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Research Article

Government Size and Openness: Insights Based on Country Classifications[a]

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This study investigates the nexus between government size and openness by paying special attention to country classification. The main results of our empirical investigations show that (i) there are two government size trends meaning two different country groups exist; (ii) there is a positive relationship between trade openness and government size for the first country group, which validates the compensation hypothesis; (iii) a negative relationship between financial openness and government size is found for the second country group, which confirms the efficiency hypothesis; (iv) the effect of financial openness is nearly ten times higher than trade openness; (v) an endogenous country classification process yields better results to understand the linkages between openness and government size. In this regard, our study incorporates both hypotheses and provides a uniform explanation.

JEL codes: C33, F62, H50

Keywords: Government size, Trade openness, Financial openness, Club convergence

1 Introduction

Higher economic integration embodies complex economic impacts on national economies. Either through the exchange of goods and services or financial flows, certain mechanisms such as international competition, demand for social protection, tax competition etc., emerge as a direct consequence. In this context, the role of and, more precisely, the size of government holds a major role in adapting and responding to economic integration. In his seminal work, Cameron (1978) asks "does trade openness increases government size?" linking to important aspects of economies. This question, however, only accounts for trade openness, i.e., one component of economic integration. Following the technological advancements in the telecommunication field, especially after the 1990s, financial openness increased drastically. Due to increased financial openness alongside trade openness, Cameron (1978)'s question has evolved into "does openness increase (decrease) government size?" accounting for both

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major components of economic integration.

Although the underlying question is fifty years old, the debate surrounding it is still ongoing with two competing hypotheses with contradictory results. The first hypothesis, i.e., the compensation hypothesis, argues that trade openness increases government size, while the second hypothesis, i.e., the efficiency hypothesis, argues that financial openness decreases government size. We argue that the main reason behind the lack of a consensus stems from a methodological inadequacy rather than an insufficient theoretical background. Under two competing hypotheses, shedding light on the debate without accounting for government size trends and using heterogeneous country samples would yield conflicting results, as shown in the literature section. In this context, our study differs from the rest of the literature by considering government size trends and heterogeneity by employing a club convergence methodology proposed by Phillips & Sul (2007, 2009). Therefore, our study is also the first to employ the aforementioned methodology in the literature, thereby adding a major methodological contribution.

Using the club convergence results as a basis for country classification, we are then able to test both hypotheses for different country groups by paying attention to government size trends. We then apply pooled OLS and fixed-effects models to the country groups determined by the club convergence analysis. Our data consists of 71 countries and covers the years between 1971 and 2018. The results from the club convergence analysis show that there are two country groups. While the pooled OLS models fail to provide statistically significant results, fixed-effects models imply a positive relationship between trade openness and government size for the first country group and a negative relationship between financial openness and government size for the second country group.

The rest of the study is organized as follows. Section 2 explains the two main hypotheses in the literature and presents important determinants of government size. Section 3 provides the data and methodology in detail. Section 4 includes the empirical results and findings. Section 5 concludes.

2 Literature Review and Theoretical Background

Starting with Cameron (1978), the controversial topic of the relationship between government size and openness has been investigated intensively. Although Cameron (1978) mainly focused on the dynamics between industrial concentration, collective bargaining and political behaviors generated by trade openness, the author also emphasized the role of governments in compensating the risks of international trade. Following him, the topic of the relationship between government size and trade openness has evolved and, to an extent, diverged into an extensive field with studies[1] (e.g. Islam, 2004; Benarroch & Pandey, 2008; Epifani & Gancia, 2009; Molana et al., 2011; Benarroch & Pandey, 2012; Aydoğuş & Topcu, 2013; Liberati, 2013; Turan & Karakaş, 2016; Fujii, 2017) investigating this relationship through different aspects[2] and variables. Following the increase in capital flows between countries, others (Erauskin, 2011; Dixit, 2014; de Mendonça & de Oliveira, 2019) have studied the impact of financial openness alongside trade openness. Two hypotheses, namely, the compensation and efficiency hypotheses, have emerged in the literature in order

[1] For a meta-analysis regarding the literature, please see Heimberger (2020).

[2] For instance, Arawatari (2015) developed a theoretical framework by using a Hecksher-Ohlin model.

to explain certain dynamics between government size and openness.

