(0.046)	(0.046)	(0.084)	(0.111)	(0.047)
Government expenditure to GDP (t-1)	-0.035			-0.098	-0.157	-0.242	-0.357	0.283	-0.044
	(0.322)			(0.276)	(0.332)	(0.342)	(0.288)	(0.323)	(0.174)
Gross debt ratio (t.1)		0.029**							
		(0.014)							
Social benefits (t-1)			0.701						
			(0.537)						
Banking crises (t-1)				0.053**					
				(0.021)					
Pandemics and epidemics (t-1)				-0.012					
				(0.018)					
Presidential election held (t-1)					0.000*	0.000	-0.033	0.000	0.000*
					(0.000)	(0.000)	(0.024)	(0.000)	(0.000)
Legislative election held (t-1)					0.001	0.005	0.020	-0.006	0.002
					(0.013)	(0.013)	(0.020)	(0.015)	(0.012)
Margin of majority (t-1)					0.107***	0.061**	0.107***	0.090**	0.076***
					(0.025)	(0.024)	(0.037)	(0.046)	(0.025)
Government fractionalization (t-1)					-0.107***	-0.061**	-0.107***	-0.090**	-0.077***
					(0.025)	(0.024)	(0.037)	(0.046)	(0.025)
Informality (t-1)						-0.012			
						(0.009)			
CPI inflation (t-1)							-0.044		
							(0.029)		
Corruption perception index (t-1)								-0.000	
								(0.003)	

[16] However, it is worth noting that coefficient on GDP per capita turn negative and significant at the 10 percent level when the CPI inflation is introduced as an additional regressor (specification 7). This unexpected result is partly owing to a sharp drop in the sample size, from 3,224 in the baseline specification (specification 1) to 774 (specification 7).

Government Effectiveness (t-1)									0.049
									(0.035)
Regulatory Quality (t-1)									-0.028
									(0.036)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	3,224	3,206	2,196	986	3,008	2,732	774	1,065	2,490
R-squared	0.492	0.496	0.581	0.575	0.500	0.466	0.568	0.663	0.524

Note: Results obtained by estimating Equation (3) using Weighted Least Squares. Standard errors in parentheses based on clustered robust standard errors. ***,**,* denote significance at 1,5,10 percent level, respectively.

Table 5. Determinants of Fiscal Stabilization for Advanced Economies, 1990-2021

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Credit to GDP (t-1)	0.163***	0.193***	0.206***	0.402***	0.178***	0.155***	0.070	0.171**
	(0.053)	(0.055)	(0.062)	(0.099)	(0.061)	(0.059)	(0.155)	(0.069)
GDP per capita (t-1)	-0.017	-0.007	-0.141	0.216	0.092	0.126	-0.495	0.260
	(0.178)	(0.181)	(0.221)	(0.277)	(0.188)	(0.192)	(0.542)	(0.230)
Agriculture value added (t-1)	-9.343***	-10.214***	-11.256***	2.050	-10.161***	-13.788***	2.140	-10.709***
	(3.532)	(3.418)	(3.931)	(7.587)	(3.909)	(3.798)	(8.429)	(4.018)
Trade openness (t-1)	-0.055	-0.080	-0.014	0.216*	-0.024	0.112	-0.571***	-0.117
	(0.072)	(0.075)	(0.101)	(0.130)	(0.095)	(0.072)	(0.176)	(0.105)
Capital account openness (t-1)	-0.213**	-0.210**	-0.126	-0.165	-0.266**	-0.252**	-0.083	-0.166
	(0.099)	(0.098)	(0.111)	(0.257)	(0.104)	(0.107)	(0.246)	(0.125)
Government expenditure to GDP (t-1)	0.739			2.577***	0.922*	1.045**	-0.395	0.656
	(0.483)			(0.813)	(0.509)	(0.510)	(1.021)	(0.578)
Gross debt ratio (t-1)		0.109						
		(0.099)						
Social benefits (t-1)			-1.047					
			(1.360)					
Banking crises (t-1)				0.061				
				(0.057)				
Pandemics and epidemics (t-1)				-0.035				
				(0.097)				
Presidential election held (t-1)					-0.017	-0.006	-0.025	-0.006
					(0.022)	(0.021)	(0.030)	(0.023)
Legislative election held (t-1)					0.021	0.043	-0.031	0.005
					(0.039)	(0.033)	(0.050)	(0.041)
Margin of majority (t-1)					0.390**	0.293*	0.863***	0.443**
					(0.184)	(0.179)	(0.310)	(0.198)
Government fractionalization (t-1)					0.111	0.158*	-0.354	0.052
					(0.100)	(0.081)	(0.264)	(0.125)
Informality (t-1)						0.031		
						(0.028)		
Corruption perception index (t-1)							0.015**	
							(0.007)	
Government Effectiveness (t-1)								-0.204**
								(0.086)
Regulatory Quality (t-1)								-0.168*
								(0.104)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	649	648	567	330	627	602	237	548
R-squared	0.462	0.461	0.470	0.565	0.466	0.488	0.625	0.493

Note: Results obtained by estimating Equation (3) using Weighted Least Squares. Standard errors in parentheses based on clustered robust standard errors. ***,**,* denote significance at 1,5,10 percent level, respectively.

