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Fiscal Space and Government-Spending & Tax-Rate Cyclicality Patterns: A Cross-Country Comparison, 1960-2016

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ABSTRACT

The upward trajectory of OECD policy interest rates may impose growing fiscal challenges, thus testing the fiscal space of countries and their resilience. Against this background, we compare fiscal cyclicality across Asia, Latin America, OECD, and other regions from 1960-2016, then identify factors that explain countries' government spending and tax-policy cyclicality. Our study reveals a mixed fiscal scenery, where more than half of the countries are recently characterized by limited fiscal space, and fiscal policy is either acyclical or procyclical (though not as high the level of 1980s), notably post-GFC becoming even more procyclical in government spending when accounting for net acquisition of nonfinancial assets and capital expenditure (spending components do matter). The cyclicality is also asymmetric: on average, a more indebted (relative to tax base) government spent more in good times (positive growth) and cut back the spending even more in bad times (weak economy). Added to the public debt/GDP data, we construct the 'limited-fiscal-capacity' statistic, measured by the size of public debt/[average tax revenue] and its volatility, which is found positively associated with the fiscal pro-cyclicality. Further, we also find that country's sovereign wealth fund has a countercyclical effect in our estimation. The analysis depicts a significant economic impact of an enduring interest-rate rise on fiscal space: a 10% increase of public debt/tax base is associated with an upper bound of 6.1% increase in government-spending procyclicality. For both government-spending cyclicality and tax-rate cyclicality, we find no one-size-fits-all explanation for all (OECD/developing) countries at all (good/bad) times. Fiscal space, trade, and financial openness, the share of natural resource/ manufacturing exports, inflation, and institutional risks are associated with the cross-country patterns of fiscal cyclicality, suggesting the measured cyclicality is context specific and the fiscal-monetary-political economy interactions are at work. We rank the explanatory factors across countries and regions and discuss policies to increase the fiscal capacity for countercyclical policy.

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1. Introduction

The Global Financial Crisis (GFC) focused attention on unsustainable leverage growth as a key contributing factor in growing financial fragility associated with "bubbly" dynamics. Essentially a prolonged appreciation of financial and real estate markets increases the vulnerability to sharp asset valuation corrections. A deep enough correction may trigger banking crises and fire sales dynamics, potentially pushing the economy into a prolonged depression and a growing exposure to social and political instability.[1] Concerns about reliving the 1930s Great Depression explain the complex set of policies implemented by the U.S. and other affected countries in the aftermath of the GFC: a massive infusion of liquidity in support of financial and banking systems and bailing out systemic banks and prime creditors. The forced deleverage of private borrowers, and the growing fear of a prolonged recession, induced higher household savings and lower investment, further deepening recessionary forces.

Many countries had thus experimented with fiscal stimuli aimed at mitigating the deepening recessions. Stabilizing the banking and financial systems, in addition to the stimuli, ended up sharply raising countries' public debt/GDP, pushing advanced countries towards a public debt/GDP of above 100% [see Figure 1]. Similar trends applied to emerging market economies [EMEs], driving their public debt/GDP upward, with some reaching well above 50%. Notwithstanding the fact that the average public debt/GDP of EMEs is below that of OECD countries, EMEs' lower tax base/GDP ratios, as well as the higher interest rates paid on their debt (due to sovereign risk premia), imply a rising fragility of EMEs compared with OECD countries. As such, while the public debt/GDP is used frequently in policy discussions, accounting for tax base and the ratio of public debt/average tax base may provide a more informative measure of the fiscal burden associated with the stock of public debt (Aizenman & Jinjarak, 2011). Henceforth, we refer to this fiscal measure as *limited fiscal space*.[2]

[1] See Minsky (1992) for the financial instability hypothesis, which analyzes financial market fragility over the life cycle of an economy with speculative investment bubbles endogenous to financial markets. Rajan (2006) pointed out that banking deregulation during the 1980s–2000s increased leverage and risk taking, contributing to a greater exposure to financial stability associated with tail risks. Schularick and Taylor (2012) and Jordà, Schularick, and Taylor (2013) provided empirical evidence linking leverage, business cycles, and crises.

[2] The euro crisis provided a vivid example of how focusing on public debt/GDP below a certain threshold caused a failure to recognize the large heterogeneity of the tax base/GDP in the Eurozone (Aizenman, Hutchison, & Jinjarak, 2013). Similarly, the interest expense needed to serve the public debt as a share of tax revenue may provide a robust measure of the burden of serving the public debt and be more informative than the interest cost of the public debt/GDP ratio.

Importantly, the post-GFC trajectory failed to deal with leverage concerns: "At $164 trillion—equivalent to 225% of global GDP—global debt continues to hit new record highs almost a decade after the collapse of Lehman Brothers. Compared with the previous peak in 2009, the world is now 12% of GDP deeper in debt, reflecting a pickup in both public and nonfinancial private sector debt after a short hiatus. All income groups have experienced increases in total debt, but, by far, EMEs are in the lead." (Fiscal Monitor, 2018). In other words, stabilizing a crisis triggered by an unsustainable leverage growth in turn contributed to a potentially untenable increase in leverage/GDP ratios.

For the past decade, the monetary easing associated with the U.S. Federal Reserve (FED) and the European Central Bank (ECB) policies in the aftermath of the GFC led to an unprecedented decline of policy interest rates and risk premia. These developments markedly reduced the flow costs of serving the rising public and private debt, thereby masking the increasing fragility associated with the rising aggregate leverage/GDP. This period has now passed: the (so far) robust recovery of the U.S., the gradual unwinding of the FED's balance sheet, the projected upward trajectory of the FED's funds rate, and the recovery of the Eurozone will impose growing fiscal challenges that will test countries' fiscal space and their ability to cope with projected higher interest rates by raising their resilience.

A key resilience margin is securing fiscal space—i.e., the fiscal capacity of countercyclical policy aimed at mitigating business cycles and preventing a prolonged depression in the aftermath of financial crises (Auerbach, 2011; Ostry, Ghosh, Kim, & Qureshi, 2010); see also Gavin, Hausmann, Perotti, and Talvi (1996) on the identification of fiscal procyclicality as a major amplifier of developing countries' vulnerability to shocks. Remarkably, over the last two decades leading to the GFC, a growing share of fiscal policies in developing countries and EMEs had graduated from procyclicality and become countercyclical [see J. Frankel (2011) and J. A. Frankel, Vegh, and Vuletin (2013)]. Cross-country studies offer several explanations. Woo (2009) presented some evidence showing that social polarization, as measured by income and educational inequality, is consistently and positively associated with fiscal procyclicality, controlling for other determinants; there is also a robust negative impact of fiscal procyclicality on economic growth. Aizenman and Jinjarak (2012) found that higher income inequality is strongly associated with a lower tax base, lower de-facto fiscal space, and higher sovereign spreads. Vegh and Vuletin (2015) find that tax policy is less procyclical/more countercyclical in countries with better institutional

quality and more financially integrated; tax and spending policies are conducted in a symmetric way over the business cycle. For brevity, Table 1 provides a summary of the related literature.[3]

Against this background, we assess definitions and empirical measures of fiscal cyclicality, compare fiscal cyclicality across Asia, Latin America, the OECD, and other regions, then identify factors accounting for spending and tax policy cyclicality patterns. We link the capacity of countercyclical policy to the fiscal space and the stage of economic and institutional development, as both are associated with the servicing capabilities of domestic and foreign debt. Our analysis focuses on differences across the country groups and examine the role of economic structure (commodity versus manufacturing outputs), financial openness, as well as institutions and socio-economic factors (political risks, polarization, and ethnic polarization). The paper concludes with an analysis of possible scenarios and suggested policies aiming at increasing the resilience of EMEs.

Our study reveals a mixed fiscal scenery, where more than half of the countries are characterized by limited fiscal space, and fiscal policy is either pro- or acyclical. More limited fiscal capacity, as measured by public debt / [3-years moving-average tax revenue] and its volatility are positively associated with fiscal cyclicality, while public debt/GDP are statistically significant in several cases, suggesting that public debt/tax base provides a robust fiscal-space explanation for studying government-spending and tax-rate cyclicality.[4] We calculate the impact of an enduring interest-rate rise on fiscal space, rank countries and regions by the fragility of their fiscal space to such an environment, and discuss policies to increase fiscal resilience.

[3] Related strands of the literature examine fiscal multipliers: see Ramey and Zubairy (2018), Leeper, Traum, and Walker (2017), and Ilzetski, Mendoza, and Vegh (2013); fiscal rules: see IMF (2017); and large fiscal adjustments: see Alesina, Favero, and Giavazzi (2015). Empirically, fiscal cyclicality, fiscal multipliers, fiscal rules, and large fiscal adjustments are intertwining issues; their relationships remain an open question and a challenge to address altogether in one go.

[4] Public debt/tax base in public finance is akin the net debt to earnings before interest depreciation and amortization ratio in the corporate sector (aka Debt / EBITDA). Net debt to earnings ratio is a measurement of leverage, how many years it would take for a company to pay back its debt if net borrowing is zero, and EBITDA are held constant; used frequently by credit rating agencies. "Ratios higher than 4 or 5 typically set off alarm bells because this indicates that a company is less likely to be able to handle its debt burden, and thus is less likely to be able to take on the additional debt required to grow the business", see https://www.investopedia.com/terms/n/net-debt-to-ebitda-ratio.asp .

2. Empirical Analysis

This section describes the data and reports the empirical patterns of fiscal cyclicality across Asia, Latin America, the OECD countries, and other regions, comparing the estimates across time periods from 1960-2016. We then explore the determinants of countries' capacities in conducting countercyclical fiscal policy, focusing on tax base, public debt, economic structure, financial openness, as well as institutions and socio-economic factors.

Our choice of controlling variables aims at three factors associating with the fiscal capacity to conduct countercyclical policy; the list is by no means exhaustive and subject to data availability. First: the credit constraints. The shape of the supply of funds facing the public sector in recessions is a key determinant of fiscal space. A flatter supply of funds implies an easier countercyclical policy funded by borrowing, which in turn is impacted by the presence of buffers [international reserves, sovereign wealth funds] possibly managed by a fiscal rule that allows for more counter-cyclicality during recessions. Furthermore, lower external and internal private and public debt/GDP, as well as the ability to borrow in domestic currency, is associated with greater fiscal space thereby allowing for cheaper borrowing in bad times.

Second: the quality of institutions. Factors associating with fiscal space also include a history of default and inflation, the terms of trade volatility, the quality of institutions, and so forth. In particular, the collection efficiency of tax revenue is impacted by the maturity of institutions and the spectrum of taxes [e.g., value-added taxes (VAT) and income taxes that are properly enforced]. Greater political and ethnic polarization, inequality, and corruption may reduce a population's cooperation to pay their "fair share", thereby making tax collection harder, increasing country's sovereign spreads, and leading to lower fiscal space. Public procyclicality may also be weaker in countries with more progressive taxes and transfers, as well as more countercyclical infrastructure expenditure [e.g. the People's Republic of China's use of infrastructure and housing investment as a countercyclical policy]. Third: the tax-base variability. The magnitude of revenue procyclicality depends on production structure. Higher commodity share in the GDP may be associated with higher exposure to procyclicality of government revenues. Higher urbanization and international trade is associated with easier collection of taxes, implying that tax compliance is higher and may result in tax revenue procyclicality.

2.1. Data and Empirical Specifications

To estimate the empirical patterns of fiscal-policy cyclicality and its determinants, we start by using the benchmark framework in the literature; see for example Woo (2009). Specifically, we proceed the empirical analysis in two estimation steps:

Estimation Step 1: Country-specific time-series regressions to measure the cyclicality of fiscal (spending, tax rates) policy for the 1960–2016 period (and sub-periods):

$$\Delta\, logRGS_{it} = \alpha_i + \beta_i * \Delta\, logRGDP_{it} + \varepsilon_{it}\,, \tag{1}$$

where i and t denote country and year; α_i is a constant term, ε_{it} is an error term, *RGS* is real general government final consumption, and *RGDP* is real gross domestic product. In this baseline model, we use a standard two-step Prais-Winsten regression to correct for the first-order autocorrelation in the residuals. In Prais-Winsten approach, the errors are assumed to follow a first-order autoregressive process. Since the structure of error terms is unobservable, we also report OLS with robust standard error (RSE) as a further check. We repeat the estimation procedure for the spending (GS) cyclicality subsequently for the tax rate (VAT, PIT, and CIT) cyclicality.

The estimated beta ($\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$) is the measure of spending-policy cyclicality: a positive and statistically significant coefficient indicates fiscal procyclicality; a negative and statistically significant coefficient indicates fiscal countercyclicality, and a statistically insignificant coefficient indicates fiscal acyclicality [note that the signs of tax-rate cyclicality coefficient, that is, $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$, $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}, \boldsymbol{and}\ \widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$, are the opposite that of the spending-policy cyclicality coefficient, $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$]. Clearly, a statistically significant coefficient does not necessarily imply a country conducts countercyclical fiscal policy for the whole sample period; we examine sub-periods and fiscal cyclicality across good and bad times in the following sections.

There is some variation in the estimation of fiscal cyclicality in the literature: see, for example, Lane (2003), Ilzetzki and Vegh (2008), and Vegh and Vuletin (2015), and the comparison of their methods in Table 1. We use real GDP growth instead of the output gap [based on real output and potential series by applying filtering tools, i.e. Hodrick-Prescott filter, Baxter-King filter, and Kalman filter] due to data availability. It is also unlikely that any of the potential output estimation and filtering are commonly applicable across countries. As a bottom line, we aim for the empirical framework as straightforward and easy to replicate as possible in a cross-country/panel sample. To construct the sample, we keep the countries with at least 25 years of

data. We deflated the nominal general government final consumption and nominal GDP using the GDP deflator. The main data source is the World Development Indicator (WDI) covering 137 countries from 1960–2016. For 33 countries without sufficient data from WDI, we supplement with information from the International Financial Statistics (IFS) and World Economic Outlook (WEO). These data are publicly available; we provide the raw data and codes for constructing the sample on the online appendix.

Estimation Step 2: Cross-country regressions to explain the fiscal (spending, tax rates) cyclicality for the 1960-2016 period.

We then study the determinants of the estimated $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$, $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$, $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$, **and** $\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$, focusing on the measure of limited fiscal capacity, macroeconomic and socio-economic, as well as institutional variables:

$$\hat{\beta}_i = c_0 + \gamma_i CONTROLS_i + e_i \,, \tag{2}$$

where *i* denotes country, $CONTROLS_i$ includes macroeconomic and socio-economic variables, averaged over the 1960-2016 period, including inflation, trade openness, financial openness, government size (its consumption share in the GDP), political constraints, limited fiscal capacity, export structure, and country risk, respectively. To account for the heteroskedascity, we estimate OLS regression with the White robust standard error.

Some comments on our selection of the determinants are in order. To calculate the ratio of public debt to tax revenue, we use general government tax including social contributions. To capture its second moments, we also calculate the volatility of limited fiscal capacity, using its standard deviation. As the size of tax base is persistent in the short- to medium-run, we also add an alternative measure of limited fiscal capacity, using the ratio of public debt to the 3-years moving average of tax revenue. In the estimation, we compare the public debt/tax base with the public debt/GDP, as fiscal space is a multidimensional concept, exemplified in several fiscal indicators (International Monetary Fund, 2016). To account for socio-economic and institutional quality, we use several composite risk indicators, including financial, economic, and political conditions from ICRG. We also control for political constraints (the extent to which the executives face political constraints in implementing their policy) drawn from Henisz (2002). We report in Table 2 the pairwise-correlation matrix across the determinants and Table 3 the descriptive

summary statistics of the variables in our sample [note that there are fewer countries in the later sub-period as time-series estimation becomes more demanding for many countries]. Appendix Table A1 provides the data sources and variable description [The Appendix with Tables A1-A12, and Figures A1-A2 is available via the NBER working paper Web page].

2.2. Results: Government-Spending Cyclicality and Its Determinants

Table 4 reports the summary of government-spending cyclicality based on the country-specific coefficients ($\widehat{\boldsymbol{\beta}}_{\boldsymbol{GS}}$) using Prais-Winsten estimator in Appendix Table A2: column 4. Based on the coefficient signs, we group countries into countercyclicality (6 countries), procyclicality (92 countries), and acyclicality (72 countries). Appendix Table A6.1 and Table A6.2 show the key statistics of the most procyclical and the most countercyclical countries in each region based on $\widehat{\boldsymbol{\beta}}_{\boldsymbol{GS}}$.

Looking across geographic regions in Table 4 for the 1960-2016 period, the government-spending cyclicality $\widehat{\boldsymbol{\beta}}_{\boldsymbol{GS}}$ of the Sub-Saharan Africa is the highest among the estimates of $\widehat{\boldsymbol{\beta}}_{\boldsymbol{GS}}$ (0.89; most procyclical), followed by Latin American and the Caribbean (0.77), the Middle East and North Africa (0.69), East Asia and Pacific (0.46), Europe and Central Asia (0.41), South Asia (0.35), while North America has negative and the lowest estimates of $\widehat{\boldsymbol{\beta}}_{\boldsymbol{GS}}$ (-0.25; most countercyclical). Across income levels, the degree of procyclicality is negatively associated with income level—i.e., non-OECD countries, on average, are more fiscally procyclical (0.74, higher $\widehat{\boldsymbol{\beta}}_{\boldsymbol{GS}}$) than OECD countries (0.19). Looking across income levels, the low-income countries are most fiscally procyclical (0.93) followed by lower-middle income countries (0.78), upper-middle income countries (0.69), and the high-income group (0.32). Comparing OECD countries and Non-OECD countries, the latter group is more fiscally procyclical (0.74 compared to 0.19 of the former). The empirical patterns of fiscal cyclicality across geographic regions and income levels are similar in the 1980-2016 sub-period; globally, countries became less procyclical and notably the OECD turned countercyclical. Figures 2 and 3 visualize the fiscal cyclicality of government spending ($\widehat{\boldsymbol{\beta}}_{\boldsymbol{GS}}$) by geographic region and income level.

What might explain the cross-country differences? Table 5 reports the estimation of fiscal-cyclicality ($\widehat{\boldsymbol{\beta}}_{\boldsymbol{GS}}$) coefficients on socio-economic and institutional variables for the 1960-2016 period, and the 1980-2016 sub-period. The main findings are as follows. Political constraints (*polcon*) are negatively associated with government-spending procyclicality, implying a greater degree of political constraints preventing policy discretions, which in turn limits fiscal procyclicality. Inflation *(inf)* is positively associated with fiscal procyclicality, suggesting the role

of macroeconomic instability, seigniorage, and/or passive monetary policy. Trade openness *(trade)* and financial openness *(TAL)* are negatively associated with fiscal cyclicality, implying that the countries are less likely to conduct procyclical fiscal policy if they are more trade and financially open; fiscal multipliers are smaller for more open economies. Government size, as measured by its consumption share in GDP *(gs)*, is statistically insignificant in explaining fiscal-policy procyclicality; dropping *gs* does not affect the robustness of the main results.

More limited fiscal capacity, as measured by public debt/tax base *(fiscal, lfiscap)* and its volatility *(fiscal_vol, lfiscap_vol)* are positively associated with fiscal procyclicality, while public debt/GDP *(debt)* and its volatility *(debt_vol)* are statistically insignificant, suggesting that public debt/tax base provides a robust explanation for government-spending procyclicality for the 1960-2016 period. Manufacturing export share *(manu)* is negatively associated with fiscal procyclicality, while natural resource export share *(nare)* is statistically insignificant. The composite risk index and all three component risk indices (economic, financial, and political), as well as eight out of twelve political component risk indices (social economic conditions, investment profile, internal conflict, corruption, military in politics, ethnic tensions, law and order, and bureaucracy quality), are negatively associated with fiscal procyclicality, thus indicating that lower institutional quality is associated with higher fiscal procyclicality.

Comparing the 1960-2016 period and the 1980-2016 sub-period [fewer countries as time-series estimation becomes more data demanding for many countries], the positive associations of political constraint, inflation, manufacturing export share, and institutional quality with fiscal procyclicality are largely the same. However, we find that natural resource export share and public debt/GDP become statistically and positively associated with fiscal procyclicality. The country-specific estimated coefficients using OLS estimators are consistent with those obtained from the Prais-Winsten estimators, both qualitatively and quantitatively; we find 3 fiscally countercyclical countries, 97 procyclical countries, and 70 acyclical countries [see Appendix Table A2, column 7]. The ranking of government-spending cyclicality by region, income level, and OECD group based on OLS estimates is consistent with those of the Prais-Winsten estimates. In addition, most of the associations between socio-economic/institutional variables and fiscal-policy cyclicality based on the OLS $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ estimators [see Table 5b] are supportive to the Prais-Winsten estimates, suggesting that autocorrelation and heteroscedasticity, while not necessarily non-existing, do not influence our main findings.

2.3. Additional Results: Tax-Rate Cyclicality

We look for more patterns of fiscal cyclicality by examining the association between tax rates and real GDP growth. Vegh and Vuletin (2015) construct a comprehensive data set of tax rates, including value-added tax (VAT), personal income tax (PIT), and corporate income tax (CIT). They find that tax rates are mostly procyclical (acyclical) in developing (industrial) countries, and, interestingly, VAT is procyclical in industrial countries. We are interested in understanding what explain the state (good/bad) and time-varying nature of fiscal procyclicality. To proceed, we regress tax rates (VAT, PIT, and CIT) on the percentage change in real GDP by country:

$$taxrate_{it} = \alpha_i + \beta_i * \Delta\ logRGDP_{it} + \varepsilon_{it} \quad (3)$$

, using a two-step Prais-Winsten procedure. Due to the step-like infrequent adjustment of tax rates, the estimated coefficients of some countries cannot be obtained because of the non-convergence of the AR(1) coefficient. Note that the interpretation of a sign on the estimated coefficient ($\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}, \widehat{\boldsymbol{\beta}}\boldsymbol{PIT}, \widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$) is the opposite that of $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$**:** for tax-rate cyclicality, a positive and statistically significant coefficient indicates countercyclicality; a negative and statistically significant coefficient indicates procyclicality; and a statistically insignificant coefficient indicates acyclicality. The tax-rate data cover 76 countries from 1960 to 2016. By including countries with at least 25 years of tax-rat series, we have 35 countries with VAT, 62 countries with PIT, and 62 countries with CIT. Appendix Tables A3–A5 (column 4) report the Prais-Winsten average estimated coefficients of tax-policy cyclicality using VAT, PIT, and CIT, respectively. Table A3 groups for $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$ the countries into countercyclicality (3 countries), procyclicality (5 countries), and acyclicality (27 countries). Table A4 groups for $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$ the countries into countercyclicality (6 countries), procyclicality (8 countries), and acyclicality (48 countries). Table A5 groups for $\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$ the countries into countercyclicality (2 countries), procyclicality (6 countries), and acyclicality (54 countries). Based on the estimates of tax-rate cyclicality, a majority of countries are fiscally acyclical. Appendix Tables A7.1-A9.2 provides the key statistics of the most procyclical and the most countercyclical countries based on $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}, \widehat{\boldsymbol{\beta}}\boldsymbol{PIT}, \widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$, respectively.

We cross check the OLS estimators with the Prais-Winsten estimators. Appendix Tables A3-A5 column 7 present estimated OLS coefficients for $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}, \widehat{\boldsymbol{\beta}}\boldsymbol{PIT}, \widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$. For VAT, there are 13 procyclical, 5 countercyclical and 17 acyclical countries. For PIT, there are 12 procyclical, 13 countercyclical, and 37 acyclical countries. For CIT, there are 15 procyclical, 10 countercyclical, and 37 acyclical countries. As OLS estimation makes use of all available observations (regardless of the minimum 25 years/country cut-off), we have more countries than in the Prais-Winsten estimation. While we continue to find that the majority of countries are acyclical, the OLS estimates suggest that more countries are associated with either procyclical or countercyclical tax policy. For countries with available VAT data, more of them are associated with VAT policy procyclicality, while their PIT and CIT are either countercyclical or acyclical.

After obtaining tax-rate cyclicality coefficients ($\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}, \widehat{\boldsymbol{\beta}}\boldsymbol{PIT}, \widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$) we then regress them on socio-economic and institutional variables; recall that the interpretation of $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$ is opposite that of $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$. Tables 6-8 report the determinants of tax-rate cyclicality for VAT, PIT, and CIT, respectively. As shown in Table 6 for VAT, $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$ is negatively associated, i.e. becoming more fiscally procyclical, with higher inflation (*inf*), higher institutional quality (consistent with the findings of Vegh and Vuletin (2015)), more debt/GDP volatility (*debt_vol*), and lower natural resource export share (*nare*). Table 7 reports the determinants of personal income tax rate: $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$ is negatively associated, that is, personal income tax rate is more procyclical with more limited fiscal space (*fiscal_vol, lfiscap, lfiscap_vol*), lower manufacturing export share (*manu*), lower institutional quality, and higher socio-economic and political risks. The determinants of corporate income tax rate are reported in Table 8: $\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$ is negatively associated (thus, being more procyclical) with smaller government size (*gs*), average growth (*GDP*), higher trade openness (*trade*), higher debt/GDP (*debt*), and lower institutional quality.