According to the compensation hypothesis, trade openness and government size are positively related (Cameron, 1978; Ruggie, 1982; Rodrik, 1998). The argumentation is that as countries increase their level of international economic integration, the risk perception of individuals also tends to increase, which, in turn, results in higher demand for social protection expenditures. Additionally, countries with higher openness levels are more sensitive to international economic shocks. In order to suppress the negative effects of these shocks, governments will respond by increasing public spending, thus, decreasing output volatility. Furthermore, although economic integration is considered as a win-win scenario for the partners, there could be some disadvantaged groups at sectoral level. Therefore, to compensate for the losing side of economic integration, social protection spending will increase, which also increases the size of the government. Although the theoretical foundations of the compensation hypothesis are quite reasonable, studies (e.g., Balcells Ventura, 2006; Down, 2007; Kim, 2007; Hardiman et al., 2008; Walter, 2010; Martin & Steiner, 2013; Lin et al., 2014; de Jongh, 2020) investigating the validity of this hypothesis have produced mixed results. The samples, methodologies and country classifications of these studies are presented in Table A.2 in the Appendix.

The second hypothesis is known as the efficiency hypothesis. This perspective on the issue argues that countries will decrease their government size and attract foreign investment to achieve economic growth (Garrett & Mitchell, 1999; Garrett, 2001; Garrett & Mitchell, 2001). The main assumption is that capital mobility is highly elastic to tax rates and government expenditures. The first part of the argument is an extension of the argument stating that capital flows will concentrate on countries with lower tax rates on investments and capital gains. This will force governments to lower tax rates and, as a result, a reduction in tax revenues will lead to a decrease in government size. The second part of the argument is that, apart from government expenditures that facilitate a better environment for private investments, capital flows prefer countries with smaller government sizes where public spending does not distort investment decisions. The validity of this hypothesis has also been tested by some studies (e.g., Kittel & Winner, 2005; Gemmell et al., 2008; Kim, 2009; Leibrecht et al., 2011; Meinhard & Potrafke, 2012; Bayat et al., 2017) and mixed results were obtained. Table A.2 in the Appendix presents the samples, methodologies and country classifications of these studies.

As discussed by Liberati (2007), both hypotheses should be investigated in the same context rather than focusing on only one aspect of the debate. Similar to Liberati (2007), Dreher et al. (2008) argued that both hypotheses could neutralize each other due to their contradictory structures. As a result, under heterogeneous country samples, the possibility of countries with different government size trends could impact the overall validity of the empirical results. Similar remarks have been put forward by Adam & Kammas (2007), where they have validated both hypotheses.

Although the majority of the studies focused on either testing the compensation hypothesis or the efficiency hypothesis by using trade openness and financial openness, respectively, other major studies investigated the effects of country size or output volatility on government size by controlling for openness. Studies (e.g., Alesina & Wacziarg, 1998; Ram, 2009; Jetter & Parmeter, 2015; Sabra, 2016) analyzing the relationship between country size (measured by total population) and government size have also produced mixed results. The same holds true for the relationship between output volatility and government size (Virén, 2005;

Bekaert et al., 2006; Andrés et al., 2008; Cavallo et al., 2008; Debrun et al., 2008; di Giovanni & Levchenko, 2009; Collard et al., 2017).

The combined results of the literature are quite vague and yet to be understood. Our study argues that one of the main reasons behind the conflicting results of the studies on this issue is in the country selection criteria. Exogeneous country selection criteria, such as income, development, geography, or membership of an organization would yield biased or inconsistent results. From this aspect, our study has a major difference. Instead of exogenous variables, we use an endogenous process to determine country groups. This allows us to apply panel estimations on different country groups, where each country group includes countries with converging patterns of government size. The following section explains our reasoning behind the applied methodological process.

3 Data and Methodology

We obtained our data from World Development Indicators (WDI) for the years between 1971 and 2018. Penn World Tables (PWT) 9.1 was also considered as a source. However, due to the lack of foreign direct investment data in PWT, we had to choose WDI as our source for comparable and consistent analysis. Due to the limitations of WDI, the unbalanced data[3] of foreign direct investment (inflows), we use 1971 as the first year and drop some countries from the whole sample. As a result, 71 countries were used in the estimations.

We have used government final consumption expenditure-to-GDP ratio (GS), total trade volume-to-GDP ratio (TOpen), and foreign direct investment (inflows)-to-GDP ratio (FOpen) to represent government size, trade openness and financial openness, respectively. Although we are mainly interested in the relationship between trade openness and financial openness with government size, some studies (e.g., Alesina & Wacziarg, 1998; Kim, 2007; Ram, 2009; di Giovanni & Levchenko, 2009; Collard et al., 2017) have shown the importance of country size and output volatility. The logarithm of the total population represents the country size, while output volatility is calculated as the standard deviation of GDP growth. Our control variables are GDP (in logarithms) and age dependency ratio following Rodrik (1998). The abbreviations for country size, output volatility, GDP, and age dependency ratio are CSize, Vol, GDP and Adr, respectively.