The results are consistent with the relatively higher level of countercyclicality coefficients for AEs. This country group has higher levels of financial and economic development, larger government sizes and better institutional quality. At the same time, some of the set of covariates included in equation (3) tend to have different effects across country groups (Table 5 and 6). For example, while trade and capital

account openness are negatively correlated with fiscal countercyclicality in AEs (as found in Aghion and Marinescu, 2008 and Furceri and Jalles, 2018), they are positively associated with fiscal countercyclicality in emerging markets and low-income countries. Similarly, government size tends to have a larger effect in AEs than in developing economies, while the opposite is true for the level of economic and financial development.

Table 6. Determinants of Fiscal Stabilization for Emerging Markets and Developing Economies, 1990-2021

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Credit to GDP (t-1)	0.309***	0.308***	0.139*	0.231***	0.331***	0.208***	-0.054	0.217	0.157**
	(0.074)	(0.072)	(0.073)	(0.082)	(0.073)	(0.065)	(0.144)	(0.188)	(0.072)
GDP per capita (t-1)	0.103**	0.128***	0.210***	0.221***	0.071	0.004	-0.193*	0.214	0.013
	(0.048)	(0.049)	(0.077)	(0.065)	(0.049)	(0.066)	(0.103)	(0.144)	(0.065)
Agriculture value added (t-1)	0.187	0.158	1.248***	0.504	0.037	-0.149	0.658**	1.184**	-0.133
	(0.169)	(0.159)	(0.240)	(0.365)	(0.172)	(0.170)	(0.300)	(0.475)	(0.155)
Trade openness (t-1)	0.008	0.007	-0.050	0.076	0.062**	0.033	0.092	0.326***	0.059**
	(0.024)	(0.026)	(0.062)	(0.079)	(0.025)	(0.022)	(0.061)	(0.099)	(0.023)
Capital account openness (t-1)	0.016	0.008	0.078	-0.141**	0.032	0.010	0.027	-0.087	-0.001
	(0.050)	(0.050)	(0.054)	(0.057)	(0.052)	(0.053)	(0.084)	(0.124)	(0.052)
Government expenditure to GDP (t-1)	-0.117			-0.728**	-0.251	-0.332	-0.357	0.347	-0.098
	(0.350)			(0.284)	(0.360)	(0.359)	(0.288)	(0.352)	(0.188)
Gross debt ratio (t.1)		0.021							
		(0.014)							
Social benefits (t-1)			0.855						
			(0.585)						
Banking crises (t-1)				-0.006					
				(0.024)					
Pandemics and epidemics (t-1)				-0.010					
				(0.020)					
Presidential election held (t-1)					-0.004	-0.018	-0.033	-0.017	-0.005
					(0.024)	(0.023)	(0.024)	(0.028)	(0.023)
Legislative election held (t-1)					0.002	0.010	0.020	0.005	0.006
					(0.017)	(0.017)	(0.020)	(0.021)	(0.017)
Margin of majority (t-1)					0.123***	0.077***	0.107***	0.065*	0.080***
					(0.026)	(0.025)	(0.037)	(0.040)	(0.025)
Government fractionalization (t-1)					-0.123***	-0.077***	-0.107***	-0.065*	-0.080***
					(0.026)	(0.025)	(0.037)	(0.040)	(0.025)
Informality (t-1)						-0.012			
						(0.009)			
CPIA inflation (t-1)							-0.044		
							(0.029)		
Corruption perception index (t-1)								-0.003	
								(0.004)	
Government Effectiveness (t-1)									0.097**
									(0.040)
Regulatory Quality (t-1)									-0.036
									(0.039)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2,575	2,558	1,629	656	2,380	2,129	774	827	1,941
R-squared	0.473	0.478	0.589	0.582	0.487	0.439	0.568	0.676	0.514

Note: Results obtained by estimating Equation (3) using Weighted Least Squares. Standard errors in parentheses based on clustered robust standard errors. ***,**,* denote significance at 1,5,10 percent level, respectively.

