COUNTER-CYCLICAL FISCAL POLICY IN DEVELOPED COUNTRIES: DOES GOVERNANCE HINDER?

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Abstract
Fiscal policy is an effective instrument in helping governments in developed countries overcome a recession with a high unemployment rate or a hot economy with a high inflation rate to keep the economy on a stable path. Does governance contribute significantly to keeping this goal in these countries? The study looks for an answer by empirically investigating the role of governance in the output gap – fiscal policy relationship for a group of 27 developed countries between 2002 and 2019. It employs the difference GMM Arellano-Bond estimators and the PMG estimator for estimation and robustness check. The results provide some interesting findings. Firstly, both public spending and government revenue are counter-cyclical, confirming the counter-cyclical fiscal policy in developed countries. Secondly, governance hinders the counter-cyclical fiscal policy. The findings imply some crucial policies for governments in developed countries in running the fiscal policy.

Keywords: Counter-cyclical fiscal policy, governance, developed countries
JEL Classification: E32, E62, H60

1. Introduction

Unlike classical economists – represented prominently by Adam Smith – who underestimate the role of government, neoclassical economists, especially the Keynesian school, emphasize the essential role of government in the economy with the instruments of fiscal policy. Fiscal policy involves government interventions in the tax system and public spending to achieve macroeconomic goals such as economic growth, job creation, price stability and inflation control. Therefore, fiscal policy plays a crucial role in the economy, especially in the case of a recession with a high unemployment rate or a hot economy with a high inflation rate. It also explains the reason why fiscal policy is pro-cyclical or counter-cyclical. Pro-cyclical fiscal policy is a fiscal policy that is expansionary in booms and

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contractionary in recessions (Manasse, 2006). Meanwhile, Budnevich (2003) shows that counter-cyclical fiscal policy is a fiscal policy in which steps are taken by the government to fight against the direction of the business or economic cycle. In a slowdown or recession, the government decreases taxes and/or stimulates expenditure to enhance demand, which can drive an economic boom.

The cyclicality of fiscal policy is first mentioned in a cited work by Keynes (1937). Accordingly, budget expenditure is an instrument of the government to intervene in the cyclical development of the economy to overcome an economic crisis or maintain price stability in a period of hot economy. Governments cannot separate the structure and speed of spending. The pace of government spending needs to spur national income and ultimately improve jobs. To achieve it, the government must influence private consumption and investment. In addition, to government spending, Keynes (1937) looks at taxes as a crucial instrument for macroeconomic adjustment. Changes in tax policy can affect the consumption limit. In particular, government demand financed by taxes will promote economic activities, thereby increasing national income and creating more employment. Notably, some countries may use automatic stabilizers or discretionary actions to overcome the business cycle. Some countries rely mainly on the discretionary measures instead of automatic stabilizers to stabilize the output in the economic cycle. Changes in the cyclically adjusted budget balance can be generally noted as discretionary measures taken by fiscal authorities, while a cyclical budget indicates the functioning of automatic stabilizers. Negative changes in this balance are seen as expansionary fiscal policy, and positive changes are related to contractionary fiscal policy (Grdović Gnip, 2011). Meanwhile, automatic stabilizers are the cyclically induced changes in public spending and taxes, which tend to reduce fluctuations in output. They are self-acting fiscal instruments that policy-makers cannot control, at least in the short term, but change with the business cycle. They are automatically against the business cycle and thus have the potential to absorb asymmetric shocks to output (Veld *et al*., 2013). The European Commission recommends that automatic stabilizers should primarily play a decisive role in fiscal stabilization, and discretionary measures of fiscal policy should be ruled out (Buti and Van den Noord, 2004). Unfortunately, this view is still a controversial topic among economists and policy-makers. Starting from Gavin and Perotti (1997), a strand of literature has studied the cyclicality of fiscal policy in a country or a group of countries, attempting to examine the pro-cyclicality/counter-cyclicality of fiscal policy. However, no existing studies consider the role of governance in the cyclicality of fiscal policy. Does governance hinder the counter-cyclicality of fiscal policy in developed countries? This paper suggests some arguments to show that governance can impede the counter-cyclical fiscal policy in developed countries. We focus on the political institutions in these

countries through cyclical elections. According to Li (2003), developed countries have rules-based governance (good governance/institutional quality). The constitution and laws are the foundation for governments to make decisions. The choice and application of fiscal policy carried out by them are permitted within the framework of the constitution and laws. They can implement fiscal policies in favour of their party. Notably, Ishiyama (2015) emphasizes that political party systems in democratic countries (developed countries) are closely associated with good governance. It implies that good governance shapes political party systems in developed countries. Panizza (2001) notes that checks and balances and intermediate levels of particularism in political party systems in developed countries are positively connected with good governance. Therefore, the cyclical fiscal characteristics during elections can hinder counter-cyclical fiscal policy in developed countries. Developed countries have political party systems with free and fair elections through which voters freely choose candidates to represent their interests. At the end of the term, incumbent governments often adopt expansionary fiscal policy through tax cuts and spending increases to get voters' hearts with higher election win opportunities for ruling parties. Such expansion is not a targeted policy in economic development for bad times, consequently reducing the counter-cyclical fiscal policy. According to Frankel (2010), governments tend to use fiscal expansion policies during election years.

Driven by the fact that governance can significantly contribute to the cyclicality of fiscal policy in developed countries, the study investigates the effects of the output gap, governance and their interaction on fiscal policy for a group of 27 developed countries from 2002 to 2019. It employs the difference GMM Arellano-Bond estimators (D-GMM) and the Pool Mean Group (PMG) estimator for estimation and robustness check.

The study is structured as follows. Section 1 is the introduction, while Section 2 notes some facts on fiscal policy in developed countries. Section 3 provides a literature review that focuses on the cyclicality of fiscal policy. The model specification and research data in Section 4 describe the characteristics and appropriateness of D-GMM and the PMG estimator. Section 5 shows the empirical results and discussion, while the final section concludes and suggests some policy implications.