Table 1: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Government Final Consumption Expenditure-to-GDP, %	15.63	5.65	1.98	61.07
Trade Volume-to-GDP, %	71.15	55.18	6.32	442.62
Foreign Direct Investments (Inflows)-to-GDP, %	3.09	13.44	-39.54	451.64
Total Population (in logarithm)	16.40	1.49	12.24	21.03
GDP (constant USD 2010 prices, in logarithm)	24.99	2.16	20.82	30.51
Age Dependency Ratio, %	68.32	18.87	26.99	112.80

Note: The total number of observations is 3,408 for all variables. The values of GDP and total population are in logarithms.

According to the summary statistics presented in Table 1, the coefficients of variation for government size, trade openness and financial openness are 36%, 77% and 434%, respec-

[3] In order to apply the Phillips and Sul club convergence approach, the structure of the data must be balanced. Therefore, certain countries and years were dropped from the main sample.

tively. These values indicate that the level of dispersion of government size is the lowest, while financial openness has the highest level. Additionally, the range between the minimum and maximum values for government size, trade openness and financial openness implies low levels of uniformity for each variable.

Unless the main sample is disaggregated according to government size trends, the contradictory nature of these two mechanisms could interfere with each other. Table 2 presents mean values and correlation coefficients for selected country groups. Here, we observe that the sign and magnitude of the correlation coefficients seem independent of income levels and geographical locations. The different findings and contrast found in the literature could arise for this specific reason since studies in this field either focused on samples with ex-ante classification or heterogeneous samples without any classification.

Table 2: Mean Values and Correlation Coefficients of Country Groups Based on Geography and Income (1960-2020)

Country Classification	Mean Values			Correlation Coefficient	
	GS (%)	TOpen (%)	FOpen (%)	GS & TOpen	GS & FOpen
Geographical					
Middle East and East Africa	19.54	70.84	1.36	-0.63	-0.62
Arab World	19.30	76.25	1.24	-0.59	-0.30
Europe and Central Asia	19.09	61.18	2.39	0.65	0.24
Central Europe and the Baltics	18.66	99.01	3.02	-0.74	-0.04
World	16.37	45.10	1.70	0.80	0.50
North America	16.17	25.00	1.26	-0.73	-0.73
East Asia and Pacific	14.50	46.10	1.32	0.87	0.84
Sub Saharan Africa	12.90	49.99	1.46	0.63	0.69
Latin America and Caribbean	12.83	32.83	2.13	0.89	0.90
South Asia	9.98	25.41	0.72	0.21	0.18
Income Based					
High Income	17.51	47.16	1.74	0.62	0.27
Upper Middle Income	13.45	35.28	1.78	0.87	0.77
Middle Income	13.02	36.00	1.65	0.87	0.78
Low Income	11.70	51.45	1.69	0.67	0.22
Lower Middle Income	11.22	38.98	1.22	0.20	0.21

Source: World Bank (2020)

As mentioned in the literature section, this is the first study to our best knowledge to investigate the nexus between government size and openness by putting a special emphasis on country classification. The main reason behind classifying countries is that countries have drastic differences in terms of macroeconomic dynamics, which, in turn, dictate different government size trends. If we can classify countries according to their government size trends, then we can also investigate the main forces behind the trends separately. In order to classify countries according to government size trends, we applied the club convergence approach proposed by Phillips & Sul (2007, 2009). There are two main advantages of this club convergence algorithm. Firstly, clustering countries endogenously by allowing for the possibility of transitional country heterogeneity ensures the negation of ex-ante sample classification. As a result, the method does not rely on year specifications and allows for time-varying behavior for the years covered in the sample. Secondly, it enables multiple equilibria to occur instead of a single steady-state of convergence. This is achieved by capturing different equilibria points for countries that diverge from the panel average. As a direct result, ex-ante country classifications based on income, development and geographical

locations become unnecessary. Instead, the method solely relies upon the variable of interest itself. Using this method to classify countries is justified since cross-country heterogeneity is more likely to occur due to the progress of government size over time, instead of similar income and development levels, membership of an organization or geographical and regional determinants.

