Inequality, Political Systems and Public Spending

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Abstract

The aim of this paper is to check for the existence of a link between political institutions, income inequality and public spending. We develop an empirical investigation, based on panel data analysis, on the determinants of public spending focusing on political, economic, demographic and social variables in large sample of developed and developing countries from 1970 to 2005. With respect to the electoral rule, we find that under proportional rule the degree of government heterogeneity increases public spending, while under majority rule we observe that parliamentary systems tend to spend more than presidential ones. With respect to income distribution, we highlight that its effect on public spending depends upon institutional characteristics. Moreover, we show that government spending is a policy tool used by governments to protect the domestic economy from external shocks.

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1   Introduction

The quality and the quantity of public spending is influenced by different political, social and economic determinants. The aim of this work is to study whether differences in political systems, voting rules and income distribution generate different government consumption decisions. The present work provides an accurate way to model government institutional heterogeneity, highlighting the role of income distribution in shaping government spending policies.

The literature has extensively studied the effect of political institutions and electoral systems on public spending. The theoretical paper by Lizzeri and Persico (2001) suggests the existence of a trade-off between efficiency and targetability of public spending showing that proportional systems are more efficient when public goods are very valuable and winner-take-all systems are more efficient when public goods are not very valuable. In the empirical work by Milesi-Ferretti, Perotti and Rostagno (2002) electoral systems are fundamental in order to determine how governments provide public goods. They show that since under proportional rule the government represents different groups and it is difficult to target public goods on their preferences, non-local public goods (i.e. transfer in cash, subsidies, pensions) are preferred. On the other hand, under winner-take-all rule the government is expected to represent one group (or, at least, homogeneous groups) and public goods targetability is easier, hence local public goods (i.e. schools, hospitals, etc.) are preferred. Persson and Tabellini (2003) study the economic effects of constitutions considering how a country reacts to unobserved common events in terms of government spending and welfare spending taking into account political, economic and social variables.

The present paper differs from existing studies and in particular from the significant contributions of Milesi-Ferretti, Perotti and Rostagno (2002) and Persson and Tabellini (2003) under many aspects. First of all, other than considering different country samples on the basis of electoral rule as previously done in the empirical literature, we also control for the effect of the distribution of seats within each government through the Herfindahl Government Index. This measure allows us to analyze how the degree of government fragmentation may affect public spending even within the same electoral system. There are countries with proportional rule and low fragmentation (and vice versa) and the empirical strategy followed by Milesi-Ferretti, Perotti and Rostagno (2002) cannot give an answer on their preference for local or non-local public goods. Our twofold focus on the electoral dimension (the distinction between proportional and electoral rules and the ability to control for government fragmentation) allows us to distinguish between fragmented and non-fragmented governments also within the two main subsamples of countries characterized by different electoral systems.[1] As a consequence of our methodology, we are able to discuss if electoral rule and/or government fragmentation determines the preference

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[1]Table 7 classifies each country according to the combination of their election rule (proportional or majoritarian) and political system (parliamentary or presidential).

for public spending. Second, we emphasize the role of income inequality. The effect of income distribution on public spending has been explored in the literature with controversial results. On the one hand, the theoretical works by Metzeler and Richard (1981) and Persson and Tabellini (1994, 2000) suggest that income skewness raises public spending, on the other hand, the empirical analysis by Lindert (1996) shows that income inequality lowers total public expenditure, while the theoretical work by Gregorini (2009) suggests that, if income inequality increases, it would be optimal to lower public expenditure. From the methodological point of view, our analysis of the effect of income inequality differs with respect to Persson and Tabellini (2000). While they consider income inequality (measured by Gini Index) as a constant using the average of the observations closest to 1980 and the observations closest to 1990, we consider the Gini Index exploiting also its time variation in a panel data framework based on annual observations. Moreover, we have been able to collect data for a higher number of countries (and more heterogeneous ones) with respect to the existing literature on this topic.

We find that in countries with proportional electoral rule an increase in the heterogeneity of the government increases government consumption. The second important finding relates to the effect of the political system on public spending. In particular, for countries with majoriratian electoral rule, a shift from presidential to parliamentary system leads to an increase in government consumption. With our analysis we are also able to explain that the link between income inequality and public spending depends upon institutional characteristics, in particular on the electoral rule in force. We find that while income inequality does not influence government spending decisions in winner-take-all systems, there is a positive relationship between the Gini index and government consumption in countries with proportional electoral rule. Controlling for a number of demographic country characteristics we find that in countries with proportional electoral rule an increase in the population is associated with a decrease in government consumption, as it happens when the share of elderly people increases. On the contrary, a higher share of working-age individuals leads to a reduction in government consumption. In addition our results support the argument proposed by Rodrik (1998) according to which governments tend to protect their domestic economies from the risk associated to international trade. In fact, we find government consumption to be positively related to a measure of external risk.

