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Tax policy cyclicality and financial development

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Abstract

This paper adds to the existing literature by examining the macroeconomic, political and institutional determinants of tax policy cyclicality conditional on financial development. We find that an increase in trade and financial openness leads to pro-cyclical VAT and counter-cyclical CIT rate response in high financially developed economies, while an increase in financial openness is associated with counter-cyclical VAT and PIT responses when the levels of financial development are low. A high public debt ratio leads to a counter-cyclical VAT rate response in economies with low financial development. Political power and fiscal institutions are factors that affect the tax policy cyclicality only in less financially developed economies.

Keywords: tax policy, financial development, time-varying coefficients, political, fiscal institutions
JEL Classification Codes: E32, E62, G20, H20, H30

1. Introduction

The response of fiscal policy over the business cycle has received renewed attention in recent years because of the COVID-19 pandemic and the energy crisis. However, a substantial part of the literature has focused on the cyclicality of primary balance and government spending (see e.g., Gavin and Perotti, 1997; Lane, 2003; Galí and Perotti, 2003; Kaminsky et al., 2004; Candelon et al., 2010; Benetrix and Lane, 2013; Jalles 2018, 2021 and Afonso and Carvalho, 2022). Most studies avoid examining the effect of the business cycle on the revenue side of the

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government budget because of the inherent endogeneity between tax revenues, tax base and economic activity. Moreover, according to Barro (1979), changing the tax rates is not an "optimal" option for fiscal policy makers over the business cycle as it leads to distortions. Instead, countries should run budget deficits in recessions and budget surpluses in expansions. Hence, conventional wisdom implies that tax policy should not be responsive to economic conditions. However, recent evidence presented by Vegh and Vuletin (2015) shows that tax policy tends to be a-cyclical in advanced and pro-cyclical in developing countries. Similarly, Chrysanthakopoulos and Tagkalakis (2023) examining a group of advanced and emerging economies show that value-added tax (VAT) rates have become counter-cyclical, while corporate and personal income (CIT and PIT) tax rates have become pro-cyclical over time. Moreover, they show that trade and capital account openness, the size of the government, the level of economic development and fiscal rules are significant determinants of tax policy cyclicality.

Nevertheless, the literature that examines tax policy cyclicality has not considered several relevant factors that shape the response of the fiscal policy maker. First, the level of financial development is a critical factor. Countries characterized as financially developed usually have easier access to credit and can more easily borrow and pursue countercyclical fiscal policies (see e.g., Aghion et al., 2007; Afonso and Carvalho, 2022). Moreover, Ma and Lv (2023) show that a large and stable financial system reduces fiscal policy volatility and is conducive to the smooth conduct of fiscal policy. However, other papers have shown that fiscal policy is more potent in boosting economic activity in recessions when credit constraints are binding (see e.g., Tagkalakis, 2008; McManus et al.,2021). This implies that in less financially developed economies, where credit constraints are prevalent, fiscal policy will respond in more powerful manner to changing economic conditions (counter-cyclically) because it is expected to have a bigger impact on output. Second, government indebtedness could affect tax policy cyclicality because countries with high public debt ratios are obliged by market forces to correct fiscal imbalances (see e.g., Afonso and Jalles, 2019). Third, governments tend to run deficits regardless of the prevailing cyclical conditions because of political economy reasons leading to deficit bias. A high level of political dispersion and fragmentation makes it more difficult to control spending (Talvi and Végh, 2005; Beetsma et al., 2009). According to Mink and de Haan (2006) short-termism and political competition are also sources of deficit bias, with incumbents increasing spending ahead of elections to attract voters or accumulate debt, reducing future governments' room for maneuver. Fourth, independent fiscal councils (IFCs) can reduce the pro-cyclicality of fiscal policy (Chrysanthakopoulos and Tagkalakis, 2022) e.g., by increasing the accountability and fiscal transparency and by reducing the optimistic bias in official forecasts (Beetsma et al., 2019). Hence, it should be examined whether IFCs can influence the cyclicality of tax policy.