Our results so far suggest that, for both government-spending cyclicality and tax-rate cyclicality, there is no one-size-fit-all explanation for all (OECD/developing) countries at all (good/bad) times. Fiscal space, trade and financial openness, the share of natural resource/manufacturing exports, inflation, and institutional risks are associated with the cross-country patterns of fiscal cyclicality. The fiscal-monetary-political economy interactions are at work.

3. Economic Significance and Policy Implications

3.1. Baseline

3.1.1. Determinants of fiscal cyclicality

To derive the impact, we calculate the economic significance and rank the explanatory variables. The economic significance of each explanatory variable is calculated by multiplying its (sample) standard deviation with the (estimated) coefficient from the regression, thereby approximating the impact of one standard deviation change of the variable on the degree of fiscal cyclicality. Figure 4a plots the economic significance for each of the explanatory variables to the government-spending cyclicality ($\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$); Figure 5a the economic impact to VAT cyclicality ($\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$); Figure 6a the economic impact to PIT cyclicality ($\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$); and Figure 7a the economic impact to CIT cyclicality ($\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$). We report the economic impact from both the Prais-Winsten estimators and the OLS estimators, to account for autocorrelation and heteroscedasticity that might exist in the data.

For government-spending cyclicality, Figure 4a highlights the economic impact of institutional quality (neg.), manufacturing export share (neg.), natural resource export share (pos.), and limited fiscal space (pos.). For tax-rate cyclicality, the economic impacts across the explanatory variables are largely similar for personal income tax and corporate income tax, with the exception of VAT. Figure 5a shows the economic impact of institutional quality (pos.), manufacturing export share (pos.), natural resource export share (neg.), and limited fiscal space (neg.) on VAT procyclicality, $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$ (recall the sign of tax-rate cyclicality is the opposite that of government-spending cyclicality); quite the opposite from the economic impacts on $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$ (Figure 6a) and $\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$ (Figure 7a). This suggests that the cyclicality patterns of VAT differ from the patterns of PIT and CIT.

3.1.2. Fiscal cyclicality: OECD v. Non-OECD countries

It turns out that the uniqueness of VAT cyclicality is traceable in the OECD v. non-OECD cyclicality patterns. We look into the different cyclical patterns of government spending in OECD and non-OECD countries using panel regressions with pooled-OLS and Fixed Effects (controlling for country and year effects) specifications with robust standard errors, shown in Table 9a. From 1960-2016, the non-OECD countries are more procyclical, by a factor of 1.5-3.0, than the OECD

countries. When it comes to tax-rate cyclicality, however, as shown in Table 9b we find that OECD countries are fiscally procyclical in VAT, but countercyclical in CIT and PIT; whereas non-OECD countries are associated with tax procyclicality in VAT, CIT, and PIT.

3.1.3. Government-spending cyclicality by income level

There is no surprise here. Studying with panel data estimation the cyclical patterns of government spending across income groups, shown in Table 10a we find that higher-income countries are less fiscally procyclical, followed by middle-income countries, then the low-income countries. This finding is consistent with the results from country-specific time-series regressions reported in Table 4, as well as the panel estimation of OECD v. non-OECD countries.

3.1.4. Government-spending cyclicality by sub-periods

What is the time-varying nature of fiscal cyclicality? We find that it matters whether the government spending includes net acquisition of nonfinancial assets and capital expenditure, or not. Using the WDI data, which does not include net acquisition of nonfinancial assets and capital expenditure, we find that, on average, countries in our sample have become less procyclical since the 1980s. We divided the whole sample into 6 sub-periods: 1960–1971; 1972–1980; 1981–1989; 1990–1998; 1999–2007; and 2008–2016 (hence, the first sub-period covers 12 years, and each of the other periods covers 9 years of data). As shown in Table 11a, the 1981–1989 period is characterized by the highest procyclical government-spending levels, followed by the 1990–1998 period, the 1999–2007 period, then the 2008–2016 period. Based on this evidence, government-spending cyclicality is on the downward trend.

The picture changes if we account for the net acquisition of nonfinancial assets and capital expenditure into the government spending. Using instead the government spending data based on WEO definition, which includes net acquisition of nonfinancial assets and capital expenditure, countries in our sample have not become less procyclical during the past two decades. Using the WEO data, we divided the sample into 2 periods, before-crisis period (pre-2008) and after-crisis period (from 2008 onwards). Shown in Table 11b the post-GFC period is no less fiscally procyclical compared to the before-crisis period (controlling for country and year fixed effects, the post-GFC is more procyclical). While the 2008-2016 procyclicality is well below the level witnessed in the 1980s, the current historic-high public debt outstanding may be detrimental to any chance of countercyclical policy in a more unpredictable macroeconomic environment.

3.1.5. Determinants of government-spending cyclicality across regions

It is clear that the degrees of fiscal cyclicality differ markedly across countries and regions. Given the differences in the economic development and institutions, it is unlikely that we can come up with a sweeping explanation, but at least we can try. In order to examine the economic significance of each explanatory variable on the regional basis for explaining government-spending cyclicality, we repeat the analysis by region. North America and South Asia are dropped due to insufficient data. Hence, we study in details five geographic regions: East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, the Middle East and North Africa, and Sub-Saharan Africa. We show in Figures 8–12 the economic impacts by region, focusing closely on the associations of public debt, export structure, and country risks with the government-spending cyclicality.

East Asia and the Pacific: governance and institutional quality, as measured by most of the country risk indices, have large and negative effects on fiscal procyclicality (except external conflict index, which is not statistically significant). Europe and Central Asia: manufacturing export share and institutional quality have the expected negative association with fiscal procyclicality; however, public debt/GDP has a statistically significant and negative association with the government-spending cyclicality (that is, more debt/GDP is associated with more fiscally procyclical). Latin America and the Caribbean: better institutional quality, more stable politics, smaller share of natural resource exports, and lower public debt/GDP are associated with lower government-spending procyclicality. The Middle East and North Africa: somewhat intriguing as good scores on some socio-economic and political-stability variables are negatively associated with fiscal procyclicality as expected, but there are institutional variables (lower corruption, better bureaucratic quality) positively associated with fiscal procyclicality. Sub-Saharan African countries: interestingly some evidence of better institutional quality positively associating with procyclicality, yet the negative association of fiscal space (public debt relative to tax base and GDP) and the share of manufacturing exports with government-spending procyclicality is the most obvious in this region.

3.1.6. Excluding Social Contributions from the Tax Base

Tax base has several components. What would happen if we repeat the estimation using tax base without social security contributions? Social contributions are important to many

countries' budgets. However, we do not find much difference in the regression results as well as the economic significance of each explanatory variables to $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$, $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$, $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$, $\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$, in the whole sample period and sub-periods.

3.2. Fiscal Space in Deteriorating Macroeconomic Environment

3.2.1. Increase in Public Debt/Tax Base and Government-Spending Cyclicality, by Region

What would happen if there is an enduring rise in the global interest rate, thereby increasing the cost of borrowing and servicing public debt? To gain further insight, we looked closely at the economic significance of limited fiscal capacity on government-spending cyclicality, using both the public debt/tax base [see Figure 13(i)] and the public debt/3-year average tax base [see Figure 13(ii)]. We then calculated what would happen if fiscal capacity drops by 10%: specifically, 0.1*(Regional-Specific estimated coefficient of public debt/tax base)*(Regional-Specific public debt/tax base average over the 1960-2016 period). The top panels in Figures 13(i) and 13(ii) show the limited fiscal capacity, as measured by public debt/tax base, average from 2010 to 2016. East Asia and the Pacific and the Middle East and North Africa have on average lower fiscal capacity compared to Latin America and Caribbean, Sub-Saharan Africa, and Europe and Central Asia. However, as shown in the bottom panels the Sub-Saharan Africa is distinctly fragile fiscally, being exposed to large government-spending procyclicality if the macroeconomic environment and its fiscal space deteriorate. Based on the calculation, a 10% increase in public debt/tax base is associated with an upper bound of 6.1% increase in government-spending procyclicality.

3.2.2. Increase in Public Debt/Tax Base and Government-Spending Cyclicality, by Country

We also calculate for each country the impact of deteriorating fiscal space: specifically: 0.1*(Country-Specific public debt/tax base)*(Regional-Specific estimated coefficient of public debt/tax base) to estimate the economic significance of a 10% drop in fiscal capacity on a country basis to the government-spending cyclicality. We use regional-specific coefficient in place of country-specific coefficient as there is insufficient country-level data to estimate the 2nd-step regression (that is, equation (2); $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ = f[Public Debt/Tax Base, Control Variables]) on the country-by-country basis. As shown in the upper panels of Figure 14(i) and 14(ii), Iraq, Japan, Singapore, Egypt, Greece, Libya, Yemen, Jamaica show limited fiscal capacity based on the 2010–2016 data, accumulating public debt four to eight times larger than their tax base (Iraq has public debt approximately forty time higher than its tax revenue). According to the calculation, fiscally

fragile countries are mostly in Sub-Saharan Africa (Republic of Congo, Nigeria, Rwanda Seychelles,) and a few cases in East Asia and the Pacific (Vietnam, Indonesia, Cambodia; and Japan, which is rather an exceptional case).

3.3. Fiscal Cyclicality at Good Times v. Bad Times

Recent studies point to the importance of understanding the asymmetry of fiscal cyclicality in good times vis-à-vis bad times. Alesina et al. (2017) use the narrative-identified exogenous fiscal stabilizations (i.e. their adoption is not supposed to be correlated with the economic cycle) to show that for 16 OECD countries the government spending cuts and cuts in transfers are much less harmful than tax hikes. Auerbach and Gorodnichenko (2017) show that for G-7 countries the government spending shocks do not lead to persistent increases in debt-to-GDP ratios or costs of borrowing, especially during periods of economic weakness. Yet, we are concerned with both industrial and developing countries. While the estimated $\widehat{\boldsymbol{\beta}}$'s so far [from equations (1) and (3)] provide the patterns of government-spending and tax-rate cyclicality, we could delve further by separating the fiscal actions in good times from the fiscal actions in bad times. Not to complicating our analysis with output-gap estimates and trend filtering, we define good times as the periods with positive real GDP growth rate and bad times as the periods with negative real GDP growth rate:

$$\Delta\, logRGS_{it} = \alpha_i + \gamma_i * \Delta\, logRGDP_{it} + \lambda_i * D_{it} + \theta_i * \Delta\, logRGDP_{it} * D_{it} + \nu_{it} \qquad (4)$$

, where $D_{it} = 0$ if good times (strong economic growth in country i at time t), $D = 1$ if bad times (weak economic growth), and θ_i tests the asymmetric response of government spending in bad times compared to good times for country i. To obtain the OLS and the Prais-Winsten estimators, we regress:

$$\text{D = 0:} \qquad \Delta\, logRGS_{it} = \alpha_i + \gamma_i * \Delta\, logRGDP_{it} + u_{it} \qquad (4a)$$

$$\text{D = 1:} \qquad \Delta\, logRGS_{it} = (\alpha_i + \lambda_i) + (\gamma_i + \theta_i) * \Delta\, logRGDP_{it} + \omega_{it} \qquad (4b)$$

3.3.1. Fiscal cyclicality at good times v. bad times, by country

Appendix Tables A2-A5 (columns 5, 6, 8, and 9) present fiscal cyclicality (government spending and tax) by country at good times (D = 0) and bad times (D = 1) respectively by Prais-Winsten and OLS estimations. In Table A2, the OLS estimation is less demanding on the data and

afford us more countries than the Prais-Winsten estimation. While not many, we find that fiscally countercyclical countries (according to the Prais-Winsten estimator) during good times are Canada, South Korea, Kyrgyz Republic, and Sweden. Note that the estimated coefficients from OLS estimator differ significantly from the Prais-Winsten estimator for many countries. There are many countries that are either more procyclical or acyclical in their government spending during bad times. But there are also countries that are more procyclical in good times, and there are countries that are more countercyclical in bad times. Essentially, we have a mixed bag of asymmetries in government-spending cyclicality patterns.

For tax-rate cyclicality, the OLS and Prais-Winsten estimators yield even more mixed results. Based on the OLS estimators, for VAT most of the countries (except two) are either acyclical or procyclical during good times and even more procyclical during bad times [see Table A3]. For PIT and CIT the OLS estimators yield more countercyclical cases for both good times and bad times, while the Prais-Winsten estimators suggest either procyclical or acyclical tax-rate policy for most of the countries [see Tables A4-A5]. Like government spending, it is not at all obvious for the tax-rate policy cyclicality in term of its asymmetric patterns across good times and bad times.

3.3.2. Determinants of fiscal cyclicality at good times v. bad times

To make sense of the country-specific asymmetry across good and bad times, we re-estimate the determinants and find that the associations between the government-spending procyclicality $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ and explanatory variables during good times are largely similar to the baseline model: positively with limited fiscal capacity and its volatility, as well as natural resource share of exports; and negatively with manufacturing share of exports and country risks [see Table A10.1-A10.2]. Volatility of public debt is also positively associated with government-spending procyclicality in good times. For bad times, the volatility of limited fiscal capacity and investment profile are statistically significant and negatively associated with government-spending cyclicality. Hence, it seems that in bad times, public debt, tax base, and investment confidence play a larger role in the government-spending cyclicality. Figure 4b summarizes the economic significance of the explanatory variables on the government-spending cyclicality in good and bad times. Focusing on the fiscal space, we note the asymmetry in its impact on the government-spending cyclicality: more limited fiscal space is associated with more fiscal procyclicality in good times (Figure 4b.ii) and with even more fiscal procyclicality in bad times (Figure 4b.iii); a more indebted (relative to tax base) government spent more in good times and cut back even more in bad times.

3.4. Cyclicality of Government-Spending with Capital Investment

As shown in Section 3.1, we find significant differences between the government-spending cyclicality including capital investment (WEO 1980-2016 data; more procyclical over time) and the government-spending cyclicality excluding capital investment (WDI 1960-2016 data: less procyclical over time). To examine the sensitivity of our empirical findings, we re-estimate Section 2.2 for the government-spending cyclicality with the capital investment using the same set of controlling variables. The dependent variable is the general government total-expenditure defined as total expense plus the net acquisition of nonfinancial assets: the net acquisition of nonfinancial assets equals gross fixed capital formation less consumption of fixed capital plus changes in inventories and transactions in other nonfinancial assets; this definition and the data are from the World Economic Outlook (WEO) database.

Based on the estimated country-specific $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ for the 1980-2016 period, shown in Figure 3b the government-spending cyclicality in Sub-Saharan Africa (0.94) and the Latin America & Caribbean (0.8) are among the highest. Higher income-level regions are still characterised by lower a degree of government-spending procyclicality, while OECD countries are more countercyclical than non-OECD countries [see Table 4, right panel]. Tables 5c and 5d show the estimation results on the determinants of government-spending procyclicality: public debt/GDP and its volatility are significantly and positively associated with $\widehat{\boldsymbol{\beta}}\mathbf{GS}$ as expected, but limited fiscal capacity (public debt/tax) is no long significant. Manufacturing export share remains negatively associated with the fiscal procyclicality while natural resources export share is no longer significant. The institutional risks including composite risk index, economic risk index, government stability, socioeconomic conditions, corruption, and law and order are negatively associated with fiscal procyclicality as in the baseline model.

Based on the panel data estimation of $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ using the government spending data including capital expenditure, we confirm the time-series estimation of $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ that non-OECD countries are more fiscally procyclical than OECD countries [see Table 9, right panel]. Table 10b confirms that lower income countries have the highest level of government-spending procyclicality. Figure 4c ranks the economic significance of the explanatory variables on the

government-spending cyclicality. The country risks have negative and greater association with $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ than other variables, including public debt/GDP, and export structure (manufacturing/natural resources) which remain statistically significant; public debt/tax base is no longer statistically significant in the panel estimation.

Our findings on the cyclicality of government spending with the capital expenditure suggest that it may be useful to look into not only the size but also the composition of government expenditures (i.e. healthcare, education, defence) to study which components of the spending drive the fiscal cyclicality. Given heterogeneous population and income inequality, it is quite likely that the composition of government spending is influenced by trade and financial openness, political economy consideration, the availability of social safety nets, and fiscal capacity.[5]

3.5 Sovereign Wealth Funds and the Government-Spending Cyclicality

We close the empirical analysis by looking at the role of SWFs on fiscal cyclicality:

$$\hat{\beta}_i = \alpha_0 + \gamma_i CONTROL_i + \rho SWF_i + \delta_1 fiscap_i + \delta_2 (SWF_i * fiscap_i)$$
$$+\theta_1 CRI_i + \theta_2 (SWF_i * CRI_i) + \varepsilon_i \quad (5)$$

, where the dummy SWF = 1 if country has a sovereign wealth fund in operation [starting at any point during 1960-2016]; SWF = 0 otherwise. Focusing on the fiscal space and institutional risks, we include their interactions with the SWF variable. We estimate equation (5) using the Weighted Least Squares (WLS) estimator, with real GDP (at 2010 US$) as the weight. Table 12 reports the estimation results for the full sample (1960-2016) and a sub-sample of good times; the estimates for bad-times are qualitatively similar but statistically insignificant. The negative coefficients of SWF interactions (with public debt/tax and institutional quality) suggest that the negative impact of SWFs: the existence of SWFs has a negative association with the government-spending procyclicality. Essentially, the findings point to the benefit of investing in SWFs as the countercyclical fiscal buffers in good times to mitigate tax revenue shortfalls in bad times, thereby increasing the availability of countercyclical spending policy.

[5] Shelton (2007) studies the size and composition of government expenditure across countries from 1970-2000. It is likely that the spending composition is time-varying, especially after the GFC and because of the growing concerns over income inequality across industrial and developing countries in recent years.

4. Concluding Remarks

Our study reveals a mixed fiscal environment in which more than half of the countries in the study are characterized by limited fiscal space and fiscal policy is either pro- or acyclical. We also find that, compared to public debt/GDP statistics, the ratio of public debt/average tax base is a robust measure of limited fiscal space. On average, a more indebted (relative to tax base) government spent more in good times and cut back even more in bad times. We found several economic and institutional variables associating with fiscal cyclicality and used the estimates to calculate the impact of an enduring interest-rate rise on fiscal space, then ranked countries by the fragility of their fiscal space to such an environment.

Considering the sizable increase in total leverage/GDP in the aftermath of the GFC, countries could use the global recovery as an opportune time to invest in greater fiscal space, which could be done by increasing the tax base. Countries could also benefit by investing in countercyclical fiscal buffers, including the accumulation of sovereign wealth fund (SWF) in good times to mitigate tax revenue shortfalls in bad times [e.g., Chile, Norway]; indeed, the country's SWF is shown a countercyclical effect in our estimation. Likewise, a deeper safety net will add a countercyclical buffer that mitigates the adverse income effects of recessions, thus reducing income inequalities over time.

A limitation of our study is that, due to data constraints, we focus on the general government and thereby overlook the contribution of local and state government in a federal union system to cyclicality patterns. Chances are that controlling for these issues, we would find deeper pro- or acyclical patterns (e.g., in the U.S., state governments are frequently forced to apply procyclical expenditure patterns, which means cutting budgets at time of deep and prolonged recessions). Further, while it is widely agreed that procyclical fiscal policy should be mitigated as much as possible (International Monetary Fund, 2017), there is no consensus on the practical approach, i.e. which spending components receive priority, and the fiscal rules to achieve such optimal degree of fiscal cyclicality.

As different governments face a wide range of political pressures and several targets (i.e. allocation efficiency, redistribution, debt stabilization, and structural reforms) with various ranking priority, fiscal challenges are mostly context specific without one-size fitting for all countries at all times. Our cross-country findings suggest that we need a better understanding on the mixes of (i) components of government spending, public debt, and tax base; (ii) fiscal policy, monetary

policy, socio-economics, and institutions; and (iii) the role of central banks and quasi-government entities (e.g. SWFs, SOEs). We study these monetary-fiscal-political economy interactions in our follow-up.

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Table 1. Empirical literature on the cyclicality of fiscal policy

Studies	Methodology	Measurement of fiscal cyclicality	Sample	Key findings
Philip R. Lane (2003)	$\Delta\ log(G_{it}) = \alpha_i + \beta_i * \Delta\ log(Y_{it}) + \varepsilon_{it}$ (1) $\widehat{\beta_i} = \alpha_0 + \alpha_1 Z_i + \varepsilon_i$ (2) G_{it}: various components of government spending Y_{it}: real GDP Z_i: control variables (1): Country regression using OLS procedure with a correction for AR(1) in the residuals; (2): Weighted Least Squares.	$\beta_i > 0$: procyclicality $\beta_i < 0$: countercyclicality	22 OECD countries 1960-1998	The level of procyclicality varies across spending categories and countries. Volatile output and dispersed political power are associated with government spending procyclicality.
Kaminsky, Reinhart, and Végh (2004)	$\rho(GS,OG)$, $\varphi(inflationtax,OG)$ ρ, φ : country correlation coefficient *GS*: cyclical government spending; *OG*: output gap. The cyclical series are estimated by the Hodrick-Prescott filter method.	$\rho > 0$: procyclicality $\rho < 0$: countercyclicality $\varphi > 0$: countercyclicality $\varphi < 0$: procyclicality	104 countries 1960-2003	Most OECD countries have countercyclical fiscal policy while most of developing countries have procyclical fiscal policy.
Talvi and Végh (2005)	$\rho(FC,OG)$, $\varphi(inflationtax,OG)$ ρ, φ : country correlation coefficient *FC*: cyclical government consumption, cyclical revenue; *OG*: output gap. The cyclical series are estimated by the Hodrick-Prescott filter method.	$\rho>0$: procyclicality $\rho<0$: countercyclicality $\varphi>0$: countercyclicality $\varphi<0$: procyclicality	56 countries 1970-1994	Fiscal revenues are procyclical in both developing and industrial countries. Government consumption in the G7 countries is acyclical when that in non-G7 industrial countries and developing countries is procyclical. Inflation tax rate is countercyclical in industrial countries and procyclical in developing countries.
Alesina, Campante, and Tabellini (2008)	$\Delta\ F_{it} = \alpha_i + \beta_i * OG_{it} + \gamma X_{it} + \lambda F_{it-1} + \nu_t + \varepsilon_{it}$ (1) F_{it}: government surplus or public spending; OG_{it}: output gap, X_{it}: control variables. OG_{it} is estimated by the Hodrick-Prescott filter method. (1): Fixed Effects where *OG* of country *i* is instrumented by *OG* of the region of country *i*. Alternatively, (1) is estimated by country to get $\widehat{\beta_i}$ and then run cross-country regression of $\widehat{\beta_i}$ on X_i.	β_i is interpreted depending on the fiscal policy variable	83 countries 1960-2003	Fiscal policy is procyclical in many developing countries. Political distortion (i.e. corruption) is positively correlated with procyclicality of fiscal policy.
Ilzetzki and Vegh (2008)	$\Delta\ log(GS_{it}) = \alpha_i + \beta_i * \Delta\ log(Y_{it}) + \varepsilon_{it}$ (1) Y_{it}: output, GS_{it}: government spending, or its components (1) is regressed using alternative methods include 2SLS, GMM, OLS estimation of simultaneous equations, Granger causality tests, VAR.	$\beta_i > 0$: procyclicality $\beta_i < 0$: countercyclicality	49 countries 1960-2006	Fiscal policy is always procyclical in developing countries and acyclical/procyclical in high-income countries.
Woo (2009)	$\Delta\ log\ GS_{it} = \alpha_i + \beta_i * \Delta\ log\ Y_{it} + \varepsilon_{it}$ (1) $\widehat{\beta_i} = \alpha_0 + \alpha_1(\text{Social polarization})_i + \phi X_i + \varepsilon_i$ (2) GS_{it}: real general government spending Y_{it}: real GDP X_i: control variables (1): Country regression using Prais-Winsten procedure; (2): OLS.	$\beta_i > 0$: procyclicality $\beta i < 0$: countercyclicality	96 countries 1960-2003	Developing countries are more procyclical than OECD countries. Latin America is the most fiscally procyclical region, followed by Sub-Saharan Africa and East Asian.

				Income inequality and educational inequality is positively associated with fiscal procyclicality.
Vegh and Vuletin (2015)	$Tax_{it} = \alpha_i + \beta_i * OG_{it} + \varepsilon_{it}$ *(1)* $\Delta Taxrate_{it} = \alpha_i + \beta_i * \Delta\ log(RGDP_{it}) + \varepsilon_{it}$ *(2)* Tax_{it}: Inflation tax, cyclical component of revenues, and Revenues/GDP OG_{it}: output gap $Taxrate_{it}$: VAT, PIT, CIT, Tax index The cyclical series are estimated by the Hodrick-Prescott filter method. (1): Fixed Effects (2): Fixed Effects, Instrumental Variables	β_i is interpreted depending on the fiscal policy variable	62 countries 1960-2013	Tax policy is acyclical in industrial countries but mostly procyclical in developing countries. Better institutional quality (less corruption and more bureaucratic quality) and more financially integration are associated with less procyclical/more countercyclical fiscal policy.