2. Fiscal Policy in Developed Countries

In the face of the economic downturn due to the lockdown to fight against the coronavirus pandemic from the end of 2019, many developed countries have used fiscal policy as a crucial instrument in macroeconomic stabilization during the crisis (WB, 2021). Many developed countries have implemented fiscal easing since 2019. Some large economies with high public debt (Italy, Japan and the United States) have elevated budget

deficits. Besides, some developed economies with strong fiscal rules (the Netherlands and Germany) are reluctant to significantly loosen their fiscal stance and increase government spending (UN, 2020).

Notably, the growth momentum across the developed economies has slowed considerably since mid-2018. In the United States, the pace of expansion could decrease further in 2020, although the recent cuts in the federal fund rate can support economic activities. Weak business confidence, declining job growth and policy uncertainty seem to weigh on domestic demand. In Europe, average growth has been projected to stay modest in the outlook period. International trade tensions, policy uncertainty (the exit of the United Kingdom from the European Union, for instance) and the economic slowdown in China have been the adverse factors affecting the manufacturing sector. In Japan, economic growth remained subdued in 2020 due to declining real wages, sluggish exports to East Asian economies and a consumption tax rise.

According to UN (2020), calls for a more proactive role of fiscal policy in dealing with the economic slowdown in developed countries have become more frequent and forceful under overstretched monetary policy since the end of 2020. More importantly, fiscal policy has generally been underutilized as a counter-cyclical instrument to stimulate aggregate demand and promote economic growth. Financial market conditions seem to be very favourable for developed countries. Real yields on 10-year government bonds in the six largest developed countries have reached below zero. Furthermore, governments in the six largest developed economies have greater fiscal space as the sustainability of public debt has improved. In such circumstances, the welfare costs of public debt may be low or even negative, which is a strong argument for a more active contribution of fiscal policy. However, these calls are often met with scepticism. In a way, it shows ongoing uncertainty relating to persistence and worsening economic trends. In particular, sizeable fiscal deficits and a high ratio of public debt may limit the room for fiscal stimuli, although interest rates across developed countries are at historic lows. Even for economies in which government debt has dropped to moderate ratios, such as the Netherlands and Germany, long-term economic prospects are subject to substantial pressure on fiscal policy over the coming decades.

Against this backdrop, WB (2021) emphasizes that governments in developed countries should adjust their fiscal policy to meet their changing needs and fiscal space. Given the urgent need for public investment, governments with a fiscal space should use the current favourable conditions. Public spending should focus on enhancing the long-run growth potential and promoting sustainable development more broadly through investment projects in education and health, infrastructure, research and development, telecommunications, and the transition to a low-carbon economy.

3. Literature Review

Most studies point out that pro-cyclical fiscal policy emerges in developing countries while counter-cyclical/acyclical fiscal policy exists in developed counties.

Regarding pro-cyclical fiscal policy, most of the studies confirm that fiscal policy in developing countries is pro-cyclical (Kaminsky *et al*., 2004; Du Plessis *et al*., 2007; Gurvich *et al*., 2009; Abdih *et al*., 2010; Carmignani, 2010; Çiçek and Elgin, 2011; Abbott and Jones, 2013; Dalić, 2013; Dessus *et al*., 2016). Abbott and Jones (2013) apply the three-stage least squares (3SLS) estimator and the one-step system GMM Arellano-Bond estimator to 20 OECD countries between 1995 and 2006, while Dalić (2013) uses the estimators of OLS and IV-2SLS for 14 new member states of the European Union from 1999 to 2011. Meanwhile, Dessus *et al*. (2016) use public investment as a proxy for fiscal policy to examine the cyclicality of fiscal policy for a group of eight countries of the West African Economic and Monetary Union between 1995 and 2012 with the one-step GMM Arellano-Bond estimator. More recently, Combes *et al*. (2019), Gootjes and de Haan (2022), and Larch *et al*. (2021) also find that fiscal policy in many countries is pro-cyclical. Combes *et al*. (2019) use the one-step system and the difference GMM Arellano-Bond estimator for a group of 31 provinces in China during the period 1978–2013. Meanwhile, Gootjes and de Haan (2022) apply the fixed effects model to a sample of 27 European Union (EU) member states from 2000 to 2015 with primary budget balance as a proxy for fiscal policy. Lately, Larch *et al*. (2021) employ the LSDVC, IV-2SLS and IV-GMM estimators on panel data from 40 EU and non-EU countries over the period 1972–2017. Larch *et al*. (2021) indicate that deviations from fiscal rules and the accumulation of government debt are the causes that make fiscal policy pro-cyclical. From these findings, studies suggest that governments in developing countries need to reverse fiscal policy to ensure their sustainable economic development.

Regarding the counter-cyclical fiscal policy, some studies note that fiscal policy in developed countries is counter-cyclical (Thornton, 2007; de Mendonça and Pinton, 2013; Klemm, 2015; Bashar *et al*., 2017). Klemm (2015) applies the fixed-effect model and IV estimator to 33 advanced countries from 1980 to 2012 with primary budget balance as a proxy for fiscal policy. Meanwhile, Bashar *et al*. (2017) indicate that fiscal policy in developed countries such as the USA, Canada, the UK, Japan, France, Germany, Italy, Australia, Greece, Spain and Portugal is mildly counter-cyclical. Lately, Jalles (2021) applies the weighted least squares (WLS) and ordinary least squares (OLS) to a group of 36 advanced economies during the period from 1970 to 2015. These studies suggest that governments in developed countries should maintain counter-cyclicality of fiscal policy.