The Phillips and Sul club convergence method (PS thereafter) can be explained as,

$$X_{it} \;=\; \delta_{it}\;\mu_t \tag{1}$$

where X_{it} is the variable of interest and consists of two components for time t at country i. The first component, δ_{it}, captures the time-varying idiosyncratic element of the equation and represents the deviation of a country from the common trend. The second component, μ_t, on the other hand, represents the common trend. However, since δ_{it} cannot be directly estimated, PS have rescaled the panel average by removing the common component, μ_t.[4] This, in turn, allows the relative transition parameter, h_{it}, to estimate δ_{it} by relating it to the panel average as seen in Eq. (2).

$$h_{it} \;=\; \frac{X_{it}}{\frac{1}{N}\;\sum_{i=1}^{N} X_{it}} \;=\; \frac{\delta_{it}}{\frac{1}{N}\;\sum_{i=1}^{N} \delta_{it}} \tag{2}$$

PS have also assumed a semiparametric model for δ_{it} such as,

$$\delta_{it} \;=\; \delta_i \;+\; \sigma_{it}\;\xi_{it} \tag{3}$$

where, σ_{it} is $\frac{\sigma_i}{L(t)t^{\alpha}}$, $L_t \to \infty$, $t \to \infty$, ξ_{it} is $iid(0,1)$ across i and δ_i is fixed. The most important aspect of Eq. (3) is the speed of convergence, α, since δ_{it} will converge to δ_i as long as $\alpha > 0$. This form of δ_{it} allows us to develop a null and alternative hypothesis of convergence as,

$$\begin{aligned} H_0 &: \; \delta_i \;=\; \delta \;\; and \;\; \alpha \geq 0 \\ H_A &: \; \delta_i \;\neq \delta \; for \; all \; i \; or \; \alpha < 0 \end{aligned} \tag{4}$$

In order to test the null hypothesis, Eq. (5) is formed. This equation is also known as the log t-test.

$$log\left(\frac{H_1}{H_t}\right) \;-\; 2logL(t) \;=\; \hat{a} \;+\; \hat{b}\;logt \;+\; \hat{\mu}_t \tag{5}$$

Here, $t = [r^*T], [r^*T{+}1], [r^*T{+}2], \ldots, T$ with $r > 0$, H_1/H_t is the cross-sectional variance ratio, and the estimated coefficient, $\hat{b}$, is equal to $2\hat{a}$. Using a one-sided t-test of inequality with heteroskedasticity and autocorrelation consistent standard errors on $\hat{b}$ enables the test of the null hypothesis of convergence, i.e., $\alpha \geq 0$. Here, we focus on whether $t_{\hat{b}} < 1.65$ or $t_{\hat{b}} > -1.65$, which is the PS method's reference value. Under the scenario of $t_{\hat{b}} < 1.65$, the null hypothesis of convergence is rejected at the 5% significance level.

Following the log t-test, the data-driven algorithm developed by Phillips & Sul (2007, 2009) is applied. This process consists of four steps and identifies the clubs within the whole sample. The first step orders countries according to their last observations. The underlying assumption behind this step is that if there is convergent behavior, it is more likely to emerge

[4] The application of the Phillips and Sul club convergence approach is presented in detail by Du (2017).

in the latest period. The second step forms the core group by choosing the first k highest countries for some $N > k \geq 2$. Establishing the size of the core group requires maximizing $t_k = t_{(G_k)}$ over k, where the log t-test is used. The third step forms a complementary group. Here, by adding one country at a time to the core group from this complementary group and using the log t-test, we determine if the newly added country is a part of this club or not. The fourth step forms a new group, including countries that failed to meet the criteria of the core group. The log t-test is used again to see if there is convergent behavior within the new group. If the t-statistic log t-test reveals convergence, then another club is formed. This process continues until there are no more countries to form a new club. Lastly, the log t-test is applied to clubs to test for possible merging amongst clubs.

After applying the Phillips and Sul club convergence approach, we then utilize the club convergence results as a base for country classification.[5] Here, we split our data according to club memberships under the assumption that the number of clubs is more than one. Following this procedure, we then utilize pooled OLS and fixed-effects models to determine the underlying mechanisms for each country group separately. The main reason for utilizing fixed-effect models over random-effect models is that since we apply the club convergence approach proposed by Phillips & Sul (2007, 2009), our country groups will have homogenous structures. In this case, where we have homogenous samples, fixed-effect models produce more robust results compared to random-effect models.

4 Empirical Results

4.1 Results of Country Classification

The log t-test and club convergence results are shown in Table A.1. The estimated coefficient of the log t-test is less than zero and statistically significant. Thus, the null hypothesis of panel convergence is rejected; the full sample is not converging and indicates the presence of clubs. The second step is to apply the data-driven PS algorithm, which identifies two clubs. The first and second club consists of 48 and 23 members, respectively.

