Government Size and Trade Openness using Bayesian Model Average

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Abstract:

This paper uses the Bayesian Model Average estimation in order to investigate the relationship between government size and trade openness taking into account the model uncertainty. The empirical findings are consistent with the efficiency hypothesis. We use three different government size variables and more than 140 dependent variables. In addition, we divide trade openness into two groups. The trade openness under trade agreement regime, such as Customs Union, Economic Integration Agreement, Free Trade Agreement and Partial Scope Agreement and the trade openness under no trade agreement regime. We find evidence against any effect of trade openness under trade agreement regime on government expenditure and a negative effect of the trade openness under no trade agreement regime on government expenditure, which supports the efficiency hypothesis.

Keywords: BMA; Government Consumption; Government Expenditure; Trade Agreements; Trade Openness

JEL classification: C11; C26; F13; F15; H5; H7; H87

1. Introduction

In the last few years, fiscal adjustment and government expenditure are a part the daily agenda. If we observe the data about government size we can see that the per year average time trend of government size increases in time, up to 1989, a year in which we have radical changes in the global scene, then they slightly decrease up to 2008 and then we have a rapid increase. Since we are in a globalized world the primary objective of the article is to find the relationship between government size and trade, especially in the case where trade can be divided into trade agreement regime, such as Customs Union (CU), Economic Integration Agreement (EIA), Free Trade Agreement (FTA) and Partial Scope Agreement (PSA). From the data we can see that all types of trade agreements increase from 1958 onwards. This increase though is sharper after 1989. Also a main objective is to find all possible determinants of government size.

There is a large existing literature about the relationship between government size and trade openness. This relationship is not clear, but we can divide the literature into two "schools". Garrett (1995), Schulze and Ursprung (1999), Garrett (2001) and Garrett and Mitchell (2001) state that under the compensate hypothesis as a response to globalization the policy makers increases government expenditure. Globalization may well benefit all segments of society in the long run through the more efficient allocation of production and investment. The short-term political effects of globalization though are likely to be very different. Expanding the scope of markets can be expected to have two effects, the increase of inequality and the increase of economic insecurity which would increase government spending for the support of citizens. Globalization tends to increase economic inequality, economic insecurity and external risk. From the demand side of the political market this creates incentives for government to compensate the losers from globalization, mainly through income transfer programs and economic policy activism. Under the efficiency hypothesis as a response to globalization the policy makers decrease government expenditure. Government spending reduces the competitiveness of national producers in international goods and services markets. Income transfer programs and social services distort labor markets and bias intertemporal investment decisions. Under efficiency hypothesis globalization increases the ability of the capital holders to move money and production around the world in search of higher rates of return. From the supply side of the political market this creates incentives for the government to reduce economic policy activism to promote competitiveness in order to keep mobile capital within national borders.

Studying the existing literature, one of the first articles which support the compensate hypothesis is Cameron (1978), which find a positive relationship between government revenue and trade openness, for 18 countries, for the years 1960-1975 averages, using the OLS cross section estimator. Alesina and Wacziarg (1998) find a positive relationship between government consumption in GDP and trade openness, for 137 developed and developing countries, for the years 1980-1984 and 1985-1989 averages, using the OLS cross section estimator. Rodrik (1998) support the compensate hypothesis using government consumption and trade openness, for 125 developed and developing countries, for the years 1985-1989 and 1990-1992 average, using the OLS cross section estimator. In the same context Shelton (2007) find a positive coefficient of trade openness on central government expenditure, for 101 developed and developing countries, for the years

1970-2000, using the panel data pooled OLS estimator and the between estimator. Finally Epifani and Gancia (2009) find a positive coefficient of trade openness on both government consumption and the expenditure for social security and welfare, for 143 countries, for the years 1950-2000 (five year averages), using the OLS cross section estimator, for 1995-2000 average, and the panel data fixed effect estimator for the whole period. Other papers that support the compensate hypothesis are Abizadeh (2005), Adsera and Boix (2002), Baunsgaard and Keen (2010), Bretschger and Hettich (2002), Eterovic and Eterovic (2012), Garen and Trask (2005), Garrett (2001), Gemmell, Kneller and Sanz (2008), Islam (2004), Khattry and Rao (2002), Kimakova (2009), Molana, Montagna and Violato (2004), Mueller and Stratmann (2003), Pickup (2006), Prohl and Schneider (2009), Ram (2009), Swank (2001) and Zakaria and Shakoor (2011).

One of the first articles that support the efficiency hypothesis is Cusack (1997), where he finds a negative relationship between and the international financial integration, for 16 countries, for the years 1955-1989, using the panel data pooled OLS estimator. Garrett and Mitchell (2001) found a negative coefficient for trade openness, a negative coefficient for low wage imports and an insignificant coefficient for foreign direct and international financial openness on government spending, government consumption and social security transfers, for 18 OECD countries, for the years 1961-1993, using the linear regression with panel-corrected standard errors estimator. Finally Adsera and Boix (2002) found a positive and significant coefficient of trade openness on revenue if they use the pooled OLS and the random effect and a negative coefficient of trade if they use the fixed effect on the general government revenue, for 65 countries, for the years 1950-1990, using panel data pooled OLS, fixed and random effect estimator. Other papers that support the efficiency hypothesis are Abizadeh (2005), Baskaran (2011), Bretschger and Hettich (2002), Cassette and Paty (2010), Ferris, Park and Winer (2008), Islam (2004), Kaufman and Segura-Ubiergo (2001), Kittel and Winner (2005), Liberati (2007), Molana, Montagna and Violato (2004) and Swank (2001).

Iversen and Cusack (2000) find no relationship between the transfer spending and both trade openness and capital openness, for 15 countries, for the years 1961-1993, using the OLS cross section estimator. In the same context Aidt and Jensen (2009) found an insignificant coefficient of trade openness on both government spending and tax revenue, for 10 European countries, for the years 1860-1938, using the linear estimator with panel corrected standard error. Other papers that support neither the compensate nor the efficiency hypothesis are Balle and Vaidya (2002), Benarroch and Pandey (2008), Dreher (2006), Dreher, Sturm and Ursprung (2008), Jin and Zou (2002), Potrafke (2009) and Tavits (2004).

For the government size variable we use the consolidated central and general government expenditure and the government consumption variables. Those variables refer to the period 1960-2011, for 185 countries. For the trade variable we use the trade openness variable as well as the Regional Trade Agreements Information System of the World Trade Organization to identify trade agreements from 1958-2012. We run 71 specifications using more than 140 variables in order to find out which of those affect government size. After removing the variables that were not significant in none of the 71 specifications we have 50 independent variables in the final model. We ended up using data from 1976-2010. For avoiding business cycles we used a 5-year average technique in all variables. We ended up with seven time periods.

In order to explain government size using a linear combination we need to find the "best" set of independent variables, which is a subset of all possible independent variables and then make inferences as if the selected model is the true. Leamer (1978), Moulton (1991) and Raftery (1988, 1996) state that, a solution to this is averaging over all possible combinations of predictors when making inferences about quantities of interest. In order to achieve this we use the Bayesian Model Average (BMA) estimation.

The main contributions of the article are: (1) we try to find evidence of the compensate or the efficiency hypothesis, not using the traditional trade openness variable, but instead using the constructed variables trade openness under trade agreement regime and trade openness under no trade agreement regime; (2) we take into account model uncertainty. We test more than 140 control variables that are used in the existing literature, without deciding a priori which of those to include in the final mode. In order to do this we use a new econometric technique, the Bayesian Model Average, which is not used in any other article, for explaining government size and government consumption.

First, we revisit the two hypothesis using trade openness. We found that the results for government expenditure are consistent with the efficiency hypothesis. This shows that more trade open countries tend, on average, to decrease their government expenditures. This is not true if we use the government consumption. We found a statistically insignificant coefficient which shows that trade does not affect government consumption. Secondly, when we divide trade openness into the trade openness under the trade agreement regime and the trade openness under no trade agreement regime we get new information on how trade affects government size. For government expenditure we found evidence that trade under customs union, economic integration agreement, free trade agreement and partial scope agreement does not support neither the compensate nor the efficiency hypothesis. On the other hand we found evidence of a negative relationship between trade under no trade agreement regime and government expenditure. This shows that trade can be very beneficial for a country that wants to decrease its expenditure and achieve a fiscal adjustment. Finally we found that neither the trade openness under the trade agreement regime nor the trade openness under no trade agreement regime affect government consumption.

Government expenditure is negatively affected from infant mortality rate, the share of central to general government expenditure (this is true for general government expenditure), gdp per capita and if the type of regime is presidential. Furthermore it is affected positively from death rate, the number of neighboring countries sharing a border, if the chief executive party is nationalist, the share of central to general government expenditure (this is true for central government expenditure) and social globalization. Government consumption is affected negatively from infant mortality rate, population, gdp per capita and if the type of regime is presidential. It is affected positively from ethnic war, death rate, population density, religious fractionalization, total area and investment.

This paper is organized as follows. Section 2 describes the dataset in details. Section 4 describes the econometric methodology we used; we show the Bayesian Model Average estimation. Section 5 presents the empirical results of the article and finally in section 6 we present our overall conclusions.

2. Data

2.1. Government Expenditure Variables

Using the existing literature we try to find the most commonly used variables for government size. We found out that in almost every article, of that specific literature, the authors used either the government consumption or the government expenditure as the dependent variable. Aidt and Jensen (2009), Cusack (1997), Garrett (2001), Garrett and Mitchell (2001), Islam (2004), Iversen and Cusack (2000), Kittel and Winner (2005), Liberati (2007), Potrafke (2009), Shelton (2007) and Tavits (2004) are among the articles that use government expenditure. On the other hand Alesina and Wacziarg (1998), Epifani and Gancia (2009), Kimakova (2009), Ram (2009), Rodrik (1998) and Swank (2001) are among the articles that use government consumption.

For government consumption we use the Government Consumption share of PPP converted GDP per capita at current prices (GovCon1) from the PWT7.1 database. This variable refers to the period 1950-2010, for 147 countries in an unbalanced panel. For the government expenditure we use the share of Consolidated Central Government Expenses to GDP (GovExp1) and the share of Consolidated General Government Expenses to GDP (GovExp3) from the GFS database. Those variables are in current local currency and using the PWT7.1 GDP data we calculate the share to gdp. Variables refer to the period 1972-2010, for 169 countries in an unbalanced panel.

The description for all variables can be found in Appendix Table 1 and the descriptive statistics in Table 2.

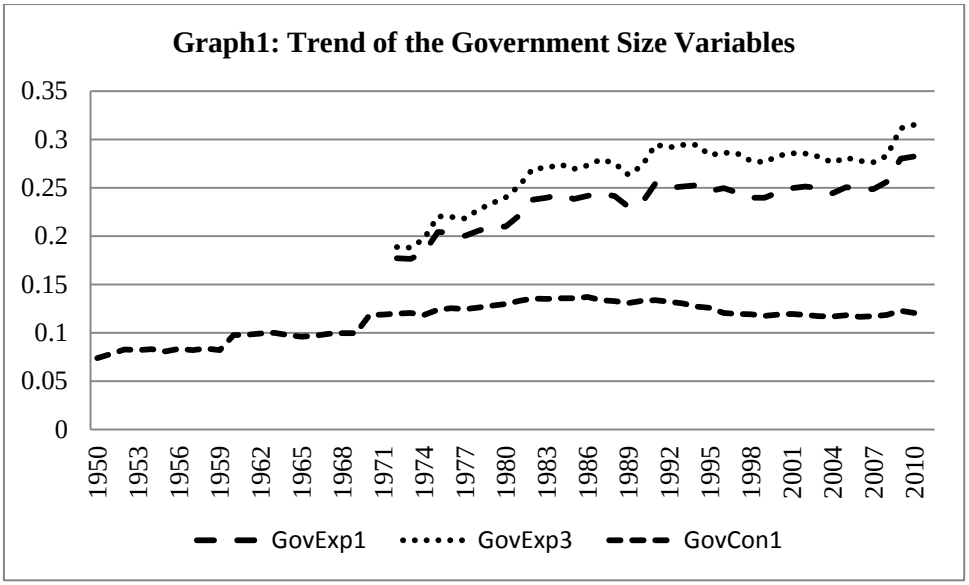
Table 1: Government Size Variables
Correlation

	GovExp1	GovExp3	GovCon1
GovExp1	1.000	0.987	-0.003
GovExp3		1.000	0.054
GovCon1			1.000

As we can see in the Table 1 the correlation between the central government expenditure and the general government expenditure is positive and very high as well. The correlation between central government expenditure and government consumption is negative and fairly low and between general government expenditure and government consumption is positive and low. As Rodrik (1998) states in his article, PWT7.1 government consumption data have the advantages of being available for a much larger group of countries/years and they are free of biases arising from cross-country differences in the relative price of government purchases. The disadvantage is that this measure of government includes only consumption and excludes income transfers and public investment. In the Graph 1 we can see the per year average time trend of each government variable. As we can see all variables increases in time, up to 1989, a year in which we have radical changes in the global scene, then they slightly decrease up to 2008 and then we have a rapid increase.

Table 2: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
GovExp1	510	-1.557	0.483	-2.913	-0.307
GovExp3	510	-1.459	0.544	-2.913	-0.230
GovCon1	672	-2.463	0.508	-4.191	-0.572
Open_Total	672	0.510	0.222	0.076	1.630
Open_TrAgree	652	0.140	0.179	0.000	1.381
Open_NoTrAgree	672	0.408	0.220	0.034	1.501
centraliz_expense	510	-0.119	0.188	-0.947	0.000
centraliz_tot_outl	514	-0.127	0.200	-0.971	0.000
chief_left	669	0.269	0.392	0.000	1.000
chief_military	671	0.241	0.405	0.000	1.000
chief_nationalist	667	0.107	0.292	0.000	1.000
chief_regional	667	0.005	0.062	0.000	1.000
chief_religious	667	0.045	0.189	0.000	1.000
chief_rural	667	0.007	0.072	0.000	1.000
civil_liberties	672	1.088	0.613	0.000	1.946
death_rate	672	2.223	0.432	1.171	3.245
east_asia&pacific	672	0.125	0.331	0.000	1.000
ethnic_fraction	672	-1.136	1.067	-6.216	-0.096
ethnic_wars	672	0.112	0.299	0.000	1.000
federal	672	0.341	0.465	0.000	1.000
gdp_per_capita	672	7.999	1.373	4.992	10.914
inf_morta_rate	672	3.435	1.097	0.673	5.090
inflation	672	0.462	3.650	-0.049	70.343
investment_share	672	-1.544	0.475	-4.071	-0.551
latin_amer&carib	672	0.229	0.421	0.000	1.000
life_expect	672	4.150	0.187	3.624	4.415
lingu_fraction	672	-1.493	1.273	-6.160	-0.101
mid_east&nor_afr	672	0.094	0.292	0.000	1.000
north_america	672	0.021	0.143	0.000	1.000
num_neighb_st	644	3.323	2.347	0.000	14.000
particip_compet	631	0.262	0.436	0.000	1.000
political_compet	631	1.573	0.840	0.000	2.303
political_global	672	4.078	0.357	2.896	4.586
political_rights	672	1.009	0.711	0.000	1.946
polity_score	644	2.543	6.959	-10.000	10.000
pop_density	672	3.803	1.494	0.330	8.834
pop_growth	672	0.018	0.011	-0.008	0.061
population	672	16.067	1.708	12.214	20.999
presidential	672	0.557	0.487	0.000	1.000
proportionality	665	0.414	0.487	0.000	1.000
relig_fraction	672	-1.146	1.076	-5.666	-0.151
revol_wars	672	0.066	0.229	0.000	1.000
social_global	672	3.544	0.588	1.846	4.528
south_asia	672	0.042	0.200	0.000	1.000
subsaharan_africa	672	0.323	0.468	0.000	1.000
total_area	672	12.265	2.031	5.768	16.048
urb_pop_growth	672	0.029	0.020	-0.016	0.131
work_age_rat	672	-0.364	0.269	-0.993	0.119



2.2. Trade Openness Variables

The most used variable for globalization in the literature is trade openness, which is the share of the sum of a country total imports and exports, in GDP. Among other articles, Adsera and Boix (2002), Alesina and Wacziarg (1998), Baskaran (2011), Cameron (1978), Epifani and Gancia (2009), Kittel and Winner (2005), Rodrik (1998) and Shelton (2007) use trade openness as the main globalization variable. In various articles, authors use different variables for globalization. For example Iversen and Cusack (2000) and Swank (2001) use capital openness, Dreher (2006) and Potrafke (2009) use the globalization index and Gemmell, Kneller and Sanz (2008) and Liberati (2007) use investment openness.