Unlike the mentioned studies, Talvi and Vegh (2005), del Granado *et al*. (2013), Mesea (2013), Calderón *et al*. (2016) and Srebrnik and Strawczynski (2016) carry the

research for both developing and developed countries. These studies show that fiscal policy in developing countries is pro-cyclical while that in developed countries is acyclical or counter-cyclical. Del Granado *et al*. (2013) use the one-step system GMM Arellano-Bond estimator for 145 countries from 1987 to 2007. Notably, Calderón *et al*. (2016) apply the one-step GMM Arellano-Bond estimator to 112 industrial and developing countries from 1984 to 2008, while Srebrnik and Strawczynski (2016) employ panel regression on 30 developed economies and 17 developing countries between 1980 and 2012. These studies also emphasize that governments in developing countries should apply counter-cyclical fiscal policy for bad times and good times to keep the economy stable.

From the literature perspective, in short, the study highlights three aspects. Firstly, it uses public spending and government revenue as a proxy for fiscal policy to test the cyclicality of fiscal policy. Secondly, it examines the effect of governance on the cyclicality of fiscal policy. Thirdly, it employs the difference GMM Arellano-Bond estimators and the PMG estimator for estimation and robustness check.

4. Methodology and Research Data

4.1 Methodology

Following Darby and Melitz (2008), the empirical equation is extended as follows:

$$FIS_{it} = \beta_0 + \beta_1 FIS_{it-1} + \beta_2 GAP_{it} + \beta_3 GOV_{it} + \beta_4 \left(GAP \times GOV\right)_{it} + X_{it}\beta' + \eta_i + \xi_{it}, \quad (1)$$

where the subscripts i and t are the country and time indices, respectively. FIS_{it} is public spending/government revenue, a proxy for the fiscal policy, FIS_{it-1} is the initial level of public spending/government revenue (EXP/REV), GAP_{it} is the output gap, GOV_{it} is governance (six dimensions of governance, including control of corruption, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, voice and accountability), and $(GAP \times GOV)_{it}$ is the interaction between fiscal policy and governance. X_{it} is a set of control variables such as economic growth, trade openness, inflation and infrastructure; η_i is an unobserved time-invariant country-specific effect and ζ_{it} is an observation-specific error term; β_0, β_1, β_2, β_3, β_4, and β' are estimated coefficients. For the case of total public spending, if $\beta_2 < 0$ then government spending is pro-cyclical and $\beta_2 > 0$ then government spending is counter-cyclical. In contrast, for the case of total government revenue, if $\beta_2 < 0$ then government revenue is counter-cyclical and $\beta_2 > 0$ then government revenue is pro-cyclical.

The paper uses the following control variables through the literature review: economic growth (Raut and Raju, 2019), trade openness (Dalić, 2013; Jalles, 2021) and inflation (Gootjes and de Haan, 2022). Raut and Raju (2019) note that economic growth

(real gross state domestic product) increases fiscal deficits in India. Jalles (2021) reports that trade openness enhances government expenditure in 36 advanced countries between 1970 and 2015. Gootjes and de Haan (2022) indicate that inflation makes a positive change in the cyclically-adjusted primary budget balance for a sample of 27 European Union member states from 2000 to 2015. Besides, Yoshino and Abidhadjaev (2017) note the positive contribution of infrastructure to enhancing tax revenue in countries. Meanwhile, Arvin *et al*. (2021) show that institutional quality can significantly affect tax revenue, public spending and economic growth. In particular, Huang and Ho (2017), Fraj *et al*. (2018) and Islam and McGillivray (2020) confirm that governance/institutional quality positively contributes to promoting real output. It implies that a change in governance/institutional quality can change real output in countries, affecting government revenue and public spending. Therefore, we introduce the interaction term between governance/institutional quality and output gap into the empirical equation to study the effect of the interaction term on government revenue and public spending. It also determines the role of governance/institutional quality on the cyclicality of fiscal policy. Calderón *et al*. (2016) find that institutional settings contribute significantly to countries' willingness and ability to implement countercyclical policies. Countries with poor institutional quality adopt pro-cyclical/countercyclical policies indicated in extended fiscal and monetary policy rules. In the same vein, Jalles (2021) notes the positive effect of institutional quality on government spending cyclicality.

We apply Equation (1) to investigate the effects of the output gap, institutional quality and their interaction on public spending/government revenue for a group of 27 advanced economies. This study uses six dimensions of governance as defined by the WB as a proxy for institutional quality/political institutions, each having a value from –2.5 to 2.5 (Kaufmann *et al*., 2011).

Some problems in econometrics arise from estimating Equation (1). Firstly, the output gap, economic growth, inflation and institutional quality can be endogenous. They can correlate with η_i, which results in the endogenous phenomenon. Secondly, some unobserved characteristics such as geography, culture, customs and anthropology (fixed effects) can correlate with the regressors and exist in η_i. Thirdly, a high autocorrelation stems from the presence of FIS_{t-1}. Finally, data have a short length of observation (H = 19) and a large unit (M = 27). These problems could make the OLS regression inconsistent. REM (random-effects model) and FEM (fixed-effects model) cannot handle endogenous phenomena and serial autocorrelation, and the IV-2SLS estimator needs some suitable instruments from among regressors in the empirical equation. Following the suggestion by Judson and Owen (1999), therefore, the study decides to apply D-GMM and PMG for estimation and robustness check.

Holtz-Eakin *et al*. (1988) propose the GMM (General Method of Moments) written by Arellano and Bond (1991) for estimation. The study initially takes the first difference to rule out country-fixed effects. The study then uses the independent variables in the first difference as instrumented by their lags (Judson and Owen, 1999). It is D-GMM that could deal with biases of simultaneity in estimations.

Two-step D-GMM can be more asymptotically efficient, but applying two-step D-GMM in small research samples is a problem (Roodman, 2009). It is the proliferation of instruments that increases quadratically as the time dimension increases. In this case, the number of instruments is very large relative to the number of panel units. Roodman (2009) suggests using the rule of thumb to maintain the number of countries (the number of panel units) larger than or equal to the number of instruments. The study uses the Arellano-Bond, Sargan and Hansen statistics to examine the validity of instruments. The study employs the Arellano-Bond test in detecting autocorrelation and uses the Sargan and Hansen tests to search for endogenous phenomena. So, the paper ignores AR(1) test and keeps AR(2) test.