Building on Vegh and Vuletin (2015), Jalles (2018, 2021), Afonso and Carvalho (2022) and Chrysanthakopoulos and Tagkalakis (2023) we add to the existing literature on tax policy cyclicality in the following ways: First, we calculate time-varying measures of the cyclicality of various tax rates for 23 OECD countries over the period 1985-2019. Second, we examine the effect of various political variables (political power, ideology, elections), fiscal councils (and their specific characteristics), the level of government indebtedness and the level of financial development on tax policy cyclicality. Third, and most importantly, we condition the effect of all explanatory variables on the level of financial development.

The paper is organized as follows. Section 2 presents the methodology and data, Section 3 presents the results and Section 4 concludes.

2. Methodology and Data

As explained in Vegh and Vuletin (2015) tax rates are the only relevant instrument that should be considered when assessing tax policy cyclicality because tax revenues are endogenous to the business cycle. Hence, we use the standard VAT tax rate, the maximum corporate income tax rate (CIT), and the highest marginal personal income tax rate (PIT). However, policy mak-ers determine both the tax rates and the legal tax bases by adjusting the coverage and the thresholds for each tax rate. The lack of coverage and threshold data is a limitation, but as already pointed out by Vegh and Vuletin (2015) there is a "*high correlation between the standard VAT rate and either the reduced VAT rate or the effective VAT rate and between the highest marginal personal income tax rate and the average marginal income tax rate*". Hence, the available tax rates are a validinstrument to assess tax policy cyclicality.

Building on Jalles (2018), Afonso and Carvalho (2022) and Chrysanthakopoulos and Tagkala-kis (2023), we compute the degree of tax policy cyclicality by estimating:

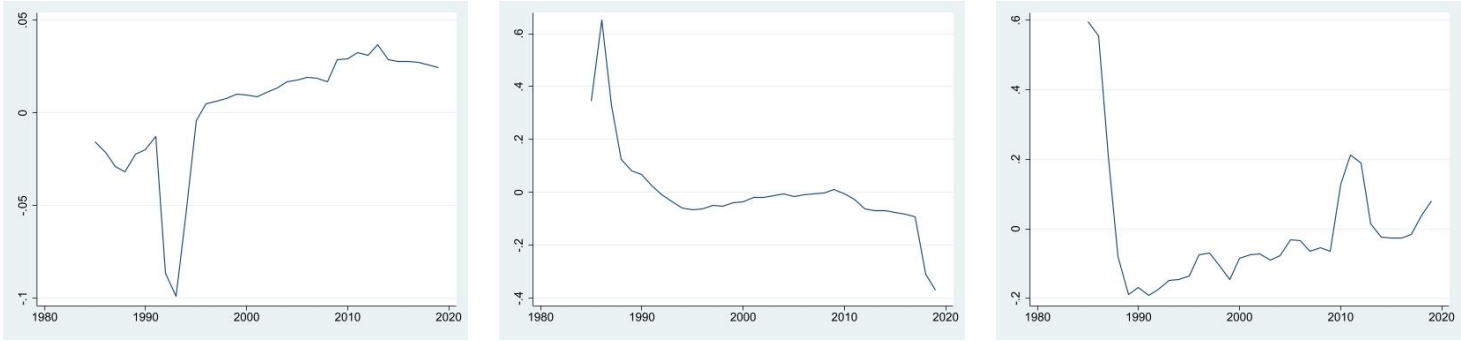
$$tax_{it} = \alpha_{it} + \beta_{it} * \Delta lnGDP_{it} + \varepsilon_{it} \quad (1)$$

tax_{it} stands for VAT rate, CIT rate, and PIT rate; $\Delta lnGDP_{it}$ is the change in the logarithm of real GDP (GDP growth) and ε_{it} is the error term.[1] Tax policy is counter-cyclical when $\beta>0$, pro-cyclical when $\beta<0$ and a-cyclical whenever $\beta=0$. In addition, we assume that β_{it} vary over time and changes slowly and unsystematically. In particular:

$$\beta_{it} = \beta_{it-1} + u_{it}, \quad where \quad u_{it} \sim N(0, \sigma_i^2) \quad (2)$$