Table 2a. Pairwise correlation matrix of the variables
Sample period: 1960-2016

	$\hat{\beta}GS$	$\hat{\beta}VAT$	$\hat{\beta}PIT$	$\hat{\beta}CIT$	polcon	inf	trade	TAL	gs	GDP	debt	debt_vol	fiscap	fiscap_vol
$\hat{\beta}GS$	1.00													
$\hat{\beta}VAT$	-0.03	1.00												
$\hat{\beta}PIT$	-0.15*	-0.02	1.00											
$\hat{\beta}CIT$	-0.19*	-0.26*	0.09	1.00										
polcon	-0.22*	-0.08	-0.00	0.18*	1.00									
inf	0.20*	-0.29*	-0.11*	-0.01	0.09*	1.00								
trade	-0.17*	0.08	0.01	-0.02	-0.15*	-0.11*	1.00							
TAL	-0.13*	-0.04	-0.00	-0.01	0.09*	-0.04	0.33*	1.00						
gs	0.09*	-0.04	0.16*	0.11*	0.19*	0.01	0.07*	0.01	1.00					
GDP	-0.12*	0.03	0.32*	0.15*	-0.23*	-0.16*	0.29*	-0.00	-0.13*	1.00				
debt	0.06*	0.07	-0.14*	0.13*	-0.05	0.15*	0.01	-0.10*	0.09*	-0.02	1.00			
debt_vol	0.10*	-0.19*	-0.19*	0.13*	0.01	0.32*	0.02	-0.04	0.07*	-0.02	0.82*	1.00		
fiscap	0.04	0.12*	-0.14*	0.16*	0.13*	0.02	-0.02	-0.02	0.08*	0.19*	0.19*	0.21*	1.00	
fiscap_vol	0.04	0.04	-0.23*	-0.01	0.14*	0.05	-0.02	-0.01	0.08*	0.18*	0.19*	0.22*	1.00*	1.00
lfiscap	0.04	0.11	-0.15*	0.15*	0.13*	0.03	-0.02	-0.02	0.08*	0.20*	0.20*	0.22*	1.00*	1.00*
lfiscap_vol	0.04	0.02	-0.22*	-0.00	0.14*	0.04	-0.02	-0.02	0.08*	0.18*	0.19*	0.21*	1.00*	1.00*
nare	0.23*	-0.05	-0.23*	-0.23*	-0.11*	0.21*	-0.19*	-0.13*	0.00	-0.02	0.12*	0.25*	0.20*	0.20*
manu	-0.30*	-0.05	0.37*	0.31*	0.27*	-0.08*	0.04	-0.01	0.07*	-0.05*	-0.20*	-0.20*	-0.14*	-0.14*
CRI	-0.35*	-0.10	0.19*	0.12*	0.17*	-0.32*	0.31*	0.22*	0.24*	0.00	-0.45*	-0.41*	-0.33*	-0.33*
ERI	-0.30*	-0.23*	0.28*	0.15*	0.16*	-0.36*	0.32*	0.18*	0.17*	0.16*	-0.51*	-0.46*	-0.25*	-0.25*
FRI	-0.28*	-0.22*	0.17*	0.15*	0.15*	-0.31*	0.27*	0.19*	0.15*	0.07*	-0.52*	-0.46*	-0.31*	-0.31*
PRI	-0.35*	-0.01	0.13*	0.09	0.16*	-0.27*	0.28*	0.23*	0.27*	-0.09*	-0.35*	-0.31*	-0.33*	-0.32*
govstab	-0.14*	-0.13*	0.11*	0.05	-0.11*	-0.20*	0.35*	0.27*	0.21*	0.18*	-0.38*	-0.31*	-0.19*	-0.19*
socecon	-0.37*	-0.17*	0.23*	0.17*	0.16*	-0.30*	0.29*	0.23*	0.18*	0.08*	-0.39*	-0.35*	-0.28*	-0.28*
invest	-0.38*	-0.03	0.15*	0.06	0.18*	-0.35*	0.31*	0.21*	0.18*	0.06*	-0.37*	-0.33*	-0.21*	-0.20*
inconflict	-0.26*	-0.01	0.20*	0.11*	0.05	-0.24*	0.35*	0.19*	0.25*	-0.11*	-0.31*	-0.28*	-0.35*	-0.35*
exconflict	-0.16*	0.20*	-0.04	-0.06	0.08*	-0.21*	0.19*	0.13*	0.14*	-0.22*	-0.28*	-0.31*	-0.40*	-0.40*
corrupt	-0.40*	0.09	0.13*	0.12*	0.23*	-0.23*	0.15*	0.22*	0.29*	-0.10*	-0.16*	-0.16*	-0.17*	-0.17*
military	-0.30*	0.02	0.02	0.08	0.13*	-0.21*	0.30*	0.15*	0.32*	-0.16*	-0.28*	-0.25*	-0.32*	-0.31*
religious	-0.09*	-0.07	-0.02	-0.23*	0.01	0.07*	0.13*	0.11*	0.10*	-0.28*	-0.13*	-0.09*	-0.21*	-0.19*
law	-0.32*	-0.19*	0.18*	0.18*	0.17*	-0.25*	0.26*	0.20*	0.37*	0.00	-0.29*	-0.26*	-0.23*	-0.22*
ethnic	-0.22*	0.04	0.19*	0.01	-0.03	-0.14*	0.17*	0.10*	0.14*	-0.00	-0.29*	-0.20*	-0.24*	-0.24*
democracy	-0.23*	0.16*	-0.02	0.07	0.34*	-0.18*	-0.05	0.13*	0.16*	-0.27*	-0.07*	-0.09*	-0.17*	-0.17*
bureau	-0.36*	0.13*	0.07	0.17*	0.25*	-0.25*	0.18*	0.18*	0.28*	-0.03	-0.26*	-0.29*	-0.21*	-0.21*

Table 2a. Pairwise correlation matrix of the variables
Sample period: 1960-2016 *(continued)*

	lfiscap	lfiscap_vol	nare	manu	CRI	ERI	FRI	PRI	govstab	socecon	invest	inconflict	exconflict	corrupt
lfiscap	1.00													
lfiscap_vol	1.00*	1.00												
nare	0.20*	0.20*	1.00											
manu	-0.14*	-0.14*	-0.59*	1.00										
CRI	-0.33*	-0.33*	-0.47*	0.49*	1.00									
ERI	-0.25*	-0.25*	-0.35*	0.39*	0.90*	1.00								
FRI	-0.31*	-0.31*	-0.35*	0.43*	0.92*	0.90*	1.00							
PRI	-0.33*	-0.32*	-0.52*	0.50*	0.96*	0.76*	0.80*	1.00						
govstab	-0.19*	-0.19*	-0.12*	0.08*	0.62*	0.59*	0.61*	0.56*	1.00					
socecon	-0.29*	-0.28*	-0.42*	0.42*	0.94*	0.88*	0.87*	0.88*	0.60*	1.00				
invest	-0.21*	-0.20*	-0.45*	0.42*	0.91*	0.85*	0.83*	0.87*	0.58*	0.86*	1.00			
inconflict	-0.36*	-0.35*	-0.44*	0.46*	0.85*	0.64*	0.68*	0.91*	0.55*	0.75*	0.71*	1.00		
exconflict	-0.40*	-0.39*	-0.29*	0.36*	0.68*	0.49*	0.53*	0.74*	0.34*	0.53*	0.59*	0.71*	1.00	
corrupt	-0.18*	-0.17*	-0.46*	0.44*	0.79*	0.61*	0.60*	0.85*	0.36*	0.75*	0.70*	0.69*	0.55*	1.00
military	-0.32*	-0.31*	-0.46*	0.47*	0.83*	0.61*	0.68*	0.89*	0.41*	0.72*	0.75*	0.81*	0.65*	0.70*
religious	-0.21*	-0.19*	-0.26*	0.25*	0.46*	0.20*	0.29*	0.58*	0.16*	0.33*	0.37*	0.59*	0.51*	0.44*
law	-0.23*	-0.22*	-0.48*	0.45*	0.84*	0.69*	0.69*	0.86*	0.57*	0.80*	0.73*	0.80*	0.47*	0.80*
ethnic	-0.24*	-0.24*	-0.33*	0.24*	0.58*	0.41*	0.45*	0.65*	0.40*	0.51*	0.45*	0.67*	0.43*	0.45*
democracy	-0.18*	-0.17*	-0.55*	0.49*	0.58*	0.37*	0.40*	0.68*	-0.01	0.49*	0.53*	0.52*	0.55*	0.71*
bureau	-0.21*	-0.21*	-0.48*	0.50*	0.86*	0.73*	0.75*	0.86*	0.41*	0.84*	0.79*	0.68*	0.57*	0.84*

	military	religious	law	ethnic	democracy	bureau
military	1.00					
religious	0.50*	1.00				
law	0.75*	0.36*	1.00			
ethnic	0.52*	0.46*	0.52*	1.00		
democracy	0.64*	0.45*	0.52*	0.28*	1.00	
bureau	0.76*	0.35*	0.77*	0.40*	0.69*	1.00

*Note: * denotes 5% level of significance. $\hat{\beta}GS$, $\hat{\beta}VAT$, $\hat{\beta}PIT$, $\hat{\beta}CIT$ are estimated coefficients from equations (1) and (3) using Prais-Winsten approach for the full sample.*

Table 2b. Pairwise correlation matrix of the variables
Sample period: 1980-2016

	$\hat{\beta}GS$	$\hat{\beta}VAT$	$\hat{\beta}PIT$	$\hat{\beta}CIT$	polcon	inf	trade	TAL	gs	GDP	debt	debt_vol	fiscap	fiscap_vol
$\hat{\beta}GS$	1.00													
$\hat{\beta}VAT$	0.01	1.00												
$\hat{\beta}PIT$	-0.28*	0.14	1.00											
$\hat{\beta}CIT$	-0.44*	-0.04	0.02	1.00										
polcon	-0.22*	-0.06	0.02	0.28*	1.00									
inf	0.28*	-0.04	-0.38*	-0.02	0.08*	1.00								
trade	-0.21*	0.04	0.22*	-0.09	-0.28*	-0.12*	1.00							
TAL	-0.31*	0.29*	0.16*	-0.06	0.05	-0.10*	0.58*	1.00						
gs	-0.13*	-0.10	0.33*	0.29*	0.45*	-0.03	0.17*	0.11*	1.00					
GDP	-0.09*	0.33*	-0.23*	-0.19*	-0.30*	-0.06	0.37*	0.05	0.06	1.00				
debt	0.24*	-0.16*	0.07	-0.01	0.03	-0.03	-0.07*	-0.11*	0.11*	-0.03	1.00			
debt_vol	0.20*	-0.27*	-0.03	-0.02	0.12*	0.01	-0.06	-0.08*	0.18*	0.10*	0.59*	1.00		
fiscap	0.14*	-0.18*	-0.27*	-0.10	-0.08	-0.05	0.11*	-0.10*	-0.19*	0.20*	0.45*	0.55*	1.00	
fiscap_vol	0.13*	-0.16	-0.15*	-0.10	0.13*	0.04	0.01	-0.10*	-0.15*	0.09*	0.17*	0.72*	0.81*	1.00
lfiscap	0.16*	-0.19*	-0.27*	-0.09	-0.13*	-0.04	0.11*	-0.10*	-0.20*	0.21*	0.49*	0.54*	1.00*	0.77*
lfiscap_vol	0.16*	-0.16*	-0.16*	-0.09	0.11*	0.06	-0.00	-0.10*	-0.16*	0.08	0.19*	0.75*	0.80*	1.00*
nare	0.17*	0.23*	-0.14*	-0.50*	-0.01	0.11*	-0.17*	-0.13*	-0.15*	-0.01	-0.20*	0.23*	0.34*	0.49*
manu	-0.32*	-0.21*	0.30*	0.20*	0.20*	-0.08*	0.07*	0.16*	0.09*	-0.07*	-0.01	-0.27*	-0.24*	-0.33*
CRI	-0.36*	-0.03	0.39*	0.21*	0.25*	-0.19*	0.33*	0.39*	0.60*	-0.20*	-0.27*	-0.37*	-0.44*	-0.42*
ERI	-0.42*	-0.10	0.37*	0.29*	0.23*	-0.21*	0.41*	0.45*	0.49*	-0.05	-0.34*	-0.32*	-0.35*	-0.28*
FRI	-0.34*	0.07	0.34*	0.22*	0.18*	-0.17*	0.32*	0.35*	0.48*	-0.16*	-0.34*	-0.41*	-0.30*	-0.34*
PRI	-0.30*	-0.06	0.36*	0.16*	0.26*	-0.16*	0.26*	0.33*	0.62*	-0.25*	-0.18*	-0.34*	-0.47*	-0.45*
govstab	-0.32*	0.19*	0.29*	-0.00	-0.10*	-0.21*	0.37*	0.35*	0.31*	0.13*	-0.32*	-0.21*	0.08	0.04
socecon	-0.40*	-0.01	0.29*	0.12*	0.26*	-0.19*	0.32*	0.43*	0.55*	-0.15*	-0.23*	-0.34*	-0.47*	-0.47*
invest	-0.35*	0.05	0.37*	0.15*	0.22*	-0.24*	0.34*	0.42*	0.53*	-0.16*	-0.19*	-0.29*	-0.41*	-0.40*
inconflict	-0.22*	-0.21*	0.47*	0.12*	0.15*	-0.14*	0.34*	0.30*	0.53*	-0.21*	-0.25*	-0.32*	-0.43*	-0.36*
exconflict	-0.09*	-0.21*	0.34*	0.01	0.26*	-0.02	0.17*	0.11*	0.40*	-0.34*	-0.14*	-0.24*	-0.28*	-0.26*
corrupt	-0.37*	0.07	0.24*	0.18*	0.35*	-0.20*	0.16*	0.28*	0.60*	-0.25*	-0.08*	-0.21*	-0.39*	-0.32*
military	-0.23*	-0.02	0.33*	0.28*	0.18*	-0.14*	0.24*	0.28*	0.57*	-0.21*	-0.15*	-0.40*	-0.44*	-0.56*
religious	0.09*	-0.02	0.26*	-0.15*	0.01	0.10*	0.07	0.01	0.22*	-0.26*	-0.12*	-0.23*	-0.46*	-0.39*
law	-0.36*	-0.09	0.30*	0.23*	0.24*	-0.21*	0.21*	0.39*	0.64*	-0.10*	-0.15*	-0.26*	-0.50*	-0.42*
ethnic	-0.14*	-0.17*	0.29*	0.13*	0.01	-0.13*	0.21*	0.22*	0.42*	-0.15*	-0.18*	-0.19*	-0.21*	-0.21*
democracy	-0.05	-0.02	0.15*	0.21*	0.52*	0.00	-0.19*	-0.06	0.47*	-0.36*	0.11*	-0.18*	-0.32*	-0.29*
bureau	-0.34*	0.20*	0.20*	0.14*	0.37*	-0.19*	0.21*	0.33*	0.56*	-0.24*	-0.04	-0.27*	-0.37*	-0.40*

Table 2b. Pairwise correlation matrix of the variables
Sample period: 1980-2016 *(continued)*

	lfiscap	lfiscap_vol	nare	manu	CRI	ERI	FRI	PRI	govstab	socecon	invest	inconflict	exconflict	corrupt
lfiscap	1.00													
lfiscap_vol	0.76*	1.00												
nare	0.31*	0.48*	1.00											
manu	-0.22*	-0.32*	-0.59*	1.00										
CRI	-0.44*	-0.42*	-0.41*	0.47*	1.00									
ERI	-0.36*	-0.28*	-0.29*	0.39*	0.89*	1.00								
FRI	-0.28*	-0.34*	-0.28*	0.41*	0.91*	0.88*	1.00							
PRI	-0.47*	-0.45*	-0.46*	0.47*	0.96*	0.74*	0.77*	1.00						
govstab	0.08	0.02	-0.01	0.07	0.60*	0.59*	0.57*	0.54*	1.00					
socecon	-0.46*	-0.47*	-0.34*	0.40*	0.94*	0.87*	0.85*	0.89*	0.59*	1.00				
invest	-0.40*	-0.40*	-0.39*	0.39*	0.91*	0.82*	0.80*	0.87*	0.59*	0.87*	1.00			
inconflict	-0.43*	-0.35*	-0.35*	0.41*	0.88*	0.67*	0.71*	0.91*	0.55*	0.79*	0.75*	1.00		
exconflict	-0.28*	-0.26*	-0.30*	0.37*	0.64*	0.40*	0.49*	0.71*	0.29*	0.51*	0.57*	0.66*	1.00	
corrupt	-0.40*	-0.32*	-0.44*	0.45*	0.81*	0.59*	0.59*	0.88*	0.39*	0.75*	0.71*	0.74*	0.56*	1.00
military	-0.42*	-0.56*	-0.49*	0.46*	0.85*	0.63*	0.68*	0.90*	0.44*	0.78*	0.78*	0.81*	0.60*	0.74*
religious	-0.45*	-0.39*	-0.31*	0.29*	0.48*	0.19*	0.28*	0.61*	0.14*	0.37*	0.43*	0.61*	0.59*	0.50*
law	-0.50*	-0.41*	-0.42*	0.38*	0.86*	0.72*	0.67*	0.87*	0.54*	0.82*	0.78*	0.80*	0.42*	0.84*
ethnic	-0.20*	-0.20*	-0.28*	0.21*	0.61*	0.45*	0.47*	0.65*	0.40*	0.54*	0.49*	0.62*	0.36*	0.48*
democracy	-0.31*	-0.28*	-0.55*	0.48*	0.52*	0.24*	0.31*	0.65*	-0.09*	0.41*	0.40*	0.48*	0.56*	0.70*
bureau	-0.36*	-0.39*	-0.44*	0.47*	0.89*	0.72*	0.75*	0.90*	0.42*	0.85*	0.83*	0.74*	0.59*	0.84*

	military	religious	law	ethnic	democracy	bureau
military	1.00					
religious	0.43*	1.00				
law	0.79*	0.37*	1.00			
ethnic	0.54*	0.49*	0.51*	1.00		
democracy	0.62*	0.50*	0.50*	0.31*	1.00	
bureau	0.83*	0.43*	0.79*	0.45*	0.68*	1.00

*Note: * denotes 5% level of significance. $\hat{\beta}GS$, $\hat{\beta}VAT$, $\hat{\beta}PIT$, $\hat{\beta}CIT$ are estimated coefficients from equations (1) and (3) using Prais-Winsten approach for the 1980-2016 sample.*

Table 3. Summary statistics of the variables

Sample period		1960-2016					1980-2016			
VARIABLE	**Observation**	**Mean**	**SD**	**Min**	**Max**	**Observation**	**Mean**	**SD**	**Min**	**Max**
$\hat{\beta}GS$	170	0.64	0.72	-2.90	3.44	104	0.49	1.07	-4.68	3.26
$\hat{\beta}VAT$	35	-0.01	0.09	-0.20	0.22	22	0.00	0.08	-0.12	0.23
$\hat{\beta}PIT$	62	0.04	0.81	-2.74	3.22	41	-0.06	0.66	-2.46	2.11
$\hat{\beta}CIT$	62	0.00	0.14	-0.38	0.52	42	-0.07	0.38	-2.21	0.31
polcon	148	0.38	0.11	0.07	0.67	88	0.38	0.11	0.05	0.70
inf	164	0.36	1.01	0.02	7.16	100	0.14	0.41	0.01	3.79
trade	169	0.80	0.43	0.19	3.31	103	0.86	0.49	0.24	3.55
TAL	165	2.81	13.42	0.36	172.45	103	2.29	2.61	0.39	16.38
gs	170	0.15	0.06	0.00	0.36	104	0.33	0.15	0.12	1.16
GDP	169	0.04	0.02	-0.01	0.17	103	0.04	0.03	-0.01	0.17
debt	167	0.57	0.36	0.02	2.60	102	0.57	0.33	0.01	1.54
debt_vol	167	0.31	0.35	0.01	3.18	102	0.21	0.18	0.01	0.99
fiscap	104	6.12	32.70	0.26	335.23	55	2.62	1.98	0.11	10.57
fiscap_vol	104	5.55	40.03	0.13	408.07	55	0.88	1.16	0.12	7.27
lfiscap	104	5.70	28.23	0.27	289.60	55	2.60	1.87	0.10	9.27
lfiscap_vol	104	5.23	36.67	0.16	373.88	55	0.86	1.09	0.12	6.63
nare	165	0.44	0.28	0.01	1.44	102	0.42	0.29	0.03	1.48
manu	165	0.26	0.23	0.00	0.84	102	0.28	0.25	0.00	0.83
CRI	132	66.56	11.17	34.36	90.05	78	69.60	10.90	41.76	90.05
ERI	132	33.85	5.28	19.08	44.80	78	35.38	5.12	21.56	44.80
FRI	132	34.98	5.51	18.56	47.36	78	36.57	5.23	23.24	47.36
PRI	132	64.16	12.94	27.70	91.89	78	67.11	12.96	33.83	89.64
govstab	132	7.62	0.91	4.54	10.65	78	7.74	0.83	6.06	10.65
socecon	132	5.70	1.93	1.26	10.19	78	6.13	1.94	2.42	10.19
invest	132	7.45	1.59	2.42	10.52	78	7.84	1.44	4.56	10.52
inconflict	132	8.85	1.78	3.52	12.00	78	9.10	1.78	4.14	12.00
exconflict	132	9.66	1.37	5.23	11.98	78	9.98	1.26	5.35	11.98
corrupt	132	2.96	1.12	0.74	5.93	78	3.22	1.21	1.30	5.93
military	132	3.80	1.60	0.34	6.00	78	4.08	1.65	0.37	6.00
religious	132	4.55	1.16	1.08	6.00	78	4.65	1.20	1.23	6.00
law	132	3.69	1.25	0.99	6.00	78	3.93	1.34	1.50	6.00
ethnic	132	3.98	1.18	0.86	6.00	78	4.13	1.12	0.86	6.00
democracy	132	3.79	1.39	0.89	6.00	78	3.96	1.42	0.89	6.00
bureau	132	2.17	1.06	0.00	4.00	78	2.42	1.06	0.41	4.00

Note: $\hat{\beta}GS$, $\hat{\beta}VAT$, $\hat{\beta}PIT$, $\hat{\beta}CIT$ are estimated coefficients from equations (1) and (3) using Prais-Winsten. Note that there are fewer countries in the 1980-2016 sub-period as time-series estimation becomes more data demanding for many countries.

Table 4. Government-spending cyclicality $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ by region and income

Sample period	**1960-2016**				**1980-2016**			
	Mean	**SD**	**Minimum**	**Maximum**	**Mean**	**SD**	**Minimum**	**Maximum**
Region								
East Asia & Pacific	0.46	0.72	-0.98	1.84	0.18	0.83	-0.89	1.96
Europe & Central Asia	0.41	0.55	-1.36	1.47	0.07	0.54	-0.57	1.32
Latin America & Caribbean	0.77	0.54	-0.13	2.42	0.80	0.71	-0.40	2.75
Middle East & North Africa	0.69	0.35	0.16	1.36	0.27	1.01	-1.70	1.96
North America	-0.25	0.36	-0.50	0.01	-0.50	*NA*	-0.50	-0.50
South Asia	0.35	1.02	-0.67	2.08	0.41	0.57	-0.17	1.08
Sub-Saharan Africa	0.89	0.93	-2.90	3.44	0.94	1.55	-4.68	3.26
Level								
High income	0.32	0.53	-1.36	1.56	0.01	0.76	-1.70	1.93
Low income	0.93	1.13	-2.90	3.44	0.92	1.83	-4.68	2.89
Lower middle income	0.78	0.67	-0.98	2.08	0.77	0.93	-1.03	2.75
Upper middle income	0.69	0.50	-0.54	2.42	0.64	0.84	-0.89	3.26
OECD group								
OECD	0.19	0.55	-1.36	1.36	-0.10	0.41	-0.57	0.97
non-OECD	0.74	0.72	-2.90	3.44	0.65	1.14	-4.68	3.26
Total countries			**170**				**104**	
Entire sample	**0.64**	**0.72**	**-2.90**	**3.44**	**0.49**	**1.07**	**-4.68**	**3.26**

Note: $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ is the estimated coefficient from equation (1) using Prais-Winsten to measure government-spending cyclicality. Higher $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ indicates greater procyclicality (lesser countercyclicality). There are fewer countries in the 1980-2016 sub-period as time-series estimation becomes more data demanding for many countries.