The study applies the PMG estimator developed by Pesaran *et al*. (1999) to check the robustness of the two-step D-GMM. In this estimation, the long-term coefficients are homogeneous, and the short-term parameters are heterogeneous between countries. Notably, the PMG estimator emphasizes the correction dynamics between the long run and the short run. The study presents the PMG-based ECM model as follows:

$$\Delta M_{it} = \gamma Z_{it-1} + \sum_{j=1}^{p} \delta_{ij} \Delta H_{it-j} + \tau_{it} + \psi_{it} \quad \text{where} \quad Z_{it-1} = M_{it-1} - \varphi H_{it-1}, \tag{2}$$

where M is public spending/government revenue, being a proxy for fiscal policy; Z_{it-1} is the deviations from equilibrium in the long run for the group i in any period, and γ is the error-correction coefficient. The vector φ contains long-run coefficients. They express the long-run elasticity of the private sector investments corresponding with every variable in H_{it-1}. Meanwhile, the vector δ captures short-run responses of the H variables. τ_i is a fixed effectand ψ_{it} is an error term. The study uses the value and significance level of the speed of adjustment γ (negative, lower than 1) to check the validity of estimates.

4.2 Research data

The dataset consists of total government expenditure, total government revenue, the output gap, governance indicators, real GDP per capita, trade openness, inflation and infrastructure. The research sample contains data for 27 developed countries from 2002 to 2019. The definition and descriptive statistics of data are presented in the Appendix (Table A, Table B).

The statistical results in Table B show that the average output gap in the 27 developed countries from 2002 to 2019 is −0.496%, meaning that real output in these countries is less than potential output. Indeed, average public spending in these countries over the same period is 43.298% GDP, larger than the average government revenue (41.572% GDP). It implies that most developed countries can adopt expansionary fiscal policy with fiscal deficits to promote economic growth. Notably, institutional quality in these countries is good with high average scores (higher than 1). Therefore, developed countries have high per capita income (approximately 42,764.44 USD/year) and good institutional settings.

5. Estimated Results and Discussion

5.1 D-GMM estimates

The paper illustrates the two-step D-GMM estimates for the empirical models without the interaction between governance and output gap (baseline regressions) in Tables 1 and 2, corresponding to public spending and government revenue, respectively. Meanwhile, Tables 3 and 4 show the two-step D-GMM estimates, while Tables 5 and 6 report the one-step D-GMM estimates for the empirical models with the interaction. Every column in each table is a model corresponding with each governance dimension.

In the baseline regressions (without the interaction), the results across empirical models in Table 1 report that the output gap and governance boost public spending. With the presence of the interaction term (Tables 3 and 5), the results are still consistent in that the output gap and governance increase public spending, but the interaction decreases it. For this reason, the main result is that the output gap boosts public spending, and this positive effect is diminished by governance. Similarly, Table 2 (without the interaction) notes that the output gap reduces government revenue, while governance accelerates it. With the presence of the interaction term (Tables 4 and 6), the results are still consistent in that the output gap decreases and governance boosts government revenue, but the interaction increases it. Because of this, the main result is that the output gap reduces government revenue, and this negative effect is weakened by governance. These findings imply that fiscal policy in developed countries is counter-cyclical, but governance hinders the counter-cyclicality of fiscal policy in these countries.

The counter-cyclicality of fiscal policy in developed countries can stem from three main reasons: (1) automatic stabilizers, (2) discretionary measures and (3) resources and development levels. Indeed, automatic stabilizers are a vital part of fiscal policy in developed countries. Over the business cycle, tax revenues seem to follow their respective tax bases. They decrease during downturns and increase during upturns. On the expenditure side,

in contrast, automatic stabilizers are unemployment benefits. Their total amount rises during downturns and shrinks during upturns. Melitz and Darby (2008) emphasize that social expenditure on health also responds to the business cycle in a stabilizing manner. Dolls *et al*. (2012) note that automatic stabilizers absorb 38% of a proportional income shock in the EU and 32% in the US. In particular, Debrun and Kapoor (2010) find the significantly negative effect of automatic stabilizers on output volatility, supporting the hypothesis that automatic fiscal stabilizers are effective, while Şen and Kaya (2020) indicate that automatic stabilizers have a significant counter-effect on output volatility in the short run in nine EMU member states from 1995 to 2017. Meanwhile, governments make negative changes in the cyclically adjusted budget balance to adopt expansionary fiscal policy for a recession with a high unemployment rate. By contrast, they make positive changes in this balance to implement contractionary fiscal policy for a hot economy with a high inflation rate (discretionary fiscal policy). Furthermore, with good resources and a high level of development, developed countries have easy access to low-interest loans to finance budget deficits when reducing taxes or increasing public spending. Therefore, these countries easily boost aggregate demand and economic growth during a recession.

Why does governance impede counter-cyclical fiscal policy in developed countries? The answer comes from the political institutions in these countries through cyclical elections. Ishiyama (2015) notes that good governance in these democratic countries shapes political party systems. Checks and balances and intermediate levels of particularism in political party systems are closely connected to good governance. Therefore, the cyclical fiscal characteristics of end-of-term elections in these countries make governance reduce the counter-cyclical fiscal policy. Multi-party electoral systems with free and fair elections in developed countries allow voters to vote freely to choose suitable candidates to represent their interests. At the end of the term, incumbent governments in these countries often enforce expansionary fiscal policy through spending increases and tax cuts to win voters' hearts, thereby seeking election win opportunities for the ruling party. In particular, after winning elections, governments in these economies can expand fiscal policy through public investment and spending in certain regions to keep their voters' loyalty. Some elected members of parliament can coordinate to pass policies and laws to increase public investment and spending for the regions that supported them in elections. Such fiscal expansions are not a targeted policy in economic development for bad times, which can decrease counter-cyclical fiscal policy. In short, the results show that the effect of political institutions/governance on the counter-cyclicality of fiscal policy in developed countries seems counter-intuitive and negative.