The paper is organized as follows. The next session describes the dataset and gives a detailed explanation of the variables used in the empirical analysis. Section 3 presents some descriptive statistics explaining the relationship between the main explanatory variables and government consumption and gives some predictions on the behavior of the main regressors. Section 4 explains the econometric methodology applied in the empirical analysis while results are shown in section 5. Finally, section 6 concludes.

2 Dataset and variables description

Our empirical investigation is based on a data-set of a large number of developed and developing countries over the period 1970-2005. Table 6 and table 9 in the Appendix provide the list of countries included in the analysis and some descriptive statistics of the main variables included in our study. Economic and demographic data are taken from the World Bank WDI data-set. Political variables come from different sources such as the Database of Political Institutions (DPI) created by Beck et al. (2002), the Freedom House and La Porta et al. (1999), while data on income inequality come from the WIID2 database. Table 1 provides a brief description of the explanatory variables. Table 8 shows some systematic relationships between some economic and social country characteristics such us per-capita income, demography, openness to international trade, the degree of civil liberties and the two aspects of the political environment on which we focus our analysis: the electoral rule and the form of government.

2.1 Dependent variable

We want to analyse the effect of a country institutional characteristics on the size of its government. We proxy government size by the general government final consumption expenditure as a percentage of GDP (*Govcon*). This measure includes all government current expenditures for purchases of goods and services including compensation of employees, most expenditures on national defense and security, but excludes government military expenditures.[2] Figure 1 shows the averages of government consumption over decades for the entire country sample and for a sample restricted to OECD countries. The increase in government consumption in OECD countries from the seventies to the eighties, might be due to an increase in welfare spending following economic shocks due to oil price. From the 80s, government consumption appears to be increasing in OECD countries and fairly stable worldwide. This might represent a consequence of the economic crisis experienced during the early 90s and the reaction of governments to the introduction of budget constraints coming from international authorities, like the "Stability and Growth Pact" for many European countries [3], and pressures from international agencies, such as the IMF, to keep government spending under control.

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[2] Government military expenditures are part of government capital formation.

[3] European Union member states adopting the euro have to meet the so-called Maastricht convergence criteria, and the Stability and Growth Pact ensures that they continue to observe them. Member states must respect two main criteria: an annual budget deficit no higher than 3% of GDP and a national debt lower than 60% of GDP or approaching that value.

2.2 Inequality, political rules and forms of government

Government fragmentation. We proxy it by the Herfindhal index for government (*Herfgov*) which represents a measure of concentration of the ruling coalition. This measure is obtained by the sum of the squared seat shares of all parties in the government and thus it indicates how the seats in the parliament are distributed within the government coalition. In case of single-party governments the index equals 1, while in case of government coalitions the index lies between "0" and "1". Formally, this index is given can be expressed by the following formula:

$$H = \sum_{i=1}^{N} s_i^2$$

where s_i represents the share of seats held by each party supporting the government with respect to the total seats held by government parties.

Typically, the higher the number of parties within the coalition, the lower the value of the Index. Furthermore, there is an inverse relationship between the disproportionality of seats shares between parties belonging to government coalition and the value of the Index. Thus, the presence of a dominant party within a coalition increases the value of the Index. This variable allows us to distinguish not only between proportional and majority systems but it also gives us information on the degree of proportionality within the government.

Typology of political system. We distinguish between different types of political systems through the discrete variable (*System*) which takes value "2" in case of parliamentary system, value "1" if the President is elected by an assembly, and value "0" in case of Presidential systems. Systems with unelected executives get a "0". Systems with presidents who are elected directly or by an electoral college (whose only function is to elect the president), in cases where there is no prime minister, also receive a 0.[4]

Income distribution. We measure income inequality through the Gini Index (*Gini*). The Index takes values between "0", in case of uniform income distribution

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[4]In systems with both a prime minister and a president, the Database of Political Institutions (DPI) from which this measure is taken, considers the following factors to categorize the system. a) Veto power: president can veto legislation and the parliament needs a supermajority to override the veto. b) Appoint prime minister: president can appoint and dismiss prime minister and / or other ministers. c) Dissolve parliament: president can dissolve parliament and call for new elections. d) Mentioning in sources: if the sources mention the president more often than the Prime Minister then this serves as an additional indicator to call the system presidential. The system is presidential if (a) is true, or if (b) and (c) are true. If no information or ambiguous information on (a), (b), (c), then (d) holds. Countries in which the legislature elects the chief executive are parliamentary (2), with the following exception: if that assembly or group cannot easily recall him (if they need a 2/3 vote to impeach, or must dissolve themselves while forcing him out) then the system gets a "1".