There are several important findings of the club convergence results. Firstly, although the club convergence results seem to classify countries based on development levels, there are significant exceptions. Developing and least developed countries such as Bolivia, Madagascar, Niger and South Africa are included in the first club, which also includes the majority of developed countries. As for the exceptions in the second club, we observe that Ireland and Singapore have similar government size trends with developing and least developed countries. It is clear from these results that classifying countries according to their development levels is not sufficient, and there are major differences between countries in terms of government spending. As our results imply, countries with relatively lower income and development levels have the same government size trends as comparatively developed ones. The second finding is that government size trends are not affected by membership of an organization or geographical locations. Thirdly, the number of members in Club 1 is two times higher than that of in Club 2. This finding means that nearly 66% of countries have the same government size trend in the long term, and the trend is more dominant, compared to Club 2. Lastly, there are only two government size trends which is consistent with the

[5] Another study that uses the same club convergence approach to classify countries is Karakaya et al. (2021).

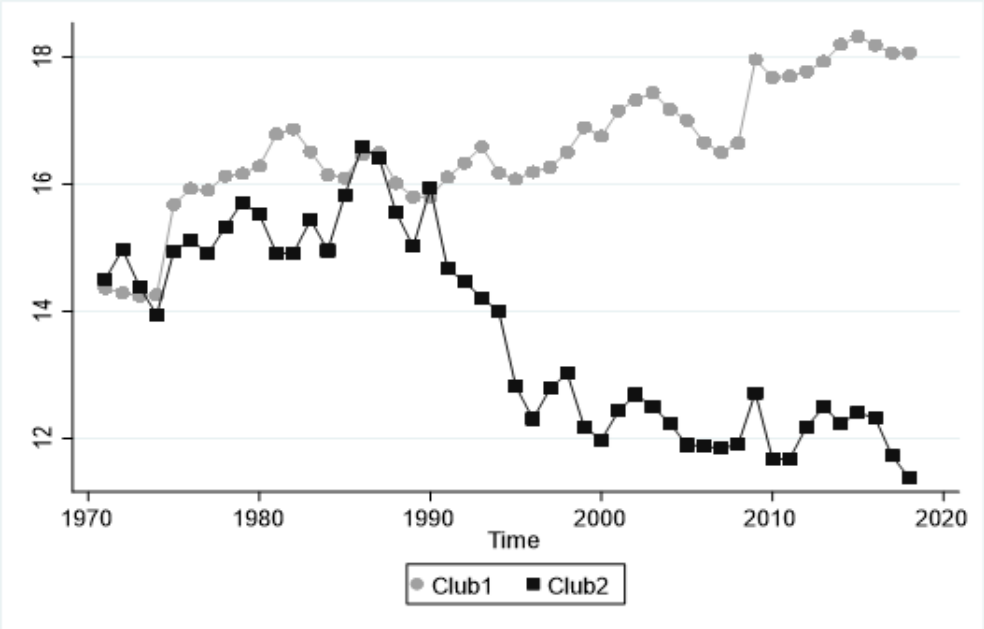

Figure 1: Government Size Trends of Clubs

theoretical foundations.

As mentioned earlier in the literature section, there are two main hypotheses for the relationship between openness and government size. Figure 1 presents valuable information with respect to these hypotheses as it illustrates diverging trends between Club 1 and Club 2. Since the compensation hypothesis mainly argues that trade openness is positively and the efficiency hypothesis argues financial openness is negatively related to government size, it is reasonable to state that Figure 1 coincides with the theoretical background of the literature. According to the trends shown in Figure 1 and the theoretical argumentation, we expect to find a positive relationship between trade openness and government size for Club 1, and a negative relationship between financial openness and government size for Club 2.

Furthermore, Figure 1 also shows a structural change after 1990. While the government size has an increasing trend for Club 1, it has a drastically decreasing trend between 1990 and 2000 for Club 2. This could be explained by the rapid financialization process (Kimakova, 2009) after the 1990s. These divergent trends also indicate that the intensity of the two hypotheses differs from each other. The government size for Club 1 increased to 18% from 16%, while it decreased to 12% from 16% for Club 2. Here, we can argue that financial openness has a more intense effect on government size compared to trade openness, which, in turn, allows us to expect higher estimated coefficients for financial openness.