Eq. (1) and (2) are jointly estimated with the Varying Coefficient method developed by Schlicht (2003). Figure 1 presents the estimated βit coefficient for each tax rate. We find that the VAT rate has become counter-cyclical over time (i.e., the estimated β's are above 0); while the CIT rate has become pro-cyclical over time (i.e., the estimated β's have declined below 0). Note that contrary to the evidence in Chrysanthakopoulos and Tagkalakis (2023) the PIT rate in OECD countries has become counter-cyclical and not pro-cyclical over time.

Figure 1. The cyclicality of tax rates over time



Notes: estimated β_{it} coefficient for each tax rate. Left panel: VAT; middle panel: CIT; right panel: PIT.
Source: Authors' calculations.

Building on Jalles (2018) and Chrysanthakopoulos and Tagkalakis (2023), we examine the determinants of tax policy cyclicality. To this end, we estimate:

$$\hat{\beta}_{it} = \alpha_1 * X_{it-1} + \alpha_2 * PV_{it-1} + \alpha_3 * FR_{it-1} + a_4 * FC_{it-1} + \eta_i + \lambda_t + \varepsilon_{it} \quad (3)$$

[1] Following Vegh and Vuletin (2015) the change in the logarithm of real GDP (GDP growth) rate reflects cyclical economic conditions. All macroeconomic variables are obtained from the IMF and the World Bank.

Eq. (3) is estimated by Weighted Least Squares in two different states: in cases of high and low financial development. The country-year observations are split into high and low groups depending on whether they are above or below the sample median value of the IMF financial development index. The results are reported in Tables 1 and 2.

The IMF financial development index refers to the degree of development of financial institutions and financial markets in terms of their depth, access, and efficiency. On the one hand, a better functioning financial system facilitates the ability of a government to borrow and run counter-cyclical fiscal policies, i.e., it can reduce taxes and run deficits in bad times. On the other hand, the easy access to financial markets for business and households implies that in bad times they will be able to smooth consumption and undertake investment without requiring a government intervention, which in any case is expected to be weak in the absence of credit constraints.

η_i are country effects, λ_t are time effects and ε_{it} is the error term. To reduce reverse causality, as in Jalles (2018) all independent variables enter the specification with one lag. X_{it-1} includes the logarithm of real GDP per capita, the government spending to GDP ratio, trade openness (i.e., the ratio of total imports and exports to GDP ratio), financial or capital account openness proxied by the Chinn-Ito index, the inflation rate, the IMF financial development index, and the public debt to GDP ratio.

More developed economies usually follow less pro-cyclical or a-cyclical fiscal policy (see e.g., Lane, 2003; Kaminsky et al., 2004). Bigger governments (i.e., having higher government spending to GDP ratio) could be associated with both procyclical (Afonso and Carvalho, 2022) and countercyclical (Jalles, 2018) fiscal policies. Highly indebted economies tend to run countercyclical fiscal policies (see e.g., Afonso and Jalles, 2019). Countries that are open to international competition (with high trade and capital account openness) are more exposed to external shocks and thus it is more likely that they will follow pro-cyclical policies (see e.g., Lane, 2003; Aghion et al. 2007).

PV_{it-1} controls for political economy deliberation. It includes the following political variables (which are obtained from Döring's et al., 2022): (a) "Elections", which is a dummy variable taking the value of 1 in election years, (b) "Power", which is a binary variable that takes the value 1 if the political party in power has the most members in the parliament, (c) "Right", which is a binary variable and takes the value 1 if the ideological orientation of the cabinet is right-wing and 0 if it is left-wing.