Table 5a. Determinants of fiscal behaviour, sample period 1960-2016

Dependent variable: Government-spending cyclicality $\hat{\beta}GS$ (Prais-Winsten estimates)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
polcon	**-1.950*****	**-1.861*****	**-1.859*****	**-1.861*****	**-1.861*****	**-1.958*****	**-1.945*****	**-1.759*****	**-1.461*****	**-1.592*****	**-1.624*****	**-1.684*****	**-1.634*****
	(0.553)	(0.557)	(0.558)	(0.557)	(0.558)	(0.548)	(0.555)	(0.559)	(0.516)	(0.594)	(0.593)	(0.595)	(0.604)
inf	0.134**	0.121	0.120	0.120	0.120	0.136**	0.126**	0.107*	0.113*	0.085	0.095	0.106	0.091
	(0.064)	(0.081)	(0.081)	(0.081)	(0.081)	(0.062)	(0.062)	(0.064)	(0.062)	(0.065)	(0.069)	(0.067)	(0.061)
trade	-0.317***	-0.228*	-0.227*	-0.228*	-0.227*	-0.312***	-0.321***	-0.253**	-0.292**	-0.116	-0.123	-0.144	-0.119
	(0.115)	(0.124)	(0.124)	(0.124)	(0.124)	(0.117)	(0.113)	(0.114)	(0.127)	(0.100)	(0.107)	(0.106)	(0.102)
TAL	-0.002**	-0.003**	-0.003**	-0.003**	-0.003**	-0.003*	-0.002*	-0.002*	-0.003**	-0.002**	-0.003***	-0.003**	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
gs	1.077	0.680	0.680	0.683	0.681	1.088	1.065	1.048	1.411	0.537	-0.067	-0.185	0.749
	(0.990)	(1.488)	(1.489)	(1.488)	(1.489)	(0.998)	(0.992)	(1.039)	(1.040)	(1.589)	(1.686)	(1.660)	(1.567)
fiscap		**0.001*****											
		(0.000)											
fiscap_vol			**0.001*****										
			(0.000)										
lfiscap				**0.001*****									
				(0.000)									
lfiscap_vol					**0.001*****								
					(0.000)								
debt						-0.045							
						(0.191)							
debt_vol							0.065						
							(0.218)						
nare								**0.468****					
								(0.235)					
manu									**-0.847*****				
									(0.247)				
CRI										**-0.018*****			
										(0.006)			
ERI											**-0.028****		
											(0.012)		
FRI												**-0.022***	
												(0.012)	
PRI													**-0.016*****
													(0.005)
Constant	1.413***	1.302***	1.304***	1.301***	1.304***	1.436***	1.398***	1.102***	1.402***	2.392***	2.271***	2.165***	2.208***
	(0.305)	(0.319)	(0.320)	(0.319)	(0.320)	(0.302)	(0.309)	(0.316)	(0.303)	(0.525)	(0.550)	(0.591)	(0.464)
Number of countries	144	94	94	94	94	144	144	143	143	117	117	117	117
R-squared	0.134	0.180	0.179	0.180	0.179	0.134	0.135	0.160	0.197	0.186	0.165	0.160	0.192
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5a. Determinants of fiscal behaviour, sample period 1960-2016 *(continued)*
Dependent variable: Government-spending cyclicality $\hat{\beta}GS$ (Prais-Winsten estimates)

VARIABLES	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
polcon	**-1.966*****	**-1.534****	**-1.452****	**-1.813*****	**-1.807*****	**-1.542****	**-1.749*****	**-1.884*****	**-1.702*****	**-1.901*****	**-1.600****	**-1.526****
	(0.636)	(0.586)	(0.599)	(0.630)	(0.629)	(0.610)	(0.605)	(0.623)	(0.640)	(0.614)	(0.627)	(0.597)
inf	0.124*	0.083	0.071	0.113*	0.127**	0.087*	0.108*	0.140**	0.098	0.122**	0.116*	0.095
	(0.064)	(0.063)	(0.064)	(0.063)	(0.064)	(0.052)	(0.064)	(0.063)	(0.060)	(0.056)	(0.063)	(0.065)
trade	-0.139	-0.111	-0.096	-0.109	-0.154	-0.195*	-0.118	-0.169	-0.153	-0.138	-0.198*	-0.168*
	(0.117)	(0.098)	(0.099)	(0.122)	(0.125)	(0.099)	(0.114)	(0.121)	(0.104)	(0.113)	(0.117)	(0.098)
TAL	-0.003	-0.002*	-0.002**	-0.003**	-0.004***	-0.001	-0.003**	-0.003**	-0.002*	-0.003***	-0.003**	-0.002**
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
gs	-0.199	0.245	0.500	0.108	-0.487	1.228	0.781	-0.376	0.961	-0.312	0.046	0.695
	(1.739)	(1.633)	(1.566)	(1.636)	(1.689)	(1.746)	(1.629)	(1.630)	(1.676)	(1.620)	(1.591)	(1.710)
govstab	-0.103											
	(0.083)											
sococon		**-0.114*****										
		(0.028)										
invest			**-0.150*****									
			(0.045)									
inconflict				**-0.073***								
				(0.038)								
exconflict					-0.043							
					(0.042)							
corrupt						**-0.213*****						
						(0.045)						
military							**-0.104****					
							(0.044)					
religious								-0.045				
								(0.057)				
law									**-0.145*****			
									(0.044)			
ethnic										**-0.122****		
										(0.061)		
democracy											-0.081	
											(0.059)	
bureau												**-0.177*****
												(0.044)
Constant	2.260***	1.889***	2.282***	2.006***	1.898***	1.797***	1.642***	1.707***	1.757***	1.963***	1.680***	1.601***
	(0.708)	(0.385)	(0.495)	(0.459)	(0.535)	(0.343)	(0.380)	(0.475)	(0.362)	(0.470)	(0.418)	(0.352)
Number of countries	117	117	117	117	117	117	117	117	117	117	117	117
R-squared	0.150	0.201	0.202	0.163	0.147	0.218	0.178	0.146	0.183	0.177	0.155	0.187
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Note: OLS specification with robust standard error. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.*

Table 5b. Determinants of fiscal behaviour, sample period 1960-2016
Dependent variable: Government-spending cyclicality $\hat{\beta}GS$ (OLS estimates)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
polcon	**-1.479*****	**-1.345****	**-1.341****	**-1.344****	**-1.342****	**-1.493*****	**-1.476*****	**-1.329****	**-1.121****	**-1.276****	**-1.301****	**-1.361****	**-1.295****
	(0.550)	(0.535)	(0.535)	(0.535)	(0.536)	(0.546)	(0.553)	(0.563)	(0.529)	(0.615)	(0.608)	(0.610)	(0.623)
inf	0.106*	0.085	0.085	0.085	0.085	0.111*	0.101*	0.086	0.091	0.072	0.079	0.090	0.074
	(0.060)	(0.075)	(0.075)	(0.075)	(0.075)	(0.058)	(0.060)	(0.062)	(0.059)	(0.063)	(0.065)	(0.064)	(0.060)
trade	**-0.347*****	**-0.290*****	**-0.289*****	**-0.290*****	**-0.289*****	**-0.339*****	**-0.350*****	**-0.299*****	**-0.330*****	**-0.196****	**-0.201****	**-0.218****	**-0.196****
	(0.107)	(0.106)	(0.106)	(0.106)	(0.106)	(0.109)	(0.105)	(0.107)	(0.119)	(0.096)	(0.099)	(0.099)	(0.096)
TAL	-0.002*	-0.002*	-0.002*	-0.002*	-0.002*	-0.002*	-0.002	-0.002	-0.003**	-0.002**	-0.003***	-0.003**	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
gs	1.203	1.086	1.087	1.088	1.088	1.222	1.195	1.177	1.444	0.712	0.326	0.197	0.884
	(0.935)	(1.277)	(1.277)	(1.277)	(1.277)	(0.942)	(0.938)	(0.977)	(0.984)	(1.570)	(1.658)	(1.630)	(1.543)
fiscap		**0.001*****											
		(0.000)											
fiscap_vol			**0.001****										
			(0.000)										
lfiscap				**0.001*****									
				(0.000)									
lfiscap_vol					**0.001****								
					(0.000)								
debt						-0.076							
						(0.183)							
debt_vol							0.047						
							(0.198)						
nare								0.361					
								(0.237)					
manu									**-0.617*****				
									(0.236)				
CRI										**-0.011****			
										(0.005)			
ERI											-0.017		
											(0.011)		
FRI												-0.010	
												(0.011)	
PRI													**-0.010****
													(0.004)
Constant	1.285***	1.172***	1.172***	1.171***	1.172***	1.325***	1.275***	1.046***	1.277***	1.925***	1.835***	1.687***	1.832***
	(0.306)	(0.304)	(0.304)	(0.304)	(0.304)	(0.299)	(0.309)	(0.318)	(0.304)	(0.522)	(0.541)	(0.585)	(0.467)
Number of countries	144	94	94	94	94	144	144	143	143	117	117	117	117
R-squared	0.111	0.154	0.154	0.154	0.154	0.112	0.111	0.128	0.148	0.123	0.113	0.108	0.128
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5b. Determinants of fiscal behaviour, sample period 1960-2016 *(continued)*
Dependent variable: Government-spending cyclicality $\hat{\beta}GS$ (OLS estimates)

VARIABLES	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
polcon	**-1.516****	**-1.209***	**-1.155***	**-1.413****	**-1.421****	**-1.209***	**-1.374****	**-1.452****	**-1.331****	**-1.470****	**-1.344****	**-1.226***
	(0.629)	(0.610)	(0.620)	(0.636)	(0.635)	(0.627)	(0.618)	(0.628)	(0.648)	(0.618)	(0.642)	(0.621)
inf	0.095	0.066	0.058	0.090	0.100	0.068	0.086	0.105*	0.077	0.094*	0.096	0.077
	(0.062)	(0.062)	(0.063)	(0.061)	(0.061)	(0.053)	(0.062)	(0.060)	(0.059)	(0.056)	(0.063)	(0.063)
trade	**-0.208****	**-0.187****	**-0.177***	**-0.192***	**-0.224****	**-0.248****	**-0.198***	**-0.231****	**-0.217****	**-0.207****	**-0.242****	**-0.228****
	(0.101)	(0.094)	(0.096)	(0.104)	(0.105)	(0.101)	(0.102)	(0.101)	(0.097)	(0.098)	(0.100)	(0.096)
TAL	-0.002	-0.002	-0.002*	-0.003**	-0.003***	-0.001	-0.003**	-0.003**	-0.002*	-0.003***	-0.003**	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
gs	0.288	0.609	0.780	0.442	0.051	1.347	0.857	0.072	1.108	0.207	0.251	0.842
	(1.701)	(1.617)	(1.544)	(1.603)	(1.657)	(1.754)	(1.581)	(1.588)	(1.655)	(1.595)	(1.538)	(1.697)
govstab	-0.072											
	(0.078)											
socecon		**-0.082*****										
		(0.026)										
invest			**-0.105****									
			(0.043)									
inconflict				-0.045								
				(0.035)								
exconflict					-0.018							
					(0.038)							
corrupt						**-0.156*****						
						(0.041)						
military							-0.064					
							(0.043)					
religious								-0.014				
								(0.054)				
law									**-0.102****			
									(0.041)			
ethnic										-0.085		
										(0.058)		
democracy											-0.031	
											(0.058)	
bureau												**-0.114*****
												(0.042)
Constant	1.901***	1.645***	1.918***	1.684***	1.546***	1.585***	1.459***	1.447***	1.549***	1.690***	1.449***	1.435***
	(0.664)	(0.390)	(0.495)	(0.453)	(0.523)	(0.349)	(0.385)	(0.481)	(0.362)	(0.472)	(0.419)	(0.358)
Number of countries	117	117	117	117	117	117	117	117	117	117	117	117
R-squared	0.108	0.138	0.137	0.113	0.105	0.150	0.119	0.104	0.127	0.123	0.106	0.125
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Note: OLS specification with robust standard error. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.*

Table 5c. Determinants of fiscal behaviour, sample period 1980-2016

Dependent variable: Government-spending cyclicality $\hat{\beta}GS$ (Prais-Winsten estimates)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
polcon	**-2.291****	**-2.994****	**-3.184****	**-2.952****	**-3.182****	**-2.010***	**-2.305****	**-2.531****	**-2.186****	**-2.334****	**-2.109***	**-2.290****	**-2.358****
	(1.011)	(1.208)	(1.250)	(1.190)	(1.235)	(1.018)	(1.119)	(0.996)	(0.966)	(1.070)	(1.122)	(1.075)	(1.038)
inf	0.700***	0.787***	0.771***	0.786***	0.767***	0.714***	0.692***	0.653***	0.636***	0.679***	0.658***	0.705***	0.719***
	(0.077)	(0.074)	(0.072)	(0.074)	(0.073)	(0.079)	(0.062)	(0.081)	(0.093)	(0.087)	(0.070)	(0.079)	(0.100)
trade	-0.286	-0.442*	-0.410*	-0.447*	-0.408*	-0.284	-0.217	-0.273	-0.346	-0.076	0.010	-0.064	-0.146
	(0.233)	(0.225)	(0.217)	(0.224)	(0.216)	(0.225)	(0.253)	(0.231)	(0.211)	(0.253)	(0.241)	(0.245)	(0.269)
TAL	-0.057	-0.017	-0.018	-0.017	-0.018	-0.065*	-0.062	-0.039	-0.021	-0.048	-0.056	-0.064	-0.057
	(0.039)	(0.034)	(0.034)	(0.034)	(0.034)	(0.037)	(0.040)	(0.039)	(0.037)	(0.063)	(0.061)	(0.058)	(0.065)
gs	-0.813	1.096	1.112	1.112	1.134	-1.092	-0.788	-0.221	0.124	1.467	1.169	0.879	0.818
	(1.249)	(1.091)	(1.039)	(1.079)	(1.027)	(1.215)	(1.200)	(1.215)	(1.273)	(1.089)	(1.181)	(0.961)	(1.248)
fiscap		0.068											
		(0.071)											
fiscap_vol			0.110										
			(0.119)										
lfiscap				0.079									
				(0.074)									
lfiscap_vol					0.126								
					(0.125)								
debt						**0.707****							
						(0.288)							
debt_vol							**1.411****						
							(0.557)						
nare								0.649					
								(0.416)					
manu									**-1.342*****				
									(0.380)				
CRI										**-0.030***			
										(0.016)			
ERI											**-0.071***		
											(0.037)		
FRI												-0.055	
												(0.034)	
PRI													-0.016
													(0.012)
Constant	1.874***	1.137*	1.267**	1.091*	1.244**	1.424**	1.519**	1.489***	1.930***	2.959**	3.330***	3.045**	2.207**
	(0.596)	(0.573)	(0.552)	(0.580)	(0.553)	(0.578)	(0.644)	(0.553)	(0.581)	(1.115)	(1.165)	(1.349)	(0.928)
Number of countries	86	49	49	49	49	85	85	86	86	67	67	67	67
R-squared	0.192	0.498	0.503	0.501	0.508	0.227	0.240	0.216	0.272	0.259	0.275	0.262	0.237
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5c. Determinants of fiscal behaviour, sample period 1980-2016 *(continued)*
Dependent variable: Government-spending cyclicality $\hat{\beta}GS$ (Prais-Winsten estimates)

VARIABLES	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
polcon	**-2.888*****	**-2.303****	**-2.280****	**-2.334****	**-2.368****	**-2.181****	**-2.338****	**-2.133****	**-2.767****	**-2.397****	**-2.433****	**-2.080***
	(0.873)	(1.107)	(1.024)	(0.996)	(1.074)	(0.993)	(1.037)	(0.991)	(1.081)	(1.021)	(1.105)	(1.160)
inf	0.677***	0.669***	0.687***	0.749***	0.765***	0.637***	0.752***	0.745***	0.652***	0.752***	0.773***	0.704***
	(0.088)	(0.068)	(0.113)	(0.103)	(0.104)	(0.089)	(0.109)	(0.108)	(0.107)	(0.106)	(0.101)	(0.102)
trade	0.001	-0.156	-0.124	-0.128	-0.239	-0.226	-0.165	-0.181	-0.276	-0.162	-0.119	-0.178
	(0.243)	(0.267)	(0.257)	(0.296)	(0.273)	(0.240)	(0.276)	(0.291)	(0.263)	(0.273)	(0.372)	(0.272)
TAL	-0.048	-0.008	-0.054	-0.079	-0.077	-0.025	-0.076	-0.082	-0.012	-0.078	-0.096	-0.049
	(0.059)	(0.059)	(0.065)	(0.062)	(0.058)	(0.049)	(0.067)	(0.064)	(0.059)	(0.064)	(0.082)	(0.064)
gs	0.645	1.498	0.734	0.131	-0.675	1.439	0.020	-0.658	1.933	-0.051	-0.863	0.488
	(1.379)	(1.381)	(1.037)	(1.508)	(1.265)	(2.015)	(0.927)	(1.256)	(1.717)	(1.107)	(0.948)	(1.484)
govstab	**-0.443****											
	(0.173)											
socecon		**-0.209*****										
		(0.072)										
invest			-0.159									
			(0.114)									
inconflict				-0.050								
				(0.065)								
exconflict					0.067							
					(0.104)							
corrupt						**-0.293****						
						(0.144)						
military							-0.039					
							(0.096)					
religious								0.069				
								(0.113)				
law									**-0.285****			
									(0.114)			
ethnic										-0.062		
										(0.102)		
democracy											0.087	
											(0.187)	
bureau												-0.179
												(0.127)
Constant	4.685***	2.095***	2.371**	1.854***	1.072	1.876***	1.616**	1.291	2.104***	1.758*	1.409	1.610**
	(1.346)	(0.690)	(1.112)	(0.657)	(1.096)	(0.621)	(0.768)	(0.912)	(0.674)	(0.910)	(0.928)	(0.679)
Number of countries	67	67	67	67	67	67	67	67	67	67	67	67
R-squared	0.279	0.278	0.242	0.227	0.228	0.273	0.225	0.228	0.272	0.226	0.228	0.237
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Note: OLS specification with robust standard error. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.*

Table 5d. Determinants of fiscal behaviour, sample period 1980-2016
Dependent variable: Government-spending cyclicality $\hat{\beta}GS$ (OLS estimates)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
polcon	**-2.651*****	**-2.949****	**-3.199****	**-2.880****	**-3.173****	**-2.374****	**-2.702****	**-2.909*****	**-2.543*****	**-2.541****	**-2.324****	**-2.496****	**-2.570****
	(0.946)	(1.156)	(1.217)	(1.125)	(1.195)	(0.950)	(1.024)	(0.914)	(0.869)	(1.008)	(1.078)	(1.006)	(0.990)
inf	**0.714*****	**0.793*****	**0.772*****	**0.792*****	**0.767*****	**0.729*****	**0.706*****	**0.663*****	**0.649*****	**0.679*****	**0.667*****	**0.705*****	**0.717*****
	(0.069)	(0.064)	(0.061)	(0.064)	(0.062)	(0.071)	(0.053)	(0.073)	(0.083)	(0.076)	(0.064)	(0.068)	(0.086)
trade	-0.410*	-0.512**	-0.471**	-0.514**	-0.465**	-0.406*	-0.329	-0.395*	-0.470**	-0.185	-0.114	-0.174	-0.255
	(0.228)	(0.230)	(0.218)	(0.229)	(0.216)	(0.219)	(0.236)	(0.223)	(0.197)	(0.230)	(0.230)	(0.219)	(0.257)
TAL	-0.040	-0.012	-0.012	-0.012	-0.013	-0.049	-0.046	-0.021	-0.003	-0.033	-0.044	-0.050	-0.041
	(0.040)	(0.038)	(0.039)	(0.038)	(0.040)	(0.038)	(0.041)	(0.040)	(0.037)	(0.067)	(0.065)	(0.061)	(0.070)
gs	-0.624	1.208	1.231	1.204	1.237	-0.903	-0.570	0.014	0.333	1.512	1.083	0.921	0.920
	(1.258)	(1.068)	(1.035)	(1.056)	(1.024)	(1.209)	(1.180)	(1.214)	(1.264)	(1.066)	(1.186)	(0.942)	(1.247)
fiscap		0.089											
		(0.060)											
fiscap_vol			0.144										
			(0.102)										
lfiscap				0.099									
				(0.063)									
lfiscap_vol					0.159								
					(0.107)								
debt						**0.747****							
						(0.303)							
debt_vol							**1.587*****						
							(0.534)						
nare								**0.698***					
								(0.415)					
manu									**-1.370*****				
									(0.340)				
CRI										**-0.030***			
										(0.016)			
ERI											**-0.066***		
											(0.037)		
FRI												-0.055	
												(0.034)	
PRI													-0.017
													(0.012)
Constant	2.009***	1.078**	1.247**	1.028**	1.219**	1.538***	1.617***	1.595***	2.066***	3.119***	3.350***	3.212**	2.393**
	(0.585)	(0.466)	(0.474)	(0.463)	(0.470)	(0.563)	(0.611)	(0.513)	(0.567)	(1.168)	(1.189)	(1.389)	(0.971)
Number of countries	86	49	49	49	49	85	85	86	86	67	67	67	67
R-squared	0.203	0.532	0.541	0.534	0.545	0.243	0.265	0.231	0.287	0.264	0.271	0.267	0.243
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5d. Determinants of fiscal behaviour, sample period 1980-2016 *(continued)*
Dependent variable: Government-spending cyclicality $\hat{\beta}GS$ (OLS estimates)

VARIABLES	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
polcon	**-2.972*****	**-2.511****	**-2.483****	**-2.542****	**-2.569****	**-2.385****	**-2.545****	**-2.378****	**-2.929*****	**-2.659*****	**-2.555****	**-2.253****
	(0.918)	(1.021)	(0.974)	(0.963)	(1.060)	(0.934)	(1.009)	(0.952)	(1.038)	(0.980)	(1.113)	(1.095)
inf	**0.695*****	**0.665*****	**0.694*****	**0.749*****	**0.766*****	**0.636*****	**0.753*****	**0.752*****	**0.662*****	**0.748*****	**0.770*****	**0.694*****
	(0.080)	(0.056)	(0.102)	(0.090)	(0.092)	(0.079)	(0.096)	(0.097)	(0.094)	(0.095)	(0.090)	(0.086)
trade	-0.144	-0.266	-0.239	-0.238	-0.347	-0.338	-0.276	-0.291	-0.378	-0.267	-0.257	-0.290
	(0.259)	(0.251)	(0.248)	(0.284)	(0.265)	(0.235)	(0.270)	(0.291)	(0.267)	(0.269)	(0.381)	(0.260)
TAL	-0.041	0.010	-0.042	-0.065	-0.063	-0.010	-0.062	-0.068	-0.004	-0.063	-0.075	-0.029
	(0.065)	(0.064)	(0.069)	(0.065)	(0.061)	(0.054)	(0.070)	(0.067)	(0.066)	(0.067)	(0.086)	(0.068)
gs	0.471	1.623	0.664	0.169	-0.642	1.484	0.048	-0.544	1.760	0.098	-0.607	0.668
	(1.405)	(1.385)	(1.048)	(1.502)	(1.276)	(2.040)	(0.936)	(1.274)	(1.742)	(1.115)	(0.943)	(1.509)
govstab	**-0.358****											
	(0.172)											
sococon		**-0.220*****										
		(0.068)										
invest			-0.146									
			(0.115)									
inconflict				-0.052								
				(0.067)								
exconflict					0.064							
					(0.101)							
corrupt						**-0.297****						
						(0.146)						
military							-0.039					
							(0.097)					
religious								0.047				
								(0.119)				
law									**-0.261****			
									(0.112)			
ethnic										-0.087		
										(0.107)		
democracy											0.046	
											(0.194)	
bureau												**-0.212***
												(0.123)
Constant	4.228***	2.266***	2.447**	2.006***	1.234	2.022***	1.759**	1.521	2.201***	1.977**	1.625*	1.759**
	(1.377)	(0.700)	(1.137)	(0.698)	(1.103)	(0.616)	(0.771)	(0.933)	(0.687)	(0.926)	(0.942)	(0.666)
Number of countries	67	67	67	67	67	67	67	67	67	67	67	67
R-squared	0.263	0.287	0.243	0.231	0.232	0.278	0.229	0.230	0.267	0.234	0.229	0.246
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Note: OLS specification with robust standard error. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.*

Table 6a. Determinants of fiscal behaviour, sample period 1960-2016

Dependent variable: Value Added Tax cyclicality $\hat{\beta}$VAT (Prais-Winsten estimates)

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
inf	**-0.050****	**-0.049****	**-0.052****	**-0.049****	**-0.052****	**-0.050****	**-0.054****	**-0.074****	**-0.064****	**-0.068****	**-0.074*****	**-0.066*****	**-0.061***
	(0.021)	(0.020)	(0.020)	(0.020)	(0.020)	(0.023)	(0.024)	(0.028)	(0.026)	(0.027)	(0.022)	(0.021)	(0.030)
fiscap		0.010											
		(0.014)											
fiscap_vol			0.013										
			(0.017)										
lfiscap				0.009									
				(0.014)									
lfiscap_vol					0.012								
					(0.017)								
debt						-0.002							
						(0.073)							
debt_vol							-0.136						
							(0.097)						
nare								0.089					
								(0.072)					
manu									-0.080				
									(0.056)				
CRI										-0.003			
										(0.002)			
ERI											**-0.009****		
											(0.004)		
FRI												**-0.007****	
												(0.003)	
PRI													-0.001
													(0.002)
Constant	0.002	-0.022	-0.009	-0.020	-0.008	0.003	0.036	-0.023	0.036	0.199	0.349**	0.256*	0.101
	(0.016)	(0.036)	(0.024)	(0.036)	(0.024)	(0.043)	(0.032)	(0.022)	(0.033)	(0.141)	(0.140)	(0.131)	(0.136)
Number of countries	35	33	33	33	33	35	35	35	35	33	33	33	33
R-squared	0.085	0.096	0.091	0.093	0.089	0.085	0.135	0.115	0.119	0.141	0.217	0.184	0.104
p-value	0.021	0.060	0.036	0.064	0.045	0.074	0.085	0.039	0.054	0.060	0.008	0.017	0.116