where Lorenz curve equals equality line, and "1", in case of perfect income inequality where only one person holds the totality of income. Thus, a low Gini coefficient indicates more equal income distribution, while a high Gini coefficient indicates more unequal distribution. "0" corresponds to perfect equality and "1" corresponds to perfect inequality. We took data based on disposable income [5] based on households as unity of analysis. Although we consider high quality data, concerns about the coverage of the data still hold. In particular, it is not always clear whether in-kind incomes are included or not in the calculation of income.[6]

Electoral rule. As it will be better explained in the next paragraph, in our analysis we will split our original sample into two sub-samples according to the electoral rule holding in each country. We are able to do this thanks to the information provided by the variable (*Prop*), a dummy for proportional electoral rule that takes value "1" or "0" in case of proportional or majoritarian electoral rule, respectively. In particular, *Prop* takes value "1" if candidates are elected based on the votes received by their party and/or if the sources specifically call the system "proportional representation" and "0" otherwise.[7]

2.3   Demographical variables

We use four demographic variables in order to capture their influence on the level of government spending. In particular, we will focus on two demographic features characterizing government spending decisions: age composition and geographical distribution.

Country size. We proxied it by total population (*Pop*). This measure is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship [8]. We include this variable in order to control for potential economies of scale in the provision of public goods.

Urbanisation. The degree of urbanization within a country is proxied by the

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[5]The definition of disposable income corresponds to that specified by the Canberra Group (2001) which represents the reference point in the developing standards on conceptual and practical issues related to the production of income distribution statistics.

[6]Often some in-kind incomes are covered but not home production are included. Sometimes non-labour incomes are asked in one question that lumps together transfers and income from property. Source: WIID2.

[7]This definition holds except if the Legislative Indices of Electoral Competitiveness (*LIEC*) provided by DPI is 4 or lower (No legislature; Unelected legislature; Elected legislature with one candidate; One party, with multiple candidates). In this case a "NA" is reported. Source: Database of Political Institutions.

[8]Except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin.

share of population, as a percentage of the total population, living in areas defined as urban in each country (*Urbpop*). Given that the provision of a local public good is easier and more efficient in cities we expect *Urbpop* and *Govcon* to be linked by a positive relationship.

Dependency ratio. A good measure to proxy for the extent of the economically dependent part of the population to the productive part is normally given by the fraction of the population that is "65" or older (*Pop65*). We include this variable in the empirical analysis because it is reasonable to assume a higher share of elderly people to positive effect government consumption through their direct influence on pensions, monetary transfers and health services.

Working age population. We take into account also the fraction of population (as percentage of the total population) with age between 15 and 64 (*Pop1564*) in order to control for the possibility of this group of people to be addressed a different type of public good with respect to that demanded by older people.

2.4 Other control variables

Following some important results stemming from the theoretical and the empirical literature, we add a number of control variables which are usually trusted to influence government consumption. We believe government spending decisions to be driven by either economic, legal and social characteristics. We will consider either internal and external economic factors, such us the level of development proxied by real GDP per capita at constant 2000 US\$ (*Gdppc*) and the volume of trade transactions (*Trade*). We expect government consumption to increase with the level of development while the relationship between trade openness and *Govcon* are less straightforward. Although the literature has extensively analyzed the link between these two important macroeconomic variables, it is important to check whether the relationship between size of government and openness to trade is due to direct or indirect factors. Following this argument, on the one hand we control whether a higher degree of trade openness, proxied by the sum of exports and imports of goods and services measured as a share of GDP, has a direct impact on government consumption. On the other hand, following the argument addressed by Rodrik (1998), we also check whether governments actually mitigate the potential negative effects due to the presence of external risk associated to trade transactions through government spending. To do this we introduce a measure that captures the effect of terms of trade volatility (*Voltot*) [9] on *Govcon* and an interaction variable *Trade*Voltot*,

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[9]Following Rodrik (1998) we choose the volatility of terms of trade as a proxy for the degree of exposure to external risk. *Voltot* is calculated as the standard deviation of (log) differences in terms of trade, measured as the ratio of the export price index to the corresponding import price index measured relative to the base year 2000 (barter terms of

resulting from the multiplication of *Trade* by *Voltot*, that allows us to disentangle the "direct" role played by a greater volume of trade transactions and the role played by external risk in effecting the size of government.

We model the influence of social and legal factors on government consumption by including an index of ethnolinguistic fractionalization and an index of civil liberties, labeled as *Ethno* and *Civillib* respectively. The former index is the average value of five different indices of ethnolinguistic fractionalization [10] and its value ranges from "0" to "1", with higher values indicating a higher degree of heterogeneity between individuals in a country. Following the argument in Alesina, Baqir, and Easterly (1999) we want to investigate whether ethnical diversity influences government spending and if governments behave differently in this respect depending on their institutional sets.[11] The second index is the index of civil liberties provides by the Freedom House (*Civillib*).[12] This measure ranges from "1" to "7" where higher values are associated with lower levels of civil liberties. Although we might expect countries with higher level of civil liberties to need and therefore be provided with higher level of public goods, the political literature explains how dictators can use public spending to maintain consensus on their politics. Thus, it is not straightforward to predict the behavior of this variable. Moreover, we take control for the political-economy argument on the relevance of electoral-business-cycles on government spending by including the variable *Yrsend* which measures the years left in the current term of chief executive.[13] According to Persson and Tabellini (2003)

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trade).