The simultaneous presence of independent fiscal councils and fiscal rules can dampen the procyclical response of fiscal policy (see e.g., Gootjes and de Haan, 2022 and Căpraru et al., 2022). To this end, we incorporate FR_{it-1} which is a dummy variable capturing the presence of a fiscal rule and is taken from Davoodi et al., (2022). Moreover, we examine whether the specific design futures of fiscal councils, i.e., enhanced remit (Remit), strong independence & accountability (Independence), and enhanced tasks & instruments (Tasks) are factors that affect the tax policy cyclicality. Following on Afonso et al. (2022) and Chrysanthakopoulos and Tagkalakis (2022) we construct the "FCC" index which combines all individual design features of fiscal councils.[2]

[2] See the supplementary material in the Annex.

3. Findings

We find that a greater degree of financial development allows bigger governments to increase tax policy cyclicality (Table 1). In countries with lower levels of financial development, the size of the government is a factor that is associated with increased cyclicality but only with respect to the CIT and VAT rates (Table 2). An increase in the debt to GDP ratio is more likely to induce a counter-cyclical tax policy change in case of VAT rate in less financially developed economies, whereas the evidence is mixed in all other cases (Tables 1 and 2). The level of economic development is associated positively with the cyclicality of the PIT rate in both groups (see Tables 1-2). However, the VAT rate cyclicality is associated positively, and the CIT rate cyclicality is associated negatively with economic development, respectively, in high and low financially developed economies (Tables 1 and 2). Hence, countries with low levels of financial development will avoid raising taxes to corporations as their economy expands on account of tax competition motive and as a way of attracting foreign investment.

Higher inflation increases the cyclicality of VAT and PIT rates in countries that are more financially developed (Table 1) and reduces the cyclicality of VAT rate in countries with low levels of financial development (Table 2). The cyclicality of the CIT and PIT rates increases as economies become more open to international trade in financially developed economies (Table 1). Nevertheless, trade openness is associated negatively with VAT rate cyclicality in countries with high degree of financial development. In countries with low levels of financial development, the coefficient of trade openness is in most cases insignificantly estimated (Table 2).

A greater degree of financial openness is linked with an increased responsiveness of the CIT rate to GDP growth in financially developed economies, while it is associated with increased responsiveness of VAT and PIT rates to GDP growth in less financially developed economies (Tables 1-2). Financial openness reduces the cyclicality of VAT rate in high financially developed economies, respectively (Table 1). A further increase in the degree of financial development in more financial developed economies lowers the responsiveness of the PIT rate to GDP growth, i.e., leads to a pro-cyclical response. (Table 1).

Elections have no particular effect on tax policy cyclicality. However, there is evidence that the political orientation of the government is a relevant factor, i.e., right-wing governments increase the cyclicality of the VAT rate in both groups. Moreover, politically powerful governments are associated with an increased responsiveness (a counter cyclical behavior) of CIT and PIT rates to GDP growth in countries with low levels of financial development.

Fiscal rules matter only in economies with high levels of financial development. In more detail, they induce counter-cyclical CIT rate and pro-cyclical PIT rate responses (Table 1). Fiscal councils induce counter-cyclical VAT and PIT rates responses and a pro-cyclical CIT rate response in countries with strong financial development Fiscal councils are associated with reduced CIT and PIT rates cyclicality (pro-cyclical behavior) in economies with low levels of financial development.

Table 1. The determinants of tax policy cyclicality. The case of countries with high financial development