The openness from all datasets is almost identical, their correlation is close to one and using the openness from those datasets, for robustness check, we did not have changes in the coefficients of our model or the statistical significance of the coefficients. We decided to use the openness from the PWT7.1.

In order to construct the trade openness under the trade agreement regime (Open_TrAgree) and the trade openness under no trade agreement regime (Open_NoTrAgree) we use the Regional Trade Agreements Information System (RTA-IS) of World Trade Organization (WTO) to identify trade agreements from 1958-2012. According to the WTO, four types of trade agreements exist: Customs Union (CU), Economic Integration Agreement (EIA), Free Trade Agreement (FTA) and Partial Scope Agreement (PSA). We find 136 bilateral, 3 trilateral and 33 trade agreements with more than 3 countries. The most well-known trade agreements are the Central European Free Trade Agreement (CEFTA), the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), the European Union (EU), the North American Free Trade Agreement (NAFTA) and the West African Economic and Monetary Union (WAEMU). For this project we did not differentiate the four trade agreement types. If a country has either a CU, an EIA, a FTA or a PSA is considered to have a trade agreement.

Trade openness under the trade agreement is equal to the sum of imports and exports (under the trade agreement regime) over GDP and similarly trade openness under no trade agreement regime (Open_NoTrAgree) is equal to the sum of imports and exports (under no trade agreement regime) over GDP.

In Graphs 2 we can see that all types of trade agreement are increasing from 1958 and after, but this increase is sharper from 1989. As we can see in Table 3 the average trade openness for all countries in the world for the period 1972-2010, is 81%, trade openness under the regime of trade agreements is 15% and trade openness under the regime of no trade agreement is 66%. We observe an upward trend of trade openness and trade openness under the regime of trade agreements (more intense after 1989) and a downward trend of trade openness under the regime of no trade agreements. This was the main cause of this study.

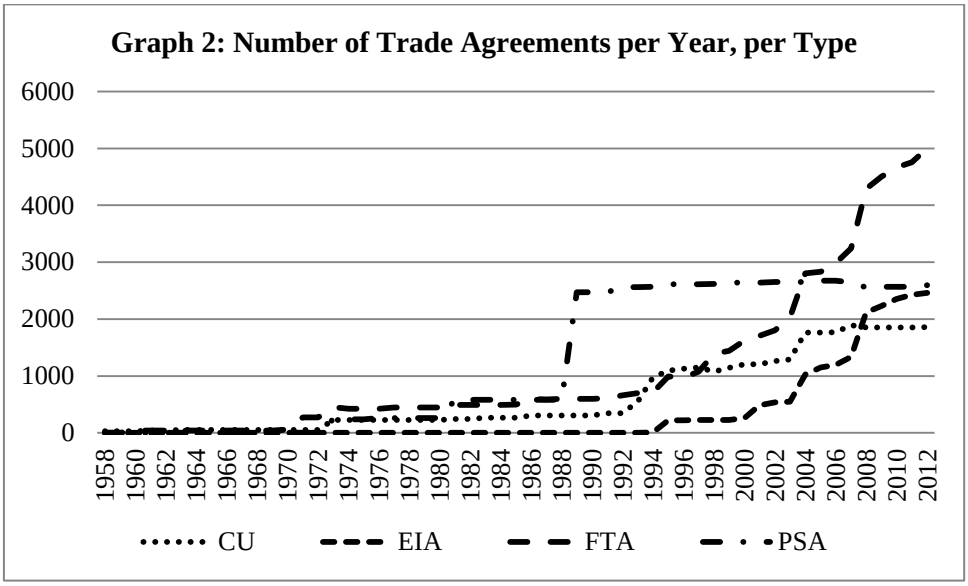


Table 3: Trade Openness - Mean

Average 1972-2010	Trade Openness	Trade Openness (Under the Regime of Trade Agreements)	Trade Openness (Under the Regime of No Trade Agreements)
World	80.9	15.3	66.6
East Asia & Pacific	102.1	21.5	83.1
Europe & Central Asia	81.9	26.3	56.2
Latin America & Caribbean	78.9	15.9	64.2
Middle East & North Africa	90.5	12.5	79.0
North America	40.8	14.0	26.8
South Asia	60.8	10.0	52.2
Sub-Saharan Africa	68.3	6.0	62.8

2.3. Control Variables

The use of the Bayesian Model Average (BMA), which will be described in the next section, allows us to use all possible control variables, that literature demonstrates affect government size. We divide control variables in eight categories: Conflict, Demographic, Geography, Economic Institution, Political Institution,

Macro Policy, Politics and Trade variables. The databases we use are the Cross-National Time-Series Data (CNTS) database, the Political Institutions (DPI) database, the Freedom House (FH) database, the International Country Risk Guide (ICRG) database, the KOF Index of Globalization (KOF) database, the NYU Development Research Institute (NYU) database, the Polity IV (PIV) database, the Penn World Table 7.1 (PWT7.1) database, the Quality of Government Institute (QoG) database and the World Development Indicators (WDI) database. We run 71 specifications using more than 140 variables, in order to find out which of those affect government expenditure and/or government consumption. After removing the variables that were not significant in none of the 71 specifications we have 50 independent variables in the final model. More information about the variables can be found in Appendix Tables 1-2.

2.3.1. Conflict Variables

In the final model we used the ethnic wars (ethnic_wars) and revolutionary wars (revol_wars) dummies from the PIV database. We expect that war variables will positively affect government size. Eterovic and Eterovic (2012) find a positive coefficient for the armed conflict dummy and Ferris, Park and Winer (2008) find that the period between the two World Wars and the period after WWII (peaceful periods) negatively affect the government size. We also tested the number of armed activity, sabotage, or bombings carried on by independent bands of citizens or irregular forces, the number of illegal or forced change in the top government elite, the number peaceful public gathering of at least 100 people, the number of strike of 1,000 or more industrial or service workers, the number of violent demonstration or clash of more than 100 citizens involving the use of physical force, the weighted conflict index and the genocide and politicide dummy. We found that none of those variables affect any of our dependent variables in any specification.

2.3.2. Demographic Variables

In the final model we used population (population) from PWT7.1 database, the percentage of working-age population (work_age_rat), the death rate (death_rate), the infant mortality rate (inf_morta_rate), the life expectancy (life_expect), the population density (pop_density), the population growth (pop_growth) and the urban population growth (urb_pop_growth) from WDI database. We expect that death rate and infant mortality rate will positively affect government size and the rest variables will negatively affect it. In literature the effect of population is ambiguous. Articles such as Epifani and Gancia (2009), Kittel and Winner (2005) and Grossman (1989, 1992) show that population has a positive effect while articles such as Alesina and Wacziarg (1998), Benarroch and Pandey (2008), Liberati (2007) and Prohl and Schneider (2009) show it has a negative effect. The same is true for urbanization. Alesina and Wacziarg (1998), Benarroch and Pandey (2008), Pickup (2006) and Rodrik (1998) conclude that urbanization negatively affects the government size while Aidt and Jensen (2009), Jin and Zou (2002), Khattry and Rao (2002) and Kimakova (2009) conclude that urbanization affects it positively. In the case of dependency ratio the vast majority of articles, like Benarroch and Pandey (2008), Garrett and Mitchell (2001), Kittel and Winner (2005), Rodrik (1998) and Shelton (2007) find out that dependency ratio positively affects the government expenditure (in our case we have the working population, which is one minus the dependency ratio, so we expect a negative result). Baskaran (2011), Cassette and Paty (2010) and Lott and Kenny (1999), which

tested population density find a negative effect. We also tested the birth rate and the rural population growth and came to the conclusion that none of those variables affect any of our dependent variables in any specification.

2.3.3. Geographic Variables

In the final model we used the number of neighboring states sharing a border with the identified state (num_neighb_st), the ethnic (ethnic_fraction), the linguistic (lingu_fraction) and the religious fractionalization (relig_fraction) index from QoG database and the country total area (total_area) from WDI database. We expect a positive coefficient for all variables. Adsera and Boix (2002), Bretschger and Hettich (2002) and Garrett (2001) found that the country area positively affects government size. Alesina Devleeschauwer, Easterly, Kurlat and Wacziarg (2003) found that ethnic and linguistic fractionalization has a negative effect on it. We also tested three geographical dummies: if a country is an island, landlocked or has a tropical climate, and found out that none of those variables affect any of our dependent variables in any specification.

2.3.4. Economic Institution Variables

In the final model we used the civil liberties index (civil_liberties) from FH database. We expect a negative coefficient, since the variable is smaller for countries with more respect to civil liberties. Adsera and Boix (2002) found a negative coefficient for the democratic index (civil liberties index can be considered as a proxy for democracy) while Zakaria and Shakoor (2011) found a positive coefficient. We also tested various risk variables from ICRG database, such as budget balance, current account as % of xgs, current account as % of gdp, debt service, exchange rate stability, foreign debt, gdp growth, per capita gdp, inflation and international liquidity risk, as well as the investment profile and socioeconomic conditions of the country. None of those variables affect any of our dependent variables in any specification.

2.3.5. Political Institution Variables

In the final model we used five dummy variables about the chief executive party from DPI database: left (chief_left), nationalist (chief_nationalist), regional (chief_regional), religious (chief_religious) and rural (chief_rural). Also we use a dummy, if the chief executive is a military officer (chief_military) from DPI, the political rights index (political_rights) from FH database and the revised combined polity score (polity_score) from PIV database. We expect that if the chief executive party is left-wing or nationalist this will positively affect the government size. We expect a negative coefficient for political rights index, since the variable is smaller for countries with more respect to political rights, and a positive coefficient for the revised combined polity score. As we mention earlier Adsera and Boix (2002) found a negative coefficient for the democratic index, while Zakaria and Shakoor (2011) found a positive coefficient. Cameron (1978), Iversen and Cusack (2000) and Kittel and Winner (2005) found that left-wing, social democratic or labor parties positively affect the governments expenditure. We also tested two extra dummies from the DPI database: if the chief executive party controls all relevant houses and if there is a finite term in office for the chief executive. Moreover we tested ten indices from ICRG database: bureaucracy quality, corruption, democratic accountability, ethnic tensions, external conflict, government stability, internal conflict, law &

order, military in politics and religious tensions. From the PIV database we tested four dummies: if an executive have unlimited authority, if the executive is recruit by election, if the executive recruitment is open to everybody if the chief executive recruitment is regulated. Finally we tested five dummies from the QoG database: if the judiciary is independent and if the legal origin of the country is British, French, German or Scandinavian. None of those variables affect any of our dependent variables in any specification.

2.3.6. Macro Policy Variables

In the final model we used two centralization variables (centraliz_expense and centraliz_tot_outl) from the GFS database, as well as the investment share to gdp (investment_share) and the gdp per capita (gdp_per_capita) from the PWT7.1 database and the inflation (inflation) from the WDI database. According to Wagner's law we expect that gdp per capita have a positive effect on government size. The Leviathan Hypothesis from Brennan and Buchanan (1980) states that government intrusion into the economy will be smaller when the public sector is decentralized. Under this hypothesis we expect a positive coefficient of centralization (in our case centralization is the share of central to general government expenditure) on central government expenditure and a negative coefficient on general government expenditure. Alesina and Wacziarg (1998), Epifani and Gancia (2009) and Rodrik (1998) find a negative sign for gdp per capita, while Adsera and Boix (2002), Garrett (2001) and Islam (2004) find a positive coefficient. As for decentralization, Grossman (1989) and Marlow (1988) find a negative effect while Baskaran (2011) and Cassette and Paty (2010) find a positive effect. We also tested for the effect of gdp growth, current account balance, foreign direct investment, gross capital formation, gross savings and total reserves. None of those variables affect any of our dependent variables in any specification.

2.3.7. Politic Variables

In the final model we used four political dummies: the electoral rule (proportionality) and type of regime (presidential) from the DPI database, if participation is competitive (particip_compet) from the PIV database and the system of government (federal) from the QoG database. Also we used the political competition index (political_compet) from the PIV database. Aidt and Jensen (2009) and Eterovic and Eterovic (2012) find a negative coefficient for political competition, Eterovic and Eterovic (2012), Iversen and Cusack (2000) and Mueller and Stratmann (2003) find a positive coefficient for participation index, Aidt and Jensen (2009) and Baraldi (2008) find a negative coefficient for the proportional electoral rule and Prohl and Schneider (2009) find a negative coefficient for the majoritarian electoral system, while Tavits (2004) find a positive coefficient. We also tested the polarization index, the vote share of government and opposition parties and the executive and/or legislative election year dummy. None of those variables affect any of our dependent variables in any specification.

2.3.8. Trade Variables

In the final model, except from the trade openness variables which was previously explained, we used the political (political_global) and social globalization index (social_global) from KOF database. We also tested the terms of trade adjustment and four dummies about the export profile of the country: fuels, manufactures,

nonfuel primary products and services. None of those variables affect any of our dependent variables in any specification.

2.3.9. Other Variables

Except from the control variables mentioned above in the final model we use time dummies and regional dummies from the WDI database: East Asia & Pacific, Latin America & Caribbean, Middle East & North Africa, North America, South Asia and Sub-Saharan Africa region. Also we run various specifications using interaction terms. We use the squares of area size, civil liberties, per capita income, political rights, population and revised combined polity score as well as the interaction of those variables with all the trade openness variables.

2.4. Final Dataset

Time: Because of the use of different databases, which cover different time periods, we had to find the common period range to use. We ended up using data from 1976-2010. In order to avoid business cycle we used a 5-year average technique in all variables. We ended up with seven time periods: 1976-1980, 1981-1985, 1986-1990, 1991-1995, 1996-2000, 2001-2005 and 2006-2010.

Countries: We decided to use a balanced panel of countries. As a result, for each of the seven depended variables, we used countries with full observation for all variables, for all time periods. We did this in order to avoid the effect on the results from "newly-born" countries, such as Russia or other former USSR countries. For each of the government variable we can see the countries we used in Appendix Table 3.

Variables: Finally we had to choose the way that a variable would enter the model. By this we mean if the variable will enter as a five-year average, the natural logarithm of the five-year average, the initial value for each time period window or the natural logarithm of the initial value. So as to decide the way we consulted the literature and ran different specifications, to see if our results are robust. All dependent variables are the logarithm of the five-year average. The openness variables are entering the final model as the logarithm of the five-year average, but we used the expression $\ln(1+X)$ instead of $\ln(X)$ in order not to reduce our sample (for a lot of countries, especially for the first years, the trade openness under the regime of no trade agreement was zero). For gdp per capita we used the logarithm of the initial value for each time period (this is the common use in the literature). Finally all other control variables are entering as the logarithm of the five-year average. In the case that we were not able to calculate the logarithm of the five-year average (in case of zero or negative values and in case of dummies that did not vary through time), we used the five-year average. For each of the government variables we can see the variables and the way they enter in the model in Appendix Table 4. Finally in Table 2 we have the descriptive statistics for all variables.

3. Econometric Methodology

Bayesian Model Average (BMA)[1, 2]

If we want to explain a dependent variable (Y) using a linear combination we need to find the "best" set, of independent variables (X's), which is a subset of all possible independent variables and then make inferences as if the selected model is the true one.

Given Y and a set of a candidate predictors X_1, X_2, …, X_k find the "best" model of the form:

$$(1) \qquad Y = \beta_0 + \sum_{j=1}^{p} \beta_j X_j + \varepsilon$$

where X_1, X_2, …, X_p is a subset of X_1, X_2, …, X_k. Whichever model selection technique (R^2, adjusted R^2, AIC, BIC, etc) we decide to use we will ignore the uncertainty about the model as Draper (1995), Hodges (1987), Leamer (1978), Moulton (1991) and Raftery (1988, 1996) state. A solution to this is averaging over all possible combinations of predictors when making inferences about quantities of interest.