[10] The five component indices are: (1) index of ethnolinguistic fractionalization in 1960, which measures the probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group (the index is based on the number and size of population groups as distinguished by their ethnic and linguistic status); (2) probability of two randomly selected individuals speaking different languages; (3) probability of two randomly selected individuals do not speak the same language; (4) percent of the population not speaking the official language; and (5) percent of the population not speaking the most widely used language.

[11] Alesina, Baqir, and Easterly (1999) study focuses on the role of ethnic fragmentation on the level and composition of public spending in U.S. cities. They conclude that more ethnically diverse jurisdictions in the United States have higher spending and higher deficits/debt per capita, and devote lower shares of spending to core public goods like education and roads.

[12] The ratings process is based on a checklist of 15 civil liberties questions. The civil liberties questions are grouped into four subcategories: Freedom of Expression and Belief (4 questions), Associational and Organizational Rights (3), Rule of Law (4), and Personal Autonomy and Individual Rights (4). Raw points are awarded to each of these questions on a scale of 0 to 4, where 0 points represents the smallest degree and 4 points the greatest degree of rights or liberties present. The highest number of points that can be awarded to the civil liberties checklist is 60 (or a total of up to 4 points for each of the 15 questions). The total number of points awarded to civil liberties checklists determines the civil liberties ratings. Each point total corresponds to a rating of 1 through 7, with 1 representing the highest and 7 the lowest level of freedom.

[13] The number of years left in current term of chief executive is scored "0" in an election

there is evidence of countries with majoritarian electoral rules to be associated with pre-electoral spending cuts, while countries with proportional electoral rules are characterize by expansions of spending both before and after elections.

Table 1: List of variables and sources.

Variable	Description	Source
Govcon	General government final consumption expenditure (% of GDP)	WDI 2005
Gini	Gini index (ranging from 0 to 1)	WIID2
Herfgov	Herfindahl Index for Government	DPI
Prop	Dummy for proportional representation? (1 if yes, 0 if no)	DPI
System	Typology of political system: Parliamentary (2), Assembly-elected President (1), Presidential (0)	DPI
Gdppc	Log of GDP per capita (constant 2000 US$)	WDI 2005
Pop1564	Population ages 15-64 (% of total)	WDI 2005
Pop65	Population ages 65 and above (% of total)	WDI 2005
Pop	Log of total population	WDI 2005
Urbpop	Urban population (% of total)	WDI 2005
Trade	Exports plus imports (% of GDP)	WDI 2005
Voltot	(Lag) Standard deviation of (log) differences in terms of trade	Authors' calculation
Trade*Voltot	(Lag) Interaction term between volatility of terms of trade and trade openness	Authors' calculation
Civillib	Civil Liberties	Freedom House
Yrsend	Years left in Current Term	DPI
Ethno	Ethnolinguistic fractionalization	La Porta et al.
Oecd	Dummy variable taking value 1 for OECD countries, 0 otherwise	Authors' calculation
Africa	Dummy variable taking value 1 for African countries, 0 otherwise	Authors' calculation
America	Dummy variable taking value 1 for Latin America and Caribbeans, 0 otherwise	Authors' calculation
Easteurope	Dummy variable taking value 1 for East European countries, 0 otherwise	Authors' calculation

3   Descriptive statistics and predictions

In this paragraphs we propose a simple and informative analysis of the variables reflecting country constitutional characteristics and income distribution, either over time and across countries, and we preliminarily investigate on their relationship with government consumption.

Figure 2 shows that Gini Index has slowly increased in OECD countries. This result suggests that the differences between upper and lower income classes are increasing notwithstanding welfare spending and redistributive public spending. Comparing figure 2 and figure 3 we also find income distribution to behave differently between OECD countries and the whole country sample. The data show that in the last years income inequality is slowly decreasing worldwide.[14] Nonetheless, given that these countries have (on average) a higher level of income inequality with respect to OECD countries, we can reasonably assume that Gini Index is not decreasing worldwide. Figure 4 suggests an inverse relationship between government spending and income inequality, in the sense that in most countries public expenditure rose more quickly during the 70s, when income inequality was generally declining, than during the 80s and the 90s, when inequality started to increase. The finding of an inverse relationship between *Govcon* and *Gini* is also confirmed by the negative correlation coefficient reported in table 2.

Figure 5 shows the relation between government consumption and *Herfgov*. This plot seems to confirm the result discussed in the literature according to which, *ceteris paribus*, the higher the fragmentation within the parties that support the government the higher public spending. In fact, an increase in government fragmentation implies that the government needs to target public spending on a wider range of supporting parties which are expected to represent a more heterogeneous share of the population. Hence, government spending increases.