Table 6a. Determinants of fiscal behaviour, sample period 1960-2016 *(continued)*
Dependent variable: Value Added Tax cyclicality $\hat{\beta}VAT$ (Prais-Winsten estimates)

VARIABLE	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
inf	**-0.055****	**-0.069*****	**-0.061****	**-0.057***	**-0.041**	**-0.050***	**-0.054***	**-0.048****	**-0.067****	**-0.048****	**-0.048**	**-0.048***
	(0.023)	(0.025)	(0.023)	(0.032)	(0.028)	(0.025)	(0.027)	(0.022)	(0.028)	(0.022)	(0.031)	(0.027)
govstab	-0.024											
	(0.016)											
socecon		-0.019										
		(0.012)										
invest			-0.013									
			(0.012)									
inconflict				-0.007								
				(0.013)								
exconflict					0.008							
					(0.018)							
corrupt						-0.003						
						(0.013)						
military							-0.006					
							(0.013)					
religious								-0.009				
								(0.017)				
law									-0.021			
									(0.014)			
ethnic										0.000		
										(0.018)		
democracy											-0.000	
											(0.020)	
bureau												-0.001
												(0.018)
Constant	0.187	0.131	0.110	0.071	-0.087	0.009	0.029	0.043	0.090	-0.004	-0.001	-0.000
	(0.129)	(0.093)	(0.115)	(0.137)	(0.199)	(0.063)	(0.072)	(0.095)	(0.073)	(0.088)	(0.112)	(0.064)
Number of countries	33	33	33	33	33	33	33	33	33	33	33	33
R-squared	0.117	0.171	0.108	0.096	0.087	0.081	0.088	0.085	0.173	0.080	0.080	0.080
p-value	0.065	0.032	0.039	0.142	0.050	0.098	0.105	0.102	0.072	0.092	0.095	0.097

*Note: OLS specification with robust standard error. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 6b. Determinants of fiscal behaviour, sample period 1960-2016
Dependent variable: Value Added Tax cyclicality $\hat{\beta}$VAT (OLS estimates)

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
inf	0.085**	0.096**	0.083**	0.096**	0.082**	0.062	0.069*	-0.032	0.035	0.019	0.032	0.051	0.020
	(0.035)	(0.036)	(0.032)	(0.036)	(0.032)	(0.041)	(0.038)	(0.063)	(0.045)	(0.044)	(0.047)	(0.041)	(0.043)
fiscap		-0.017											
		(0.036)											
fiscap_vol			0.048										
			(0.047)										
lfiscap				-0.017									
				(0.035)									
lfiscap_vol					0.045								
					(0.048)								
debt						-0.281							
						(0.187)							
debt_vol							**-0.616****						
							(0.264)						
nare								**0.438****					
								(0.208)					
manu									-0.276				
									(0.166)				
CRI										**-0.010***			
										(0.005)			
ERI											**-0.022***		
											(0.013)		
FRI												-0.015	
												(0.010)	
PRI													**-0.008***
													(0.004)
Constant	-0.134**	-0.117	-0.184**	-0.115	-0.182**	0.002	0.012	-0.258***	-0.020	0.586	0.666	0.440	0.447
	(0.051)	(0.101)	(0.074)	(0.101)	(0.074)	(0.106)	(0.080)	(0.082)	(0.085)	(0.388)	(0.475)	(0.374)	(0.311)
Number of countries	37	35	35	35	35	37	37	37	37	35	35	35	35
R-squared	0.027	0.040	0.049	0.040	0.048	0.072	0.144	0.109	0.078	0.125	0.117	0.091	0.125
p-value	0.019	0.026	0.041	0.025	0.042	0.039	0.011	0.043	0.036	0.027	0.024	0.031	0.043

Table 6b. Determinants of fiscal behaviour, sample period 1960-2016 *(continued)*
Dependent variable: Value Added Tax cyclicality $\hat{\beta}VAT$ (OLS estimates)

VARIABLE	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
inf	0.087**	0.036	0.052	0.039	0.041	0.058	0.031	0.093**	0.036	0.070	0.045	0.057
	(0.039)	(0.042)	(0.045)	(0.048)	(0.041)	(0.042)	(0.034)	(0.042)	(0.040)	(0.046)	(0.039)	(0.040)
govstab	-0.019											
	(0.047)											
socecon		-0.049										
		(0.031)										
invest			-0.039									
			(0.034)									
inconflict				-0.045								
				(0.031)								
exconflict					**-0.066***							
					(0.037)							
corrupt						-0.037						
						(0.040)						
military							**-0.074****					
							(0.031)					
religious								**-0.117****				
								(0.050)				
law									**-0.063***			
									(0.037)			
ethnic										**-0.073***		
										(0.038)		
democracy											-0.047	
											(0.040)	
bureau												-0.041
												(0.042)
Constant	-0.003	0.199	0.189	0.295	0.552	-0.004	0.205	0.468*	0.128	0.184	0.088	-0.022
	(0.375)	(0.217)	(0.290)	(0.302)	(0.375)	(0.150)	(0.134)	(0.251)	(0.160)	(0.172)	(0.187)	(0.125)
Number of countries	35	35	35	35	35	35	35	35	35	35	35	35
R-squared	0.035	0.105	0.060	0.098	0.089	0.060	0.169	0.122	0.131	0.106	0.061	0.052
p-value	0.037	0.040	0.051	0.042	0.089	0.071	0.021	0.036	0.028	0.043	0.112	0.070

*Note: OLS specification with robust standard error. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 7a. Determinants of fiscal behaviour, sample period 1960-2016

Dependent variable: Personal Income Tax cyclicality $\hat{\beta}PIT$ (Prais-Winsten estimates)

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
gs	1.506	1.479	1.346	1.515	1.059	0.803	-0.109	0.498	0.677	-0.273
	(1.334)	(1.258)	(1.286)	(1.252)	(0.959)	(0.976)	(0.679)	(0.814)	(0.825)	(0.701)
GDP	9.286**	8.127**	8.959**	8.116**	6.551**	7.309**	8.133***	6.775**	7.017**	8.571***
	(3.699)	(3.476)	(3.622)	(3.465)	(2.911)	(2.926)	(2.804)	(3.199)	(3.176)	(2.590)
fiscap	-0.056									
	(0.051)									
fiscap_vol		**-0.038*****								
		(0.005)								
lfiscap			**-0.054****							
			(0.023)							
lfiscap_vol				**-0.030*****						
				(0.003)						
nare					-0.155					
					(0.097)					
manu						**0.275***				
						(0.138)				
CRI							**0.013*****			
							(0.003)			
ERI								**0.020****		
								(0.008)		
FRI									**0.018*****	
									(0.007)	
PRI										**0.012*****
										(0.003)
Constant	-0.446	-0.485*	-0.407	-0.495*	-0.365*	-0.510**	-1.229***	-1.036**	-1.048***	-1.099***
	(0.327)	(0.277)	(0.300)	(0.275)	(0.216)	(0.217)	(0.364)	(0.406)	(0.369)	(0.315)
Number of countries	38	38	38	38	46	46	43	43	43	43
R-squared	0.238	0.373	0.310	0.382	0.136	0.164	0.264	0.172	0.184	0.279
p-value	0.085	0.000	0.009	0.000	0.098	0.067	0.004	0.102	0.047	0.002

Table 7a. Determinants of fiscal behaviour, sample period 1960-2016 *(continued)*
Dependent variable: Personal Income Tax cyclicality $\hat{\beta}PIT$ (Prais-Winsten estimates)

VARIABLE	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
gs	0.398	-0.040	0.892	-0.201	-0.555	1.472	0.257	-0.129
	(0.733)	(0.837)	(1.026)	(0.659)	(0.725)	(0.974)	(0.808)	(0.732)
GDP	7.030**	7.619***	6.479**	9.046***	7.098**	6.876**	8.273***	7.937***
	(2.719)	(2.509)	(2.965)	(2.686)	(2.838)	(2.949)	(2.329)	(2.737)
socecon	**0.059*****							
	(0.016)							
inconflict		**0.073*****						
		(0.024)						
exconflict			**0.053****					
			(0.025)					
corrupt				**0.111*****				
				(0.028)				
law					**0.093*****			
					(0.027)			
ethnic						**0.070***		
						(0.037)		
democracy							**0.102*****	
							(0.024)	
bureau								**0.114*****
								(0.029)
Constant	-0.711***	-0.985***	-0.937***	-0.692***	-0.565**	-0.806**	-0.831***	-0.585**
	(0.249)	(0.304)	(0.329)	(0.227)	(0.216)	(0.330)	(0.231)	(0.216)
Number of countries	43	43	43	43	43	43	43	43
R-squared	0.234	0.236	0.122	0.317	0.244	0.172	0.263	0.262
p-value	0.004	0.013	0.059	0.001	0.012	0.089	0.000	0.003

*Note: OLS specification with robust standard error. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 7b. Determinants of fiscal behaviour, sample period 1960-2016

Dependent variable: Personal Income Tax cyclicality $\hat{\beta}PIT$ (OLS estimates)

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
gs	7.154**	14.169***	13.154***	13.747***	13.437***	7.220**	7.140**	6.296*	3.715	2.432	3.502	4.298	3.532
	(3.502)	(4.677)	(4.453)	(4.588)	(4.416)	(3.591)	(3.512)	(3.168)	(3.240)	(3.149)	(3.283)	(3.374)	(3.159)
GDP	11.522	36.073***	34.588***	35.712***	34.666***	10.933	10.653	19.076**	15.757**	16.630*	9.146	12.895	18.107**
	(8.806)	(12.600)	(12.089)	(12.592)	(12.143)	(9.426)	(8.728)	(7.855)	(6.586)	(8.564)	(9.065)	(8.427)	(9.041)
trade	-0.759*	-0.935**	-0.923**	-0.949**	-0.906**	-0.781**	-0.807**	-0.890**	-0.505	-1.062***	-1.128***	-1.016***	-0.976***
	(0.394)	(0.422)	(0.435)	(0.420)	(0.434)	(0.378)	(0.398)	(0.378)	(0.363)	(0.343)	(0.380)	(0.368)	(0.354)
inf	-0.337	-0.319	-0.178	-0.297	-0.154	-0.335	-0.341	-0.147	-0.144	-0.174	-0.180	-0.202	-0.228
	(0.311)	(0.267)	(0.197)	(0.252)	(0.197)	(0.313)	(0.307)	(0.265)	(0.251)	(0.291)	(0.316)	(0.317)	(0.285)
fiscap		-0.031											
		(0.083)											
fiscap_vol			**-0.097*****										
			(0.023)										
lfiscap				-0.053									
				(0.083)									
lfiscap_vol					**-0.082*****								
					(0.017)								
debt						-0.169							
						(0.785)							
debt_vol							-0.543						
							(1.210)						
nare								**-1.629*****					
								(0.415)					
manu									**2.320*****				
									(0.552)				
CRI										**0.057*****			
										(0.017)			
ERI											**0.113*****		
											(0.026)		
FRI												**0.109*****	
												(0.030)	
PRI													**0.037****
													(0.015)
Constant	-0.861	-2.421**	-2.227***	-2.287**	-2.302***	-0.758	-0.666	-0.242	-1.447***	-4.226***	-4.085***	-4.409***	-3.000**
	(0.683)	(0.930)	(0.784)	(0.900)	(0.774)	(0.704)	(0.785)	(0.660)	(0.532)	(1.314)	(1.035)	(1.209)	(1.232)
Number of countries	68	53	53	53	53	68	68	68	68	64	64	64	64
R-squared	0.140	0.243	0.280	0.247	0.281	0.141	0.144	0.289	0.322	0.270	0.258	0.263	0.228
p-value	0.050	0.004	0.000	0.003	0.000	0.089	0.074	0.000	0.000	0.001	0.000	0.001	0.008

Table 7b. Determinants of fiscal behaviour, sample period 1960-2016 *(continued)*
Dependent variable: Personal Income Tax cyclicality $\hat{\beta}PIT$ (OLS estimates)

VARIABLE	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
gs	6.497*	4.107	4.087	3.370	6.950**	4.633	6.083	7.313**	2.831	7.447**	6.848*	3.490
	(3.437)	(3.328)	(3.162)	(3.381)	(3.402)	(3.342)	(4.424)	(3.411)	(3.772)	(3.542)	(3.456)	(3.598)
GDP	9.218	13.188	12.706	16.449*	14.920	17.084*	12.594	12.106	13.437	11.258	17.477*	19.294**
	(9.904)	(9.618)	(8.841)	(8.899)	(9.901)	(9.185)	(10.124)	(9.821)	(9.417)	(9.505)	(10.341)	(9.339)
trade	-0.981**	-1.094***	-1.049***	-1.070***	-0.942**	-0.792**	-0.871**	-0.849**	-0.893**	-0.881**	-0.757*	-0.762**
	(0.397)	(0.348)	(0.368)	(0.374)	(0.398)	(0.359)	(0.408)	(0.402)	(0.364)	(0.392)	(0.384)	(0.330)
inf	-0.306	-0.220	-0.189	-0.246	-0.342	-0.243	-0.316	-0.355	-0.211	-0.287	-0.255	-0.143
	(0.311)	(0.279)	(0.305)	(0.263)	(0.290)	(0.294)	(0.307)	(0.308)	(0.299)	(0.301)	(0.307)	(0.256)
govstab	0.213											
	(0.175)											
socecon		0.304***										
		(0.065)										
invest			**0.294****									
			(0.122)									
inconflict				0.285**								
				(0.116)								
exconflict					0.145							
					(0.137)							
corrupt						**0.270****						
						(0.104)						
military							0.086					
							(0.176)					
religious								0.058				
								(0.205)				
law									**0.296*****			
									(0.102)			
ethnic										0.207		
										(0.168)		
democracy											0.181	
											(0.132)	
bureau												**0.503*****
												(0.150)
Constant	-2.186	-2.231***	-2.650**	-2.948**	-2.311	-1.598**	-1.061	-1.144	-1.414**	-1.738	-1.870*	-1.959***
	(1.404)	(0.753)	(1.133)	(1.179)	(1.762)	(0.770)	(0.843)	(1.420)	(0.692)	(1.140)	(1.034)	(0.686)
Number of countries	64	64	64	64	64	64	64	64	64	64	64	64
R-squared	0.163	0.295	0.224	0.232	0.161	0.198	0.154	0.151	0.208	0.180	0.174	0.260
p-value	0.058	0.000	0.013	0.007	0.053	0.011	0.069	0.079	0.009	0.043	0.043	0.003

*Note: OLS specification with robust standard error. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 8a. Determinants of fiscal behaviour, sample period 1960-2016

Dependent variable: Corporate Income Tax cyclicality $\hat{\beta}CIT$ (Prais-Winsten estimates)

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
gs	0.423	1.258**	0.934**	1.239**	0.935**	0.421	0.398	0.318	0.251	0.449	0.374	0.455	0.459
	(0.316)	(0.471)	(0.416)	(0.466)	(0.414)	(0.319)	(0.314)	(0.310)	(0.327)	(0.344)	(0.343)	(0.322)	(0.350)
GDP	1.463*	3.083**	2.889**	3.112**	2.893**	1.627*	1.294	1.698**	1.508*	0.870	0.909	0.908	0.824
	(0.788)	(1.327)	(1.298)	(1.342)	(1.299)	(0.926)	(0.858)	(0.841)	(0.793)	(0.698)	(0.739)	(0.736)	(0.681)
fiscap		0.014											
		(0.010)											
fiscap_vol			0.001										
			(0.002)										
lfiscap				0.013									
				(0.008)									
lfiscap_vol					0.001								
					(0.002)								
debt						0.034							
						(0.070)							
debt_vol							-0.076						
							(0.134)						
nare								-0.080					
								(0.049)					
manu									0.113				
									(0.075)				
CRI										-0.000			
										(0.002)			
ERI											0.001		
											(0.003)		
FRI												-0.001	
												(0.003)	
PRI													-0.000
													(0.002)
Constant	-0.129**	-0.336***	-0.247***	-0.331***	-0.247***	-0.150**	-0.102	-0.086	-0.140***	-0.080	-0.118	-0.062	-0.080
	(0.052)	(0.115)	(0.086)	(0.113)	(0.085)	(0.062)	(0.067)	(0.057)	(0.049)	(0.117)	(0.105)	(0.121)	(0.107)
Number of countries	61	50	50	50	50	61	61	61	61	57	57	57	57
R-squared	0.048	0.107	0.073	0.105	0.073	0.051	0.054	0.082	0.084	0.031	0.030	0.032	0.031
p-value	0.012	0.035	0.037	0.035	0.037	0.032	0.032	0.011	0.012	0.073	0.060	0.072	0.073

Table 8a. Determinants of fiscal behaviour, sample period 1960-2016 *(continued)*
Dependent variable: Corporate Income Tax cyclicality $\hat{\beta}CIT$ (Prais-Winsten estimates)

VARIABLE	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
gs	0.441	0.299	0.550	0.402	0.509*	0.290	0.505	0.599*	0.214	0.419	0.366	0.284
	(0.337)	(0.328)	(0.375)	(0.316)	(0.289)	(0.364)	(0.399)	(0.299)	(0.456)	(0.307)	(0.295)	(0.358)
GDP	0.930	0.980	0.875	0.911	0.469	1.127	0.789	-0.259	1.019	0.829	1.142	1.105
	(0.741)	(0.748)	(0.720)	(0.677)	(0.641)	(0.785)	(0.670)	(0.764)	(0.757)	(0.683)	(0.763)	(0.793)
govstab	-0.005											
	(0.013)											
socecon		0.007										
		(0.007)										
invest			-0.009									
			(0.013)									
inconflict				-0.000								
				(0.012)								
exconflict					-0.015							
					(0.016)							
corrupt						0.008						
						(0.014)						
military							-0.005					
							(0.019)					
religious								**-0.040****				
								(0.019)				
law									0.010			
									(0.016)			
ethnic										-0.011		
										(0.018)		
democracy											0.006	
											(0.013)	
bureau												0.011
												(0.014)
	-0.073	-0.131**	-0.052	-0.102	0.052	-0.122**	-0.092	0.109	-0.118**	-0.057	-0.135	-0.121**
Constant	(0.097)	(0.055)	(0.076)	(0.106)	(0.173)	(0.053)	(0.069)	(0.108)	(0.049)	(0.096)	(0.088)	(0.048)
Number of countries	57	57	57	57	57	57	57	57	57	57	57	57
R-squared	0.031	0.037	0.038	0.030	0.045	0.035	0.032	0.135	0.037	0.038	0.033	0.036
p-value	0.069	0.042	0.091	0.066	0.058	0.034	0.079	0.039	0.035	0.086	0.051	0.039

*Note: OLS specification with robust standard error. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 8b. Determinants of fiscal behaviour, sample period 1960-2016

Dependent variable: Corporate Income Tax cyclicality $\hat{\beta}CIT$ (OLS estimates)

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
gs	7.384***	9.143***	9.066***	8.938***	9.061***	7.639***	7.346***	6.699***	5.774***	2.804	2.878	4.739**	3.478*
	(2.156)	(2.937)	(2.824)	(2.891)	(2.800)	(2.097)	(2.169)	(1.982)	(1.977)	(1.951)	(2.040)	(2.008)	(1.890)
GDP	0.352	4.435	4.197	4.260	4.147	-3.878	-0.138	3.051	0.559	5.941	0.693	1.372	7.872
	(5.762)	(5.938)	(5.851)	(5.931)	(5.862)	(6.387)	(6.091)	(6.021)	(6.082)	(5.089)	(5.410)	(5.449)	(5.391)
trade	-0.391*	-0.491*	-0.490*	-0.497*	-0.489*	-0.490**	-0.409*	-0.508**	-0.313	-0.573***	-0.594***	-0.520**	-0.530***
	(0.226)	(0.255)	(0.253)	(0.253)	(0.252)	(0.216)	(0.229)	(0.220)	(0.238)	(0.196)	(0.200)	(0.225)	(0.197)
fiscap		-0.013											
		(0.034)											
fiscap_vol			-0.015										
			(0.013)										
lfiscap				-0.021									
				(0.030)									
lfiscap_vol					-0.014								
					(0.008)								
debt						**-0.935***							
						(0.469)							
debt_vol							-0.244						
							(0.467)						
nare								-0.797***					
								(0.277)					
manu									0.964**				
									(0.432)				
CRI										**0.044*****			
										(0.010)			
ERI											**0.102*****		
											(0.026)		
FRI												**0.074*****	
												(0.023)	
PRI													**0.031*****
													(0.007)
Constant	-0.923***	-1.134**	-1.129**	-1.073**	-1.127**	-0.309	-0.829**	-0.492	-1.044***	-3.406***	-3.739***	-3.232***	-2.672***
	(0.318)	(0.515)	(0.444)	(0.503)	(0.437)	(0.461)	(0.392)	(0.380)	(0.336)	(0.601)	(0.770)	(0.755)	(0.463)
Number of countries	63	51	51	51	51	63	63	63	63	59	59	59	59
R-squared	0.167	0.240	0.242	0.242	0.243	0.223	0.169	0.263	0.247	0.359	0.387	0.308	0.312
p-value	0.010	0.012	0.006	0.010	0.003	0.004	0.018	0.002	0.003	0.000	0.000	0.000	0.000

Table 8b. Determinants of fiscal behaviour, sample period 1960-2016 *(continued)*
Dependent variable: Corporate Income Tax cyclicality $\hat{\beta}CIT$ (OLS estimates)

VARIABLE	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
gs	6.043***	4.407**	4.125**	4.069*	6.577***	4.018**	5.255*	7.028***	2.886	7.283***	6.443***	3.648
	(2.220)	(1.781)	(1.919)	(2.106)	(2.084)	(1.897)	(2.808)	(2.220)	(2.168)	(2.080)	(2.047)	(2.231)
GDP	0.386	3.616	2.228	5.495	6.019	7.381	3.452	3.145	3.587	2.485	7.138	6.719
	(5.979)	(5.009)	(5.498)	(5.556)	(6.202)	(6.026)	(6.881)	(6.318)	(6.517)	(5.562)	(6.333)	(5.774)
trade	-0.519**	-0.557***	-0.562***	-0.562**	-0.516**	-0.387**	-0.416*	-0.394*	-0.456**	-0.456**	-0.363*	-0.353*
	(0.255)	(0.180)	(0.209)	(0.223)	(0.241)	(0.193)	(0.230)	(0.235)	(0.206)	(0.227)	(0.206)	(0.191)
govstab	**0.206***											
	(0.118)											
socecon		**0.224*****										
		(0.047)										
invest			**0.229*****									
			(0.060)									
inconflict				**0.200*****								
				(0.054)								
exconflict					**0.168****							
					(0.068)							
corrupt						**0.261*****						
						(0.056)						
military							0.108					
							(0.085)					
religious								0.083				
								(0.083)				
law									**0.254*****			
									(0.069)			
ethnic										**0.195****		
										(0.079)		
democracy											**0.180*****	
											(0.065)	
bureau												**0.354*****
												(0.098)
Constant	-2.207***	-1.902***	-2.205***	-2.350***	-2.629***	-1.550***	-1.167***	-1.376***	-1.320***	-1.781***	-1.849***	-1.529***
	(0.762)	(0.348)	(0.461)	(0.468)	(0.737)	(0.314)	(0.344)	(0.513)	(0.341)	(0.474)	(0.414)	(0.329)
Number of countries	59	59	59	59	59	59	59	59	59	59	59	59
R-squared	0.194	0.366	0.289	0.269	0.203	0.279	0.182	0.173	0.281	0.234	0.227	0.312
p-value	0.005	0.000	0.000	0.000	0.001	0.000	0.006	0.009	0.000	0.001	0.001	0.000

*Note: OLS specification with robust standard error. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 9a. Fiscal behaviour of government spending of OECD & non-OECD countries
Dependent variable: Percentage change of real government spending

Sample period	1960-2016						1980-2016					
VARIABLE	OECD			Non-OECD			OECD			Non-OECD		
	OLS	FE	FE	OLS	FE	FE	OLS	FE	FE	OLS	FE	FE
Percentage change of real GDP	**0.537*****	**0.486*****	**0.508*****	**0.714*****	**0.698*****	**0.706*****	**0.152****	**0.072**	**0.227****	**0.638*****	**0.634*****	**0.652*****
	(0.057)	(0.086)	(0.101)	(0.055)	(0.059)	(0.060)	(0.061)	(0.087)	(0.097)	(0.099)	(0.117)	(0.126)
Constant	0.022***	0.023***	0.046***	0.014***	0.015***	0.041***	0.022***	0.024***	0.060***	0.019***	0.019***	-0.003
	(0.002)	(0.003)	(0.011)	(0.003)	(0.002)	(0.013)	(0.002)	(0.002)	(0.009)	(0.005)	(0.005)	(0.079)
Number of countries		35	35		161	161		35	35		157	157
Observations	1,692	1,692	1,692	6,368	6,368	6,368	991	991	991	3,657	3,657	3,657
R-squared	0.114	0.088	0.259	0.085	0.076	0.101	0.010	0.002	0.129	0.083	0.073	0.099
Country FE		YES	YES		YES	YES		YES	YES		YES	YES
Year FE			YES			YES			YES			YES