Leamer (1978): if $M = \{M_1, \dots, M_I\}$ denotes the set of all models being consider and if Δ is the quantity of interest then the posterior distribution of Δ given the data D (average of the posterior distributions under each model weighted by the corresponding posterior model probabilities) is:

$$(2) \qquad \Pr(\Delta|D) = \sum_{i=1}^{I} \Pr(\Delta|M_i, D)\Pr(M_i|\, D)$$

where the posterior probability of model M_i is given by:

$$(3) \qquad \Pr(M_i|D) = \frac{\Pr(D|M_i)\Pr(M_i)}{\sum_{i=1}^{I} \Pr(D|M_i)\Pr(M_i)}$$

where:

(4)

$\Pr(D|M_i) = \int \Pr(D|\beta_i, M_i)\, \Pr(\beta_i|M_i) d\beta_i$ is the marginal likelihood of model M_k

β_i is the vectors of parameters of model M_i

$\Pr(\beta_i|M_i)$ is the prior density of $\beta_i$under model M_i

$\Pr(D|\beta_i, M_i)$ is the likelihood

$\Pr(M_i)$ is the prior probability that M_i is the true model

Parameters:

The posterior mean is the sum of the posterior means of each model, weighted by their posterior probabilities:

$$(5) \qquad \hat{\beta}^{BMA} = \sum_{i=1}^{I} \Pr(M_i|\, D)\, \hat{\beta}_i$$

[1] Based on Raftery, Madigan and Hoeting, 1997. Bayesian Model Averaging for Linear Regression Models. Journal of the American Statistical Association 92 (437) 179 – 191

[2] Based on Hoeting, Madigan, Raftery and Volinsky, 1999. Bayesian Model Averaging: A Tutorial, Statistical Science 14 (4) 382 – 401

The posterior variance is the sum of the posterior variances of each model, weighted by their posterior probabilities plus a term indicates how stable the estimates are across models:

$$(6) \qquad \hat{\sigma}^{2^{BMA}}(\beta) = \sum_{i=1}^{I} \Pr(M_i|\, D)\, \hat{\sigma}_i^2 + \sum_{i=1}^{I} \Pr(M_i|\, D)(\hat{\beta}_i - \hat{\beta}^{BMA})^2$$

The inclusion probability of a variable is the sum of the posterior probabilities of the models that contain the variable (for example for variable X):

$$(7) \qquad \mu^{BMA}(\beta_X) = pr\left(\hat{\beta}_X \neq 0 \middle| D\right) = \sum_{i \in M_X} \Pr(M_i|\, D)$$

where M_X is collection of indices for which $i \in M_X$ implies model M_i does not restrict the parameter β_X to zero.

Problems and Solutions:

1. The numbers of terms in the posterior distribution of Δ given the data D (equation 2) can be enormous. If we have k-possible independent variables then we have 2^k model combinations (for example in our final model we use 50 independent variables plus the constant, so we have 2,251,799,813,685,248!!!! possible models).

   Occam's Window proposed by Madigan and Raftery (1994): This approach involves averaging over a reduced set of models. The basic principles are: (1) if a model predicts the data far less well than the model that provides the best predictions, then it has effectively been discredited and should no longer be considered; (2) if a model receives less support from the data than any of its simpler sub-models then this model is excluded. If M_0 is "smaller" model than M_1, then if there is evidence for M_0 then M_1 is rejected, but rejecting M_0 requires strong evidence for the "larger" model M_1. If the evidence is inconclusive, neither model is rejected.

   Markov Chain Monte Carlo Model Composition (MC^3) proposed by Madigan and York (1995): let M denote the space of models under consideration. We can construct a Markov chain {M(t), t=1, 2, …} with state space M and equilibrium distribution $\Pr(M_i|D)$ and simulate this Markov chain in order obtain observations M(1), …, M(N). Then under certain regularity conditions, for any function $g(M_i)$ defined on M, the average is:

   $$(8) \qquad \hat{G} = \frac{1}{N}\sum_{t=1}^{N} g\big(M(t)\big) \rightarrow E\big(g(M)\big)\ a.s\ as\ N \rightarrow \infty$$

   To construct the Markov chain firstly we have to define a neighborhood nbd(M) that consists of the model M and the sets of models with either one variable more or one variable less than M. Secondly we also have to define a transition matrix q by setting g(M→M′)=0 for all M′ ∉ nbd(M) and g(M→M′) nonzero and constant for all M′ ∈ nbd(M). If the chain is currently in state M, the next step would be to draw M′ from g(M→M′). We accept M′ with the probability:

   $$(9) \qquad \min\left\{1, \frac{\Pr(\mathrm{M}'|\, D)}{\Pr(\mathrm{M}|\, D)}\right\}$$

At first we have a model M. Then a candidate model M′ is proposed. The M′ is accepted with the probability of equation 9. If M′ is rejected, a new model M′′ is proposed against M and if M′ is accepted, it becomes the current model and has to survive against further candidate models in the next step.

Stochastic Search Variable Selection (SSVS) proposed by George and McCulloch (1993): is similar in spirit to MC^3. In SSVS a predictor is not actually removed from the full model. Instead those predictors are set close to zero with high probability.

2. The integral of the equation 4 can be hard to compute.

   The Laplace method proposed by Tierney and Kadane (1986) can provide an excellent approximation to $\Pr(D|M_i)$, which in certain circumstances yields the very simple BIC approximation. The MLE approximation proposed by Taplin (1993) suggestes approximating $\Pr(\Delta|M_i, D)$ in equation 2, by $\Pr(\Delta|M_i, \hat{\beta}, D)$, where $\hat{\beta}$ is the maximum likelihood of the parameter vector β.

3. Specification of the prior probability that M_k is the true model-$\Pr(M_i)$

   When there is little prior information about the relative plausibility of the models considered, the most common assumption is that all models are equally likely a priori. As George and McCulloch (1993) proposed, when prior information about the importance of a variable is available for model structures with a coefficient associated with each predictor, a prior probability on model M_i can be specified as:

   $$(10) \qquad \Pr(M_k) = \prod_{j=1}^{p} \pi_j^{\delta_{ij}} (1-\pi_j)^{1-\delta_{ij}}$$

   where $\pi_j \in [0,1]$ is the prior probability that $\beta_j \neq 0$ in a regression model and δ_{ij} is an indicator of whether or not variable j is included in model M_i. Assigning $\pi_j = 0.5$ for all j corresponds to a uniform prior across model space, while $\pi_j < 0.5$ for all j imposes a penalty for large models. Using $\pi_j = 1$ ensures that variable j is included in all models.

In order to interpret the statistical significance of the coefficient we use the Kass and Raftery (1995) rules of thumb for the posterior inclusion probability (PIP). If PIP<50% there is evidence against the effect, if 50%≤PIP<75% there is weak evidence for the effect, if 75%≤PIP<95% there is positive evidence for the effect, if 95%≤PIP<99% there is strong evidence for the effect and if PIP≥99% there is very strong evidence for the effect.

4. Result

As we mentioned earlier we have three dependent variables for government size: the share of consolidated central government expenses to gdp, the share of consolidated general government expenses to gdp and the share of government consumption to gdp at current prices. We ran 71 specifications using more than 140 variables and we ended up with the variables we described in section 3. For each government variable we ran two models. In model 1 we ran the Bayesian Model Average (BMA) estimation using the logarithm of the 5-year average trade openness and in model 2 we ran the BMA estimation using the lag of the logarithm of 5-year average trade openness and using all the other variables as in Model 1. In order to see whether government size behaves differently if imports and exports come from countries with trade agreements, we ran the two models for each dependent variable twice. Firstly using the usual trade openness variable, and secondly replacing it with the two variables that we construct: Trade openness under the trade agreement regime and Trade openness under no trade agreement regime.

4.1. Relationship of Government Size and Trade Openness

In Table 4 we can see the variables that affect the three government size dependent variables. Using the BMA estimation we found that for both government expenditure variables the coefficient of trade openness is negative, something that is consistent with the efficiency hypothesis, that more open countries have lower government size. The result is stable either by using the contemporaneous effect (Model 1) or the first lag effect (Model 2) for openness. In all cases the posterior inclusion probability (PIP) is very high, ranging from 0.984-1, which shows strong or very strong evidence for the effect, according to the rules of thumb by Kass and Raftery (1995). On the other hand, the results for government consumption show support neither for the compensate nor the efficiency hypothesis. In both model there is evidence against the effect. This tells us that the choice of the dependent variable affects our conclusion for the support of compensate or the efficiency hypothesis.

<u>Conflict Variables:</u>

The Ethnic wars dummy has a positive effect only for government consumption for both models, where PIP is ranging between 0.959-1, showing strong or very strong evidence. For government expenditure we have evidence against the effect. This opposes literature, where various authors found a positive relationship between ethnic war dummy and government expenditure.

The Revolutionary wars dummy has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). This result opposes literature, where positive effect for the conflict variables is found.

<u>Demographic Variables:</u>

Death rate has a positive effect only for the government expenditure variables. This means that as death rate increases, the policy makers increase expenditures, probably in order to deal with this. PIP is 1 in all of those four models, showing very strong evidence for the effect. The result of death rate is consistent with our prior

Table 4: Results - Relationship of Government Size and Trade Openness

Dependent Variable	Central Government Expenditure		General Government Expenditure		Government Consumption	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Conflict Variables						
ethnic_wars	0.0014	0.0011	0.0014	0.0011	0.2588 ***	0.2456 **
	(0.054)	(0.049)	(0.022)	(0.039)	(1.000)	(0.959)
revol_wars	-0.0002	-0.0005	0.0006	0.0013	-0.0864	-0.0405
	(0.018)	(0.048)	(0.077)	(0.049)	(0.454)	(0.220)
Demographic Variables						
death_rate	0.4928 ***	0.5064 ***	0.4671 ***	0.4808 ***	-0.0043	-0.0015
	(1.000)	(1.000)	(1.000)	(1.000)	(0.068)	(0.082)
inf_morta_rate	-0.2892 ***	-0.2778 ***	-0.3101 ***	-0.2943 ***	0.0009	0.0007
	(1.000)	(1.000)	(1.000)	(1.000)	(0.071)	(0.023)
life_expect	0.0099	-0.0018	0.0149	-0.0042	0.0024	0.0295
	(0.143)	(0.094)	(0.132)	(0.094)	(0.011)	(0.065)
pop_density	0.0002	-0.0001	-0.0002	-0.0003	3.0111 ***	2.9915 ***
	(0.037)	(0.027)	(0.024)	(0.027)	(1.000)	(1.000)
pop_growth	-0.2096	-0.0901	-0.2965	-0.1245	0.0181	-0.0289
	(0.065)	(0.069)	(0.132)	(0.037)	(0.020)	(0.071)
population	-0.0007	-0.0004	-0.0006	-0.0001	-3.1143 ***	-3.0939 ***
	(0.046)	(0.046)	(0.050)	(0.048)	(1.000)	(1.000)
urb_pop_growth	-0.5044	-0.4431	-0.6789	-0.4278	-0.0601	-0.0709
	(0.241)	(0.245)	(0.292)	(0.175)	(0.053)	(0.079)
work_age_rat	-0.0008	0.0003	0.0071	0.0014	0.0050	0.0197
	(0.081)	(0.017)	(0.090)	(0.033)	(0.032)	(0.135)
Geographic Variables						
ethnic_fraction	-0.0014	-0.0010	-0.0021	-0.0002	0.0197	0.0147
	(0.100)	(0.096)	(0.160)	(0.040)	(0.390)	(0.316)
lingu_fraction	-0.0028	-0.0032	-0.0031	-0.0051	-0.0017	-0.0007
	(0.163)	(0.187)	(0.177)	(0.219)	(0.058)	(0.052)
relig_fraction	0.0352	0.0336	0.0271	0.0291	0.0918 ***	0.0885 ***
	(0.743)	(0.698)	(0.596)	(0.618)	(1.000)	(1.000)
num_neighb_st	0.0465 ***	0.0449 ***	0.0427 ***	0.0425 ***		
	(1.000)	(1.000)	(1.000)	(1.000)		
total_area	-0.0004	-0.0013	-0.0002	0.0006	3.0492 ***	3.0278 ***
	(0.037)	(0.156)	(0.024)	(0.065)	(1.000)	(1.000)
Economic Institution Variables						
civil_liberties	-0.0740	-0.0557	-0.0721	-0.0839	0.0006	0.0014
	(0.568)	(0.466)	(0.512)	(0.551)	(0.034)	(0.051)

Table 4 (continued): Results - Relationship of Government Size and Trade Openness

Dependent Variable	Central Government Expenditure		General Government Expenditure		Government Consumption	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Political Institution Variables						
chief_left	0.0073	0.0085	0.0160	0.0107		
	(0.141)	(0.181)	(0.267)	(0.188)		
chief_military	0.0008	0.0006	0.0021	0.0051		
	(0.059)	(0.015)	(0.063)	(0.084)		
chief_nationalist	0.2130 *	0.2355 ***	0.2274 ***	0.2341 ***		
	(0.943)	(1.000)	(1.000)	(1.000)		
chief_regional	0.0191	0.0030	0.0019	0.0091		
	(0.079)	(0.017)	(0.059)	(0.076)		
chief_religious	0.0729	0.0754	0.0483	0.0529		
	(0.549)	(0.590)	(0.417)	(0.450)		
chief_rural	-0.0004	-0.0045	-0.0003	-0.0016		
	(0.008)	(0.087)	(0.062)	(0.118)		
political_rights	-0.0030	-0.0002	0.0090	0.0352	0.0056	0.0050
	(0.095)	(0.017)	(0.105)	(0.347)	(0.111)	(0.093)
polity_score	0.0099	0.0126 *	0.0126 *	0.0142 *		
	(0.632)	(0.831)	(0.789)	(0.822)		
Macro Policy Variables						
centraliz_expense	0.4623 ***	0.4599 ***	-0.3872 ***	-0.3780 ***		
	(1.000)	(1.000)	(1.000)	(1.000)		
gdp_per_capita	-0.2205 ***	-0.2029 ***	-0.2552 ***	-0.2287 ***	-0.1340 ***	-0.1350 ***
	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)
inflation	0.0111 *	0.0114 **	0.0117 **	0.0103 *	-0.0004	-0.0008
	(0.944)	(0.972)	(0.968)	(0.874)	(0.073)	(0.164)
investment_share	0.0000	-0.0018	-0.0031	-0.0008	-0.0001	-0.0010
	(0.000)	(0.157)	(0.098)	(0.021)	(0.023)	(0.061)
Politic Variables						
particip_compet	0.0118	0.0247	0.0224	0.0474		
	(0.144)	(0.261)	(0.164)	(0.364)		
political_compet	-0.0137	-0.0168	-0.0165	-0.0149		
	(0.222)	(0.270)	(0.174)	(0.210)		
federal	-0.0020	-0.0058	-0.0042	-0.0111	-0.0885	-0.0615
	(0.048)	(0.139)	(0.118)	(0.210)	(0.723)	(0.509)
presidential	-0.1639 **	-0.1654 ***	-0.1651 ***	-0.1548 ***	-0.1478 **	-0.1514 **
	(0.966)	(1.000)	(1.000)	(1.000)	(0.951)	(0.957)
proportionality	0.1250 ***	0.1192 ***	0.1087 *	0.1080 **		
	(0.998)	(1.000)	(0.941)	(0.967)		

Table 4 (continued): Results - Relationship of Government Size and Trade Openness

Dependent Variable	Central Government Expenditure		General Government Expenditure		Government Consumption	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Trade Variables						
Open_Total	-0.3655 ***	-0.3575 **	-0.3814 ***	-0.3435 **	0.0034	0.0026
	(1.000)	(0.980)	(1.000)	(0.984)	(0.075)	(0.050)
political_global	-0.0109	-0.0165	-0.0033	-0.0059	-0.0063	-0.0084
	(0.090)	(0.216)	(0.037)	(0.118)	(0.062)	(0.088)
social_global	0.5617 ***	0.5449 ***	0.6006 ***	0.5785 ***	0.0024	0.0049
	(1.000)	(1.000)	(1.000)	(1.000)	(0.043)	(0.066)
Regional Dummy Variables						
east_asia&pacific	-0.0026	-0.0031	-0.0018	-0.0035	-0.0078	-0.0025
	(0.094)	(0.073)	(0.066)	(0.074)	(0.106)	(0.033)
latin_amer&carib	0.0006	-0.0009	-0.0009	0.0013	0.0029	0.0042
	(0.087) *	(0.096) *	(0.071) *	(0.056) *	(0.063)	(0.117)
mid_east&nor_afr	0.7962 ***	0.8121 ***	0.7942 ***	0.8084 ***	0.0093	0.0117
	(1.000)	(1.000)	(1.000)	(1.000)	(0.101)	(0.103)
north_america	-0.0058	-0.0076	0.0041	0.0035	0.0221	0.0226
	(0.081)	(0.117)	(0.071)	(0.103)	(0.133)	(0.141)
south_asia	0.0345	0.0202	0.1285	0.1421	-0.0096	-0.0048
	(0.265)	(0.179)	(0.691)	(0.734)	(0.099)	(0.035)
subsaharan_africa	0.0039	-0.0004	0.0026	0.0031	-0.1925 *	-0.1710 *
	(0.103)	(0.041)	(0.094)	(0.057)	(0.903)	(0.833)
Time Dummy Variables						
Year 1986-1990	-0.0001	0.0001	0.0005	-0.0004	-0.0014	-0.0035
	(0.061)	(0.148)	(0.039)	(0.192)	(0.040)	(0.098)
Year 1991-1995	-0.0009	-0.0008	-0.0032	-0.0098	0.0000	-0.0011
	(0.087)	(0.069)	(0.220)	(0.167)	(0.000)	(0.042)
Year 1996-2000	-0.0655 *	-0.0770 *	-0.1336 ***	-0.1509 ***	-0.0006	-0.0024
	(0.774)	(0.850)	(1.000)	(1.000)	(0.040)	(0.139)
Year 2001-2005	-0.0161	-0.0105	-0.1089 *	-0.1246 *	0.0061	0.0040
	(0.282)	(0.177)	(0.910)	(0.947)	(0.098)	(0.074)
Year 2006-2010	0.0022	0.0012	-0.0412	-0.0697	0.0265	0.0346
	(0.055)	(0.035)	(0.447)	(0.601)	(0.234)	(0.307)
Intercept	-1.7466 ***	-1.8575 ***	-1.5254 ***	-1.7232 ***	0.0938 ***	-0.0272 ***
	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)

* if 75%≤PIP<95%
** if 95%≤PIP<99%
*** if PIP≥99%
PIP is the Posterior Inclusion Probability
Notes:
In model 1 we run the Bayesian Model Average (BMA) estimation using the logarithm of 5-year average trade openness. In model 2 we run the BMA estimation using the lag of the logarithm of 5-year average trade openness and using all the other variables that we use in Model 1.
Central Government is the share of Consolidated Central Government Expenses to GDP, General Governmant is the share of Consolidated General Government Expenses to GDP and Government Consumption is the Government Consumption share of PPP converted GDP per capita at current prices.
Central Government and General Governmant data comes from Government Financial Statistics statistic (GFS) database of the International Monetary Fund (IMF) and Government Consumption data comes from Penn World Table 7.1 (PWT7.1).

expectations. This is not true for the government consumption variable, where death rate has a very low PIP, for all models, showing evidence against the effect according to Kass and Raftery (1995).