			VAT					CIT					PIT		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Inflation (t-1)	0.456*	0.410*	0.440*	0.439*	0.450*	0.290	0.292	-0.655	0.294	0.376	9.721*	10.17	10.84*	7.529*	7.933**
	(0.233)	(0.233)	(0.223)	(0.231)	(0.231)	(0.814)	(0.848)	(0.879)	(0.867)	(0.856)	(5.379)	(6.700)	(5.982)	(3.875)	(3.958)
Trade open. (t-1)	-0.0882*	-0.0838*	-0.0634	-0.0762	-0.0827*	0.834***	0.796***	0.537*	0.872***	0.897***	0.675	2.733*	2.970**	1.963*	1.727
	(0.0465)	(0.0480)	(0.0467)	(0.0480)	(0.0479)	(0.290)	(0.303)	(0.274)	(0.315)	(0.313)	(1.025)	(1.584)	(1.337)	(1.142)	(1.120)
GDP per capita (t-1)	4.743***	4.853***	4.749***	5.132***	5.096***	1.249	-0.722	-0.685	-0.967	-1.128	33.06**	30.96*	19.20	32.63***	33.71***
	(1.041)	(1.022)	(0.975)	(1.043)	(1.043)	(3.676)	(3.945)	(3.734)	(4.108)	(4.123)	(13.29)	(17.50)	(16.33)	(10.81)	(11.19)
Spending (t-1)	0.967***	1.056***	1.130***	1.105***	1.074***	2.554***	1.443	1.068	1.864*	1.916**	10.15**	17.88***	18.37***	13.10***	12.55***
	(0.227)	(0.236)	(0.224)	(0.237)	(0.234)	(0.939)	(0.960)	(0.858)	(0.969)	(0.970)	(4.215)	(5.501)	(4.592)	(4.429)	(4.354)
Financial open. (t-1)	-0.239***	-0.238***	-0.225***	-0.292***	-0.284***	0.504*	0.478*	0.387	0.594**	0.582**	1.246	0.128	0.781	-0.314	-0.289
	(0.0513)	(0.0510)	(0.0476)	(0.0577)	(0.0566)	(0.264)	(0.257)	(0.234)	(0.263)	(0.260)	(1.618)	(1.247)	(0.979)	(0.950)	(0.970)
Debt (t-1)	0.000479**	0.000294	-0.000215	0.000146	0.000208	-0.00419*	-0.00392	-0.000942	-0.00389	-0.00399	0.0157***	0.0130*	-0.00979	0.00346	0.00553
	(0.000223)	(0.000227)	(0.000240)	(0.000232)	(0.000230)	(0.00248)	(0.00240)	(0.00198)	(0.00244)	(0.00247)	(0.00541)	(0.00665)	(0.00920)	(0.00420)	(0.00414)
FDI (t-1)	-0.0538	-0.0535	-0.0857	-0.0645	-0.0676	0.0747	0.167	0.238	0.147	0.143	-0.914	-3.054	-2.762*	-2.266*	-2.416*
	(0.0784)	(0.0811)	(0.0759)	(0.0796)	(0.0808)	(0.246)	(0.245)	(0.245)	(0.256)	(0.255)	(1.462)	(2.054)	(1.647)	(1.183)	(1.259)
Elections (t-1)	0.000229	0.00124	0.00181	0.00137	0.00128	-0.0201	-0.0202	-0.0224	-0.0196	-0.0191	0.111	0.143	0.0899	0.0653	0.0664
	(0.00387)	(0.00391)	(0.00370)	(0.00385)	(0.00388)	(0.0195)	(0.0194)	(0.0197)	(0.0195)	(0.0194)	(0.137)	(0.147)	(0.121)	(0.0965)	(0.101)
Right (t-1)	0.0142***	0.0113**	0.00830*	0.0115**	0.0119**	-0.0400	-0.0372	-0.0471	-0.0448	-0.0457	0.0661	0.173	0.111	0.00930	0.0310
	(0.00526)	(0.00528)	(0.00486)	(0.00510)	(0.00517)	(0.0375)	(0.0351)	(0.0363)	(0.0359)	(0.0362)	(0.127)	(0.147)	(0.128)	(0.0966)	(0.100)
Power (t-1)	-0.00816	-0.00201	0.00341	-0.00116	-0.00217	0.00751	-0.00172	-0.0248	0.0114	0.0128	-0.545	-0.502	-0.210	-0.245	-0.285
	(0.00811)	(0.00854)	(0.00791)	(0.00856)	(0.00855)	(0.0438)	(0.0444)	(0.0465)	(0.0439)	(0.0437)	(0.381)	(0.318)	(0.238)	(0.201)	(0.215)
Fiscal Rule (t-1)		0.0205	0.0120	0.0189	0.0165		0.107	0.133*	0.143*	0.141*		-1.410***	-1.415***	-1.032***	-1.110***
		(0.0159)	(0.0149)	(0.0158)	(0.0158)		(0.0775)	(0.0730)	(0.0811)	(0.0811)		(0.473)	(0.432)	(0.393)	(0.421)
Remit (t-1)		0.0202**					-0.161**					1.318**			
		(0.00970)					(0.0756)					(0.567)			
Tasks (t-1)			0.0617***					-0.420***					2.424***		
			(0.0169)					(0.119)					(0.731)		
Independence (t-1)				0.0264***					-0.0376					0.847**	
				(0.00962)					(0.0543)					(0.376)	
FCC (t-1)					0.0286**					-0.0213					0.949**
					(0.0115)					(0.0609)					(0.463)
Observations	235	235	235	235	235	241	241	241	241	241	241	241	241	241	241
R-squared	0.899	0.902	0.910	0.903	0.902	0.522	0.539	0.578	0.528	0.528	0.565	0.679	0.702	0.573	0.572