As such, the political institutions/governance impede counter-cyclical fiscal policy in developed countries. It requires developed countries, especially parliaments, to formulate

and enforce laws to reverse this situation; otherwise, it will distort long-term development goals. More importantly, fiscal policy will become more discretionary to serve the interests of politicians, ignoring the country's development goals and the people's interests. In particular, these results indicate that fiscal policy is more discretionary in election periods in developed countries, limiting the crucial role of automatic stabilizers and reducing the counter-cyclicality of fiscal policy. Should parliaments in developed countries formulate and enforce laws that require the government to obtain their approval before implementing policies related to public spending and taxation?

Besides, economic growth, trade openness, inflation and infrastructure promote public spending. In contrast, these variables reduce government revenue. Jibir and Aluthge (2019) note that economic growth, trade openness and inflation promote public expenditure in Nigeria. Alavirad (2003) finds that inflation seems to stimulate nominal public spending faster than government revenue in Iran. The development of infrastructure such as electricity, water, roads, telecommunications, bridges and ports are activities that require the participation of the public sector and thus promote public spending. Sackey (1981) indicates a negative impact of inflation on tax revenue in Trinidad and Tobago, while Agbeyegbe *et al*. (2006) do not find any significant influence of trade liberalization on tax revenue in 22 countries in Sub-Saharan Africa. Notably, Yoshino and Abidhadjaev (2017) show a positive effect of infrastructure on tax revenue. Thus, the effects of control variables are different between public spending and government revenue. Governments should implement appropriate policies to enhance the positive impacts and limit the negative ones.

Table 1: Governance and cyclicality of public spending: two-step D-GMM (without interaction – baseline regression)

Dependent variable: Public spending (% GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Government expenditure (–1)	0.193*** (0.046)	0.140** (0.066)	0.225*** (0.051)	0.196*** (0.051)	0.223*** (0.047)	0.214*** (0.050)
Output gap	1.554*** (0.159)	1.490*** (0.212)	1.453*** (0.148)	1.716*** (0.151)	1.693*** (0.162)	1.673*** (0.165)
Governance	5.397*** (1.468)	11.078*** (3.057)	2.739** (1.174)	0.846** (0.391)	3.311** (1.352)	1.079** (0.575)
Economic growth	0.001*** (0.0002)	0.001*** (0.0003)	0.001*** (0.0002)	0.001*** (0.0002)	0.001*** (0.0002)	0.001*** (0.0002)
Trade openness	0.001 (0.006)	0.021** (0.010)	0.053*** (0.015)	0.0003 (0.007)	0.025** (0.009)	0.002 (0.008)
Inflation	0.319*** (0.072)	0.275** (0.126)	0.286*** (0.081)	0.327*** (0.084)	0.312*** (0.115)	0.316*** (0.085)
Infrastructure	0.446*** (0.093)	0.342** (0.156)	0.387*** (0.099)	0.492*** (0.089)	0.520*** (0.095)	0.494*** (0.089)
Instrument	23	22	22	21	23	20
Countries/observations	27/405	27/378	27/405	27/378	27/405	27/378
AR(2) test	0.447	0.693	0.730	0.405	0.434	0.421
Sargan test	0.525	0.698	0.124	0.321	0.626	0.133
Hansen test	0.260	0.191	0.171	0.147	0.151	0.106

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.

Source: Author's processing

Table 2: Governance and cyclicality of government revenue: two-step D-GMM (without interaction – baseline regression)

Dependent variable: Government revenue (% GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Government revenue (–1)	0.834*** (0.088)	0.502*** (0.053)	0.264*** (0.063)	0.487*** (0.055)	0.542*** (0.054)	0.510*** (0.054)
Output gap	−0.216*** (0.043)	−0.161*** (0.039)	−0.118*** (0.037)	−0.169*** (0.037)	−0.115*** (0.035)	−0.161*** (0.035)
Governance	9.360*** (1.961)	1.110*** (0.277	5.737*** (0.747)	1.883*** (0.332)	2.928** (1.384)	1.108*** (0.518)
Economic growth	0*** (0)	0*** (0)	0* (0)	0*** (0)	0*** (0)	0*** (0)
Trade openness	−0.013** (0.005)	−0.004 (0.009)	−0.002 (0.006)	−0.001 (0.009)	−0.016** (0.006)	−0.013** (0.008)
Inflation	−0.117 (0.039)	−0.013 (0.042)	−0.070*** (0.022)	−0.012 (0.036)	−0.012** (0.009)	−0.026*** (0.002)
Infrastructure	−0.010 (0.015)	−0.169*** (0.058)	−0.048** (0.019)	−0.171*** (0.057)	−0.113** (0.053)	−0.191*** (0.050)
Instrument	21	22	22	22	22	24
Countries/Observations	27/405	27/405	27/405	27/405	27/378	27/405
AR(2) test	0.923	0.829	0.877	0.872	0.702	0.764
Sargan test	0.339	0.197	0.179	0.194	0.225	0.163
Hansen test	0.363	0.155	0.559	0.227	0.330	0.115

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.