4.2 Results of Panel Estimations

In order to understand how openness is related to government size by paying special attention to country groups, we employ pooled OLS and fixed-effects models for each country group. The yearly data was transformed into 5-year intervals with the exception of the years between 2016 and 2018, which were transformed into a 3-year interval. As a result

of this transformation, our time intervals start with 1971-1975 and end with 2016-2018. This transformation is necessary to avoid the distortionary effects of business cycles on the results. Additionally, as governments plan public spending through mid-term and long-term

Table 3: Estimated Coefficients of Trade and Financial Openness

Dependent Variable: Government Size								
Variable	**Method**	**Sample**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Topen	Pooled OLS	Whole	-0.0148***	-0.00822**	0.0012			
			(0.0036)	(0.0038)	(0.0038)			
		Club 1	-0.0036	0.00415	0.00868			
			(0.0080)	(0.0082)	(0.0068)			
		Club 2	-0.00311	-0.00825*	-0.00177			
			(0.0048)	(0.0045)	(0.0032)			
	Fixed-Effects	Whole	0.00926	0.0176*	0.0114			
			(0.0081)	(0.0093)	(0.0071)			
		Club 1	0.0109	0.0182**	0.0263***			
			(0.0095)	(0.0085)	(0.0069)			
		Club 2	0.0128	0.00999	-0.0269**			
			(0.0188)	(0.0200)	(0.0120)			
Fopen	Pooled OLS	Whole	0.00153	0.00347		0.00828		
			(0.0119)	(0.0117)		(0.0119)		
		Club 1	-0.00692	-0.00577		0.0136		
			(0.0124)	(0.0133)		(0.0101)		
		Club 2	-0.0829	-0.1		-0.0798		
			(0.0625)	(0.0736)		(0.0528)		
	Fixed-Effects	Whole	-0.0139	-0.013		-0.00219		
			(0.0188)	(0.0178)		(0.0149)		
		Club 1	-0.00579	-0.00537		0.0162**		
			(0.0099)	(0.0092)		(0.0071)		
		Club 2	-0.183**	-0.182**		-0.277**		
			(0.0816)	(0.087)		(0.104)		
Volatility	Pooled OLS	Whole	-0.101	-0.276***			-0.155**	
			(0.0744)	(0.0741)			(0.0724)	
		Club 1	-0.0641	0.387***			-0.359***	
			(0.116)	(0.128)			(0.121)	
		Club 2	-0.0825	-0.0288			0.266**	
			(0.0911)	(0.0946)			(0.107)	
	Fixed-Effects	Whole	-0.0679	-0.0699			-0.0243	
			(0.051)	(0.0498)			(0.0479)	
		Club 1	-0.0232	-0.0363			-0.175**	
			(0.0572)	(0.0542)			(0.076)	
		Club 2	-0.0787	-0.0363			0.141**	
			(0.113)	(0.0996)			(0.0595)	
Country Size	Pooled OLS	Whole	-3.096***	-0.892***				-0.677***
			(0.203)	(0.146)				(0.127)
		Club 1	-2.998***	-0.362**				-0.346**
			(0.286)	(0.175)				(0.136)
		Club 2	-2.365***	-1.429***				-1.231***
			(0.44)	(0.277)				(0.23)
	Fixed-Effects	Whole	-2.893	-1.099				-0.578
			(2.268)	(1.275)				(1.116)
		Club 1	1.004	2.523*				3.141***
			(2.059)	(1.305)				(1.115)
		Club 2	-4.579	-3.300*				-3.847**
			(3.39)	(1.786)				(1.617)

Note: Robust standard errors in parentheses. ***, **, and * stand for 1%, 5%, and 10% significance level, respectively.

development goals, using 5-year averages also encapsulates such progress plans, which includes expenses such as social protection and economic affairs.

For both pooled OLS and fixed-effects models, six regressions were estimated. Model (1) includes all variables, i.e., TOpen, FOpen, Vol, CSize, GDP and Adr. Model (2) drops the control variables GDP and Adr. Model (3) includes only TOpen, whereas Model (4) is regressed using only FOpen. As for Model (5) and Model (6), they also include only one variable, i.e., Vol and CSize, respectively. Table 3 presents the estimated coefficients for TOpen, FOpen, Vol and CSize.

According to Table 3, the pooled OLS results for the whole sample indicate that trade openness is negatively related to government size, while the coefficients for financial openness are statistically insignificant. Focusing on the samples of Club 1 and Club 2, we also observe that pooled OLS models fail to produce statistically significant results. However, these results must be approached with suspicion because, firstly, the pooled OLS and fixed-effect results for the whole sample contain counter tendencies due to two competing government size trends. As mentioned earlier, Liberati (2007), Adam & Kammas (2007) and Dreher et al. (2008) have emphasized that, these counter tendencies could neutralize each other. Secondly, pooled OLS models are not consistent as fixed-effect models when there is unobserved heterogeneity and, also, fail to capture individual heterogeneity.