Notes: Dependent variable: Time varying coefficients of tax policy. Robust standard errors in parentheses. ***p<0.01, **p<0.05, * p<0.1. Countries included in the analysis: Australia, Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Mexico, Portugal, Spain, Sweden, United Kingdom, and United States

Source: Authors' calculations.

Table 2. The determinants of tax policy cyclicality. The case of countries with low financial development

			VAT					CIT					PIT		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Inflation (t-1)	-0.0889***	-0.0926***	-0.0980***	-0.0965***	-0.0934***	1.454*	1.056	0.926	1.082	0.744	0.0791	0.0684	0.0577	0.0213	-0.0326
	(0.0333)	(0.0341)	(0.0348)	(0.0345)	(0.0344)	(0.815)	(0.732)	(0.698)	(0.729)	(0.601)	(0.181)	(0.182)	(0.177)	(0.181)	(0.191)
Trade open. (t-1)	0.00426	0.00235	0.000941	0.00151	0.00213	0.442**	0.277	0.268	0.318	0.247	-0.0417	-0.115	-0.0909	-0.114	-0.139*
	(0.00848)	(0.00930)	(0.00929)	(0.00915)	(0.00930)	(0.184)	(0.197)	(0.190)	(0.196)	(0.168)	(0.0735)	(0.0771)	(0.0767)	(0.0789)	(0.0824)
GDP per capita (t-1)	-0.0113	-0.0142	-0.00213	0.00684	-0.00891	-2.692**	-2.865**	-2.202**	-1.987*	-1.607*	1.048	2.553***	2.070***	2.800***	2.999***
	(0.0795)	(0.0824)	(0.0825)	(0.0852)	(0.0838)	(1.187)	(1.207)	(1.100)	(1.047)	(0.969)	(0.671)	(0.709)	(0.710)	(0.832)	(0.778)
Spending (t-1)	0.0455	0.0476*	0.0490*	0.0477*	0.0479*	1.257**	1.258**	1.332**	1.323**	1.101**	0.229	-0.179	-0.0700	-0.0428	-0.120
	(0.0278)	(0.0269)	(0.0268)	(0.0270)	(0.0269)	(0.552)	(0.596)	(0.600)	(0.603)	(0.494)	(0.237)	(0.243)	(0.250)	(0.246)	(0.251)
Financial open. (t-1)	0.0259***	0.0259***	0.0264***	0.0259***	0.0261***	-0.0714	-0.0626	-0.0384	-0.0728	-0.0172	0.0876*	0.269***	0.231***	0.212***	0.260***
	(0.00682)	(0.00679)	(0.00676)	(0.00659)	(0.00681)	(0.0806)	(0.0792)	(0.0737)	(0.0789)	(0.0605)	(0.0519)	(0.0631)	(0.0634)	(0.0603)	(0.0614)
Debt (t-1)	0.000342***	0.000341***	0.000311***	0.000334***	0.000336***	0.000316	0.000833	-0.00104	3.79e-05	0.000190	0.000655	0.00184*	0.000876	0.00157	0.00116
	(9.06e-05)	(8.40e-05)	(8.55e-05)	(8.20e-05)	(8.31e-05)	(0.00146)	(0.00149)	(0.00152)	(0.00148)	(0.00122)	(0.00117)	(0.00104)	(0.00110)	(0.00108)	(0.00102)