*Note: OLS/FE: Ordinary Least Squares/Fixed Effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 9b. Fiscal behaviour of tax rates of OECD and non-OECD countries, sample period 1960-2016
Dependent variable: Tax rate

VARIABLE	VAT				PIT				CIT			
	OECD		Non-OECD		OECD		Non-OECD		OECD		Non-OECD	
Real GDP growth rate	**-0.149*****	**-0.149*****	**-0.009**	**-0.009**	**0.486****	**0.484****	**-0.191****	**-0.191****	**0.315****	**0.313*****	**-0.148****	**-0.147****
	(0.045)	(0.044)	(0.033)	(0.033)	(0.204)	(0.202)	(0.087)	(0.087)	(0.121)	(0.120)	(0.065)	(0.065)
Constant	17.294***	16.818***	14.739***	14.268***	48.061***	46.268***	30.831***	30.974***	33.220***	32.213***	32.774***	32.205***
	(0.114)	(1.062)	(0.116)	(0.653)	(0.538)	(1.943)	(0.309)	(2.330)	(0.341)	(1.387)	(0.238)	(1.244)
Number of countries	26	26	42	42	27	27	49	49	27	27	49	49
Observations	926	926	958	958	1097	1097	1661	1661	1200	1200	1740	1740
p-value	0.003	0.001	0.784	0.786	0.025	0.016	0.033	0.029	0.015	0.009	0.028	0.023
R-squared	0.031	0.028	0.001	0.002	0.012	0.000	0.008	0.001	0.014	0.011	0.009	0.000
Fixed Effect	YES		YES		YES		YES		YES		YES	
Random Effect		YES		YES		YES		YES		YES		YES

*Note: Fixed Effects and Random Effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 10a. Fiscal behaviour of government spending by income level, sample period 1960-2016
Dependent variable: Percentage change of real government spending

	HIC		UMC		LMC		LIC	
Percentage change of real GDP	**0.517*** **	**0.586*** **	**0.715*** **	**0.725*** **	**0.639*** **	**0.632*** **	**0.877*** **	**0.866*** **
	(0.079)	(0.080)	(0.055)	(0.064)	(0.156)	(0.159)	(0.141)	(0.147)
Constant	0.023***	0.062***	0.014***	0.021	0.016**	0.042**	0.011**	0.036
	(0.003)	(0.014)	(0.002)	(0.022)	(0.006)	(0.018)	(0.004)	(0.026)
Number of countries	62	62	52	52	52	52	30	30
Observations	2,576	2,576	2,133	2,133	2,063	2,063	1,288	1,288
p-value	0.000	0.000	0.000	.	0.000	.	0.000	.
R-squared	0.078	0.163	0.112	0.164	0.052	0.091	0.077	0.108
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE		YES		YES		YES		YES

Note: HIC: high income countries; UMC: upper middle income countries; LMC: lower middle income countries; LIC: lower income countries
*Fixed Effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 10b. Fiscal behaviour of government spending by income level, sample period 1980-2016
Dependent variable: Percentage change of real government spending

	HIC		UMC		LMC		LIC	
Percentage change of real GDP	**0.068**	**0.150**	**0.506*** **	**0.512*** **	**0.943*** **	**0.947*** **	**1.305*** **	**1.351*** **
	(0.161)	(0.213)	(0.093)	(0.100)	(0.152)	(0.150)	(0.242)	(0.263)
Constant	0.027***	0.039	0.021***	0.061	0.007	-0.078	0.001	0.180
	(0.005)	(0.027)	(0.004)	(0.057)	(0.007)	(0.152)	(0.010)	(0.240)
Number of countries	57	57	54	54	52	52	29	29
Observations	1,523	1,523	1,231	1,231	1,246	1,246	648	648
p-value	0.673	0.000	0.000	.	0.000	0.000	0.000	.
R-squared	0.001	0.058	0.078	0.128	0.070	0.114	0.188	0.233
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE		YES		YES		YES		YES

Note: HIC: high income countries; UMC: upper middle income countries; LMC: lower middle income countries; LIC: lower income countries
*Fixed Effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 11a. Time-Varying fiscal behaviour of government spending
Dependent variable: Percentage change of real government spending

VARIABLES	1960-1971		1972-1980		1981-1989		1990-1998		1999-2007		2008-2016	
Percentage change of real GDP	**0.658*** **	**0.657*** **	**0.361*** **	**0.367*** **	**0.801*** **	**0.844*** **	**0.734*** **	**0.718*** **	**0.635** **	**0.653** **	**0.325** **	**0.516*** **
	(0.106)	(0.105)	(0.115)	(0.111)	(0.112)	(0.116)	(0.112)	(0.115)	(0.271)	(0.290)	(0.141)	(0.171)
Constant	0.039***	0.042***	0.036***	0.054***	0.007**	0.022	0.007**	0.008	0.008	0.003	0.031***	0.020
	(0.005)	(0.011)	(0.005)	(0.013)	(0.003)	(0.018)	(0.003)	(0.019)	(0.012)	(0.016)	(0.004)	(0.012)
Number of countries	99	99	110	110	157	157	180	180	191	191	189	189
Observations	952	952	934	934	1,319	1,319	1,526	1,526	1,671	1,671	1,658	1,658
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.000
R-squared	0.0974	0.117	0.0254	0.0575	0.0696	0.0857	0.0762	0.0873	0.0405	0.0448	0.0176	0.0919
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE		YES		YES		YES		YES		YES		YES

*Note: Fixed Effects (country control, time control). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 11b. Time-Varying fiscal behaviour of government spending with net acquisition of nonfinancial assets and capital expenditure
Dependent variable: Percentage change of real government spending

VARIABLES	Before crisis								After crisis	
	1980-1989		1990-1998		1999-2007		1980-2007		2008-2016	
Percentage change of real GDP	**0.930*** **	**0.915*** **	**0.314**	**0.324**	**0.691*** **	**0.690*** **	**0.557*** **	**0.557*** **	**0.650*** **	**0.724*** **
	(0.245)	(0.246)	(0.229)	(0.236)	(0.134)	(0.134)	(0.155)	(0.161)	(0.067)	(0.091)
Constant	0.002	0.017	0.020**	0.016	0.014**	-0.002	0.017**	0.030	0.022***	0.044***
	(0.009)	(0.038)	(0.009)	(0.024)	(0.006)	(0.012)	(0.007)	(0.038)	(0.002)	(0.011)
Observations	352	352	991	991	1,596	1,596	2,939	2,939	1,709	1,709
R-squared	0.069	0.083	0.017	0.034	0.060	0.070	0.048	0.061	0.100	0.161
Number of countries	52	52	148	148	189	189	189	189	192	192
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE		YES		YES		YES		YES		YES

*Note: Fixed Effects (country control, time control). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 12. Sovereign Wealth Funds and the Government-Spending Cyclicality

VARIABLES	Full sample		Good times	
	(1)	(2)	(3)	(4)
polcon	-0.816	-0.826	-0.328	-0.341
	(0.751)	(0.748)	(0.671)	(0.669)
inf	-0.091	-0.090	-0.038	-0.038
	(0.080)	(0.080)	(0.060)	(0.060)
trade	0.058	0.066	0.036	0.046
	(0.132)	(0.131)	(0.146)	(0.146)
TAL	-0.004	-0.004	-0.001	-0.000
	(0.003)	(0.003)	(0.003)	(0.003)
fiscap	**0.121*** **		**0.102***	
	(0.041)		(0.051)	
SWF*fiscap	**-0.125*** **		**-0.103****	
	(0.041)		(0.051)	
lfiscap		**0.119*** **		**0.101****
		(0.038)		(0.047)
SWF*lfiscap		**-0.125*** **		**-0.103****
		(0.038)		(0.047)
CRI	**-0.019****	**-0.019****	**-0.016***	**-0.017***
	(0.008)	(0.008)	(0.009)	(0.009)
SWF*CRI	**-0.046*** **	**-0.046*** **	**-0.023***	**-0.023***
	(0.011)	(0.011)	(0.013)	(0.013)
Constant	1.778***	1.810***	1.593**	1.623**
	(0.660)	(0.653)	(0.676)	(0.670)
Number of countries	81	81	80	80
R-squared	0.584	0.586	0.368	0.373
p-value	0.000	0.000	0.000	0.000

*Note: $\hat{\beta}_{GS}$ by country is estimated by Prais-Winsten approach, from equation (1) for full samples, and from equation (4a) for good-times sub-sample. WLS with robust standard errors is used in this table, the weight is real GDP (2010 US$) by country averaged over the full period in full sample, over good times in good-times sub-sample. The same average specifications for other control variables. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Figure 1. Public debt/GDP (%) in advanced economies, and emerging markets and developing economies.
Source: World Economic Outlook; authors' calculation.

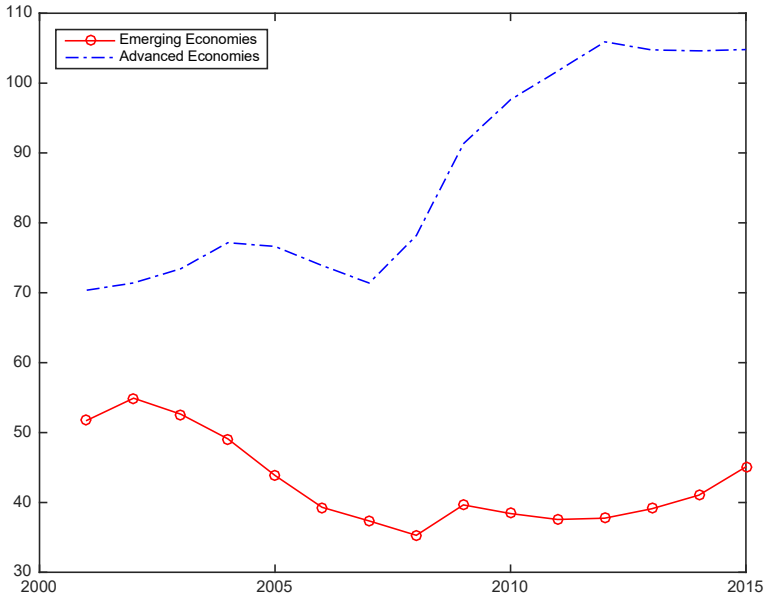
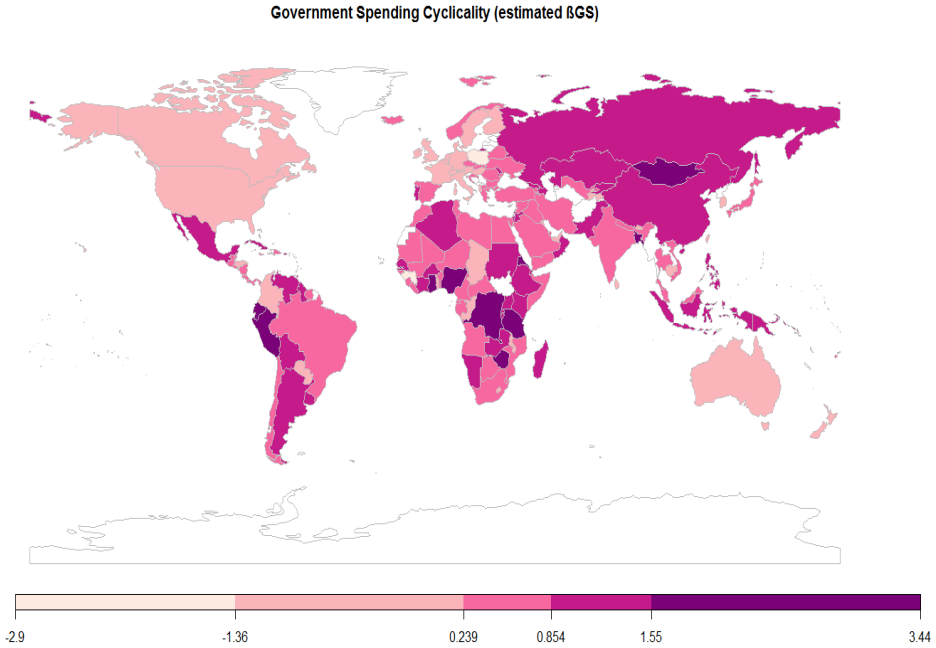


Figure 2. Magnitude of government spending cyclicality $\hat{\beta}GS$, sample period 1960-2016

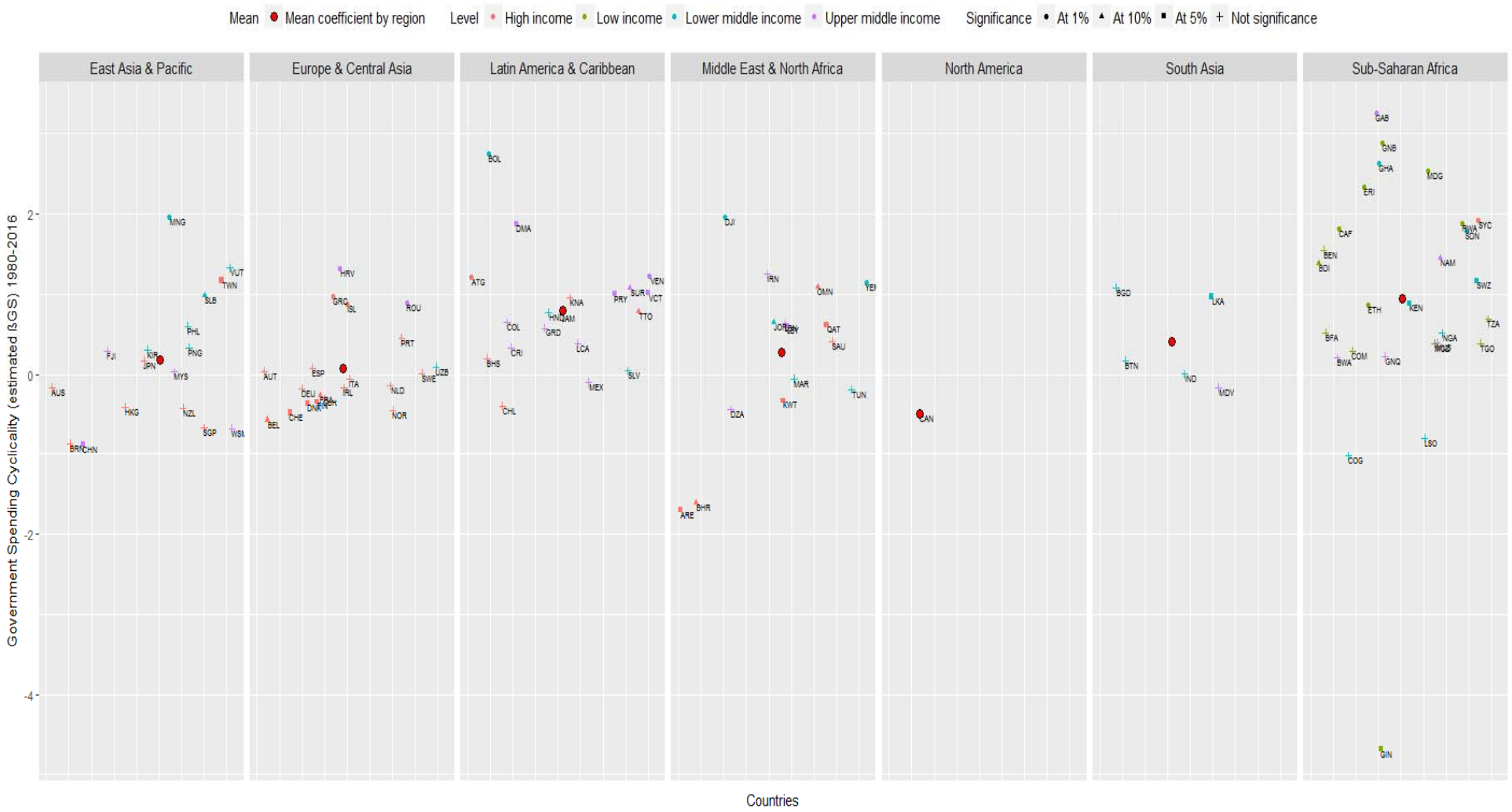


Note: $\hat{\beta}GS$ is estimated in equation (1) by country using Prais-Winsten approach to correct for the first order-autocorrelation in the residuals, the sample period is 1960-2016.

Figure 3a. Government spending cyclicality $\hat{\beta}GS$ by region and income, sample period 1960-2016

Note: $\hat{\beta}GS$ is estimated in equation (1) by country using Prais-Winsten approach to correct for the first order-autocorrelation in the residuals, the sample period is 1960-2016. The countries are grouped based on World Bank classification in this figure.

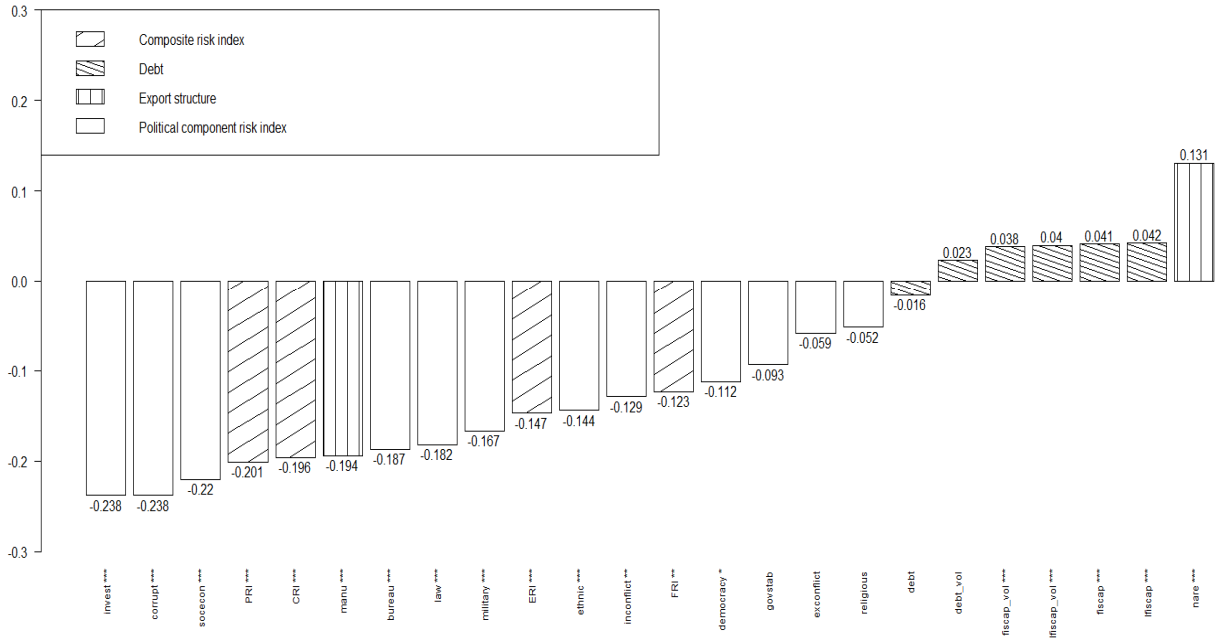
Figure 3b. Government spending cyclicality $\hat{\beta}GS$ by region and income, sample period 1980-2016



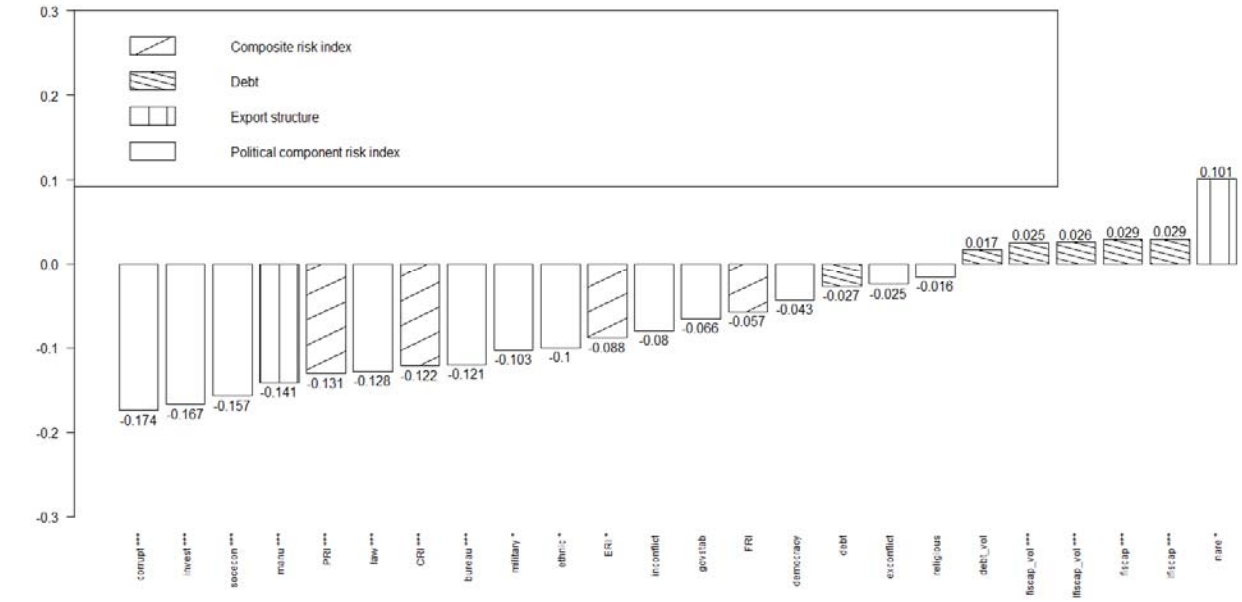
Note: $\hat{\beta}GS$ is estimated in equation (1) by country using Prais-Winsten approach to correct for the first order-autocorrelation in the residuals. The sample period is 1980-2016 as a scenario for a different definition of government spending. The countries are grouped based on World Bank classification in this figure.