Source: Author's processing

Table 3: Governance and cyclicality of public spending: two-step D-GMM
Dependent variable: Public spending (% GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Government expenditure (–1)	0.036 (0.038)	−0.077 (0.048)	0.072* (0.037)	0.018 (0.035)	0.002 (0.023)	0.026 (0.017)
Output gap	0.883** (0.401)	0.826** (0.308)	0.555** (0.260)	2.262*** (0.249)	0.830*** (0.192)	2.772*** (0.538)
Governance	10.873*** (2.874)	24.879*** (5.554)	5.849** (2.419)	9.900*** (2.862)	1.980** (0.928)	4.154*** (1.449)
Governance*output gap	–1.306*** (0.217)	–1.629*** (0.241)	–2.258*** (0.289)	–2.442*** (0.178)	–1.507*** (0.177)	–3.261*** (0.395)
Economic growth	0** (0)	0*** (0)	0*** (0)	0** (0)	0*** (0)	0.001*** (0)
Trade openness	0.028 (0.020)	0.118** (0.044)	0.115*** (0.021)	0.065** (0.029)	0.101*** (0.016)	0.059*** (0.020)
Inflation	0.236 (0.158)	0.014 (0.097)	0.122** (0.059)	0.181*** (0.064)	0.111*** (0.032)	−0.045 (0.033)
Infrastructure	0.179 (0.137)	0.205 (0.147)	0.449*** (0.082)	0.299*** (0.076)	0.429*** (0.057)	0.413*** (0.052)
Instrument	24	24	27	26	27	26
Countries/Observations	27/405	27/378	27/378	27/378	27/378	27/351
AR(2) test	0.986	0.110	0.831	0.567	0.823	0.329
Sargan test	0.260	0.242	0.163	0.125	0.114	0.109
Hansen test	0.427	0.442	0.311	0.340	0.484	0.607

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.

Source: Author's processing

Table 4: Governance and cyclicality of government revenue: two-step D-GMM
Dependent variable: Government revenue (% GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Government revenue (–1)	−0.052 (0.031)	−0.079** (0.037)	−0.080** (0.031)	−0.029 (0.026)	−0.081 (0.031)	0.005 (0.022)
Output gap	−0.341*** (0.071)	−0.402*** (2.055)	−0.171*** (0.045)	−0.412*** (0.087)	−0.394*** (0.069)	−1.010*** (0.168)
Governance	1.228** (0.586)	7.856*** (0.586)	3.576** (1.603)	3.344*** (0.991)	3.389** (1.553)	4.351** (1.779)
Governance*output gap	0.504*** (0.066)	0.488*** (0.096)	0.368*** (0.077)	0.465*** (0.086)	0.536*** (0.071)	1.082*** (0.150)
Economic growth	0*** (0)	0*** (0)	0*** (0)	0*** (0)	0*** (0)	0*** (0)
Trade openness	−0.073*** (0.026)	−0.023 (0.019)	−0.017*** (0.005)	0.017 (0.017)	−0.011 (0.010)	−0.040*** (0.007)
Inflation	−0.110* (0.058)	−0.097* (0.052)	−0.091*** (0.019)	−0.092*** (0.028)	−0.093*** (0.032)	−0.034 (0.022)
Infrastructure	−0.469*** (0.123)	−0.329*** (0.074)	−0.202*** (0.249)	−0.160*** (0.027)	−0.263*** (0.031)	−0.272*** (0.045)
Instrument	24	20	25	24	25	27
Countries/Observations	27/378	27/351	27/351	27/351	27/351	27/351
AR(2) test	0.162	0.151	0.539	0.398	0.771	0.564
Sargan test	0.435	0.388	0.116	0.109	0.335	0.135
Hansen test	0.559	0.219	0.480	0.238	0.241	0.365

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.

Source: Author's processing

Table 5: Governance and cyclicality of public spending: one-step D-GMM

Dependent variable: Public spending (% GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Public spending (–1)	0 (0.071)	0.001 (0.087)	0.092 (0.090)	0.057 (0.074)	−0.022 (0.069)	0.024 (0.071)
Output gap	0.384* (0.207)	1.096*** (0.395)	0.803** (0.372)	2.119*** (0.558)	1.104*** (0.302)	3.628*** (0.902)
Governance	19.975*** (5.659)	23.872** (10.431)	9.670* (5.325)	13.489** (6.685)	2.929 (4.582)	13.978* (8.331)
Governance*output gap	–1.179*** (0.181)	–1.751*** (0.357)	–2.736*** (0.614)	–2.435*** (0.499)	–1.823*** (0.282)	–3.991*** (0.739)
Economic growth	0*** (0)	0*** (0)	0.001*** (0)	0 (0)	0.001*** (0)	0.001*** (0)
Trade openness	0.001 (0.040)	0.111** (0.065)	0.124*** (0.068)	0.125** (0.054)	0.100* (0.056)	0.081* (0.043)
Inflation	0.291** (0.138)	0.059* (0.179)	0.567* (0.216)	0.146 (0.150)	0.151 (0.143)	−0.040 (0.149)
Infrastructure	0.163 (0.118)	0.330* (0.188)	0.163*** (0.118)	0.330** (0.171)	0.521*** (0.169)	0.562*** (0.136)
Instrument	27	24	27	26	27	27
Countries/Observations	27/405	27/378	27/378	27/378	27/378	27/351
AR(2) test	0.673	0.148	0.749	0.920	0.820	0.732
Sargan test	0.135	0.242	0.228	0.151	0.113	0.125

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.

Source: Author's processing

Table 6: Governance and cyclicality of government revenue: one-step D-GMM

Dependent variable: Government revenue (% GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Government revenue (–1)	−0.124 (0.101)	−0.083 (0.079)	0.053 (0.055)	−0.008 (0.059)	−0.049 (0.076)	−0.016 (0.067)
Output gap	−0.277** (0.125)	−0.423** (0.189)	−0.175** (0.085)	−0.316** (0.141)	−0.502*** (0.149)	−1.551*** (0.413)
Governance	0.701 (1.210)	7.695** (3.527)	1.514** (0.607)	5.047** (2.553)	5.373* (3.213)	14.461** (6.482)
Governance*output gap	0.554*** (0.174)	0.584*** (0.199)	0.295*** (0.096)	0.376*** (0.127)	0.730*** (0.150)	1.435*** (0.362)
Economic growth	0*** (0)	0*** (0)	0** (0)	0*** (0)	0*** (0)	0 (0)
Trade openness	−0.069 (0.081)	−0.033 (0.038)	0.025 (0.022)	0.0111 (0.026)	−0.062** (0.030)	−0.021 (0.027)
Inflation	−0.134 (0.188)	−0.118 (0.075)	−0.101* (0.056)	−0.128** (0.064)	−0.136** (0.071)	−0.269*** (0.096)
Infrastructure	−0.640** (0.315)	−0.345*** (0.117)	−0.166** (0.078)	−0.176** (0.075)	−0.374*** (0.101)	−0.145 (0.096)
Instrument	20	22	27	25	27	25
Countries/Observations	27/351	27/351	27/351	27/351	27/351	27/351
AR(2) test	0.183	0.217	0.987	0.471	0.421	0.257
Sargan test	0.927	0.613	0.182	0.164	0.118	0.827

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.