Our fixed-effect results for the whole sample show statistically insignificant results as well. However, it is observed that trade openness is positively related to government size for Club 1, while financial openness is negatively related to government size for Club 2. Compared to pooled OLS results, fixed-effect results provide higher levels of significance. Overall, these results are in line with Liberati (2007); Epifani & Gancia (2009); Erauskin (2011) and Lin et al. (2014).

As for the volatility and country size variables, the whole sample results of pooled OLS models imply a negative relationship with government size for both variables, while fixed-effect models do not provide any evidence. Focusing on Club 1, it is observed that there is partial support for a negative relationship between volatility and government size. Additionally, the coefficients of country size for Club 1 differs across pooled OLS and fixed-effect models; therefore, it is not possible to make a conclusion. For Club 2, there is partial support for a positive relationship between volatility and government size. Moreover, the pooled OLS and fixed-effect models both imply a negative relationship between country size and government size for Club 2 and support previous studies such as Alesina & Wacziarg (1998) and Jetter & Parmeter (2015).

The general conclusion from these results is that there seems to be a positive relationship between trade openness and government size for Club 1, while also there seems to be a negative relationship between financial openness and government size for Club 2. To test these observations, we have estimated several models. For both country clubs, six models were estimated. The models are given below, where Model (1) is represented by Eq. (6) and Model (6) is represented by Eq. (11). Here, $i = 1, \ldots, N$ and $t = 1, \ldots, T$, while β_0 is the intercept andμ is the error term.

$$GSize_{it} = \beta_0 + \beta_1 T(F)Open_{it} + \beta_2 F(T)Open_{it} + \beta_3 Vol_{it} + \beta_4\, CSize_{it} + \beta_5 GDP_{it} + \beta_6 Adr_{it} + \mu_{it} \tag{6}$$

$$GSize_{it} = \beta_0 + \beta_1 T(F)Open_{it} + \beta_2 F(T)Open_{it} + \beta_3 Vol_{it} + \beta_4 CSize_{it} + \beta_5 GDP_{it} + \mu_{it} \quad (7)$$

$$GSize_{it} = \beta_0 + \beta_1 T(F)Open_{it} + \beta_2 F(T)Open_{it} + \beta_3 Vol_{it} + \beta_4 CSize_{it} + \mu_{it} \quad (8)$$

$$GSize_{it} = \beta_0 + \beta_1 T(F)Open_{it} + \beta_2 F(T)Open_{it} + \beta_3 Vol_{it} + \mu_{it} \quad (9)$$

$$GSize_{it} = \beta_0 + \beta_1 T(F)Open_{it} + \beta_2 F(T)Open_{it} + \mu_{it} \quad (10)$$

$$GSize_{it} = \beta_0 + \beta_1 T(F)Open_{it} + \mu_{it} \quad (11)$$

This process allows us to obtain better insights regarding interactions between openness and government size. The results are shown in Table 4.

Table 4: Additional Regressions for Trade and Financial Openness

Sample	Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Club 1	TOpen	0.0109	0.0176**	0.0182**	0.0258***	0.0273***	0.0263***
		(0.0095)	(0.0077)	(0.0085)	(0.0076)	(0.0076)	(0.0069)
	FOpen	-0.0058	-0.0053	-0.0054	-0.0051	-0.0051	
		(0.0099)	(0.0092)	(0.0092)	(0.008)	(0.0076)	
Club 2	TOpen	0.0128	0.0187	0.0100	0.0007	0.0023	
		(0.0188)	(0.0207)	(0.02)	(0.0196)	(0.0193)	
	FOpen	-0.183**	-0.174**	-0.182**	-0.276**	-0.283**	-0.277**
		(0.0816)	(0.0838)	(0.087)	(0.131)	(0.135)	(0.104)

According to the results presented in Table 4, for Club 1, trade openness is positively related to government size in all models except for Model (1). However, there is no indication of a relationship regarding financial openness for Club 1. As for Club 2, as opposed to Club 1, there is a negative relationship between financial openness and government size in all models, whereas trade openness is not statistically significant. Moreover, in almost all models, the coefficients of financial openness are approximately ten times higher than the coefficients of trade openness. This shows that the intensity of financialization puts more pressure on some countries and, as a result, the effect of trade openness diminishes.