The analysis can be further refined by investigating the specific determinants of automatic stabilizers (Table 7). For this purpose, we use (3) to decompose the coefficient β^{AS} associated with automatic stabilizer component estimated in (2). Results show that the impact of financial and economic development on automatic stabilizers is relatively less pronounced than for the overall coefficient.

Notable exceptions compared with results in Table 4 are the government size and the gross debt ratio, whose impact of automatic stabilization is more pronounced.

Finally, as a robustness check, we apply alternative indicators and re-estimate the full specification in Table 4 by excluding country and/or time fixed effects (Table 8) and by splitting the country sample into high-debt versus low-debt countries (Table 9). Results are largely consistent with those in the baseline specification in Table 4 in terms of the statistical significance of the macroeconomic variables.

Table 7. Determinants of Automatic Stabilizers, 1990-2021

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Credit to GDP (t-1)	0.035* (0.021)	0.066*** (0.020)	0.071*** (0.023)	0.029 (0.030)	0.035* (0.022)	0.028 (0.023)	0.785* (0.456)	0.163*** (0.044)	0.029 (0.023)
GDP per capita (t-1)	-0.001 (0.040)	0.019 (0.044)	-0.143** (0.060)	-0.049 (0.049)	-0.008 (0.040)	-0.025 (0.047)	1.242* (0.666)	-0.000 (0.133)	-0.039 (0.046)
Agriculture value added (t-1)	-0.370 (0.438)	-0.874** (0.440)	-0.324 (0.532)	-0.659 (0.549)	-0.439 (0.435)	-0.413 (0.430)	1.890 (2.143)	0.773 (1.216)	-0.248 (0.449)
Trade openness (t-1)	0.003 (0.014)	-0.019 (0.015)	0.014 (0.025)	0.033 (0.025)	0.008 (0.019)	0.014 (0.018)	-0.179 (0.220)	-0.118** (0.053)	-0.001 (0.019)
Capital account openness (t-1)	0.035* (0.019)	0.005 (0.019)	0.038 (0.024)	0.045* (0.028)	0.037* (0.019)	0.038* (0.020)	0.033 (0.263)	-0.034 (0.048)	0.055*** (0.021)
Government expenditure to GDP (t-1)	0.779*** (0.108)			0.633*** (0.157)	0.783*** (0.114)	0.787*** (0.117)	1.697 (1.079)	0.882*** (0.254)	0.710*** (0.134)
Gross debt ratio (t-1)		0.144*** (0.030)							
Social benefits (t-1)			0.457* (0.247)						
Banking crises (t-1)				0.018 (0.015)					
Pandemics and epidemics (t-1)				0.008 (0.009)					
Legislative election held (t-1)					-0.010 (0.007)	-0.008 (0.006)	-0.005 (0.051)	-0.002 (0.011)	-0.005 (0.007)
Presidential election held (t-1)					0.007 (0.010)	0.003 (0.008)	-0.031 (0.128)	0.011 (0.015)	0.007 (0.010)
Margin of majority (t-1)					0.011 (0.018)	0.014 (0.018)	0.344 (0.431)	-0.014 (0.032)	0.014 (0.018)
Government fractionalization (t-1)					-0.011 (0.018)	-0.014 (0.018)	0.344 (0.227)	0.014 (0.032)	-0.014 (0.018)
Informality (t-1)						-0.002 (0.003)			
CPIA inflation (t-1)							0.077 (0.171)		
Corruption perception index (t-1)								-0.003 (0.002)	
Government Effectiveness (t-1)									0.056** (0.025)
Regulatory Quality (t-1)									-0.044* (0.024)
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1,431	1,426	1,128	749	1,398	1,292	75	583	1,254
R-squared	0.779	0.777	0.417	0.864	0.779	0.791	0.438	0.560	0.796

Note: Results obtained by estimating Equation using Weighted Least Squares (3) , and Hamilton-filtered *CAB* in (2). Standard errors in parentheses based on clustered robust standard errors. ***,**,* denote significance at 1,5,10 percent level, respectively.