Source: Author's processing

5.2 Robustness check

The paper employs the PMG estimator in Equation (2) to test the robustness of the D-GMM estimates. We only use public spending/government revenue, output gap, governance and economic growth. The PMG estimator is a type of ECM model that needs co-integration. First, the paper examines the stationarity of all regressors in the empirical model to guarantee that they all have the same order. Next, the study performs panel co-integration tests introduced by Westerlund (2007).

The results in Table 7 note that public spending, government revenue, output gap, governance and economic growth are stationary at significance levels lower than 10%,

suggesting that all variables in the empirical model have the same integration (zero-order I(0)). The panel co-integration tests designed by Westerlund (2007) in Tables 8 and 9 indicate that three in four tests deny the null hypothesis (no co-integration). Therefore, public spending/government revenue co-integrates with the output gap, governance, and economic growth. The study shows the main results in Tables 10 and 11. In line with the D-GMM estimates, the estimates by the PMG estimator note that fiscal policy is counter--cyclical in developed countries. Meanwhile, governance enhances public spending and government revenue. However, the interaction between governance and output gap reduces public debt/fiscal deficit, suggesting that governance impedes counter-cyclical fiscal policy in developed countries. Furthermore, economic growth increases public spending but decreases government revenue.

Tables 12 and 13 show the test results for cross-sectional independence with each governance indicator developed by De Hoyos and Sarafidis (2006), corresponding to public spending and government revenue, respectively. In this regard, the paper performs three tests, *i.e.*, a Frees test, a Friedman test and a Pesaran test. Furthermore, it also checks the Breusch-Pagan LM test. All the tests in Tables 12 and 13 accept the null hypothesis (the coefficients are statistically insignificant). Therefore, there is no cross-sectional dependency problem.

Table 7: Unit root tests

Variables	Levin-Lin-Chu test		ADF test		PP test	
	Prob > χ^2		Prob > χ^2		Prob > χ^2	
	Without trend	With trend	Without trend	With trend	Without trend	With trend
Public spending	−4.131***	−4.388***	73.062***	60.655	60.557	41.764
Government revenue	−3.724***	−5.378***	70.670*	93.014***	50.980	53.599
Output gap	−6.302***	−5.552***	129.928***	130.668***	89.398***	60.646
Governance 1	−2.328***	−2.159**	57.327	47.556	58.492	56.472***
Governance 2	−5.765***	−5.989***	86.144***	78.818***	85.982***	87.611***
Governance 3	−2.694***	−3.250***	75.180**	66.067	235.544***	180.645***
Governance 4	−2.655***	−1.800**	49.304	62.892	90.786***	88.026***
Governance 5	−4.834***	−5.864***	50.876	56.732	76.748**	65.933
Governance 6	−7.102***	−8.890***	115.632***	82.200***	96.493***	81.502***
Economic growth	−2.938***	−4.763***	76.473**	34.317	59.465	15.258

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.

Source: Author's processing

Table 8: Westerlund panel co-integration tests
Normalized variable: Public spending (% GDP)

Covariates	G_t	G_a	P_t	P_a
Output gap	−3.305***	−10.743	−13.326***	−11.769***
Governance 1	−4.779***	−16.640	−16.956***	−10.507*
Governance 2	−3.084***	−10.956***	−8.325*	−5.248
Governance 3	−3.548***	−15.217***	−15.287***	−14.12***
Governance 4	−2.860***	−10.462***	−9.518**	−6.056**
Governance 5	−3.026***	−12.50	−14.147***	−11.234**
Governance 6	−2.597***	−8.965**	−9.052*	−5.896**
Economic growth	−3.815***	−8.471	−13.864***	−7.230***

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.
Source: Author's processing

Table 9: Westerlund panel co-integration tests
Normalized variable: Government revenue (% GDP)

Covariates	G_t	G_a	P_t	P_a
Output gap	−3.706***	−15.73***	−16.211***	−14.910***
Governance 1	−3.733***	−18.317***	−14.753***	−12.171***
Governance 2	−3.652***	−14.087**	−15.773***	−12.421***
Governance 3	−3.380***	−16.541***	−15.851***	−14.471***
Governance 4	−2.915***	−10.360***	−10.389***	−13.889***
Governance 5	−3.304***	−15.854***	−17.345***	−13.450***
Governance 6	−2.963***	−14.651**	−13.634***	−11.253**
Economic growth	−3.583***	−16.886***	−18.399***	−15.629***

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.
Source: Author's processing

Table 10: Governance and cyclicality of public spending: PMG estimates
Long-run co-integrating vectors
Dependent variable: Public spending (% GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Output gap	1.641*** (0.370)	1.067*** (0.249)	0.640** (0.304)	0.446*** (0.158)	1.821*** (0.463)	2.276*** (0.711)
Governance	2.855*** (0.932)	6.719*** (0.780)	1.940*** (0.377)	4.554*** (0.750)	6.284*** (1.384)	3.851*** (1.390)
Governance*output gap	−0.732*** (0.313)	−0.958*** (0.159)	−1.065*** (0.260)	−0.443*** (0.107)	−1.835*** (0.401)	−3.161*** (0.558)
Economic growth	0.0001*** (0)	0** (0)	0.0002*** (0)	0.0002*** (0)	0.0001* (0)	0.0004*** (0)
Error correction	−0.416***	−0.347***	−0.445***	−0.460***	−0.396***	−0.421***
Observation	459	459	459	459	459	459
Log likelihood	−530.663	−532.921	−520.215	−530.769	−526.994	−511.626

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.