FDI (t-1)	0.0163	0.0173	0.0172	0.0202	0.0177	0.310	0.446	0.327	0.487	0.318	-0.261	0.00208	-0.0401	-0.0722	-0.0198
	(0.0247)	(0.0252)	(0.0249)	(0.0253)	(0.0253)	(0.482)	(0.457)	(0.435)	(0.469)	(0.372)	(0.202)	(0.176)	(0.183)	(0.191)	(0.182)
Elections (t-1)	0.000319	0.000368	0.000436	0.000437	0.000385	0.0147	0.0190	0.0203	0.0188	0.0162	0.00208	0.00613	0.00480	0.00607	0.00591
	(0.00129)	(0.00129)	(0.00128)	(0.00127)	(0.00128)	(0.0263)	(0.0251)	(0.0249)	(0.0251)	(0.0207)	(0.00981)	(0.00893)	(0.00927)	(0.00938)	(0.0100)
Right (t-1)	0.00318*	0.00322*	0.00349*	0.00321*	0.00325*	0.0346	0.0461	0.0518	0.0356	0.0337	-0.00907	0.0172	0.0136	0.00713	0.0142
	(0.00169)	(0.00178)	(0.00178)	(0.00174)	(0.00178)	(0.0331)	(0.0334)	(0.0340)	(0.0319)	(0.0277)	(0.0121)	(0.0128)	(0.0138)	(0.0127)	(0.0134)
Power (t-1)	0.0105***	0.0102***	0.0106***	0.00977***	0.0103***	0.112*	0.0974*	0.127**	0.0815	0.0724	0.0292	-0.00602	0.0405	0.0195	-0.00992
	(0.00337)	(0.00337)	(0.00337)	(0.00336)	(0.00337)	(0.0629)	(0.0584)	(0.0613)	(0.0558)	(0.0511)	(0.0676)	(0.0579)	(0.0666)	(0.0611)	(0.0582)
Fiscal Rule (t-1)		0.00196	0.00268	0.00232	0.00204		0.130	0.136	0.103	0.0968		-0.0235	-0.0149	-0.0501	-0.0190
		(0.00516)	(0.00512)	(0.00508)	(0.00514)		(0.131)	(0.131)	(0.127)	(0.114)		(0.0430)	(0.0436)	(0.0438)	(0.0444)
Remit (t-1)		-0.00220					-0.275***					-0.164***			
		(0.00327)					(0.0925)					(0.0306)			
Tasks (t-1)			-0.00521					-0.285***					-0.143***		
			(0.00396)					(0.0996)					(0.0370)		
Independence (t-1)				-0.00528					-0.233***					-0.131***	
				(0.00325)					(0.0833)					(0.0326)	
FCC (t-1)					-0.00241					-0.200***					-0.145***
					(0.00318)					(0.0746)					(0.0301)
Observations	216	216	216	216	216	222	222	222	222	222	222	222	222	222	222
R-squared	0.989	0.989	0.989	0.989	0.989	0.672	0.699	0.697	0.693	0.710	0.966	0.976	0.971	0.973	0.966

Notes: Dependent variable: Time varying coefficients of tax policy. Robust standard errors in parentheses. ***p<0.01, **p<0.05, * p<0.1 Countries included in the analysis: Australia, Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Mexico, Portugal, Spain, Sweden, United Kingdom, and United States

Source: Authors' calculations.