Figure 4a. Economic significance of variables to government spending cyclicality $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$, sample period 1960-2016

(i) $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ *by country is estimated from equation (1) using Prais-Winsten*



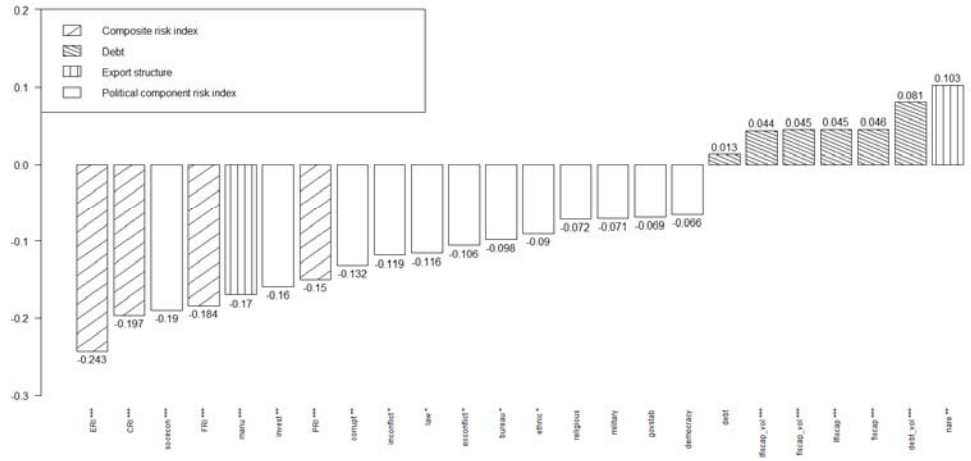
(ii) $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ *by country is estimated from equation (1) using OLS (RSE)*



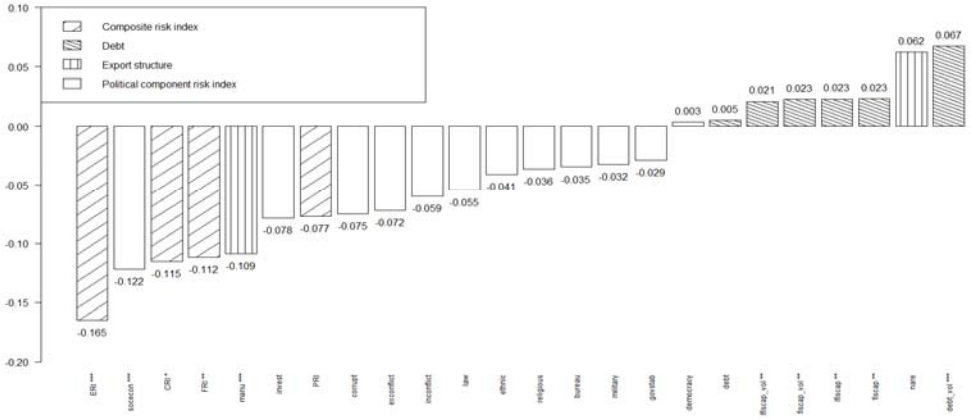
*Note: The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with the estimated coefficient in the corresponding regression (equation (2)) to approximate the effect of its one standard deviation increase on the fiscal cyclicality. The sample period is 1960-2016. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

Figure 4b. Economic significance of variables to government spending cyclicality $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ at good times/bad times
Sample period 1960-2016

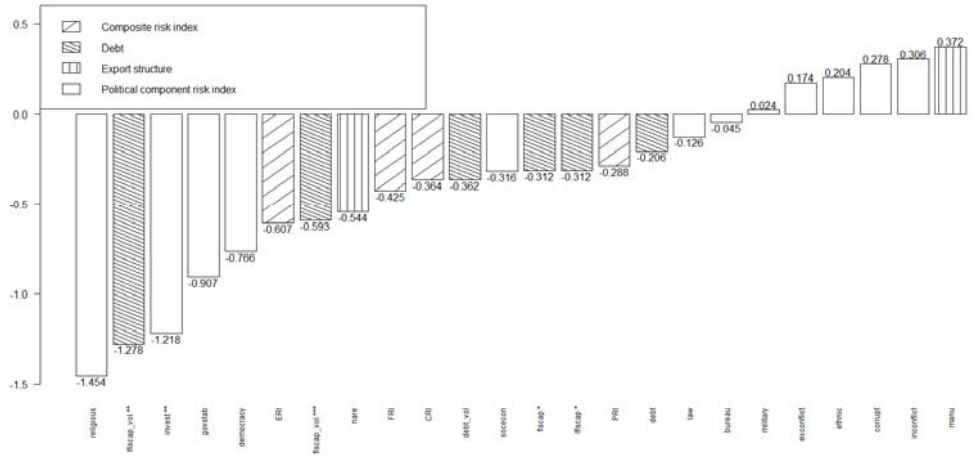
(i) $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ *by country is estimated from equation (4a) using Prais-Winsten (good times)*



(ii) $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ *by country is estimated from equation (4a) using OLS (RSE) (good times)*



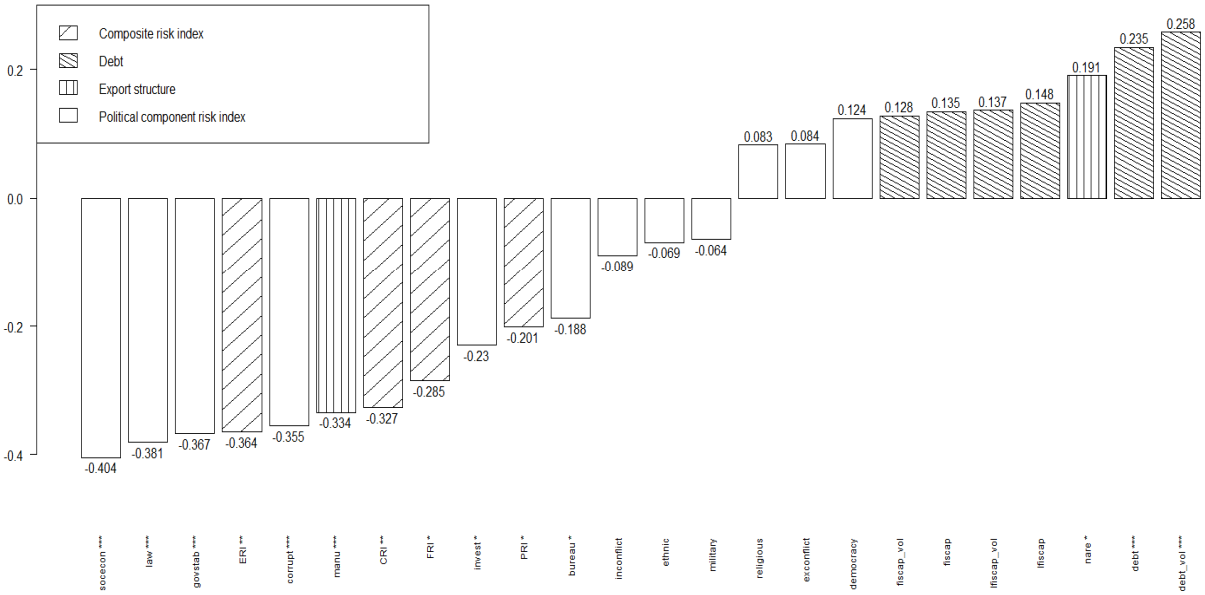
(iii) $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ *by country is estimated from equation (4b) using OLS (RSE) for bad times*



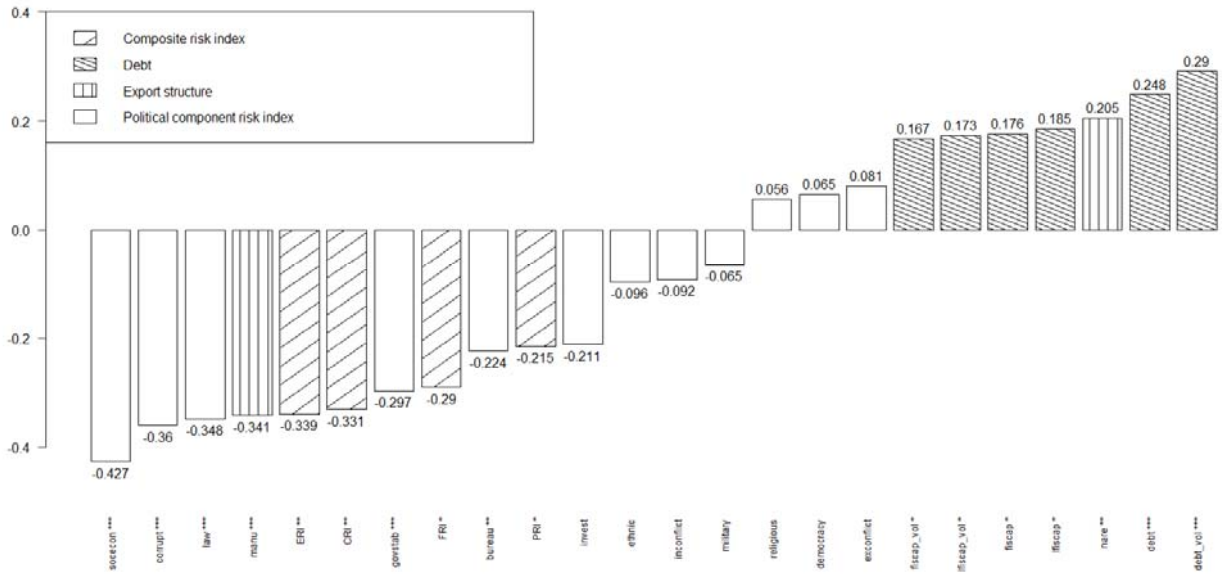
*Note: The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with the estimated coefficient in the corresponding regression (equation (2)) to approximate the effect of its one standard deviation increase on the fiscal cyclicality. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

Figure 4c. Economic significance of variables to government spending cyclicality $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$
Sample period 1980-2016

(i) $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ *by country is estimated from equation (1) using Prais-Winsten*



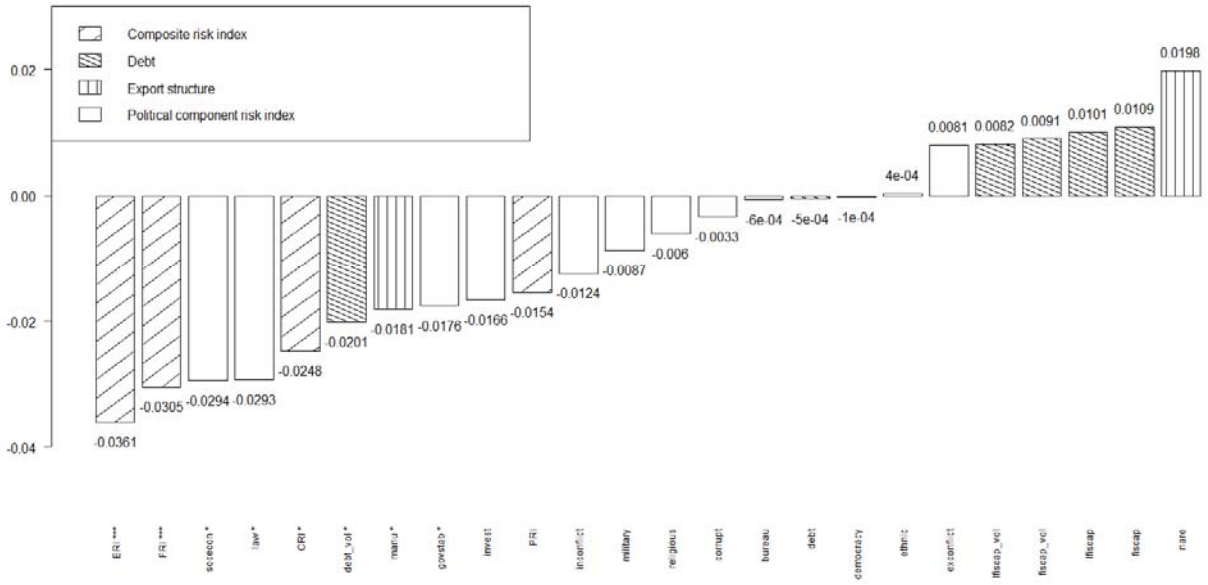
(ii) $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ *by country is estimated from equation (1) using OLS (RSE)*



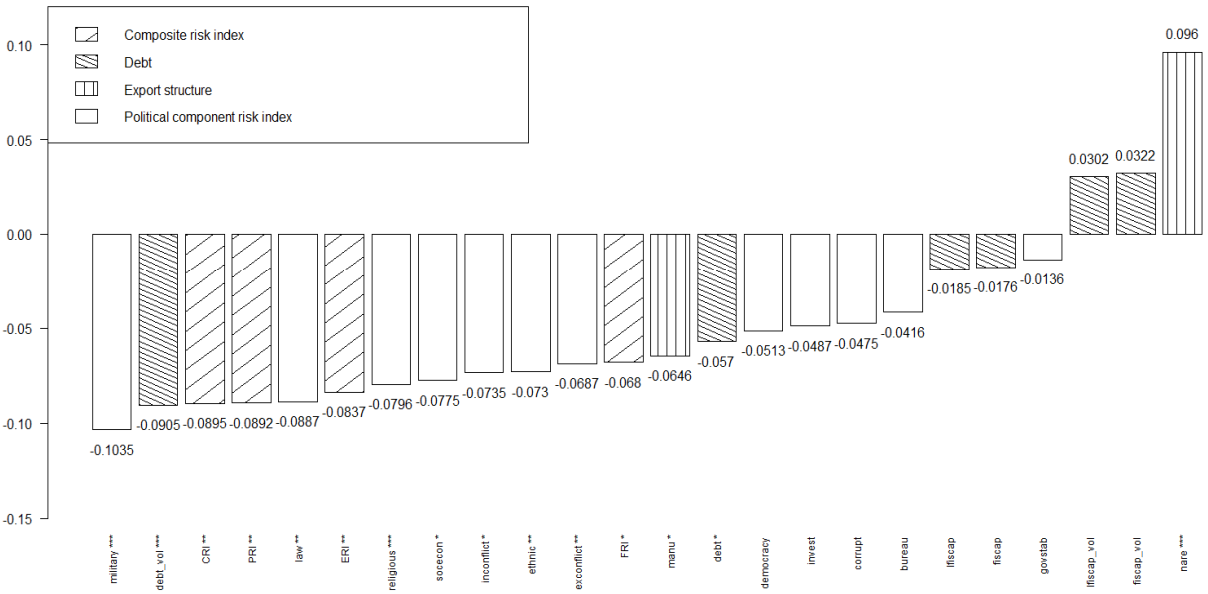
Note: The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with the estimated coefficient in the corresponding regression (equation (2)) to approximate the effect of its one standard deviation increase on the fiscal cyclicality. The sample period is 1980-2016 as a scenario for a different definition of government spending.
****, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

Figure 5. Economic significance of variables to $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$, sample period 1960-2016

(i) $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$ *by country is estimated from equation (3) using Prais-Winsten*



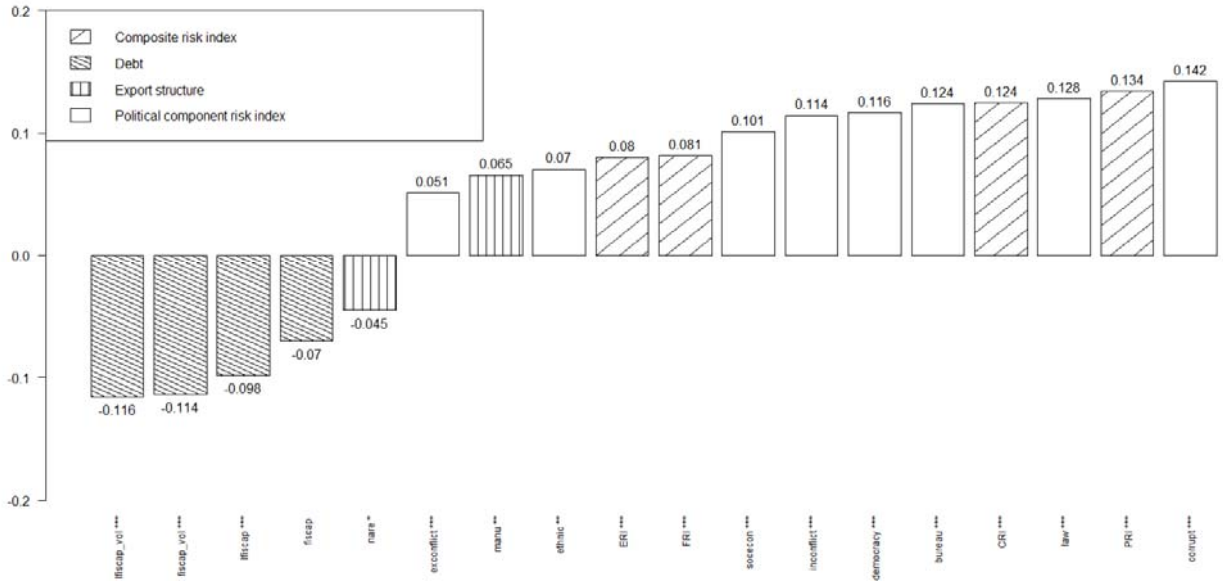
(ii) $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$ *by country is estimated from equation (3) using OLS (RSE)*



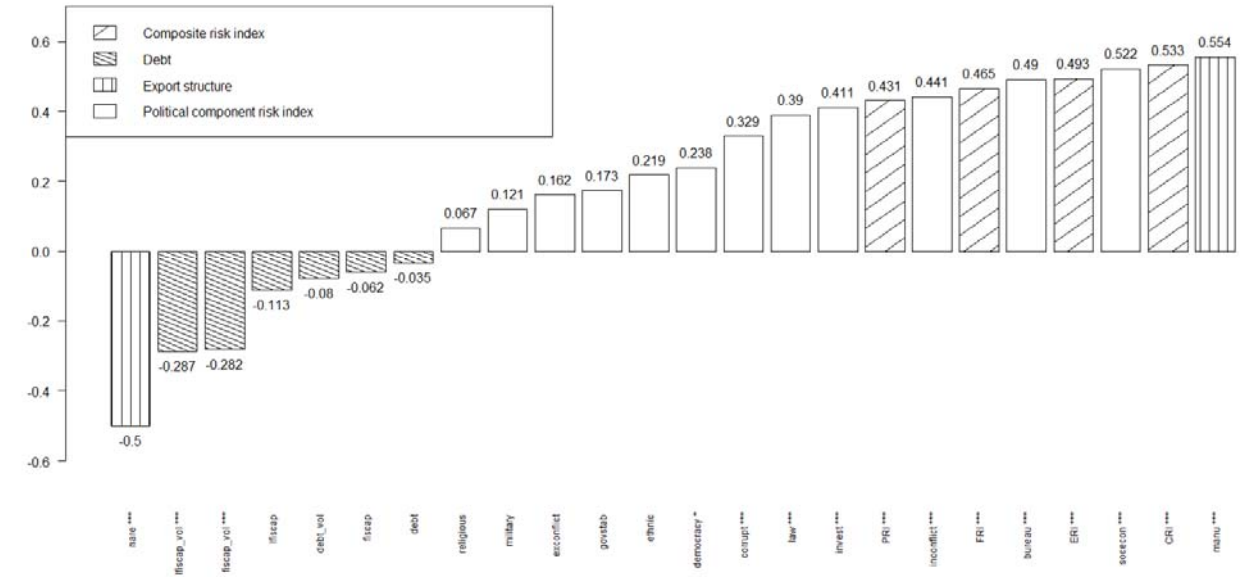
Note: The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with the estimated coefficient in the corresponding regression (equation (2) using $\widehat{\boldsymbol{\beta}}\boldsymbol{VAT}$ *as dependent variable) to approximate the effect of its one standard deviation change on the fiscal cyclicality. The sample period is 1960-2016. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

Figure 6. Economic significance of variables to $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$, sample period 1960-2016

(i) $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$ *by country is estimated from equation (3) using Prais-Winsten*



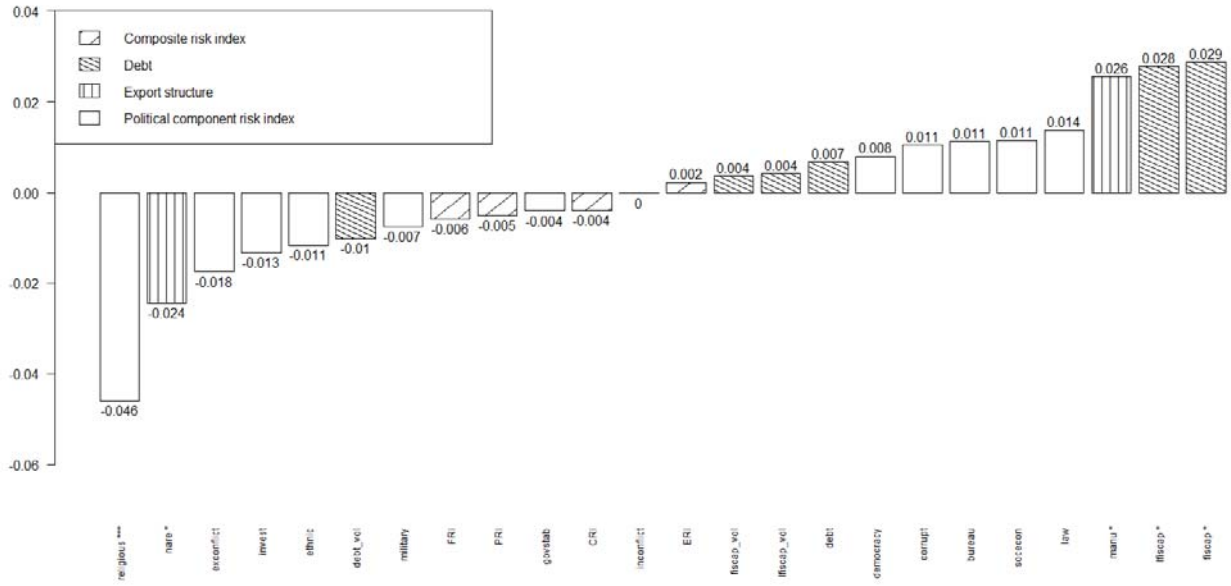
(ii) $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$ *by country is estimated from equation (3) using OLS (RSE)*



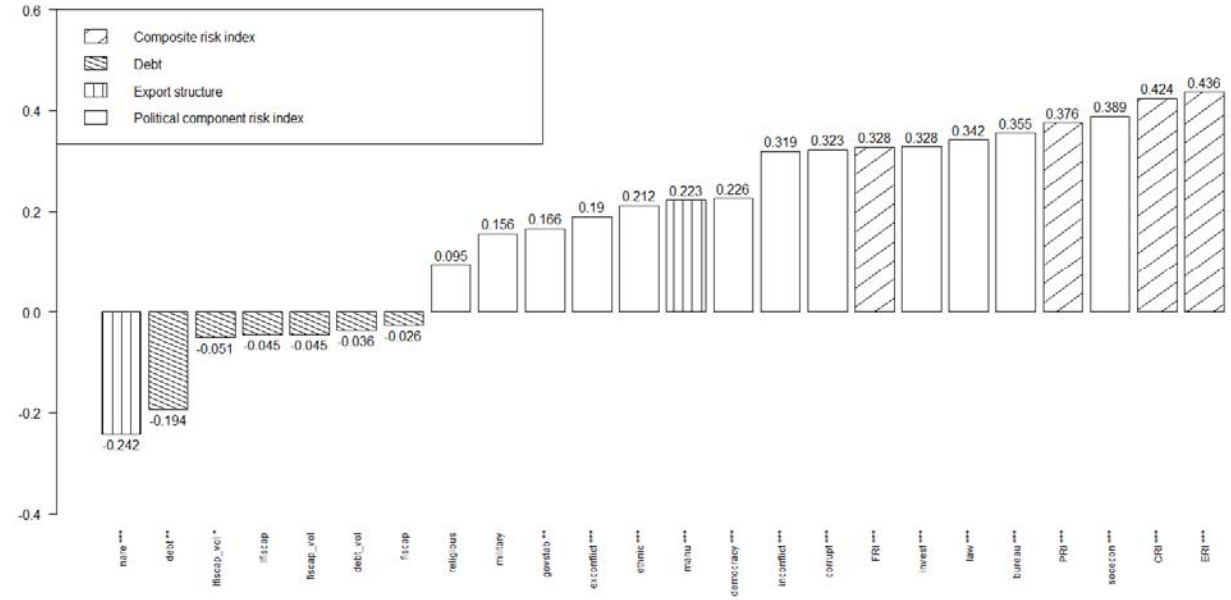
Note: The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with the estimated coefficient in the corresponding regression (equation (2) using $\widehat{\boldsymbol{\beta}}\boldsymbol{PIT}$ *as dependent variable) to approximate the effect of its one standard deviation change on the fiscal cyclicality. The sample period is 1960-2016. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

Figure 7. Economic significance of variables to $\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$, sample period 1960-2016

(i) $\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$ *by country is estimated from equation (3) using Prais-Winsten*

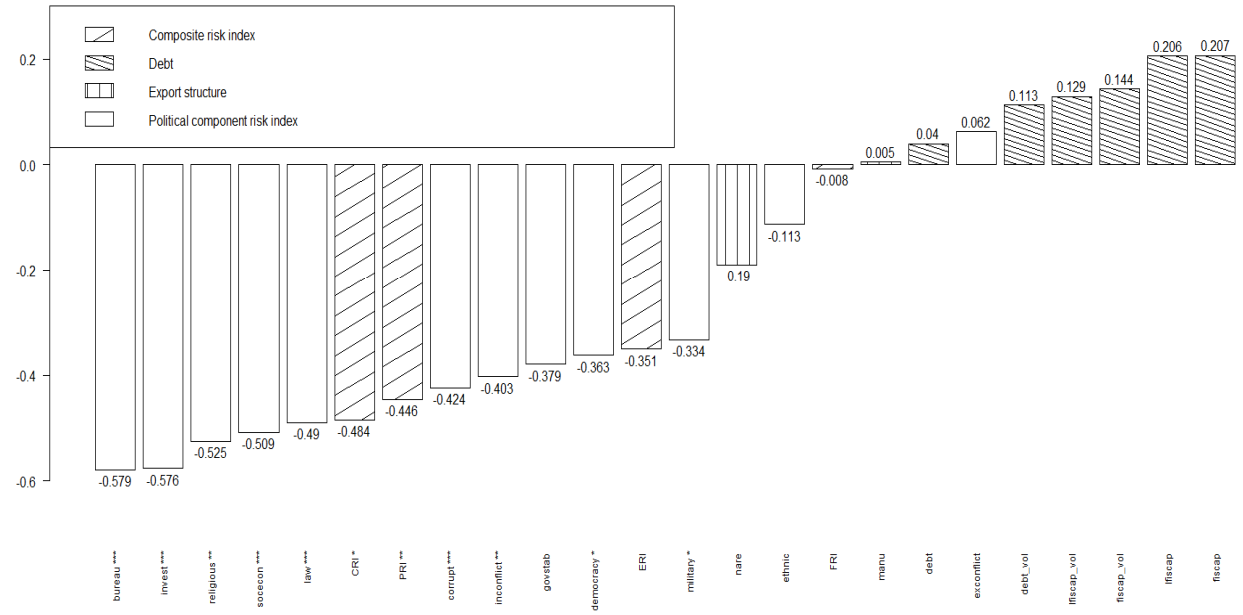


(ii) $\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$ *by country is estimated from equation (3) using OLS (RSE)*