Table 8. Determinants of Countercyclicality of Fiscal Policy, Robustness check with Alternative Specifications

Specification Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Credit to GDP (t-1)	0.262***	0.164***	0.294***	0.135***	0.251**	0.048	0.240**	0.048
	(0.039)	(0.026)	(0.042)	(0.021)	(0.115)	(0.042)	(0.106)	(0.042)
GDP per capita (t-1)	0.073	0.003	0.174***	0.019	0.141	-0.051*	0.157	-0.051*
	(0.047)	(0.012)	(0.033)	(0.012)	(0.153)	(0.026)	(0.151)	(0.027)
Agriculture value added (t-1)	0.018	-0.028	-0.097	-0.010	0.667	-0.776***	0.605	-0.775***
	(0.168)	(0.121)	(0.189)	(0.098)	(0.601)	(0.171)	(0.583)	(0.172)
Trade openness (t-1)	0.052**	-0.028	0.053**	-0.058***	0.202**	-0.061***	0.180*	-0.061***
	(0.023)	(0.027)	(0.022)	(0.014)	(0.102)	(0.023)	(0.101)	(0.023)
Capital account openness (t-1)	0.017	0.121*	0.015	0.105***	-0.217**	0.077**	-0.215**	0.077**
	(0.046)	(0.063)	(0.045)	(0.026)	(0.093)	(0.038)	(0.093)	(0.038)
Government expenditure to GDP (t-1)	-0.156	0.406***	-0.167	0.268***	0.170	0.527***	0.167	0.527***
	(0.332)	(0.123)	(0.378)	(0.097)	(0.356)	(0.126)	(0.354)	(0.126)
Presidential election held (t-1)	-0.008	0.026	-0.004	0.008	-0.027	-0.036	-0.027	-0.036
	(0.019)	(0.030)	(0.020)	(0.027)	(0.022)	(0.033)	(0.022)	(0.033)
Legislative election held (t-1)	0.005	0.050**	0.011	0.028	0.020	0.058*	0.021	0.058*
	(0.015)	(0.023)	(0.016)	(0.018)	(0.020)	(0.034)	(0.020)	(0.035)
Margin of majority (t-1)	0.107***	0.058*	0.097***	0.066***	0.058	0.089**	0.057	0.089**
	(0.025)	(0.033)	(0.027)	(0.024)	(0.049)	(0.041)	(0.049)	(0.041)
Government fractionalization (t-1)	-0.107***	-0.058*	-0.097***	-0.066***	-0.058	-0.089**	-0.057	-0.089**
	(0.025)	(0.033)	(0.027)	(0.024)	(0.049)	(0.041)	(0.049)	(0.042)
Informality (t-1)					0.023*	-0.004***	0.019	-0.004***
					(0.014)	(0.001)	(0.012)	(0.001)
Corruption perception index (t-1)					0.003	-0.000	0.003	-0.000
					(0.004)	(0.002)	(0.004)	(0.002)
Government Effectiveness (t-1)					-0.022	-0.045	-0.020	-0.045
					(0.081)	(0.057)	(0.080)	(0.058)
Regulatory Quality (t-1)					0.152*	0.054	0.140	0.053
					(0.095)	(0.038)	(0.095)	(0.038)
Country fixed effect	Yes	No	Yes	No	Yes	No	Yes	No
Time fixed effect	Yes	No	No	Yes	Yes	No	No	Yes
No. of observations	3,007	3,007	3,007	3,007	878	878	878	878
R-squared	0.500	0.099	0.484	0.171	0.716	0.115	0.716	0.115

Note: Results obtained by estimating Equation (3) Hamilton-filtered output gaps and Weighted Least Squares. Standard errors in parentheses based on clustered robust standard errors. ***,**,* denote significance at 1,5,10 percent level, respectively.

Table 9. A Summary on the Determinants of Countercyclicality of Fiscal Policy: Distinguishing between High- and Low-Debt Countries

Explanatory variables	Overall stabilization			Automatic stabilization		
	All countries	High debt	Low debt	All countries	High debt	Low debt
Credit to GDP (t-1)	+,*	+,*		+,*	+,*	
GDP per capita (t-1)	+,*	+,*	+,*			
Agriculture value added (t-1)	+,*	+,*	+,*	-,*	+,*	-,*
Trade openness (t-1)	+,*	+,*				+,*
Capital account openness (t-1)	-,*			+,*	+,*	
Government expenditure to GDP (t-1)				+,*		+,*
Gross debt ratio (t.1)	+,*		+,*	+,*		+,*
Banking crises (t-1)	+,*	+,*			+,*	-,*
Presidential election held (t-1)	+,*					
Legislative election held (t-1)						
Margin of majority (t-1)	+,*	+,*	+,*		+,*	-,*
Government fractionalization (t-1)	-,*	-,*			-,*	+,*
Informality (t-1)		-,*			-,*	-,*
CPI inflation (t-1)						
Corruption perception index (t-1)					-,*	
Government effectiveness (t-1)				+,*	+,*	
Regulatory quality (t-1)				-,*	-,*	

Note: Countries are separated into high and low debt based on the public debt to GDP ratio. Countries with a public debt ratio exceeding the corresponding median would be considered as high debt. The '+' and '-' signs refer to the signs of the estimated coefficients. '*' indicates that the estimated coefficients are statistically significant at 10 percent level; blank cells indicate the coefficients are statistically insignificant.