Figure 6 indicates that government consumption is higher in parliamentary rather than in presidential systems. Most of the literature on the outcome of democracies, and in particular Lijphart (1999), shows that in parliamentary systems decisions on spending are typically supported by overweighted coalitions. The obvious consequence is that such decisions contain benefits for a wide range of interests. On the contrary, in presidential systems the power of parliament on budget decisions is typically limited by presidential veto-power and this helps in reducing public spending.

Table 3 briefly presents our predictions on the behavior of the main determinants of public spending taking into account previous results stemming from the theoretical and the empirical literature. We would expect income inequality (*Gini*) to have different effects on government consumption depending on the type of electoral rule. In winner-take-all systems, given the relative easiness in targeting public goods, an increase in income inequality should not represent a major concern for the govern-

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[14]This divergence might be due to the availability of few observations on Gini in developing countries for the first years of the sample.
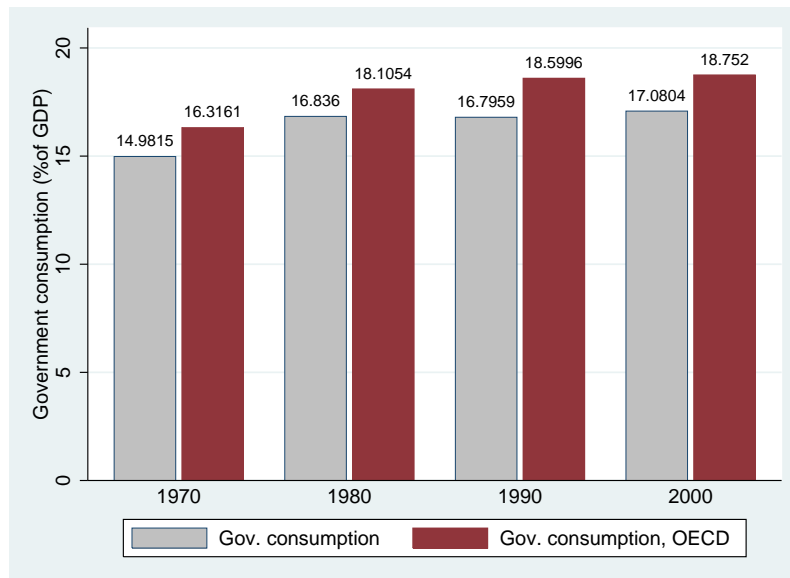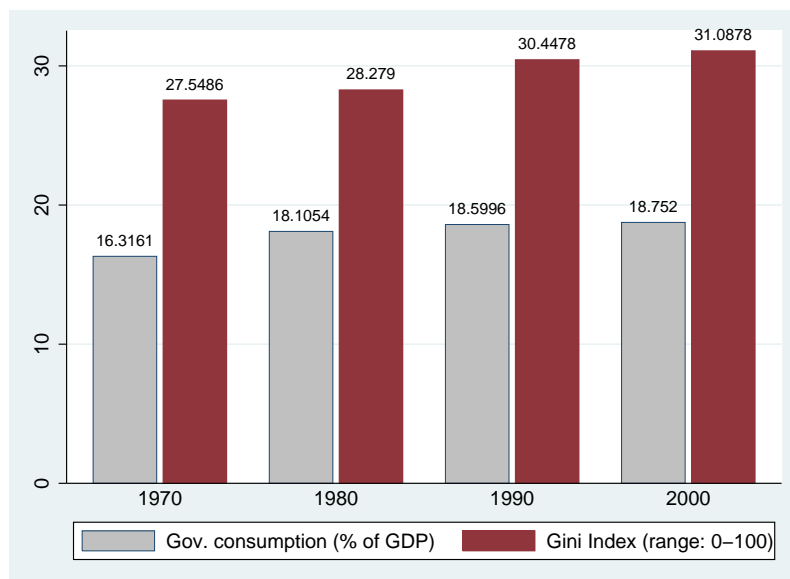
Figure 1: Government consumption over decades.