4. Conclusions

Using a panel of 23 OECD countries over the period 1985-2019 we examine the macroeconomic, political and institutional determinants of tax policy cyclicality in states of high and low financial development. We find that an increase in trade and financial openness leads to pro-cyclical VAT and a counter-cyclical CIT rate response in high financially developed economies. Increased financial openness leads to counter-cyclical VAT and PIT responses in countries with low levels of financial development. A high debt ratio leads to a counter-cyclical VAT rate response in economies with low financial development. An acceleration of the inflation rate leads to an increase in VAT and PIT rate cyclicality in high financially developed economies, while in low financially developed economies it is associated with a reduction in VAT rate cyclicality. Right-wing governments induce a counter-cyclical VAT response in both groups, while powerful governments can lead to counter-cyclical VAT and CIT responses in economies with low degree of financial development. Fiscal rules affect tax cyclicality and fiscal councils enhance counter-cyclicality only in financially developed economies.

Overall, additional research is needed, especially regarding the effect of the structure of economic activity on the cyclicality of tax rates. This refers, in particular, to the share of the tourism and industrial sectors in economic activity, the share of SMEs in GVA and employment, the presence of multinational companies, the ratio of self-employment to total employment and the income distribution. For example, a country that relies more on international tourism may find it difficult to pursue a countercyclical VAT rate policy, as this could have a negative impact on inbound tourism. Similarly, countries in which multinational corporations (which engage in profit shifting) are dominant players in their economic activity will find it difficult to change CIT rates when business conditions require it. Whereas countries with a large share of self-employed population typically have high tax evasion and smaller tax bases, which could induce policymakers to actively adjust PIT rates over the business cycle.

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Annex.

Table A1. Summary statistics

VARIABLES	(1) N	(2) Mean	(3) SD	(4) Min	(5) Max	Source
Right	530	0.621	0.486	0	1	https://www.parlgov.org
Power	546	0.302	0.460	0	1	https://www.parlgov.org
Elections	570	0.282	0.451	0	1	https://www.parlgov.org
Independence	805	0.296	0.407	0	1	IMF
Tasks	805	0.195	0.286	0	1	IMF
Remit	805	0.277	0.385	0	1	IMF
FCC	805	0.255	0.348	0	1	Own calculation
Spending	710	0.430	0.104	0.142	0.677	IMF
GDP per capita	778	2.416	0.160	2.121	2.815	IMF
Trade openness	774	0.782	0.528	0.166	3.801	World Bank
Inflation	755	0.0442	0.0680	-0.102	0.887	IMF
Debt	669	60.34	35.10	3.817	190.1	IMF
Financial openness	736	0.825	0.284	0	1	IMF
Fiscal Rule	805	0.421	0.337	0	1	IMF

Notes: This table shows the summary statistics.

Construction of fiscal councils' characteristics

We consider the following indices of the fiscal councils' characteristics of the IMF Fiscal council dataset (Davoodi et al. 2022):

1. ***Remit***. This index is computed by summing its twelve subcategories and then normalized so that it ranges between 0 and 1. Subcategories: positive and normative analysis, forecast preparation and assessment, recommendations, long-term sustainability, consistency with objectives, costing of measures, monitoring of fiscal rules, ex-post analysis, fiscal policy coordination, and mandate beyond fiscal policy. Overall, this indicator highlights the importance of independent analysis.
2. ***Independence***. This index is computed by summing its six subcategories and then normalized so that it ranges between 0 and 1. Subcategories: legal and operational independence, safeguards on budget, right to select staff, access to information and own staff commensurate to tasks. This index shows that the legal independence of a fiscal council is crucial in the provision of unbiased judgement and monitoring on the budgetary process.
3. ***Tasks***. This index is computed by summing its seven subcategories and then normalized so that it ranges between 0 and 1. Subcategories: public reports, high media impact, forecasts used in budget, binding forecasts, comply or explain, formal consultation or hearings and can stall the budget process. This index describes the tools that are available to fiscal councils in order to perform two crucial tasks, to manage public relations and to influence the budgetary process.

Moreover, we construct one more combined index:

4. ***FCC***. This is an overall index involving all fiscal councils' characteristics described above and then it is normalized so that it ranges between 0 and 1. This indicator captures the overall strength of the fiscal council and better reflects its ability to influence the budgetary process, especially in more advanced economies that typically have richer fiscal institutions, meaning that some or all of the above characteristics may coexist.

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