Infant mortality rate has a negative effect for the government expenditure variables. This shows that as infant mortality rate increases, the policy makers decrease expenditures. PIP is 1 in all models, demonstrating very strong evidence for the effect. If we use the government consumption as the dependent variable, the results are different. Infant mortality rate has a very low PIP, for all models, showing evidence against the effect according to Kass and Raftery (1995).

Life expectancy has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995).

Population density has a very strong positive effect only for government consumption, with PIP equal to 1. For both government expenditure variables population density shows evidence against the effect. Those results opposes the literature, where they found a negative coefficient for government size, showing that as the population per square km of land area increases, the policy makers decrease expenditures.

Population growth has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). This result opposes our prior expectations, where we expected a negative effect.

Population has a strong negative effect for government consumption to gdp with PIP equal to 1 in both models, showing a very strong evidence for the effect. This is not true for the government expenditure variables, where we find evidence against the effect. The negative effect is consistent with a part of the literature (since the effect is ambiguous) and shows that as population increases, the policy makers decrease expenditures.

Urban population growth has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). This opposes literature where various authors found either a negative or a positive effect.

Working age ratio has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). This opposes literature. The vast majority of the literature found a negative effect and shows that as working age ratio increases, the policy makers decrease expenditures, since the inhabitants that need social transfers decreased.

Geographic Variables:

The Ethnic, Linguistic and Religious fractionalization index has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). The only exception is the very strong positive effect of religious fractionalization for both models if we use the government consumption as the dependent variable. This shows that as the probability that two randomly selected people from a given country will not belong to the same religious group increases, the policy makers increase expenditures. In the literature ethnic and linguistic fractionalization indices have a negative effect, which opposes our results.

The number of neighboring states sharing a border with the identified state has a very strong positive effect on both government expenditure variables. This shows that countries with many neighbors tend to have more government expenditures, probably in order to deal with this, in terms of external threads or migration. The result of the number of neighboring states sharing a border with the identified state is consistent with our prior expectations.

The country's total area in square kilometers has a very strong positive effect only for government consumption. This is consistent with literature findings and shows that bigger countries tend to have bigger government consumption.

Economic Institution Variables:

The Civil liberties index has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). For Model 1, in the case of the central government expenditure variable, and for the general government expenditure variable, PIP is ranging from 0.512-0.568, which shows weak evidence for the effect, according rules of thumb of Kass and Raftery (1995). Those results opposes the literature, where various authors found that countries with greater respect (smaller number of the index show greater respect) for civil liberties tend to have higher government expenditures.

Political Institution Variables:

The orientation of the chief executive party (in our case if we test for a left-wing party), has a very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). This result opposes the literature, where a positive effect is found.

Whether the president is a military officer, then this will not affect either the government expenditure or the government consumption. In all cases we have a very low PIP, showing evidence against the effect according to Kass and Raftery (1995).

The background of the chief executive party (we test if the chief executive originates from a nationalist, a regional, a religious or a rural parties) do not seem to affect government expenditure. The only exception is when the chief executive party is nationalist. This affects the government expenditures positively. PIP is very high, ranging from 0.943-1, which shows strong or very strong evidence for the effect, according rules of thumb of Kass and Raftery (1995). In the case when we use the central government expenditure, when the chief executive party is religious we have a weak positive evidence for the effect. In all other cases PIP shows evidence against the effect

The Political rights index has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). This opposes the literature findings which shows that countries with greater respect (smaller number of the index show greater respect) for political rights tend to have higher government size.

The Revised combined polity score has a positive effect for government expenditure, with PIP ranging from 0.789-0.831. The only exception is Model 1 for the central government expenditure, where we have a weak evidence for a positive effect. This result is consistent with the literature and shows that more democratic

countries (the index range from -10, strongly autocratic regime to +10, strongly democratic regime) tend to have bigger government expenditures.

Macro Policy Variables:

The share of central government to general government expenditure has a very strong positive effect on central government expenditure and a very strong negative effect on general government expenditure. PIP is equal to 1 in models. The result is consistent with the literature and the Brennan and Buchanan (1980) Leviathan Hypothesis and states that government intrusion into the economy will be smaller when the public sector is decentralized.

Gdp per capita has a negative effect on all government size variables with PIP equal to 1, showing a very strong evidence for the effect. The negative result is consistent with a part of the literature and is in contrast with the Wagner's law, where it assumes a positive effect.

Inflation has a positive effect only for government expenditure. For central government expenditure, in the first lag estimation and for the general government expenditure in the contemporaneous model we have a strong evidence for the effect. For the central government expenditure, in the contemporaneous estimation and for the general government expenditure in the first lag model we have a positive evidence for the effect. On the other hand for government consumption we have evidence against the effect. The result of inflation is consistent with our prior expectations and states that as inflation rises, the government expenditures increase.

The share of investment to gdp has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). This opposes our prir expectations. We expected that as investment share rises, the government expenditures would decreased.

Politic Variables:

The Competitiveness of participation dummy, the Political competition index and the Federal system of government have a very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). The result for the competitiveness of participation opposes the literature, in which, authors find a positive effect. Also the result for the political competition opposes the literature, in which, authors find a negative effect. Finally the result for the federal dummy opposes the literature, in which authors find a positive effect.

The Presidential type of regime has a negative effect on all government size variables. PIP is ranging between 0.951-1 in all of those models, showing strong or very strong evidence for the effect. The negative result is consistent with our prior expectations and states that countries with presidential type of regime tend to have lower government expenditures.

The Proportional electoral rule has a positive effect on all government expenditure variables. If we use the central government expenditure as the dependent variable then we have a very strong evidence for the effect. If we use the general government expenditure, for the contemporaneous model (Model 1) we have positive evidence for the effect and for the first lag model we have a strong evidence for the effect. The result for the proportional electoral rule opposes the literature, in which authors find a negative effect.

Trade Variables:

The Political globalization index has a very low PIP for all government expenditures variables, for all models, showing evidence against the effect according to Kass and Raftery (1995).

The Social globalization index has a positive effect on all government expenditure variables. PIP is equal to 1 showing very strong evidence for the effect. On the other hand for government consumption we have evidence against the effect.

4.2. Relationship of Government Size and Trade Agreements

In Table 5 we can see the variables that affect the three government size dependent variables. Those models use the exact same control variables as the Table 4. The only difference is that we do not use the trade openness variable. We instead use the two trade openness variables that we constructed: Trade openness under the trade agreement regime and Trade openness under no trade agreement regime. We want to check if the use of those new variables affects the coefficients of the control variables and if by using those variables we have new information about the relationship between trade openness and government expenditures. The Trade openness under the trade agreement regime has very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). Those result do not support neither the compensate nor the efficiency hypothesis, and we can state that the trade with a country under a trade agreement (Customs Union, Economic Integration Agreement, Free Trade Agreement and Partial Scope Agreement) does not affect government expenditures.

The Trade openness under no trade agreement regime has a negative sign when we use government consumption as the dependent variable. PIP for the contemporaneous model (Model 1), when the central government expenditure is used, is equal to 1 showing very strong evidence for the effect. When we use general government expenditure for Model 1, PIP is equal to 0.96 showing strong evidence for the effect. PIP for the first lag model (Model 2), when the central government expenditure is used, is equal to 0.651 showing positive evidence for the effect. When we use general government expenditure for Model 2, PIP is equal to 0.332 showing evidence against for the effect. On the other hand, for both model when government consumption is used as the dependent variable, we have a fairly low PIP, ranging from 0.053-0.074, showing evidence against the effect. The results for the government expenditure are consistent with the efficiency hypothesis and shows that the trade with a country with no trade agreements decreases government expenditures.

Conflict Variables:

The Ethnic and Revolutionary wars dummies have a very low PIP for all government size variables, for all models. For the government expenditure variables those results are the same as in the case where we use trade openness. For the government consumption variable the results are different from the case where we use trade openness, where we found very strong or strong evidence for the effect. Now the coefficient for both models fall, and according to PIP we have a positive evidence for the effect.

Table 5 : Results - Relationship of Government Size and Trade Agreements

Dependent Variable	Central Government Expenditure		General Government Expenditure		Government Consumption	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Conflict Variables						
ethnic_wars	0.0004	0.0002	0.0022	0.0064	0.1181	0.1241
	(0.136)	(0.004)	(0.063)	(0.105)	(0.613)	(0.636)
revol_wars	-0.0017	-0.0006	0.0002	0.0004	-0.1223	-0.0581
	(0.116)	(0.101)	(0.033)	(0.018)	(0.574)	(0.287)
Demographic Variables						
death_rate	0.4910 ***	0.4894 ***	0.4416 ***	0.4774 ***	0.0207	0.0631
	(1.000)	(1.000)	(1.000)	(1.000)	(0.150)	(0.380)
inf_morta_rate	-0.2451 ***	-0.2256 **	-0.2721 ***	-0.2488 ***	0.0559	0.0160
	(0.999)	(0.953)	(1.000)	(1.000)	(0.463)	(0.174)
life_expect	0.0331	0.0207	-0.0187	0.0093	-0.0229	-0.0593
	(0.116)	(0.059)	(0.095)	(0.145)	(0.094)	(0.102)
pop_density	0.0000	-0.0009	-0.0005	-0.0041	3.6147 ***	3.5195 ***
	(0.035)	(0.083)	(0.056)	(0.169)	(1.000)	(1.000)
pop_growth	-0.1258	-1.3554	-0.7239	-1.1752	0.0550	-0.0423
	(0.082)	(0.300)	(0.175)	(0.278)	(0.049)	(0.019)
population	-0.0002	-0.0003	-0.0003	0.0017	-3.6442 ***	-3.5558 ***
	(0.029)	(0.098)	(0.051)	(0.117)	(1.000)	(1.000)
urb_pop_growth	-0.3108	-0.3452	-0.3099	-1.1232	0.1696	0.0251
	(0.191)	(0.144)	(0.149)	(0.320)	(0.089)	(0.034)
work_age_rat	-0.0038	0.0013	0.0062	0.0143	0.0386	0.0255
	(0.098)	(0.085)	(0.055)	(0.155)	(0.146)	(0.146)
Geographic Variables						
ethnic_fraction	-0.0026	-0.0008	-0.0004	-0.0022	0.0056	0.0544 *
	(0.116)	(0.046)	(0.041)	(0.065)	(0.100)	(0.785)
lingu_fraction	-0.0061	-0.0114	-0.0045	-0.0170	0.0009	-0.0001
	(0.245)	(0.457)	(0.192)	(0.530)	(0.043)	(0.085)
relig_fraction	0.0331	0.0348	0.0382	0.0219	0.0946 ***	0.0912 ***
	(0.662)	(0.664)	(0.709)	(0.450)	(1.000)	(1.000)
num_neighb_st	0.0456 ***	0.0473 ***	0.0408 ***	0.0487 ***		
	(1.000)	(1.000)	(1.000)	(1.000)		
total_area	-0.0002	0.0006	0.0021	0.0095	3.6084 ***	3.5175 ***
	(0.036)	(0.042)	(0.116)	(0.393)	(1.000)	(1.000)
Economic Institution Variables						
civil_liberties	-0.0633	-0.0402	-0.0695	-0.1012	0.0000	0.0012
	(0.420)	(0.305)	(0.495)	(0.616)	(0.038)	(0.080)

Table 5 (continued): Results - Relationship of Government Size and Trade Agreements

Dependent Variable	Central Government Expenditure		General Government Expenditure		Government Consumption	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Political Institution Variables						
chief_left	0.0085	0.0047	0.0028	0.0148		
	(0.169)	(0.103)	(0.062)	(0.275)		
chief_military	0.0051	0.0101	0.0033	0.0071		
	(0.128)	(0.185)	(0.089)	(0.119)		
chief_nationalist	0.2488 ***	0.2382 ***	0.2509 ***	0.2351 ***		
	(1.000)	(1.000)	(1.000)	(1.000)		
chief_regional	0.0053	0.0139	0.0039	0.0072		
	(0.052)	(0.051)	(0.052)	(0.091)		
chief_religious	0.0630	0.0564	0.0341	0.0542		
	(0.534)	(0.450)	(0.306)	(0.449)		
chief_rural	-0.0007	-0.0015	0.0032	0.0008		
	(0.034)	(0.063)	(0.074)	(0.091)		
political_rights	-0.0092	-0.0002	0.0065	0.0234	0.0027	0.0149
	(0.134)	(0.073)	(0.199)	(0.200)	(0.073)	(0.194)
polity_score	0.0124 *	0.0117 *	0.0162 *	0.0119		
	(0.814)	(0.775)	(0.867)	(0.728)		
Macro Policy Variables						
centraliz_expense	0.4442 ***	0.3016	-0.3699 ***	-0.4162 **		
	(1.000)	(0.683)	(1.000)	(0.984)		
gdp_per_capita	-0.2143 ***	-0.1867 **	-0.2249 ***	-0.2357 ***	-0.0370	-0.0210
	(1.000)	(0.979)	(1.000)	(1.000)	(0.357)	(0.276)
inflation	0.0122 ***	0.0114 *	0.0106 *	0.0126 **	-0.0012	-0.0007
	(1.000)	(0.934)	(0.927)	(0.982)	(0.185)	(0.102)
investment_share	0.0014	-0.0027	0.0006	-0.0016	-0.0016	-0.0043
	(0.062)	(0.074)	(0.060)	(0.067)	(0.033)	(0.070)
Politic Variables						
particip_compet	0.0558	0.1046	0.0357	0.1309		
	(0.383)	(0.536)	(0.272)	(0.682)		
political_compet	-0.0170	-0.0150	-0.0193	-0.0197		
	(0.201)	(0.207)	(0.248)	(0.181)		
federal	-0.0033	-0.0043	-0.0079	-0.0031	-0.1161 *	-0.1219 *
	(0.115)	(0.161)	(0.190)	(0.066)	(0.777)	(0.852)
presidential	-0.1686 ***	-0.1179 *	-0.1440 ***	-0.1402 **	-0.0600	-0.0181
	(1.000)	(0.830)	(1.000)	(0.959)	(0.498)	(0.175)
proportionality	0.0893 *	0.0810 *	0.0944 *	0.0659		
	(0.850)	(0.752)	(0.936)	(0.667)		

Table 5 (continued): Results - Relationship of Government Size and Trade Agreements