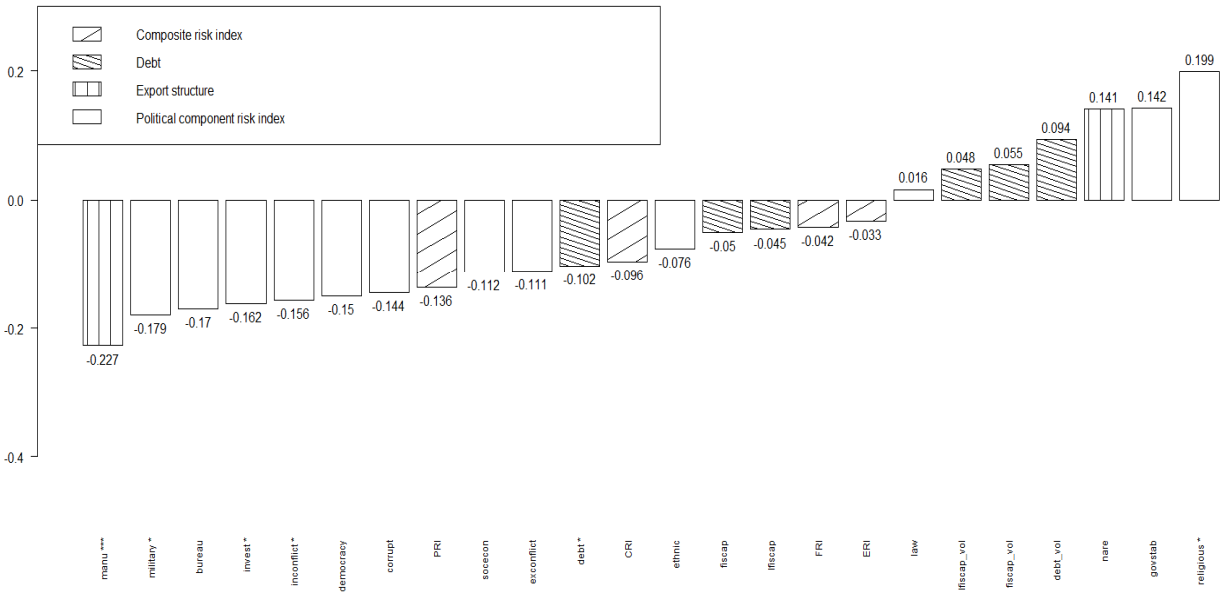
Note: The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with the estimated coefficient in the corresponding regression (equation (2) using $\widehat{\boldsymbol{\beta}}\boldsymbol{CIT}$ *as dependent variable) to approximate the effect of its one standard deviation change on the fiscal cyclicality. The sample period is 1960-2016. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

Figure 8. Economic significance of variables to government spending cyclicality $\widehat{\boldsymbol{\beta GS}}$ for East Asia & Pacific, sample period 1960-2016



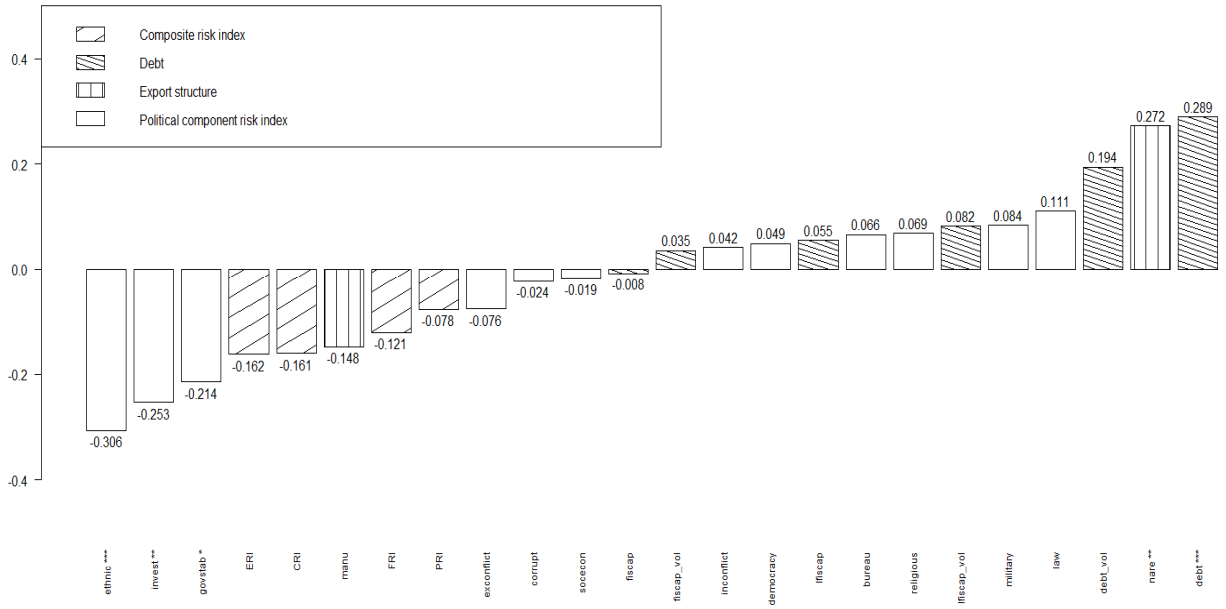
*Note: $\widehat{\boldsymbol{\beta GS}}$ by country is estimated from equation (1) using Prais-Winsten. The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with its estimated coefficient from cross sectional regression for the countries in East Asia & Pacific (similar to equation (2)) to approximate the effect of its one standard deviation increase on the fiscal cyclicality. The sample period is 1960-2016. The countries are grouped based on World Bank classification. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

Figure 9. Economic significance of variables to government spending cyclicality $\widehat{\boldsymbol{\beta GS}}$ for Europe & Central Asia, sample period 1960-2016



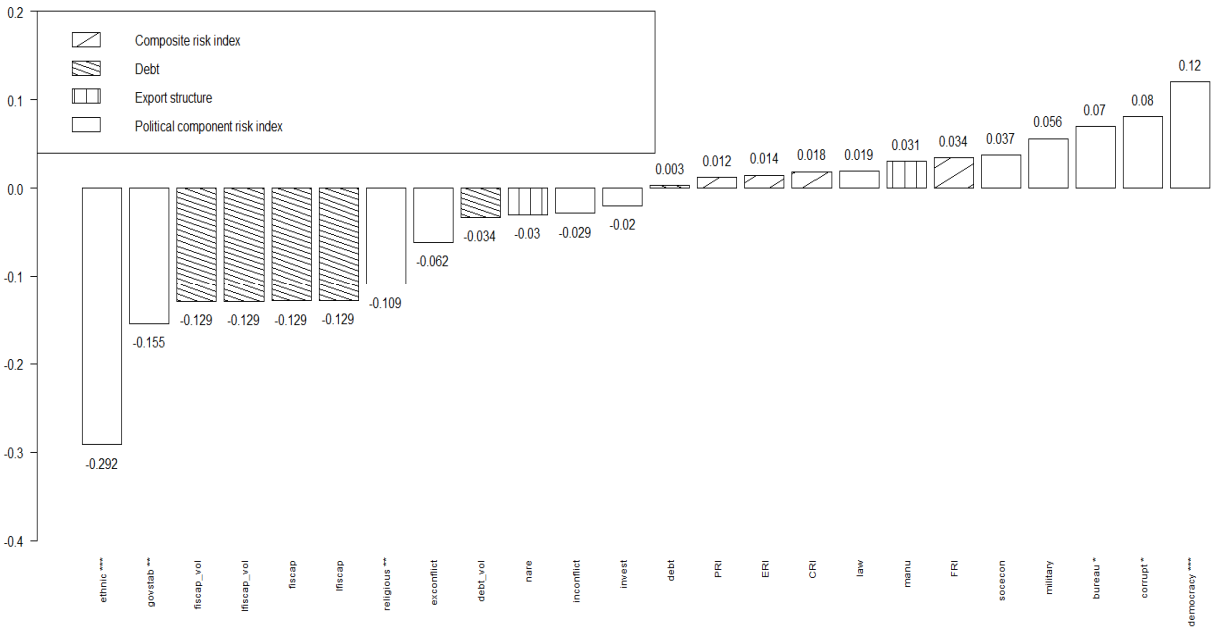
*Note: $\widehat{\boldsymbol{\beta GS}}$ by country is estimated from equation (1) using Prais-Winsten. The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with its estimated coefficient from cross sectional regression for the countries in Europe & Central Asia (similar to equation (2)) to approximate the effect of its one standard deviation increase on the fiscal cyclicality. The sample period is 1960-2016. The countries are grouped based on World Bank classification. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

Figure 10. Economic significance of variables to government spending cyclicality $\widehat{\boldsymbol{\beta GS}}$ for Latin America & Caribbean, sample period 1960-2016



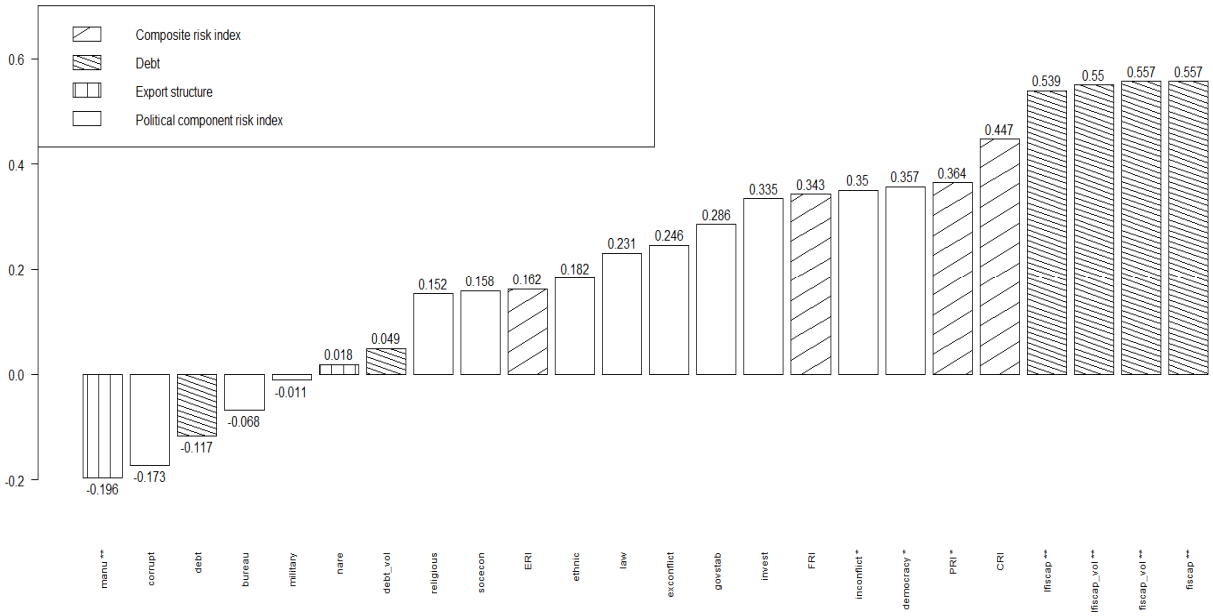
*Note: $\widehat{\boldsymbol{\beta GS}}$ by country is estimated from equation (1) using Prais-Winsten. The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with its estimated coefficient from cross sectional regression for the countries in Latin America & Caribbean (similar to equation (2)) to approximate the effect of its one standard deviation increase on the fiscal cyclicality. The sample period is 1960-2016. The countries are grouped based on World Bank classification. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

Figure 11. Economic significance of variables to government spending cyclicality $\widehat{\boldsymbol{\beta GS}}$ for Middle East & North Africa, sample period 1960-2016



*Note: $\widehat{\boldsymbol{\beta GS}}$ by country is estimated from equation (1) using Prais-Winsten. The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with its estimated coefficient from cross sectional regression for the countries in Middle East & North Africa (similar to equation (2)) to approximate the effect of its one standard deviation increase on the fiscal cyclicality. The sample period is 1960-2016. The countries are grouped based on World Bank classification. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

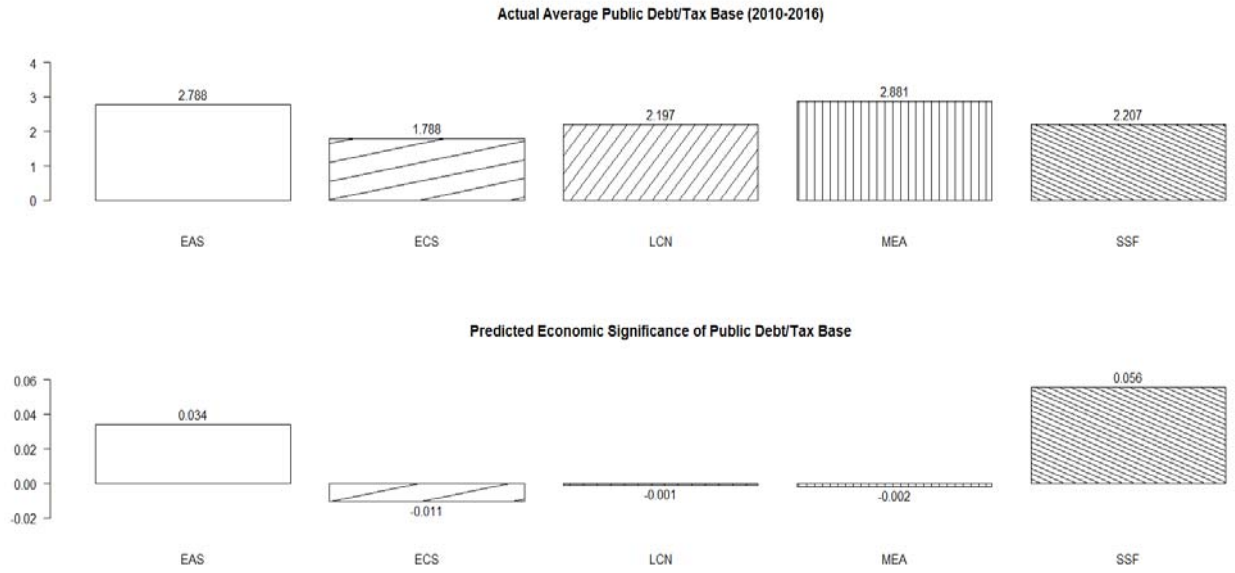
Figure 12. Economic significance of variables to government spending cyclicality $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ for Sub-Saharan Africa, sample period 1960-2016



*Note: $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ by country is estimated from equation (1) using Prais-Winsten. The economic significance of each explanatory variable is calculated by multiplying its corresponding standard deviation with its estimated coefficient from cross sectional regression for the countries in Sub-Saharan Africa (similar to equation (2)) to approximate the effect of its one standard deviation increase on the fiscal cyclicality. The sample period is 1960-2016. The countries are grouped based on World Bank classification. ***, **, * denotes that variable is statistically significant at 5%, 10%, 20% respectively.*

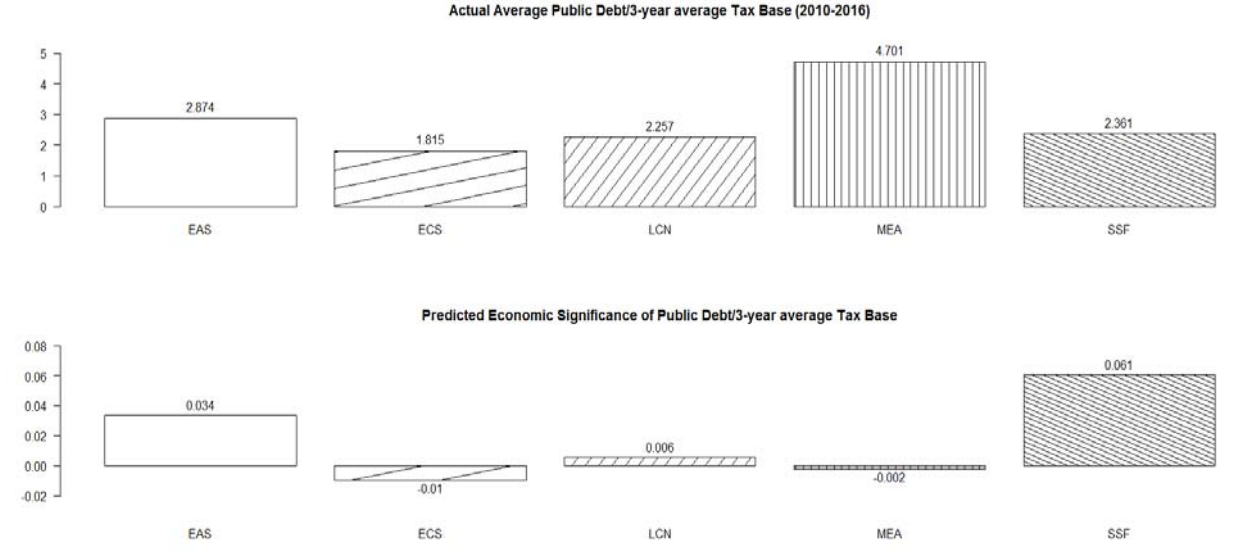
Figure 13. Economic significance of public debt/tax base to government spending cyclicality $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ by region, sample period 1960-2016

(i) Public debt/tax base



Note: The upper graph shows the actual public debt/tax base average over 2010-2016 by region. The lower graph approximates the change of government spending cyclicality by region if their public debt/tax base increases by 10%, which is calculated by 0.1(Regional-specific estimated coefficient of public debt/tax base)*(Actual regional-specific public debt/tax base average over 1960-2016). Regional-specific estimated coefficient of public debt/tax base is from the corresponding cross sectional regression for the region (similar to equation (2)) [See Appendix Table A15 for Regional-specific estimated coefficient of public debt/tax base].* $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ *by country is estimated from equation (1) using Prais-Winsten.*

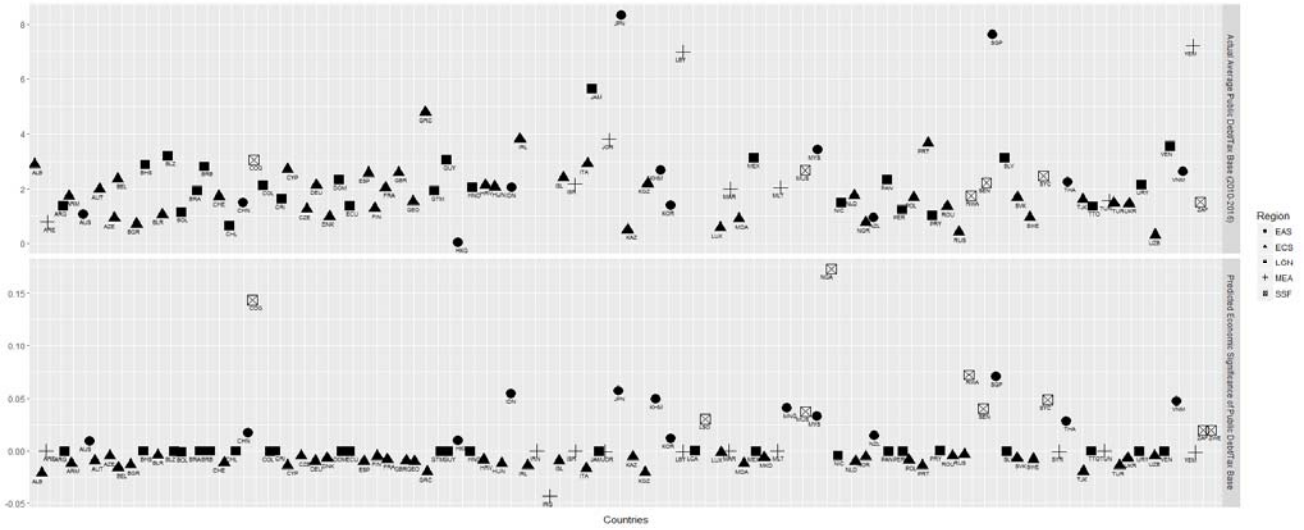
(ii) Public debt/3-year average tax base



Note: The upper graph shows the actual public debt/3-year average tax base over 2010-2016 by region. The lower graph approximates the change of government spending cyclicality by region if their public debt/3-year average tax base increases by 10%, which is calculated by 0.1(Regional-specific estimated coefficient of public debt/3-year average tax base)*(Actual regional-specific public debt/3-year average tax base over 1960-2016). Regional-specific estimated coefficient of public debt/3-year average tax base is from the corresponding cross sectional regression for the region (similar to equation (2)) [See Appendix Table A15 for Regional-specific estimated coefficient of Public Debt/Tax Base].* $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ *by country is estimated from equation (1) using Prais-Winsten.*
EAS: East Asia & Pacific; ECS: Europe & Central Asia; LCN: Latin America & Caribbean; MEA: Middle East & North Africa; SSF: Sub-Saharan Africa. The countries are grouped based on World Bank classification.

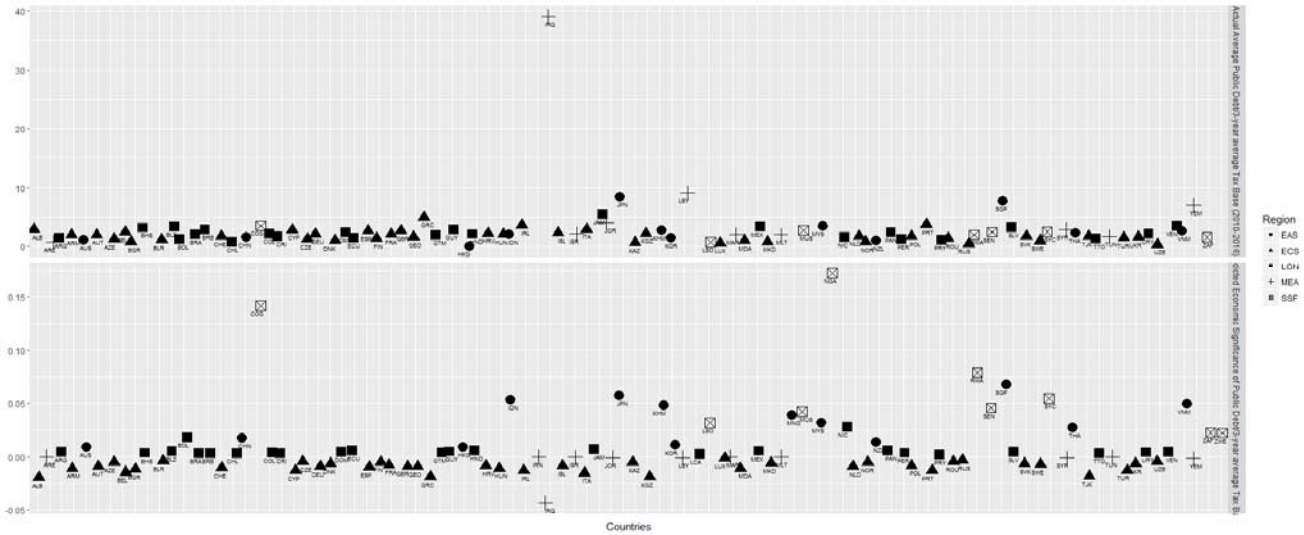
Figure 14. Economic significance of public debt/tax base to government spending cyclicality $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ by country, sample period 1960-2016

(i) Public debt/tax base



Note: The upper graph shows the actual public debt/tax base average over 2010-2016 by country. The lower graph approximates the change of government spending cyclicality by country if their public debt/tax base increases by 10%, which is calculated by multiplying 0.1(Regional-specific estimated coefficient of public debt/tax base)*(Actual country-specific public debt/tax base average over 1960-2016). Regional-specific estimated coefficient of public debt/tax base is from the corresponding cross sectional regression for the region (similar to equation (2)) [See Appendix Table A15 for Regional-specific estimated coefficient of public debt/tax base]. We use regional-specific coefficient in place of country-specific coefficient as there is insufficient country-level data to estimate the 2nd-step regression (that is, equation (2); $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ = f[Public Debt/Tax Base, Control Variables]) on the country-by-country basis. $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ by country is estimated from equation (1) using Prais-Winsten.*

(ii) Public debt/3-year average tax base



Note: The upper graph shows the actual public debt/3-year average tax base average over 2010-2016 by country. The lower graph approximates the change of government spending cyclicality by country if their public debt/3-year average tax base increases by 10%, which is calculated by multiplying 0.1(Regional-specific estimated coefficient of public debt/3-year average tax base)*(Actual country-specific public debt/3-year average tax base average over 1960-2016). Regional-specific estimated coefficient of public debt/3-year average tax base is from the corresponding cross sectional regression for the region (similar to equation (2)). [See Appendix Table A11 for Regional-specific estimated coefficient of public debt/3-year average tax base]. We use regional-specific coefficient in place of country-specific coefficient as there is insufficient country-level data to estimate the 2nd-step regression (that is, equation (2); $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ = f[Public Debt/Tax Base, Control Variables]) on the country-by-country basis. $\widehat{\boldsymbol{\beta}}\boldsymbol{GS}$ by country is estimated from equation (1) using Prais-Winsten.*

EAS: East Asia & Pacific; ECS: Europe & Central Asia; LCN: Latin America & Caribbean; MEA: Middle East & North Africa; SSF: Sub-Saharan Africa. The countries are grouped based on World Bank classification.