Source: Author's processing

Table 11: Governance and cyclicality of government revenue: PMG estimates
Long-run co-integrating vectors
Dependent variable: Government revenue (% GDP)

Variables	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Output gap	−0.959* (0.560)	−1.601*** (0.190)	−0.871*** (0.216)	−1.840*** (0.317)	−0.636*** (0.156)	−1.086*** (0.248)
Governance	13.374*** (2.131)	3.959*** (0.699)	4.423*** (0.830)	7.408*** (0.841)	0.514 (0.729)	7.060*** (1.672)
Governance*output gap	0.156 (0.381)	1.229*** (0.173)	0.485*** (0.202)	1.386*** (0.226)	0.695*** (0.220)	0.738*** (0.202)
Economic growth	−0.0003*** (0)	−0.0001** (0)	−0.0002** (0)	−0.0004** (0.0001)	−0.0004*** (0.0001)	−0.0003*** (0.0001)
Error correction	−0.131***	−0.293***	−0.250***	−0.220***	−0.579***	−0.312***
Observation	459	459	459	459	459	459
Log likelihood	−426.810	−431.717	−441.929	−432.971	−416.739	−432.148

Note: ***, ** and *denote significance at 1%, 5% and 10% levels respectively.

Source: Author's processing

Table 12: Cross-sectional dependence tests
Dependent variable: Public spending (% GDP)
***H*$_0$:** Cross-sectional independence

Tests	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Frees test	0.179	0.130	0.155	0.156	0.157	0.169
Friedman test	12.271	14.621	13.090	16.003	15.146	12.536
Pesaran test	6.745	6.520	6.040	7.070	5.509	5.738
Breusch-Pagan LM test	260.139	233.493	302.830	296.606	085.384	214.556

Note: ***, ** and * denote significance at 1%, 5% and 10% levels respectively.
Source: Author's processing

Table 13: Cross-sectional dependence tests
Dependent variable: Government revenue (% GDP)
***H*$_0$:** Cross-sectional independence

Tests	GOV1	GOV2	GOV3	GOV4	GOV5	GOV6
Frees test	0.184	0.119	0.165	0.173	0.158	0.130
Friedman test	13.778	15.982	12.132	16.778	17.955	13.227
Pesaran test	3.526	4.07	4.961	3.853	4.471	4.221
Breusch-Pagan LM test	490.676	497.065	506.254	489.363	507.941	446.497

Note: ***, ** and * denote significance at 1%, 5% and 10% levels respectively.
Source: Author's processing

6. Conclusion and Policy Implications

Fiscal policy plays a crucial role in running the economy, and governance can significantly influence the cyclicality of fiscal policy. In view of these facts, the study empirically assesses the role of governance in the output gap – the fiscal policy relationship for a group of 27 developed countries over the period 2002–2019. It employs the difference GMM Arellano-Bond estimators and the PMG estimator. The results point out some exciting findings. Firstly, public spending and government revenue are counter-cyclical, confirming that fiscal policy in developed countries is counter-cyclical. Secondly, governance hinders the counter-cyclicality of fiscal policy. These results are similar for all six governance dimensions.

The findings in this paper suggest some implications for parliaments in developed countries in passing some laws related to fiscal policy. Governance/institutional quality

in these countries significantly affects fiscal policy and plays a crucial role in counter-cyclical fiscal policy. These laws should be carefully analysed and evaluated before being approved to ensure that they contribute significantly to the economy in bad times and limit the cyclical fiscal characteristics during elections. In particular, parliaments in these countries should be cautious in passing economic stimulus packages proposed by governments in election periods because they can hinder counter-cyclical fiscal policy. Future research should focus on the role of governance in cyclical fiscal policy by sector/industry for developed and developing countries.

Appendix

Table A: Data description

Variable	Definition	Type	Source
Public spending (EXP)	Total expenditure consists of total expense and the net acquisition nonfinancial assets measured as a share of GDP.	%	IMF
Government revenue (REV)	Revenue consists of taxes, social contributions, grants receivable and other revenue measured as a share of GDP.	%	IMF
Output gap (GAP)	Output gaps are calculated as actual GDP minus potential GDP as a percent of potential GDP.	%	IMF
Economic growth (GDP)	GDP per capita (constant 2010 US$)	log	WB
Trade openness (OPE)	Trade is the sum of exports and imports of goods and services measured as a share of GDP.	%	WB
Inflation (INF)	Inflation as measured by the consumer price index	%	WB
Infrastructure (TEL)	Fixed telephone subscriptions per 100 persons	log	WB
Regulatory quality (GOV1)	Dimensions of governance	level	WB
Rule of law (GOV2)			
Voice and accountability (GOV3)			
Control of corruption (GOV4)			
Government effectiveness (GOV5)			
Political stability (GOV6)			

Source: IMF and WB - please specify the source

Table B: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Public spending (EXP)	486	43.298	7.996	16.462	65.032
Government revenue (REV)	486	41.572	8.240	19.291	58.621
Output gap (GAP)	486	−0.496	2.995	−16.256	11.892
Economic growth (GDP)	486	42764.44	20067.81	11161.4	111968.4
Trade openness (OPE)	486	104.39	72.235	20.685	408.362
Inflation (INF)	486	1.839	1.450	−4.478	10.362
Infrastructure (TEL)	486	44.402	12.032	4.862	68.881
Regulatory quality (GOV1)	486	1.432	0.674	−0.189	2.469
Rule of law (GOV2)	486	1.439	0.454	0.197	2.353
Voice and accountability (GOV3)	486	0.848	0.417	−0.473	1.755
Control of corruption (GOV4)	486	1.385	0.382	0.148	2.088
Government effectiveness (GOV5)	486	1.436	0.472	0.083	2.100
Political stability (GOV6)	486	1.274	0.257	0.618	1.800

Source: Author's processing

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