Dependent Variable	Central Government Expenditure		General Government Expenditure		Government Consumption	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Trade Variables						
Open_TrAgree	-0.0680	-0.1001	-0.0151	-0.0237	-0.0183	-0.0606
	(0.340)	(0.474)	(0.104)	(0.138)	(0.120)	(0.207)
Open_NoTrAgree	-0.3150 ***	-0.1865	-0.3675 **	-0.0770	0.0101	0.0040
	(1.000)	(0.651)	(0.960)	(0.332)	(0.074)	(0.053)
political_global	-0.0112	-0.0089	-0.0043	0.0064	-0.0019	-0.0027
	(0.080)	(0.127)	(0.144)	(0.155)	(0.051)	(0.037)
social_global	0.5439 ***	0.5187 ***	0.5838 ***	0.5251 ***	-0.0795	-0.0518
	(1.000)	(1.000)	(1.000)	(1.000)	(0.431)	(0.379)
Regional Dummy Variables						
east_asia&pacific	-0.0015	-0.0004	0.0016	-0.0048	-0.0230	-0.0028
	(0.073)	(0.011)	(0.140)	(0.198)	(0.188)	(0.055)
latin_amer&carib	0.0002	-0.0035	-0.0012	-0.0002	-0.0026	-0.0010
	(0.077) *	(0.088) *	(0.032) *	(0.002)	(0.074)	(0.029)
mid_east&nor_afr	0.7709 ***	0.7615 ***	0.8261 ***	0.7227 ***	0.0091	0.0162
	(1.000)	(1.000)	(1.000)	(1.000)	(0.097)	(0.129)
north_america	-0.0056	-0.1016	0.0007	0.0009	0.0121	0.0008
	(0.068)	(0.407)	(0.029)	(0.094)	(0.075)	(0.027)
south_asia	0.0171	0.0324	0.1718 *	0.0934	0.0794	-0.0005
	(0.194)	(0.282)	(0.802)	(0.415)	(0.252)	(0.014)
subsaharan_africa	0.0007	-0.0055	0.0131	0.0022	-0.0519	-0.0478
	(0.122)	(0.150)	(0.166)	(0.117)	(0.283)	(0.286)
Time Dummy Variables						
Year 1986-1990	-0.0002	0.0008	-0.0038	-0.0004	-0.0005	-0.0002
	(0.079)	(0.153)	(0.150)	(0.020)	(0.035)	(0.099)
Year 1991-1995	-0.0008	-0.0001	-0.0257	-0.0032	-0.0002	-0.0006
	(0.061)	(0.104)	(0.316)	(0.167)	(0.017)	(0.061)
Year 1996-2000	-0.0663 *	-0.0609	-0.1894 ***	-0.1207 **	-0.0006	-0.0002
	(0.752)	(0.701)	(1.000)	(0.962)	(0.052)	(0.009)
Year 2001-2005	-0.0292	-0.0135	-0.1914 ***	-0.0931 *	0.0039	0.0001
	(0.387)	(0.205)	(1.000)	(0.750)	(0.101)	(0.005)
Year 2006-2010	-0.0067	0.0029	-0.1729 ***	-0.0481	0.0031	0.0000
	(0.114)	(0.067)	(0.990)	(0.362)	(0.074)	(0.008)
Intercept	-2.0458 ***	-2.3253 ***	-1.6786 ***	-1.9597 ***	-1.2253 ***	-1.2049 ***
	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)

* if 75%≤PIP<95%
** if 95%≤PIP<99%
*** if PIP≥99%
PIP is the Posterior Inclusion Probability
Notes:
In model 1 we run the Bayesian Model Average (BMA) estimation using the logarithm of 5-year average trade openness. In model 2 we run the BMA estimation using the lag of the logarithm of 5-year average trade openness and using all the other variables that we use in Model 1.
Central Government is the share of Consolidated Central Government Expenses to GDP, General Governmant is the share of Consolidated General Government Expenses to GDP and Government Consumption is the Government Consumption share of PPP converted GDP per capita at current prices.
Central Government and General Governmant data comes from Government Financial Statistics statistic (GFS) database of the International Monetary Fund (IMF) and Government Consumption data comes from Penn World Table 7.1 (PWT7.1).

Demographic Variables:

Death rate has a positive effect on all government expenditure variables as in the case where we use trade openness. In all model the PIP is equal to 1, showing very strong evidence for the effect. For government consumption PIP is very low, as before, showing evidence against the effect.

Infant mortality rate has a negative effect on all government expenditure variables as in the case where we use trade openness. PIP is ranging from 0.953-1 in every of those models, showing strong or very strong evidence for the effect. This is not true if we use the government consumption as the dependent variable, where, as before, PIP shows evidence against the effect.

Life expectancy has a fairly low PIP, showing evidence against the effect, for all government size variables. The overall results are quite similar as in the case where we use trade openness.

Population density has a very strong positive effect only when the government consumption is used as the dependent variable. For government expenditure we have evidence against the effect. The overall results are quite similar as in the case where we use trade openness.

Population growth has a very low PIP for all government size variables showing evidence against the effect. The overall results are quite similar as in the case where we use trade openness.

Population has a negative effect only when we use government consumption. PIP is equal to 1showing very strong evidence for the effect. When we use government expenditure we have evidence against the effect. The overall results are quite similar as in the case where we use trade openness.

Both urban population growth and working age ratio have a fairly low PIP, for all government size variables, showing evidence against the effect. The overall results are quite similar as in the case where we use trade openness.

Geographic Variables:

The overall results for Ethnic, Linguistic and Religious fractionalization index are quite similar as in the case where we use trade openness. The Ethnic, Linguistic and Religious fractionalization index have very a low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995) as in the case where we use trade openness. As before the only exception is when we use the religious fractionalization index on government consumption, where it has a very strong positive effect. The only difference from the case where we use trade openness is the ethnic fractionalization index, for the first lag model (Model 2), when the dependent variable is government consumption. PIP is 0.785 showing a positive evidence for the effect.

The number of neighboring states sharing a border with the identified state has a positive effect on all government expenditure variables as in the case where we use trade openness. PIP is ranging from 0.973-1 in all of those models, showing strong or very strong evidence for the effect. The overall results are quite similar as in the case where we use trade openness.

The country's total area in square kilometers has a very strong negative effect only for government consumption. The overall results are quite similar as in the case where we use trade openness.

Economic Institution Variables:

The Civil liberties index has a fairly low PIP for all government size variables showing evidence against the effect. When the dependent variable is general government, for the first lag model (Model 2), PIP is 0.616 showing a weak evidence for the effect. The overall results are quite similar as in the case where we use trade openness.

Political Institution Variables:

The orientation of the chief executive party (in our case if we test for a left party), has a very low PIP for all government expenditures variables, for all models, showing evidence against the effect according to Kass and Raftery (1995) as in the case where we use trade openness.

The results show that a chief executive, who is a military officer, will not affect government expenditures. PIP is ranging from 0.089-0.185, showing evidence against the effect. The overall results are quite similar as in the case where we use trade openness.

The background of the chief executive party (we test for nationalist, regional, religious and rural parties) do not seem to affect government expenditure, with the exception of a nationalist party, as in the case where we use trade openness. If the chief executive party is nationalist then this affect positive all government expenditure variables. The overall results are quite similar as in the case where we use trade openness.

The Political rights index has a fairly low PIP for all government size variables showing evidence against the effect. The overall results are quite similar as in the case where we use trade openness.

The Revised combined polity score has quite similar results as in the case where we use trade openness. PIP is ranging from 0.775-0.867 showing a positive evidence for the effect when we use the government expenditure as the dependent variable. The only exception is for the first lag model (Model 2), for the general government consumption

Macro Policy Variables:

The share of central government to general government expenditure has a strong or a very strong effect on both government expenditure variables. PIP is ranging from 0.984-1 showing strong or very strong evidence for the effect. This is not true for the first lag estimation (Model 2) on central government expenditure. For central government expenditure we have a positive effect and for general government effect we have a negative effect. The overall results are similar as in the case where we use trade openness.

Gdp per capita has a negative effect on both government expenditure variables as in the case where we use trade openness. PIP is ranging from 0.979-1 in all of those models, showing strong or very strong evidence for the effect. In contract with the case where we use trade openness, we have evidence against the effect of GDP per capita on government consumption.

Inflation has a positive effect only for government expenditure. For central government expenditure, in the contemporaneous estimation (Model 1) we have a very strong evidence for the effect and for the first lag model (Model 2) we have a positive evidence for the effect. For general government expenditure, in Model 1 we have a positive evidence for the effect and in Model 1 we have a strong evidence for the effect. On the other hand for government consumption we have evidence against the effect. The overall results are quite similar as in the case where we use trade openness.

The share of investment to gdp has a very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995) as in the case where we use trade openness.

Politic Variables:

The Competitiveness of participation dummy, the Political competition index and the Federal system of government have a very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). This is not true for the federal system dummy only when we use government consumption as the dependent variable where we have a positive evidence for the effect. The overall results are similar as in the case where we use trade openness.

The Presidential type of regime has a negative effect on all government expenditure variables. PIP is ranging from 0.830-1 in all of those models, showing positive, strong or very strong evidence for the effect. For the government consumption variable the results are different from the case where we use trade openness, where we found strong evidence for the effect. Now the coefficient for both models fall, and according to PIP we have evidence against the effect.

The Proportional electoral rule has a positive effect on all government expenditure variables as in the case where we use trade openness. Now the coefficient for both government expenditure variables fall and according to Kass and Raftery (1995) rule of thumb there is a positive evidence for the effect. The overall results are similar as in the case where we use trade openness.

Trade Variables:

The Political globalization index has a very low PIP for all government size variables, for all models, showing evidence against the effect according to Kass and Raftery (1995). The overall results are similar as in the case where we use trade openness.

The Social globalization index has a very strong, positive effect on all government expenditure variables. On the other hand for government consumption we have evidence against the effect. The overall results are similar as in the case where we use trade openness.

4.3. Robustness

In order to check the robustness of the results we run the models in tables 5 and 6 using four different dependent variables. For government expenditure we use the hare of Consolidated Central Government Total Outlays to GDP (GovExp2) and the share of Consolidated General Government Total Outlays to GDP (GovExp4) from the Government Financial Statistics statistic (GFS) database of the International Monetary Fund (IMF). Those two variables refer to the period 1972-2010, for 169 countries in an unbalanced panel. For government consumption we use the Government Consumption share of PPP converted GDP per capita at 2005 constant prices (GovCon2) from the Penn World Table 7.1 (PWT7.1) database and the share of General Government Final Consumption Expenditure to GDP (GovCon3) from the World Development Indicators (WDI) database of the World Bank (WB). GovCon2 refers to the period 1950-2010, for 147 countries in an unbalanced panel and GovCon3 refers to the period 1960-2011, for 185 countries in an unbalanced panel. The results for the robustness check can be found in table 6 below.

Table 6: Results - Robustness

	Relationship of Government Size and Trade Openness								Relationship of Government Size and Trade Agreements							
Dependent Variable	**GovExp2**		**GovExp4**		**GovCon2**		**GovCon3**		**GovExp2**		**GovExp4**		**GovCon2**		**GovCon3**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Conflict Variables																
ethnic_wars	0.0013	0.0006	0.0002	0.0005	0.2659 ***	0.2664 ***	0.0066	0.0020	-0.0016	0.0003	0.0003	0.0044	0.1070	0.1537	0.0015	0.0037
	(0.069)	(0.035)	(0.017)	(0.062)	(1.000)	(1.000)	(0.101)	(0.031)	(0.126)	(0.050)	(0.043)	(0.104)	(0.586)	(0.745)	(0.104)	(0.076)
revol_wars	-0.0054	-0.0021	-0.0017	-0.0004	-0.0494	-0.0467	-0.0062	-0.0043	-0.0004	-0.0028	-0.0002	0.0002	-0.0439	-0.0518	-0.0321	-0.0182
	(0.117)	(0.062)	(0.061)	(0.038)	(0.284)	(0.273)	(0.090)	(0.056)	(0.009)	(0.061)	(0.036)	(0.066)	(0.248)	(0.292)	(0.250)	(0.188)
Demographic Variables																
death_rate	0.4378 ***	0.4507 ***	0.4278 ***	0.4780 ***	-0.0006	-0.0024	0.3958 ***	0.3856 ***	0.4551 ***	0.4414 ***	0.4725 ***	0.4566 ***	0.0126	0.0066	0.3052 **	0.3468 ***
	(1.000)	(1.000)	(1.000)	(1.000)	(0.087)	(0.026)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(0.135)	(0.063)	(0.987)	(1.000)
inf_morta_rate	-0.2641 ***	-0.2546 ***	-0.2795 ***	-0.2666 ***	0.0029	0.0015	-0.1532 ***	-0.1470 ***	-0.2432 ***	-0.2379 ***	-0.2562 ***	-0.2616 ***	0.0310	0.0550	-0.1457 ***	-0.1099 *
	(1.000)	(1.000)	(1.000)	(1.000)	(0.060)	(0.028)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(0.318)	(0.558)	(0.998)	(0.935)
life_expect	-0.0030	-0.0040	0.0104	0.0746	0.0814	0.1679	-0.0257	-0.0088	0.0024	0.0054	0.0743	0.0248	-0.0148	-0.0435	-0.0408	-0.0239
	(0.034)	(0.040)	(0.069)	(0.143)	(0.157)	(0.322)	(0.068)	(0.038)	(0.030)	(0.055)	(0.147)	(0.080)	(0.121)	(0.169)	(0.112)	(0.103)
pop_density	-0.0003	-0.0001	0.0000	-0.0070	3.1051 ***	3.1063 ***	-0.0618 ***	-0.0614 ***	-0.0023	-0.0016	-0.0025	0.0026	3.5646 ***	3.6540 ***	-0.0432 **	-0.0480 ***
	(0.025)	(0.048)	(0.095)	(0.252)	(1.000)	(1.000)	(1.000)	(1.000)	(0.042)	(0.122)	(0.115)	(0.277)	(1.000)	(1.000)	(0.957)	(0.996)
pop_growth	-0.1883	-0.0031	-0.6814	-0.8774	0.0056	0.0059	-0.4356	-0.4552	-0.1869	-0.7138	-1.2627	-0.8082	0.0707	0.0028	0.4452	-0.0472
	(0.077)	(0.031)	(0.230)	(0.222)	(0.015)	(0.026)	(0.154)	(0.179)	(0.065)	(0.194)	(0.273)	(0.188)	(0.068)	(0.056)	(0.119)	(0.071)
population	0.0001	0.0004	0.0005	0.0039	-3.2182 ***	-3.2193 ***	0.0005	0.0010	0.0024	0.0014	0.0013	-0.0013	-3.6056 ***	-3.7055 ***	-0.0003	-0.0006
	(0.019)	(0.157)	(0.134)	(0.200)	(1.000)	(1.000)	(0.079)	(0.092)	(0.076)	(0.092)	(0.101)	(0.322)	(1.000)	(1.000)	(0.035)	(0.051)
urb_pop_growth	-0.2383	-0.3500	-0.2871	-0.7916	-0.0449	-0.0455	-0.0294	-0.0219	-0.4526	-1.0033	-1.1356	-1.9605	0.2754	-0.0079	0.1469	0.0816
	(0.151)	(0.191)	(0.130)	(0.262)	(0.062)	(0.037)	(0.056)	(0.048)	(0.241)	(0.317)	(0.361)	(0.544)	(0.150)	(0.030)	(0.093)	(0.053)
work_age_rat	-0.0053	-0.0016	-0.0019	-0.0023	0.0031	0.0045	0.3552 **	0.3689 **	-0.0027	-0.0041	0.0039	0.0212	0.0301	0.0029	0.3403 *	0.3495 *
	(0.134)	(0.085)	(0.046)	(0.068)	(0.033)	(0.044)	(0.969)	(0.964)	(0.076)	(0.117)	(0.092)	(0.173)	(0.170)	(0.027)	(0.892)	(0.905)
Geographic Variables																
ethnic_fraction	0.0000	0.0001	0.0004	0.0004	0.0110	0.0136	0.0001	0.0002	-0.0004	0.0004	-0.0006	0.0001	0.0057	0.0260	-0.0008	0.0000
	(0.000)	(0.047)	(0.222)	(0.084)	(0.229)	(0.289)	(0.084)	(0.045)	(0.104)	(0.112)	(0.054)	(0.035)	(0.160)	(0.431)	(0.056)	(0.006)
lingu_fraction	-0.0001	-0.0012	-0.0017	-0.0049	-0.0003	-0.0001	-0.0002	-0.0002	-0.0012	-0.0010	-0.0086	-0.0091	0.0008	0.0017	0.0000	-0.0002
	(0.020)	(0.222)	(0.097)	(0.259)	(0.014)	(0.023)	(0.033)	(0.138)	(0.108)	(0.113)	(0.367)	(0.420)	(0.036)	(0.124)	(0.027)	(0.112)
relig_fraction	0.0264	0.0244	0.0153	0.0206	0.0923 ***	0.0902 ***	0.0000	0.0002	0.0359 *	0.0391 *	0.0283	0.0181	0.0937 ***	0.0952 ***	-0.0004	-0.0003
	(0.648)	(0.578)	(0.408)	(0.460)	(1.000)	(1.000)	(0.000)	(0.049)	(0.783)	(0.781)	(0.631)	(0.442)	(1.000)	(1.000)	(0.038)	(0.084)
num_neighb_st	0.0400 ***	0.0381 ***	0.0389 ***	0.0364 ***					0.0355 ***	0.0356 ***	0.0349 **	0.0341 ***				
	(1.000)	(1.000)	(1.000)	(1.000)					(1.000)	(0.995)	(0.973)	(0.992)				
total_area	0.0004	0.0013	0.0000	0.0058	3.1492 ***	3.1511 ***	0.0007	0.0001	0.0003	0.0079	0.0199	0.0320	3.5693 ***	3.6652 ***	0.0015	0.0013
	(0.153)	(0.134)	(0.027)	(0.223)	(1.000)	(1.000)	(0.054)	(0.006)	(0.146)	(0.243)	(0.658)	(0.688)	(1.000)	(1.000)	(0.136)	(0.055)