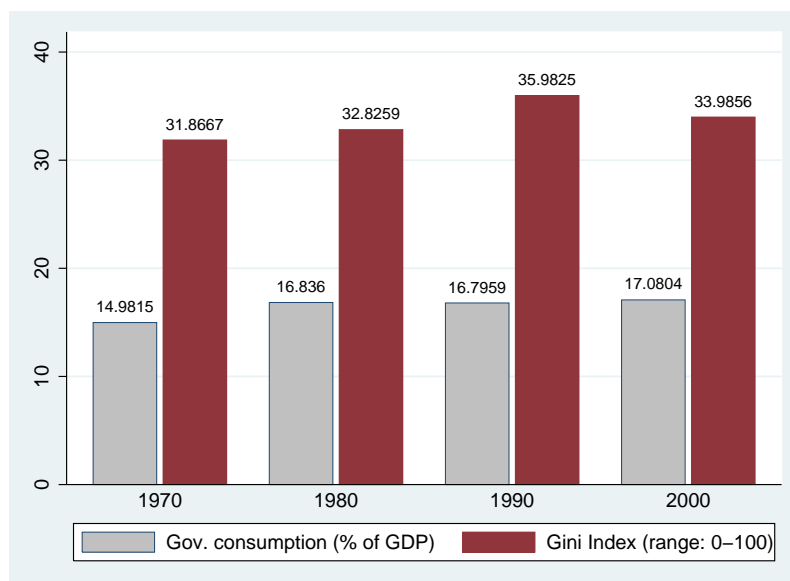Figure 2: Government consumption and Gini Index over decades in OECD countries.

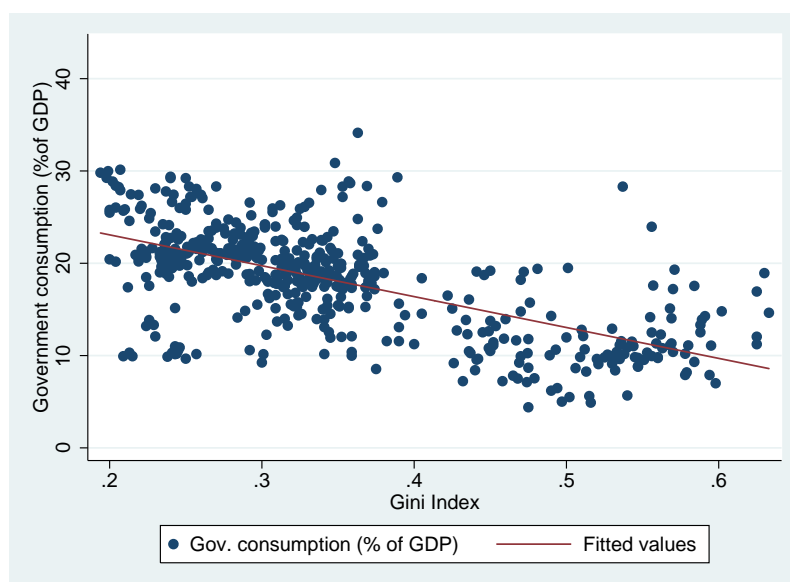Figure 3: Government consumption and Gini Index over decades.

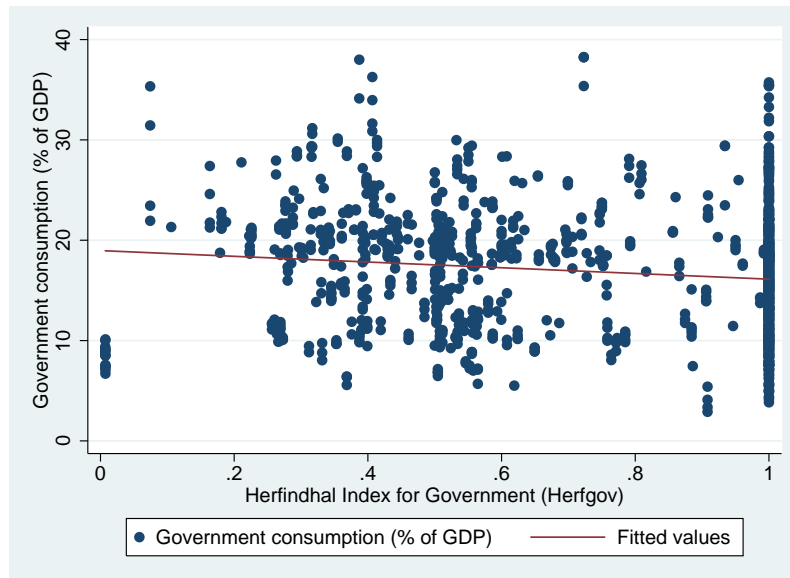Figure 4: Government consumption and Gini Index.