Considering all the results together, we observe an apparent difference between Club 1 and Club 2. The results for Club 1 provide strong support for a positive relationship between trade openness and government size. On the contrary, the results for Club 2 indicates a robust negative relationship between financial openness and government size. These findings are in line with the results presented in Figure 1. Furthermore, although trade openness is more prevalent in most countries, the intensity of financial openness is higher than trade openness. These results prove our emphasis on using club convergence to classify countries according to their government size trends.

5 Conclusions

In this study, we have investigated the two main hypotheses regarding the nexus of government size and openness. However, we have put a special emphasis on country clas-

sifications, where we have divided our sample according to trends in government sizes. According to our results, there is a crucial difference regarding the dynamics of government size. Firstly, we have found two country groups with diverging government size trends. The first country group includes the vast majority of developed countries, although developing and least developed countries with the same government size patterns are also within the first group. The second group mostly consists of developing and undeveloped countries. These results highlight the importance of classifying countries according to their government size trends rather than ex-ante classifications such as income and development levels, geographical locations, or membership of an organization. Secondly, there is a positive relationship between trade openness and government size for the first country group. This result validates the compensation hypothesis and shows that governments respond to higher trade openness with more public spending to compensate for the negative effects of economic integration and external economic shocks. Thirdly, for the second country group, we found a negative relationship between financial openness and government size. According to this result, we also validate the efficiency hypothesis, which indicates that some countries reduce tax rates and public spending due to tax competition and the negative response of capital mobility to distortionary public spending. Fourthly, the impact of trade openness is observed for the majority of countries in our sample; however, financial openness has a bigger impact on countries as the intensity of financialization is higher. As a result, this study incorporates both hypotheses in the same context. From this perspective, economic integration is a complex process that includes the dynamics of both the compensation and efficiency hypotheses. Depending on countries idiosyncratic characteristics, either trade or financial openness has the potential to suppress the other. Further research could focus on the intensity aspect of the issue. In this regard, determining which factors elevate one effect while also suppressing the other one could be a major contribution to the overall debate.

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Appendix: Additional Tables

Table A.1: Country Classifications

Club 1, 48 Members	**Club 2, 23 Members**
Algeria, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Denmark, Dominican Republic, Ecuador, Finland, France, Germany, Greece, Guatemala, Guyana, Hong Kong SAR, Iceland, Israel, Italy, Japan, Korea Rep., Madagascar, Malta, Mexico, Morocco, Netherlands, New Zealand, Niger, Norway, Paraguay, Peru, Portugal, Rwanda, Saudi Arabia, South Africa, Spain, Sweden, Thailand, Togo, Tunisia, Turkey, United Kingdom, United States, Uruguay	Benin, Burkina Faso, Cameroon, Central African Republic, Congo Rep., Cote d'Ivoire, Egypt Arab Rep., Gabon, Ghana, India, Indonesia, Ireland, Kenya, Malawi, Malaysia, Mauritania, Nicaragua, Pakistan, Philippines, Senegal, Sierra Leone, Singapore, Sri Lanka

Note: The coefficient of log t-test result and its standard error are -0.0521 and 0.0166, respectively. The t-statistics of the coefficient is -3.1438.

Table A.2: Summary of the Literature

Focus	Study	Period/Sample	Method	Country Classification
(a) Compensation Hypothesis	Balcells Ventura (2006)	Survey from 23 countries	Logit	Ex-ante classification based on income levels
	Down (2007)	1950-2000, Developed countries	Panel	Whole sample
	Kim (2007)	1950-2002, 175 countries	Panel	Whole sample
	Hardiman et al. (2008)	Various periods, Ireland	Comparative analysis	Single country
	Walter (2010)	Survey from Switzerland	Logit	Single country
	Martin & Steiner (2013)	1951-1993, 20 OECD countries	Panel	Whole sample
	Lin et al. (2014)	1985-2010, Small developing countries	Panel	Whole sample
	de Jongh (2020)	1995-2018, South Africa	ARDL	Single country
(b) Efficiency Hypothesis	Kittel & Winner (2005)	1961-1993, 17 OECD countries	Panel	Whole sample
	Gemmell et al. (2008)	1980-1997, 25 OECD countries	Panel	Whole sample
	Kim (2009)	1970-2000, 18 Developed countries	Auto-regression	Whole sample
	Leibrecht et al. (2011)	1990-2006, 27 EU countries	Panel	Ex-ante classification based on welfare regimes
	Meinhard & Potrafke (2012)	1970-2004, 186 countries	Panel	Ex-ante classifications based on; (i) OECD and non-OECD; (ii) before and after 1990; (iii) income levels
	Bayat et al. (2017)	1980-2015, G7 countries	Panel	Whole sample