Table 6 (continued): Results - Robustness

	Relationship of Government Size and Trade Openness								Relationship of Government Size and Trade Agreements							
Dependent Variable	**GovExp2**		**GovExp4**		**GovCon2**		**GovCon3**		**GovExp2**		**GovExp4**		**GovCon2**		**GovCon3**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Economic Institution Variables																
civil_liberties	-0.0108	-0.0207	-0.1312 *	-0.0656	0.0011	0.0038	-0.0366	-0.0401	-0.0127	-0.0206	-0.0811	-0.1084	0.0013	0.0006	-0.0205	-0.0086
	(0.194)	(0.260)	(0.835)	(0.424)	(0.019)	(0.054)	(0.347)	(0.391)	(0.226)	(0.228)	(0.528)	(0.675)	(0.056)	(0.035)	(0.218)	(0.103)
Political Institution Variables																
chief_left	0.0098	0.0088	0.0075	0.0111			-0.0015	-0.0008	0.0038	0.0106	0.0052	0.0123			-0.0014	-0.0003
	(0.251)	(0.227)	(0.158)	(0.221)			(0.051)	(0.029)	(0.107)	(0.209)	(0.109)	(0.226)			(0.057)	(0.036)
chief_military	0.0045	0.0028	0.0031	0.0056			-0.0071	-0.0135	0.0027	0.0013	0.0007	0.0048			-0.0488	-0.0027
	(0.142)	(0.116)	(0.144)	(0.174)			(0.113)	(0.179)	(0.072)	(0.032)	(0.087)	(0.124)			(0.417)	(0.040)
chief_nationalist	0.2302 ***	0.2404 ***	0.2276 ***	0.2324 **			0.1048 *	0.1227 *	0.2451 ***	0.2184 *	0.2452 ***	0.2356 ***			0.1110 *	0.0576
	(1.000)	(1.000)	(1.000)	(0.979)			(0.752)	(0.861)	(1.000)	(0.904)	(1.000)	(1.000)			(0.776)	(0.487)
chief_regional	-0.0030	0.0001	-0.0146	-0.0001			-0.0052	-0.0092	-0.0008	0.0077	-0.0117	-0.0021			-0.0280	-0.0037
	(0.107)	(0.072)	(0.053)	(0.009)			(0.036)	(0.079)	(0.030)	(0.127)	(0.223)	(0.106)			(0.092)	(0.027)
chief_religious	0.0794	0.0774	0.0726	0.0616			0.0025	0.0015	0.0509	0.0465	0.0700	0.0472			-0.0003	0.0003
	(0.670)	(0.633)	(0.597)	(0.534)			(0.066)	(0.035)	(0.477)	(0.451)	(0.579)	(0.384)			(0.039)	(0.051)
chief_rural	-0.0005	-0.0002	0.0000	-0.0014			-0.0001	-0.0039	0.0006	-0.0003	0.0002	-0.0003			-0.0001	0.0004
	(0.029)	(0.041)	(0.050)	(0.116)			(0.002)	(0.133)	(0.076)	(0.012)	(0.021)	(0.082)			(0.003)	(0.038)
political_rights	0.0166	0.0264	0.1417 *	0.0498	0.0196	0.0077	-0.0539	-0.0487	0.0025	0.0045	0.0448	0.0491	0.0171	0.0130	-0.0769	-0.1081 *
	(0.183)	(0.267)	(0.865)	(0.327)	(0.273)	(0.108)	(0.572)	(0.500)	(0.063)	(0.131)	(0.333)	(0.424)	(0.201)	(0.155)	(0.658)	(0.927)
polity_score	0.0167 ***	0.0171 ***	0.0205 ***	0.0172 ***					0.0172 ***	0.0151 *	0.0160 *	0.0150 *				
	(1.000)	(0.997)	(1.000)	(0.994)					(1.000)	(0.909)	(0.916)	(0.900)				
Macro Policy Variables																
centraliz_tot_outl	0.4947 ***	0.5107 ***	-0.3305 ***	-0.3240 ***					0.5083 ***	0.5072 ***	-0.3051 ***	-0.2351 *				
	(1.000)	(1.000)	(1.000)	(0.991)					(1.000)	(1.000)	(1.000)	(0.830)				
gdp_per_capita	-0.2147 ***	-0.1994 ***	-0.2444 ***	-0.2467 ***	-0.1301 **	-0.1387 ***	-0.0759 *	-0.0652 *	-0.2165 ***	-0.2053 ***	-0.2506 ***	-0.2460 ***	-0.0372	-0.0136	-0.0111	-0.0160
	(1.000)	(1.000)	(1.000)	(1.000)	(0.980)	(1.000)	(0.905)	(0.798)	(1.000)	(1.000)	(1.000)	(1.000)	(0.386)	(0.202)	(0.225)	(0.237)
inflation	0.0086 *	0.0094 **	0.0099 **	0.0107 ***	-0.0003	-0.0001	0.0166 ***	0.0165 **	0.0096 *	0.0100 **	0.0102 *	0.0107 *	-0.0014	-0.0003	0.0171 ***	0.0178 ***
	(0.880)	(0.953)	(0.979)	(0.990)	(0.055)	(0.013)	(0.992)	(0.969)	(0.948)	(0.964)	(0.937)	(0.948)	(0.199)	(0.040)	(1.000)	(1.000)
investment_share	-0.0017	-0.0011	-0.0018	-0.0023	-0.0005	-0.0014	0.1564 ***	0.1539 ***	0.0007	-0.0024	-0.0015	-0.0024	-0.0074	-0.0172	0.1164 *	0.1700 ***
	(0.086)	(0.090)	(0.132)	(0.066)	(0.043)	(0.079)	(1.000)	(1.000)	(0.017)	(0.086)	(0.139)	(0.130)	(0.121)	(0.241)	(0.947)	(1.000)

Table 6 (continued): Results - Robustness

	Relationship of Government Size and Trade Openness								Relationship of Government Size and Trade Agreements							
Dependent Variable	**GovExp2**		**GovExp4**		**GovCon2**		**GovCon3**		**GovExp2**		**GovExp4**		**GovCon2**		**GovCon3**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Politic Variables																
federal	-0.0323	-0.0264	-0.0151	-0.0133	-0.0407	-0.0526	-0.0004	-0.0002	-0.0049	-0.0121	-0.0108	-0.0073	-0.1104 *	-0.0986	-0.0125	-0.0040
	(0.545)	(0.453)	(0.317)	(0.279)	(0.368)	(0.473)	(0.033)	(0.036)	(0.110)	(0.251)	(0.213)	(0.154)	(0.788)	(0.745)	(0.224)	(0.077)
presidential	-0.1735 ***	-0.1732 ***	-0.1857 ***	-0.1607 *	-0.1453 *	-0.1429 *	-0.1405 **	-0.1508 ***	-0.1711 ***	-0.1407 *	-0.1584 ***	-0.1612 ***	-0.0683	-0.0217	-0.1489 ***	-0.1297 **
	(1.000)	(1.000)	(1.000)	(0.944)	(0.930)	(0.920)	(0.973)	(1.000)	(1.000)	(0.896)	(1.000)	(1.000)	(0.535)	(0.206)	(0.998)	(0.978)
proportionality	0.1289 ***	0.1275 ***	0.1019 **	0.1087 ***			0.0022	0.0033	0.1187 ***	0.1242 ***	0.1115 ***	0.1207 ***			0.0017	0.0009
	(1.000)	(1.000)	(0.976)	(1.000)			(0.055)	(0.076)	(1.000)	(1.000)	(0.993)	(1.000)			(0.057)	(0.021)
Trade Variables																
Open_Total	-0.3286 **	-0.3031 **	-0.3503 ***	-0.1864	0.0017	0.0018	0.0000	0.0039								
	(0.989)	(0.966)	(1.000)	(0.618)	(0.021)	(0.015)	(0.024)	(0.105)								
Open_TrAgree									-0.0281	-0.0192	-0.0130	-0.0054	-0.0499	-0.0333	-0.0117	0.0026
									(0.249)	(0.130)	(0.081)	(0.061)	(0.221)	(0.110)	(0.099)	(0.028)
Open_NoTrAgree									-0.2824 *	-0.2006	-0.1051	-0.0193	0.0515	0.0100	-0.0065	-0.0040
									(0.927)	(0.729)	(0.372)	(0.140)	(0.257)	(0.052)	(0.084)	(0.114)
political_global	0.0188	0.0247	0.0073	0.0079	-0.0085	-0.0079	-0.1336 *	-0.1080 *	0.0115	0.0059	0.0053	0.0331	-0.0046	-0.0034	-0.0187	-0.0317
	(0.185)	(0.204)	(0.062)	(0.073)	(0.074)	(0.063)	(0.909)	(0.759)	(0.179)	(0.058)	(0.111)	(0.271)	(0.054)	(0.068)	(0.150)	(0.270)
social_global	0.5730 ***	0.5563 ***	0.5788 ***	0.5630 ***	0.0023	0.0077	0.3862 ***	0.3715 ***	0.5476 ***	0.5397 ***	0.5672 ***	0.5546 ***	-0.0867	-0.0338	0.2017 *	0.3263 ***
	(1.000)	(1.000)	(1.000)	(1.000)	(0.031)	(0.122)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(0.444)	(0.257)	(0.950)	(1.000)
Regional Dummy Variables																
east_asia&pacific	0.0006	0.0003	-0.0001	-0.0007	-0.0043	-0.0022	-0.0021	-0.0014	0.0009	-0.0208	-0.0001	-0.0094	-0.0510	-0.0007	-0.0720	-0.0255
	(0.106)	(0.039)	(0.020)	(0.026)	(0.047)	(0.024)	(0.060)	(0.031)	(0.042)	(0.261)	(0.059)	(0.216)	(0.318)	(0.007)	(0.537)	(0.309)
latin_amer&carib	-0.0030	-0.0047	-0.0068	-0.0187	0.0007	0.0027	-0.0043	-0.0021	-0.0102	-0.0420	-0.0080	-0.0158	-0.0007	-0.0023	-0.0163	0.0007
	(0.062) *	(0.120) *	(0.121) *	(0.164) *	(0.023)	(0.076)	(0.088)	(0.108)	(0.156) *	(0.264) *	(0.119) *	(0.138)	(0.043)	(0.077)	(0.181)	(0.049)
mid_east&nor_afr	0.7872 ***	0.7863 ***	0.7591 ***	0.7543 ***	0.0311	0.0165	0.4416 ***	0.4442 ***	0.7987 ***	0.7787 ***	0.7585 ***	0.7253 ***	0.0100	0.0209	0.4341 ***	0.4665 ***
	(1.000)	(1.000)	(1.000)	(1.000)	(0.234)	(0.116)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(0.083)	(0.152)	(1.000)	(1.000)
north_america	-0.0008	-0.0016	0.0103	0.0128	0.0077	0.0100	-0.0004	-0.0017	-0.0028	-0.0419	0.0057	0.0102	0.0085	0.0034	-0.0006	-0.0040
	(0.023)	(0.090)	(0.145)	(0.165)	(0.046)	(0.063)	(0.010)	(0.052)	(0.144)	(0.191)	(0.128)	(0.104)	(0.063)	(0.078)	(0.030)	(0.071)
south_asia	0.0084	0.0133	0.0304	0.0605	-0.0076	-0.0012	-0.0199	-0.0155	0.0090	0.0175	0.0902	0.1044	0.1182	-0.0016	0.0382	-0.0029
	(0.132)	(0.173)	(0.235)	(0.422)	(0.070)	(0.012)	(0.172)	(0.144)	(0.149)	(0.218)	(0.578)	(0.517)	(0.361)	(0.013)	(0.238)	(0.046)
subsaharan_africa	0.0024	0.0073	0.0015	-0.0026	-0.1511 *	-0.1279	0.0721	0.0979	0.0000	0.0006	0.0010	0.0279	-0.0290	-0.0087	0.1194	0.2100 ***
	(0.116)	(0.150)	(0.031)	(0.079)	(0.765)	(0.652)	(0.592)	(0.738)	(0.007)	(0.036)	(0.127)	(0.179)	(0.199)	(0.088)	(0.736)	(1.000)

Table 6 (continued): Results - Robustness

	Relationship of Government Size and Trade Openness								Relationship of Government Size and Trade Agreements							
Dependent Variable	**GovExp2**		**GovExp4**		**GovCon2**		**GovCon3**		**GovExp2**		**GovExp4**		**GovCon2**		**GovCon3**	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Time Dummy Variables																
Year 1986-1990	-0.0008	-0.0013	0.0015	0.0019	-0.0014	-0.0009	0.0000	0.0009	-0.0005	-0.0010	0.0039	0.0000	-0.0001	-0.0002	0.0012	0.0002
	(0.061)	(0.099)	(0.082)	(0.054)	(0.048)	(0.028)	(0.000)	(0.043)	(0.025)	(0.053)	(0.221)	(0.066)	(0.005)	(0.041)	(0.053)	(0.006)
Year 1991-1995	0.0509	0.0367	0.0574	0.0853 *	-0.0053	-0.0001	0.0004	0.0004	0.0476	0.0675 *	0.0866 *	0.0862 *	-0.0007	-0.0004	-0.0013	-0.0003
	(0.727)	(0.539)	(0.649)	(0.891)	(0.120)	(0.002)	(0.043)	(0.036)	(0.618)	(0.835)	(0.822)	(0.839)	(0.022)	(0.019)	(0.066)	(0.102)
Year 1996-2000	-0.0001	-0.0031	-0.0281	-0.0121	-0.0012	-0.0007	-0.0084	-0.0059	-0.0029	-0.0018	-0.0244	-0.0263	-0.0003	0.0000	-0.0130	-0.0189
	(0.010)	(0.110)	(0.400)	(0.260)	(0.080)	(0.039)	(0.139)	(0.108)	(0.072)	(0.093)	(0.229)	(0.247)	(0.026)	(0.002)	(0.243)	(0.306)
Year 2001-2005	-0.0008	-0.0037	-0.0475	-0.0212	0.0044	0.0010 ***	-0.0024	-0.0008	-0.0060	-0.0051	-0.0445	-0.0488	0.0041	0.0006	-0.0006	-0.0086
	(0.064)	(0.120)	(0.556)	(0.317)	(0.090)	(0.017)	(0.069)	(0.060)	(0.123)	(0.145)	(0.429)	(0.472)	(0.124)	(0.042)	(0.026)	(0.222)
Year 2006-2010	0.0117	0.0060	-0.0180	0.0004	0.0380	0.0283	0.0011	0.0029	-0.0010	0.0009	-0.0275	-0.0279	0.0032	0.0005	-0.0010	-0.0001
	(0.246)	(0.147)	(0.228)	(0.120)	(0.302)	(0.226)	(0.052)	(0.118)	(0.067)	(0.027)	(0.238)	(0.296)	(0.044)	(0.020)	(0.072)	(0.033)
Intercept	-1.9661 ***	-2.1381 ***	-1.6518 ***	-2.1512 ***	-0.2336 ***	-0.5418	-1.6901 ***	-1.9091 ***	-1.9875 ***	-2.1064 ***	-2.2902 ***	-2.2583 ***	-1.1104 ***	-1.3879 ***	-1.9349 ***	-2.4858 ***
	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)

* if 75%≤PIP<95%
** if 95%≤PIP<99%
*** if PIP≥99%
PIP is the Posterior Inclusion Probability
Notes:
In model 1 we run the Bayesian Model Average (BMA) estimation using the logarithm of 5-year average trade openness. In model 2 we run the BMA estimation using the lag of the logarithm of 5-year average trade openness and using all the other variables that we use in Model 1.
GovExp2 is the share of Consolidated Central Government Total Outlays to GDP, GovExp4 is the share of Consolidated General Government Total Outlays to GDP, GovCon2 is the Government Consumption share of PPP converted GDP per capita at 2005 constant prices and GovCon3 is the share of General Government Final Consumption Expenditure to GDP.
GovExp2 and GovExp4 data comes from Government Financial Statistics statistic (GFS) database of the International Monetary Fund (IMF), GovCon2 data comes from Penn World Table 7.1 (PWT7.1) and GovCon3 data comes from World Development Indicators (WDI) database of the World Bank (WB).