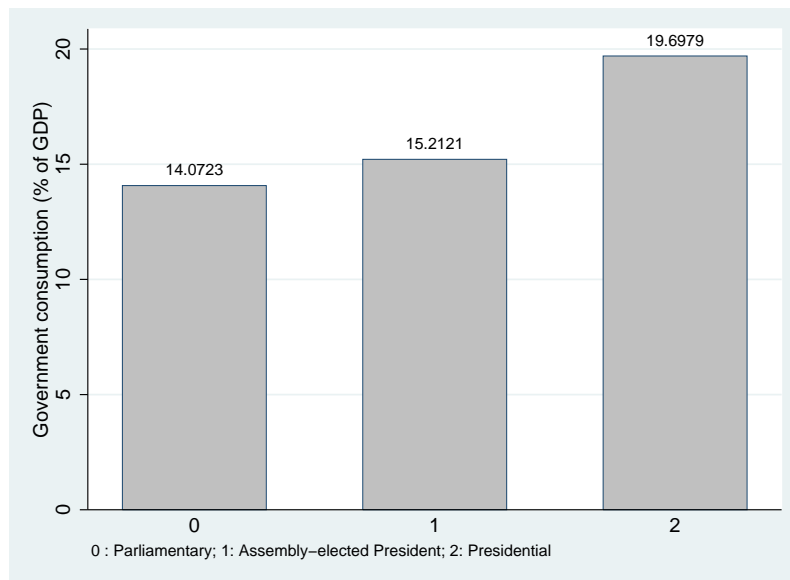Figure 5: Government consumption and government fragmentation.

Figure 6: Government consumption and political system.

Table 2: Pairwise correlation between main variables.

	Gov. consumption (Entire sample)	Gov. consumption (OECD sample)
Herfindhal index (Herfgov)	-0.1372	-0.1814
Political system (System)	0.4091	0.4257
Income distribution (Gini)	-0.6327	-0.5016

ment and thus we expect it not to have a direct impact on government consumption. In proportional systems instead, where the government represents different groups with different needs, an increase in *Gini* would be related to an increase in non-local public goods, thus exerting pressure for an increase in public spending. Following the same reasoning we expect *Herfgov* to influence government consumption only in country with proportional electoral rule, and to be negatively related to *Govcon*. [15] On the other hand, we expect *System* to influence government consumption only in countries with majoritarian electoral rule, and to be positively related to *Govcon*. Moreover, we would expect an increase in *Pop65*, *Urbpop*, *Gdppc* and *Trade*, to have a positive impact on government spending, and a negative relationship between *Pop*, *Pop1564*, *Civillib*, *Ethno* and *Govcon*.

Table 3: Country characteristics and government spending by electoral rule: predictions.

Variable	Majoritarian El. Rule	Proportional El. Rule
Herfindhal index (Herfgov)	?	-
Political System (System)	+	X
Income distribution (Gini)	X	+
Population (Pop)	-	-

Legend: "+" indicates a positive effect, "-" a negative effect, "X" no effect, and "?" uncertain effect.

4 Methodology

As pointed out in the introduction we base our empirical investigation on the determinants of government consumption on a panel data analysis. Panel data have the advantage of taking into account both the cross-section and the time variation of the data allowing to better control for countries heterogeneity. In the next session we will first describe the results obtained applying the panel Random-effects (RE) estimator which we prefer to the Fixed-effect (FE) estimator on the basis of a standard

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[15]Recall that an increase in *Herfgov* represents a decrease of the degree of government fragmentation.

Hausman test.[16] Then, we extend our analysis using a different model specification that takes into account the argument proposed by Rodrik (1998) and we apply an instrumental variables (IV) estimation method that controls for potential endogeneity bias due to the inclusion of GDP per capita (*Gdppc*) among the regressors. In fact, the relationship between the level of GDP per-capita and government size might be effected by the endogenous nature of the latter regressor in that the level of development of a country effects the level of government consumption which, in turn, might effect the level of output per-capita. In order to apply the GLS Random-effects (RE) two-stage least squares (2SLS) model we first need to run a test of endogeneity and choose effective instrumental variables for the level of per-capita GDP. The choice of the instrument always represents a tough challenge. A good instrument is a variable that is supposed to be uncorrelated with the error term but correlated with the endogenous variable. Following a strategy often adopted in macroeconomics empirical works, we use the log of per-capita GDP at the beginning of the sample period to instrument *Gdppc*. Moreover, following the argument proposed by Hall and Jones (1999), as additional external instrumental variable for the level of GDP per-capita we use the latitude of a nation's capital.[17] The authors detect a high correlation between distance from the equator and economic performance and in the empirical literature there is a certain consensus regarding the fact that a country's geographical position is connected to its economic development.[18]

In order to test for the presence of endogeneity, first, we run a test of endogeneity applying a procedure proposed by Wooldridge (2000) and secondly, we run the Hausman test for endogeneity. Wooldridge (2000) explains that some steps must be taken in order to test the endogeneity of a single variable as in our case. The first step consists in estimating a reduced form of the original model in which the variable supposed to be endogenous is regressed on all the exogenous variable included in the

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[16]The specificity of the Random effect estimator is that in addition to the use of the orthogonality conditions that the regressors are uncorrelated with the idiosyncratic error e_{it} (i.e. $E(X_{it}e_{it}) = 0$) as in the case of the Fixed-effects estimator, it also exploits the additional orthogonality conditions that the regressors are uncorrelated with the group-specific error u_i, the "random effect" (i.e. $E(X_{it}u_i) = 0$).