V. Conclusions

This paper revisited the notion of fiscal countercyclicality in light of recent business cycles and severe downturns. The main contribution of the paper is to provide a novel dataset of time-varying measures of fiscal countercyclicality for a large and unbalanced panel of advanced and emerging market and developing economies between 1980 and 2021. The paper investigated the scope, time trend, and cross-country variation of the countercyclicality of fiscal policies, distinguishing the role between discretionary fiscal policy and automatic stabilizers, as well as the effects of different budget components. It also presents the main macroeconomic and structural determinants of fiscal countercyclicality. The use of time-varying measures of fiscal stabilization overcomes the major limitations of previous studies when assessing its determinants that rely on cross-country regressions without accounting for country-specific as well as global factors, such as the potential different effects during severe crises.

Our results show that: (i) the counter-cyclicality of fiscal policies has increased over time for many economies over the last two decades, particularly for emerging market economies; (ii) the countercyclicality tends to be much stronger during severe downturns and statistically different from

typical recessions, especially for advanced economies; (iii) previously estimated coefficients on counter-cyclicality are likely to be lower bounds, (iv) the discretionary and automatic components of the budget balance display countercyclical effects for advanced economies, but cannot be pinpointed in a statistically significant way for emerging market economies and low-income countries, (v) the countercyclicality of fiscal policies operates primarily though the expenditure side of the budget, with social benefits being the most countercyclical component; and (vi) financial development, government size, and institutional quality matter for the degree of countercyclicality. These findings support the view that fiscal responses have been stronger during severe economic downturns, such as the COVID-19 pandemic and during the global financial crisis. Our results also confirm the importance of automatic stabilizers as part of the fiscal toolkits in responding to adverse shocks. One limitation of our work is that it does not provide a benchmark for the optimal degree of fiscal countercyclicality.

Appendix. Table A1: Variables definition

Variable	Proxy for	Expected sign	Data source
Real GDP per capita	The level of economic development	Positive: higher income levels are typically associated with better quality institutions and larger automatic stabilization	WEO
Inflation, percent change of annual average CPI	Macroeconomic stability	Positive if active fiscal policy is required to produce macroeconomic stability, but negative if fiscal policy does not need to be active in a stable macroeconomic environment	WEO
Credit-to-GDP ratio	Financial development	Positive: better financial systems improve the ability of government to borrow during downturns and to conduct countercyclical policy.	WDI
Ratio of total exports and imports in GDP	Trade openness	Positive: trade openness opens the door to external shocks, which in turn induces the use of active fiscal policy as a stabilization device.	WEO
Chinn-Ito index	Capital account openness	Positive: financial openness increases exposure to external shocks, which in turn, induces the use of active fiscal policy as a stabilization device.	Chinn and Ito (2006)
Government expenditure to GDP ratio	Government size	Positive: larger government expenditure implies more active fiscal policy.	WEO
Dummy variable indicating banking crises	Financial crises	Positive or negative depending on the level of indebtedness and borrowing cost.	Leaven and Valencia (2018)
Dummy variable indicating Pandemics	Pandemics	Positive: more active fiscal policy during pandemics	Ma et al. (2020)
Share of agriculture value added	Economic modernization	Negative: fiscal policy is less active in agriculture-oriented economies	WDI
Government gross debt and fiscal balance, as ratios to average tax revenues	Fiscal space	Positive: more fiscal space allows for active fiscal policy.	Kose et al. (2020)
Dummy indicating the existence of fiscal rules	Strength and quality of fiscal institutions	Positive: better fiscal institutions allow for active fiscal policy.	Davoodi and others; IMF, 2022
Indexes for democracy and governance	Democracy and governance	Positive: Democracy and governance are associated with higher degree of political and economic freedom, which in turn, allow for active fiscal policy.	Worldwide Governance Indicators
Indexes for constraints on the executive branch of the government	Institutional quality	Positive: constraints on the executive branch are likely to reduce spending volatility, which in turn, positively influences the size of fiscal stabilization	Acemoglu et al. (2013) and Fatas and Mihov (2013)
Dummy variables for the occurrence of executive and legislative elections	Political stability	Positive: political stability allows for active fiscal policy.	Drazen 2000; Persson and Tabellini 2000
Index for Informality	Economic modernization	Negative: informal economies tend to display lower countercyclical forces	Elgin et al. (2021)
Index for Corruption	Institutional quality	Negative: reduce the ability of governments to adjust to economic shocks	Worldwide Governance Indicators

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