Trade openness has a negative coefficient on both new government expenditure variables. PIP is ranging from 0.966-1, showing strong or very strong evidence for the effect. The only exception is the first lag model (Model 2) where PIP shows weak evidence for the effect. PIP shows evidence against the effect of trade openness on both the new government consumption variables. Those results are robust with our previous findings and consistent with the efficiency hypothesis.

For all new dependent variables, for all models, PIP for the trade openness under trade agreement regime is less than 0.5, showing evidence against the effect. The Trade openness under no trade agreement regime has a negative sign only on the new central government expenditure and PIP shows strong evidence for the effect. The results for both trade openness variables, under trade agreement regime and under no trade agreement regime, are robust with the previous ones.

Conflict Variables:

The Ethnic and Revolutionary wars dummies have a very low PIP for all government size variables, for all models even if we use trade openness or trade openness with the trade agreement information. The only exception, as in our previous finding, is the government consumption variable from PWT7.1 where we have very strong evidence for a positive effect.

Demographic Variables:

Death rate has a positive effect on all government size variables, for all trade openness variables. PIP shows strong or very strong evidence for the effect. The only exception is when we use the government consumption from PWT7.1, where we have evidence against the effect if we use trade openness and weak evidence for the effect if we use trade openness under trade agreement regime. The overall results are robust with our previous findings.

Infant mortality rate has a negative effect on all government size variables, for all trade openness variables. PIP shows strong or very strong evidence for the effect. The only exception is when we use the government consumption from PWT7.1, where we have evidence against the effect if we use trade openness and weak evidence for the effect if we use trade openness under trade agreement regime. The overall results are robust with our previous findings.

Life expectancy has a fairly low PIP, showing evidence against the effect, for all government size variables, for all trade openness variables. The overall results are quite similar with our previous results.

The PIP of the population density shows very strong evidence for the effect only on the government consumption variable. We found a positive effect on the government consumption from PWT7.1 and a negative effect on the government consumption from WDI.

Population growth has a fairly low PIP, showing evidence against the effect, for all government size variables, for all trade openness variables. The overall results are robust with our previous findings.

Population has a negative effect only when we use government consumption from PWT7.1. PIP shows very strong evidence for the effect. The overall results are robust with our previous results.

Both urban population growth and working age ratio have a fairly low PIP, for all government size variables, for all trade openness variables. Those results are robust with our previous finding. The only exception is the

positive effect on the government consumption from WDI of the working age ratio. PIP shows strong evidence using either the trade openness variable or the trade agreement openness.

Geographic Variables:

The overall results for Ethnic, Linguistic and Religious fractionalization index are robust with our previous results. The Ethnic, Linguistic and Religious fractionalization index have very a low PIP for all government size variables, for all models, for all trade openness variables. The only difference is the religious fractionalization index, when the dependent variable is government consumption from PWT7.1 where we have a very strong evidence for the effect. Also we have a positive evidence for the effect for the religious fractionalization index, when we use the trade agreement variables.

The number of neighboring states sharing a border with the identified state has a strong or very strong evidence for a positive effect on all new government expenditure variables, showing robustness with our previous finding.

The country's total area in square kilometers has a very strong negative effect only for government consumption as before. The overall results are robust with the previous ones.

Economic Institution Variables:

The Civil liberties index has a fairly low PIP for all new government size variables, for all models, for all trade openness variables. Those results are robust with our previous findings.

Political Institution Variables:

The orientation of the chief executive party (in our case if we test for a left party), has a very low PIP for all new government size variables, for all models, for all trade openness variables showing robustness with our previous results.

The results show that a chief executive, who is a military officer, will affect none of the new government size variables. We get the same results with our previous findings.

The results from the background of the chief executive party (we test for nationalist, regional, religious and rural parties) on the new government size variables are robust with our previous findings. As before if the chief executive party is nationalist then this affect positive all government expenditure variables.

The Political rights index has a very low PIP for all new government size variables, for all models, for all trade openness variables showing robustness with our previous results.

The Revised combined polity score has very strong evidence for a positive effect on both the new government expenditure variables. Those results are robust with our previous findings.

Macro Policy Variables:

The share of central government to general government expenditure has a strong or a very strong effect on both the new government expenditure variables. As before for the central government expenditure we have a positive effect and for general government effect we have a negative effect.

Gdp per capita has a negative effect on all new government size variables when we use the trade openness variable and a negative effect on the government expenditure variables when we use the trade agreement openness. Those results are robust with our previous findings.

Inflation has a positive effect on the two new government expenditure variables and on the government consumption variable from WDI. For government expenditure we have strong evidence for the effect if we use the trade openness variable and positive evidence for the effect if we use the trade agreement openness variables. For government consumption we have very strong evidence for the effect for any trade openness variable we use.

The share of investment to gdp has a very low PIP for all government size variables, for all models, showing evidence against the effect. The only exception with our previous results is the very strong evidence for a positive effect on the government consumption from WDI.

Politic Variables:

The Federal system of government has a very low PIP for all government size variables, for all trade openness variables showing robustness with our previous results.

The Presidential type of regime has a negative effect on all government size variables. PIP shows very strong evidence for the effect on the government expenditure and on government consumption from WDI even if we use trade openness or trade openness with the trade agreement information. Those results are robust with our previous findings.

The Proportional electoral rule has a positive effect only on the government expenditure. PIP shows very strong evidence for the effect something which is robust with our previous findings.

Trade Variables:

The Political globalization index has a very low PIP for all government size variables, for all models, for all trade openness variables showing robustness with our previous results.

The Social globalization index has a very strong, positive effect on all government size variables. The only exception is when we use the government consumption variable from PWT7.1 as the dependent variable. The overall results are robust with our previous findings.

5. Conclusion

Through this study we tried to find what the determinants of government size are. We used data for 102 countries from 1976 to 2010. Data for the dependent variables come from the Penn World Table 7.1 (PWT7.1) database and the Government Financial Statistics statistic (GFS) database of the International Monetary Fund (IMF). Studying the existing literature we tried to use all possible control variables that authors used in order to determine which of those affect government size. We tested more than 140 variables, and ended up with 45 for our final model. Control variables come from the Political Institutions database, the Freedom House database, the KOF Index of Globalization database, the Polity IV database, the Penn World Table 7.1 database, the Quality of Government Institute database, the World Development Indicators database and the World Trade Organization database. In order to find the determinants of government expenditures and consumption we used the Bayesian Model Average estimation so that to count for model uncertainty.

Our main independent variable is trade openness. The most used measure of trade openness is the share of the sum of exports and imports to gdp. We tested trade openness from various datasets and ended up with the one from the Penn World Table 7.1, because it includes data for more countries than other datasets. The relationship between government size and trade openness is not clear. This relationship divides the literature into two hypotheses. The first one indicates that more open countries have greater government size (compensate hypothesis) and the second one that more open countries have lower government size (efficiency hypothesis).

We found that by using trade openness, the results for government expenditure are consistent with the efficiency hypothesis. This shows that more trade open countries tend on average to decrease their government expenditures. This is not true if we use government consumption. We found a statistically insignificant coefficient which shows that trade does not affect government consumption. When we divide trade openness into trade openness under the trade agreement regime and trade openness under no trade agreement regime we get new information on how trade affects government size. For government expenditure we found evidence that trade under customs union, economic integration agreements, free trade agreements and partial scope agreements does not support neither the compensate nor the efficiency hypothesis. This was something that we expected since the countries that signed those agreements agreed to let trade between them free of any government intervention. On the other hand, we found evidence of a negative relationship between trade under no trade agreement regime and government expenditure. This shows that trade can be very beneficial for a country that wants to decrease its expenditure and achieve a fiscal adjustment. Finally we found that neither trade openness under the trade agreement regime nor trade openness under no trade agreement regime affect government consumption.

The main control variables that affect government expenditures are death rate, infant mortality rate, the number of neighboring countries sharing a border, if the chief executive party is nationalist, the share of central to general government expenditure, gdp per capita, if the type of regime is presidential and social globalization. Death rate has a positive coefficient showing that as deaths per 1000 people increase,

government expenditure increases, since the policy makers want to deal with it. The result of death rate is consistent with our prior expectations. Infant mortality rate has a negative coefficient showing that as infant deaths per 1000 live births increase, government expenditure decrease. This opposes our prior expectations. One explanation is that alive infants increase government expenditures, through the health expenditures that an infant will need. So less alive infants will decrease health expenditures and as a consequence government expenditures are decreased. The number of neighboring countries sharing a border with the identified country has a positive coefficient showing that as the neighboring countries increase, government expenditures increase. This shows that countries with many neighbors tend to have more government expenditures, probably in order to deal with this, in terms of external threads or migration. If the chief executive party is nationalist then the coefficient is positive. This is consistent with our prior expectations and shows that if nationalist parties are in charge of the government policy, then government expenditures increase. The coefficient of the share of central to general government expenditures is positive for central and negative for general government expenditures. This is consistent with the Leviathan hypothesis and shows that government intrusion into the economy will be smaller when the public sector is decentralized. Gdp per capita has a negative coefficient, something that is consistent with a part of the literature but it is contrast with Wagner's law. This shows that on average richer countries tend to have lower government expenditures. This is consistent with our prior expectations since on average richer inhabitants prefer private education or health, something that decreases government expenditures. The presidential system has a negative coefficient. A presidential system is a republican system of government where a head of government is also head of state and leads an executive branch that is separate from the legislative branch. This is consistent with our prior expectations and states that countries with presidential type of regime tend to have lower government expenditures. The Social globalization index has a positive coefficient. Social globalization is an index combining information about Telephone Traffic, Transfers, International Tourism, Foreign Population, International letters, Internet Users, Television, Trade in Newspapers, Number of McDonald's Restaurants, Number of Ikea stores, and Trade in books. The positive coefficient can be considered as evidence of the compensate hypothesis about social globalization. According to the compensate hypothesis globalization tends to increase economic inequality, economic insecurity and external risk. Consequently policy makers increase government expenditures in order to protect inhabitants and producers from the social globalization.

The main control variables that affect government consumption are ethnic war, death rate, infant mortality rate, population density, population, religious fractionalization, total area, gdp per capita, investment and if the type of regime is presidential. The coefficient of the ethnic war dummy is positive. This is consistent with the literature and states that countries involved in an ethnic war tend to have higher government consumption. Death rate has a positive coefficient and infant mortality rate has a negative coefficient, only for government consumption to gdp from WDI. Result and explanation about those two variables are the same as of government expenditures mentioned above. Population density has a positive coefficient for both the government consumption to gdp at current and 2005 constant prices and a negative coefficient for

government consumption to gdp from WDI. Population density shows population per square km. The negative effect is consistent with the literature and shows that as population per square km of land area increases, the policy makers decrease expenditures because of economics of scale. The fixed cost of some government projects, such as hospitals or schools, is independent of the population but the average variable cost decreases with the increase of population in a particular area. Population has a negative coefficient. This is consistent with a part of the literature (since the effect is ambiguous) and shows that as population increases, the policy makers decrease expenditures. The reason is the economics of scale, as for population density. Religious fractionalization has a positive coefficient and shows that as the probability that two randomly selected people from a given country will not belong to the same religious group increases, the policy makers increase expenditures. This is consistent with our prior expectations, since the policy makers are expected to increase government expenditures in order to decrease the possible tension between the different religious groups and because the government is obliged to respect all religions and to provide them with the basic tools to meet their religious needs. A Country's total area in square km has a positive coefficient. This is consistent with the literature findings and shows that bigger countries tend to have bigger government consumption. The reason for that is that a big country needs more government facilities, such as airports, ports, hospitals or schools even in places with low population. Also, a big country needs bigger military expenditures in order to deal with external threads and spend more in order to protect its borders from illegal migration. Gdp per capita has a negative coefficient and the explanation about that is the same as of government expenditures mentioned above. Investment share to gdp has a positive coefficient, only for government consumption to gdp from WDI. This opposes our prior expectations and states that as the investment share rises, the government expenditures increase. One explanation is that as investments rise, the government increases expenditures in order to protect inhabitants or producers that may be affected by these investments. Finally, as in the case of government expenditures, the presidential system coefficient is negative.

Our final conclusion is the difference in the results when we use government expenditure and government consumption. Rodrik, in his 1998 article, states that government consumption excludes income transfers and public investment. This difference between the two measures of the government size, affects our results of trade openness and the other control variables. For example, we cannot compare the article of Rodrik (1998) and Shelton (2007) because they use different government size measures. In our article we found that government expenditures are consistent with the efficiency hypothesis but government consumption are not affected by either trade openness, trade openness under the regime of trade agreements or trade openness under the regime of no trade agreements. Those two results cannot be compared with each other since we use different dependent variable and can only be compared with articles which use the same government size variable. Using our result we have evidence that death rate, infant mortality rate, gdp per capita and presidential system affect both government expenditure and government consumption, in the same direction. On the other hand we found that the number of neighboring countries sharing a border, if the chief executive party is nationalist, the share of central to general government expenditure and social globalization affect

only government expenditures whereas ethnic war, population density, population, religious fractionalization, total area and investment affect only government consumption.

This article can be considered as the first step in explaining the determinants of government expenditures and government consumption and their relationship with trade openness and trade agreements. In order to reach a final theory about government size we have to extent data and methodology. What we will try to do first is to add all possible countries which do not have data for all the years we used, and construct an unbalance panel using the variables and the same methodology from this article in order to see if this will affect our result and if the heterogeneity between countries has to be considered as a problem that needs a solution. Also, we must see what the results are if we divide countries according to their geographical and income regions. In this article we divided trade openness in trade openness under the trade agreement regime and trade openness under no trade agreement regime. We also have to divide the trade agreement regime into its four types, according to World Trade Organization (Customs Union, Economic Integration Agreement, Free Trade Agreement and Partial Scope Agreement) to see if we will get new information about the compensate and the efficiency hypothesis. The traditional measure of trade openness is the share of the sum of imports and exports to gdp. One problem of this measure is that two countries may have the same trade openness but different imports and exports. The first country might have very high imports and very low exports and the other country might have the exact opposite. Using only trade openness though, without knowing the imports and exports share, we lose information about their actual effect on government size. So in order to get as much information as we can we should divide imports and exports under trade agreement regime (CU, EIA, FTA and PSA) and imports and exports under no trade agreement regime. This is one of the first articles that use the Bayesian Model Average (BMA) estimation, in order to explain government size. We use the BMA estimation but we can also test for the simple BMA for panel data and BMA for Dynamic Panels. As a final step we must compare all possible econometric techniques that the literature uses or the ones that can be used for those data. We must compare the different versions of BMA with ordinary least squares, instrumental variables, panel data fixed and random effect, panel data between estimator, simple and GMM dynamic panel data.

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Appendix Table 1: Final Model Variables

Name	Description	Source
Dependent Variables		
GovExp1	Central Government Expenditure: share of consolidated central government expenses to gdp	CONC1
GovExp3	General Government Expenditure: share of consolidated general government expenses to gdp	CONC1
GovCon1	Government Consumption: share of government consumption to gdp at current prices	PWT7.1
Trade Openness Variables		
Open_Total	Trade Openness: share of exports plus imports to gdp	PWT7.1
Open_TrAgree	Trade openness under the trade agreement regime: share of exports plus imports to gdp, when exports and imports are under the trade agreement regime	CONC2
Open_NoTrAgree	Trade openness under no trade agreement regime: share of exports plus imports to gdp, when exports and imports are under no trade agreement regime	CONC2
Conflict Variables		
ethnic_wars	Ethnic wars dummy: equal 1 if the country involved in an ethnic war at a particular year. 0 otherwise	PIV
revol_wars	Revolutionary wars dummy: equal 1 if the country involved in an revolutionary war at a particular year. 0 otherwise	PIV
Demographic Variables		
death_rate	Death rate: deaths per 1000 people	WDI
inf_morta_rate	Infant mortality rate: infant deaths per 1000 live births	WDI
life_expect	Life expectancy: life expectancy at birth in years	WDI
pop_density	Population density: people per square km of land area	WDI
pop_growth	Population growth: annual percentage growth of population	WDI
population	Population: the actual number of population	PWT7.1
urb_pop_growth	Urban population growth: annual percentage growth of urban population	WDI
work_age_rat	Working age ratio: share of working to total population	WDI
Geographic Variables		
ethnic_fraction	Ethnic fractionalization index: probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group	QoG
lingu_fraction	Linguistic fractionalization index: probability that two randomly selected people from a given country will not belong to the same linguistic group	QoG
num_neighb_st	Neighboring states: number of neighboring states sharing a border with the identified state	PIV
relig_fraction	Religious fractionalization index: probability that two randomly selected people from a given country will not belong to the same religious group	QoG
total_area	Total area: country's total area in square kilometers	WDI
Economic Institution Variables		
civil_liberties	Civil liberties index: smaller number indicates greater respect to civil liberties. The index range from 1-7	FH

Appendix Table 1 (continued): Final Model Variables

Name	Description	Source
Political Institution Variables		
chief_left	Chief executive party dummy: equal 1 if the chief executive party is left. 0 otherwise	DPI
chief_military	Chief Executive dummy: equal 1 if the chief executive is a military officer. 0 otherwise	DPI
chief_nationalist	Chief executive party dummy: equal 1 if the chief executive party is nationalist. 0 otherwise	DPI
chief_regional	Chief executive party dummy: equal 1 if the chief executive party is regionalist. 0 otherwise	DPI
chief_religious	Chief executive party dummy: equal 1 if the chief executive party is religious. 0 otherwise	DPI
chief_rural	Chief executive party dummy: equal 1 if the chief executive party is rural. 0 otherwise	DPI
political_rights	Political rights index: smaller number indicates greater respect to political rights. The index range from 1-7	FH
polity_score	Revised combined polity score: index showing the regime of a country. Range from -10 (strongly autocratic regime) to +10 (strongly democratic regime)	PIV
Macro Policy Variables		
centraliz_expense	Centralization: share of central government to general government expenses	CONC3
centraliz_tot_outl	Centralization: share of central government to general government total outlays	CONC3
gdp_per_capita	Gdp per capita: in current international dollar	PWT7.1
inflation	Inflation: annual percentage rate of gdp deflator	WDI
investment_share	Investment Share: share of investment to gdp	PWT7.1
Politic Variables		
federal	System of government: equal 1 if the system of government is federal. 0 otherwise	QoG
particip_compet	Competitiveness of participation dummy: the extent to which alternative preferences for policy and leadership can be pursued in the political arena. Equal 1 if the preferences are competitive. 0 otherwise	PIV
political_compet	Political competition index: range from 0 (repressed competition electoral participation) to 10 (institutionalized open electoral participation)	PIV
presidential	Type of regime: equal 1 if the type of regime is presidential. 0 otherwise	DPI
proportionality	Electoral rule: equal 1 if the electoral rule is proportional representation. 0 otherwise	DPI
Trade Variables		
political_global	Political globalization index: bigger number indicates greater political globalization. The index range from 0-100	KOF
social_global	Social globalization index: bigger number indicates greater social globalization. The index range from 0-100	KOF

DPI stand for Political Institutions database, FH stand for Freedom House database, GFS stand for Government Financial Statistics statistic database, KOF stand for KOF Index of Globalization database, PIV stand for Polity IV database, PWT7.1 stand for Penn World Table 7.1 database, QoG stand for Quality of Government Institute database, WDI stand for World Development Indicators database, WTO stands for World Trade Organization database, CONC1 stand for constructed data (government expenditure data comes from GFS and gdp data from PWT7.1), CONC2 stand for constructed data (trade agreements come from WTO and imports, exports and gdp come from PWT7.1 - see section 3.2) and CONC2 stand for constructed data (government expenditure data comes from GFS)

Appendix Table 2: Other Variables

Name	Description	Source
Dependent Variables		
GovExp2	Central Government Expenditure: share of consolidated central government total outlays to gdp	CONC1
GovExp4	General Government Expenditure: share of consolidated general government total outlays to gdp	CONC1
GovCon2	Government Consumption: share of government consumption to gdp at 2005 constant prices	PWT7.1
GovCon3	Government Consumption: share of government consumption to gdp	WDI
Conflict Variables		
arm_sab_bomb	Armed activity, sabotage, or bombings: number of any armed activity, sabotage, or bombings carried on by independent bands of citizens or irregular forces	CNTS
genoc_politic	Genocide and politicide: equal 1 if the country involved in a genocide and/or politicide at a particular year. 0 otherwise	PIV
illeg_forc_chan	Illegal or forced change: number of any illegal or forced change in the top government elite	CNTS
peace_gather	Peaceful public gathering: number of peaceful public gathering of at least 100 people	CNTS
strike	Strike: number of any strike of 1,000 or more industrial or service workers	CNTS
violdem_clash	Violent demonstration or clash: number of any violent demonstration or clash of more than 100 citizens involving the use of physical force.	CNTS
weigh_confl	Weighted conflict measures: index combining assassinations, strikes, guerrilla warfare, government crises, purges, riots, revolutions, and anti-government demonstrations. Bigger number indicates greater conflict	CNTS
Demographic Variables		
birth_rate	Birth rate: total number of births per 1000 people	WDI
rur_pop_growth	Rural population growth: annual percentage growth of rural population	WDI
Geographic Variables		
island	Island: equal 1 if the country is an island. 0 otherwise	CONC4
landlocked	Landlocked: equal 1 if the country is landlocked. 0 otherwise	NYU
tropic_climate	Tropical climate: equal 1 if the country have tropical climate. 0 otherwise	NYU
Economic Institution Variables		
investment_prof	Investment profile index: measure of the government's attitude toward inward investment as determined by four components: the risk to operations, taxation, repatriation, and labor costs. Range from 0 to 12	ICRG
risk_budg_bal	Risk for Budget Balance index: Range from 0 (high risk) to 10 (low risk)	ICRG
risk_ca_gdp	Risk for Current Account as % of GDP index: Range from 0 (high risk) to 15 (low risk)	ICRG
risk_ca_xgs	Risk for Current Account as % of XGS index: Range from 0 (high risk) to 15 (low risk)	ICRG
risk_debt_ser	Risk for Debt Service index: Range from 0 (high risk) to 10 (low risk)	ICRG

Appendix Table 2 (continued): Other Variables

Name	Description	Source
Economic Institution Variables		
risk_excrate_sta	Risk for Exchange Rate Stability index: Range from 0 (high risk) to 10 (low risk)	ICRG
risk_foreign_debt	Risk for Foreign Debt index: Range from 0 (high risk) to 10 (low risk)	ICRG
risk_gdp_growth	Risk for GDP Growth index: Range from 0 (high risk) to 10 (low risk)	ICRG
risk_inflation	Risk for Inflation index: Range from 0 (high risk) to 10 (low risk)	ICRG
risk_intern_liq	Risk for International Liquidity index: Range from 0 (high risk) to 10 (low risk)	ICRG
risk_pcap_gdp	Risk for Per Capita GDP index: Range from 0 (high risk) to 10 (low risk)	ICRG
socioeco_cond	Socioeconomic Conditions index: estimate of the general public's satisfaction or dissatisfaction with the government's economic policies, covering a broad spectrum of factors ranging from infant mortality and medical provision to housing and interest rates. Range from 0 to 12	ICRG
Political Institution Variables		
bureaucr_quality	Bureaucracy quality index: institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change. Range from 0 to 4	ICRG
contriol_houses	Chief executive control: equal 1 if the chief executive controls all relevant houses. 0 otherwise	DPI
corruption	Corruption index: measure of corruption within the political system that is a threat to foreign investment by distorting the economic and financial environment, reducing the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introducing inherent instability into the political process. Range from 0 to 6	ICRG
democ_account	Democratic accountability index: measure of, not just whether there are free and fair elections, but how responsive government is to its people. Range from 0 to 6	ICRG
ethnic_tensions	Ethnic tensions index: measure of the degree of tension attributable to racial, national, or language divisions. Range from 0 to 6	ICRG
exe_recr_election	Chief executive recruitment competitiveness: equal 1 if the chief executive is recruited through election. 0 otherwise	PIV
exe_recr_open	Chief executive recruitment openness: equal 1 if all the politically active population has an opportunity to be elected. 0 otherwise	PIV
exe_recr_regulat	Chief executive recruitment regulation: equal 1 if the chief executives are determined by hereditary succession or in competitive elections. 0 otherwise	PIV
exe_unlimited	Chief executive authority: equal 1 if the chief executive have unlimited authority. 0 otherwise	PIV
external_conflict	External conflict index: measure of the risk to the incumbent government and to inward investment, ranging from trade restrictions and embargoes through geopolitical disputes, armed threats, border incursions, foreign-supported insurgency and full-scale warfare. Range from 0 to 12	ICRG

Appendix Table 2 (continued): Other Variables

Name	Description	Source
Political Institution Variables		
finite_term	Chief executive term: equal 1 if the chief executive has a finite term in office. 0 otherwise	DPI
govern_stability	Government stability index: measure of the government's ability to stay in office and carry out its declared program(s), depending upon such factors as the type of governance, cohesion of the government and governing parties, approach of an election, and command of the legislature. Range from 0 to 12	ICRG
indep_judiciary	Independent judiciary: equal 1 if the country has an independent judiciary. 0 otherwise	QoG
internal_conflict	Internal conflict index: measure of political violence and its actual or potential impact on governance, taking into consideration such factors as whether threats exist, whether they have political objectives, the size and strength of support, and the geographic nature of the conflict. Range from 0 to 12	ICRG
law_order	Law & order index: two measures comprising one risk component. Each sub-component equals half of the total. The "law" sub-component assesses the strength and impartiality of the legal system, and the "order" sub-component assesses popular observance of the law. Range from 0 to 6	ICRG
legal_british	Legal origin: equal 1 if the country has a British legal origin. 0 otherwise	QoG
legal_french	Legal origin: equal 1 if the country has a French legal origin. 0 otherwise	QoG
legal_german	Legal origin: equal 1 if the country has a German legal origin. 0 otherwise	QoG
legal_scandinav	Legal origin: equal 1 if the country has a Scandinavian legal origin. 0 otherwise	QoG
military_politics	Military in politics index: measure of the military's involvement in politics. Range from 0 to 6	ICRG
religious_tensions	Religious tensions index: measure of religious tensions arising from the domination of society and/or governance by a single religious group in a way that replaces civil law by religious law, excludes other religions from the political/social processes, suppresses religious freedom or expressions of religious identity. Range from 0 to 6	ICRG
Macro Policy Variables		
current_account	Current account balance: share of current account balance to gdp	WDI
forei_dir_inv	Foreign direct investment: share of foreign direct investment (net inflows) to gdp	WDI
gdp_growth	Gdp growth: annual percentage growth of gdp	PWT7.1
gr_capit_format	Gross capital formation: share of gross capital formation to gdp	WDI
gross_savings	Gross savings: share of gross savings to gdp	WDI
total_reserves	Total reserves: share of total reserves (includes gold) to gdp	WDI

Appendix Table 2 (continued): Other Variables

Name	Description	Source
Politic Variables		
elect_executive	Executive election: equal 1 if the country had executive election that year. 0 otherwise	DPI
elect_legislative	Legislative election: equal 1 if the country had legislative election that year. 0 otherwise	DPI
gov_vote_share	Vote share of Government Parties: share of government party(ies) votes to total votes	DPI
opp_vote_share	Vote Share of Opposition Parties: share of opposition party(ies) votes to total votes	DPI
polarization	Polarization index: the polarization between the executive party and the four principle parties of the legislature	DPI
Trade Variables		
economic_global	Economic globalization index: bigger number indicates greater economic globalization. The index range from 0-100	KOF
export_fuels	Exporters: equal 1 if the country considers to be fuels (mainly oil) exporter. 0 otherwise	NYU
export_manufa	Exporters: equal 1 if the country considers to be manufactures exporter. 0 otherwise	NYU
export_primary	Exporters: equal 1 if the country considers to be nonfuel primary products exporter. 0 otherwise	NYU
export_services	Exporters: equal 1 if the country considers to be services exporter. 0 otherwise	NYU
tot_adjustment	Terms of trade adjustment: the capacity to import less exports of goods and services in constant local currency prices	WDI

CNTS stand for Cross-National Time-Series Data database, DPI stand for Political Institutions database, ICRG stand for International Country Risk Guide database, KOF stand for KOF Index of Globalization database, NYU stand for NYU Development Research Institute database, PIV stand for Polity IV database, PWT7.1 stand for Penn World Table 7.1 database, QoG stand for Quality of Government Institute database, WDI stand for World Development Indicators database and CONC4 stand for constructed data (from countries map)

Appendix Table 3: Countries

Country	GovExp1	GovExp3	GovCon1	Country	GovExp1	GovExp3	GovCon1
Algeria			∨	Kenya	√	√	√
Argentina			√	Korea South	√	√	√
Australia	√	√	√	Lesotho			√
Austria	√	√	√	Liberia			√
Bahamas			√	Madagascar			√
Bangladesh			√	Malawi			√
Barbados			√	Malaysia	√	√	√
Benin			√	Mali			√
Bolivia			√	Malta			√
Botswana			√	Mauritania			√
Brazil			√	Mauritius	√	√	√
Burkina Faso			√	Mexico			√
Burundi			√	Morocco	√	√	√
Cameroon			√	Nepal			√
Canada	√	√	√	Netherlands	√	√	√
Central African Republic			√	New Zealand	√	√	√
Chad			√	Nicaragua	√	√	√
Chile	√	√	√	Niger			√
China			√	Nigeria			√
Colombia			√	Norway	√	√	√
Costa Rica	√	√	√	Oman			√
Cyprus	√	√	√	Pakistan	√	√	√
Democ. Republic of Congo			√	Panama			√
Denmark	√	√	√	Papua New Guinea			√
Dominican Republic	√	√	√	Paraguay	√	√	√
Ecuador			√	Peru	√	√	√
Egypt	√	√	√	Philippines	√	√	√
Fiji			√	Portugal	√	√	√
Finland	√	√	√	Republic of the Congo			√
France	√	√	√	Senegal			√
Gabon			√	Sierra Leone			√
Gambia			√	Singapore	√	√	√
Ghana			√	South Africa	√	√	√
Greece			√	Spain	√	√	√
Guatemala	√	√	√	Sudan			√
Guinea Bissau			√	Swaziland			√
Guyana			√	Sweden	√	√	√
Honduras			√	Syria			√
Hungary			√	Thailand	√	√	√
Iceland			√	Togo			√
India	√	√	√	Trinidad and Tobago			√
Indonesia	√	√	√	Tunisia	√	√	√
Israel			√	Turkey			√
Italy	√	√	√	United Kingdom	√	√	√
Ivory Coast			√	United States of America	√	√	√
Jamaica			√	Uruguay	√	√	√
Japan			√	Venezuela			√
Jordan	√	√	√	Zambia			√

Appendix Table 4: Variables

Variable	GovExp1	GovExp3	GovCon1	Way of Entering into the Model
GovExp1	√			ln(5-Year Average)
GovExp2				ln(5-Year Average)
GovExp3		√		ln(5-Year Average)
GovExp4				ln(5-Year Average)
GovCon1			√	ln(5-Year Average)
GovCon2				ln(5-Year Average)
GovCon3				ln(5-Year Average)
Open_NoTrAgree	√	√	√	ln(5-Year Average) - ln(1+X)
Open_Total	√	√	√	ln(5-Year Average) - ln(1+X)
Open_TrAgree	√	√	√	ln(5-Year Average) - ln(1+X)
centraliz_expense	√	√		ln(5-Year Average)
centraliz_tot_outl				ln(5-Year Average)
chief_left	√	√		5-Year Average
chief_military	√	√		5-Year Average
chief_nationalist	√	√		5-Year Average
chief_regional	√	√		5-Year Average
chief_religious	√	√		5-Year Average
chief_rural	√	√		5-Year Average
civil_liberties	√	√	√	ln(5-Year Average)
death_rate	√	√	√	ln(5-Year Average)
east_asia&pacific	√	√	√	5-Year Average
ethnic_fraction	√	√	√	ln(5-Year Average)
ethnic_wars	√	√	√	5-Year Average
federal	√	√	√	5-Year Average
gdp_per_capita	√	√	√	ln(Initial Value)
inf_morta_rate	√	√	√	ln(5-Year Average)
inflation	√	√	√	5-Year Average
investment_share	√	√	√	ln(5-Year Average)
latin_amer&carib	√	√	√	5-Year Average
life_expect	√	√	√	ln(5-Year Average)
lingu_fraction	√	√	√	ln(5-Year Average)
mid_east&nor_afr	√	√	√	5-Year Average
north_america	√	√	√	5-Year Average
num_neighb_st	√	√		5-Year Average
particip_compet	√	√		5-Year Average
political_compet	√	√		ln(5-Year Average)
political_global	√	√	√	ln(5-Year Average)
political_rights	√	√	√	ln(5-Year Average)
polity_score	√	√		5-Year Average
pop_density	√	√	√	ln(5-Year Average)
pop_growth	√	√	√	5-Year Average
population	√	√	√	ln(5-Year Average)
presidential	√	√	√	5-Year Average
proportionality	√	√		5-Year Average
relig_fraction	√	√	√	ln(5-Year Average)
revol_wars	√	√	√	5-Year Average
social_global	√	√	√	ln(5-Year Average)
south_asia	√	√	√	5-Year Average
subsaharan_africa	√	√	√	5-Year Average
total_area	√	√	√	ln(5-Year Average)
urb_pop_growth	√	√	√	5-Year Average
work_age_rat	√	√	√	ln(5-Year Average)