The Hausman test is based on the comparison between the variance of the coefficient estimates obtained using Random and Fixed effects. Under the null hypothesis that the X_{it} and the μ_i are not correlated both Fixed-Effects and Random-Effects are consistent but Random-Effects are more efficient, whereas under the alternative hypothesis that X_{it} and μ_i are correlated, Fixed-Effects is consistent but Random-Effects is not. Thus, if there is no correlation between the unobserved individual effect and the independent observed variables of interest, then the Random-Effects and Fixed-Effects should be approximately the same. On the other hand, if the null hypothesis that the random-effect and fixed-effect are approximately the same cannot be rejected, as it happens in our analysis, then the use of the Random-Effects estimator must be favored.

[17]The variable *Latit*, developed by La Porta et al. (1999), is the absolute value of the latitude of the country, scaled to take values between 0 and 1.

[18]See the works by Landes (1998), La Porta et al. (1999) and Beck et al. (2002), among the most influential, for the theoretical underpinnings.

structural model and on the additional instruments. At this stage we are also able to check whether the additional instrumental variables are actually correlated to the endogenous variable. We are comforted with the result that the log of per-capita GDP at the beginning of the sample period and the latitude of a nation's capital are strongly statistically significant in the regression for *Gdppc*. This result also indicates that these variables may represent sound instruments for the regressor *Gdppc*. The second step requires to save the residuals obtained in the former step in order to add them to the structural equation (which includes the variable suspected to be endogenous). Then we test for the statistical significance of the estimated residuals estimating the structural model using the OLS estimator. Given that in our case the coefficient estimate of the estimated residuals is statistically different from zero we conclude that *Gdppc* is indeed endogenous thus calling for an instrumental variable estimation procedure. After concluding that *Gdppc* is endogenously determined with respect to *Govcon* we run the Hausman test for endogeneity for two reasons. First, we want to check the robustness of the result just obtained. Second, we want to confirm the goodness of the instrumental variable chosen. The Hausman (1978, 1983) test for endogeneity is based on the comparison between OLS and 2SLS estimates where the first estimator is efficient (and consistent) under the null hypothesis that the difference in coefficients is not systematic but inconsistent otherwise and the second is consistent whether or not the hypothesis is true. For this test a rejection of the null, as it is the case in our estimation results, indicates that the endogenous regressor (*Gdppc* in our case) effects on the estimates are meaningful, and this indicates that instrumental variables techniques are required. Moreover, as explained in Wooldridge (2000), when the outcome of the test indicates the existence of endogeneity it is reasonable also to have some confidence in the overall set of instruments used. Nonetheless, we further control for the validity of the external instruments included in the regression running a test of overidentifying restrictions based on the null hypothesis that the excluded instruments are valid instruments (i.e., uncorrelated with the error term and correctly excluded from the estimated equation). In our case, since we cannot reject the null hypothesis, we conclude that the level of per-capita GDP at the beginning of the sample period and the latitude of a country are good instruments for *Gdppc*.

Independently of the model specification and the estimator considered, in order to control for geographical differences across countries we include four dummy variables, namely *Africa* and *America*, *Middleast* and *Easteurope*. Moreover, we implement an estimation procedure robust to the presence of heteroskedasticity and serial correlation in order to assure correct inference on the parameters of the model. As recommended in the empirical literature, we also include time dummies in order to prevent contemporaneous correlation, to control for the fact that the population may have different distributions in different time periods and to control for time-related shocks that might homogeneously effect all the countries included in our sample.

We will carry out our empirical analysis on three different country samples. The

first sample considers the whole set of countries [19] for which we have been able to collect data on public spending and control variables. The other two sub-samples are obtained by splitting the original dataset according to the dummy variable *Prop* which, as stated above, takes value "1" or "0" in case of proportional or majoritarian electoral rule, respectively. This procedure allows us to investigate on the existence of differences in public spending decisions across different electoral rules in force.

5   Results

The aim of this analysis is to investigate on the links between government consumption and a country's institutional set also taking into account the effect of income inequality on government spending decisions. In what follows we show the empirical results based on two different model specifications and different estimation procedures.

We will first present the results obtained applying a panel random effect estimator on an initial model specification before turning to the results obtained using an IV estimator in order to account for potential endogeneity of the regressor *Gdppc*. The second set of results is based on a variant of the first model specification that controls for the existence of the "Rodrik effect".

5.1   Panel Random-Effects

Table 4 shows the results for the benchmark model specification estimated using a panel random-effects estimator. In this analysis a part from the three main variables of our analysis *Herfgov*, *System* and *Gini*, we control for a number of country features. In particular we consider the effect of demographic composition of the population such as the country size (*Pop*), the dependency ratio (*Pop65*), the share of papulation in working age (*Pop1564*) and the level of urbanization (*Urbpop*). We also control for macroeconomics determinants such as openness to international trade (*Trade*) and the level of development (*Gdppc*), and for social (*Ethno*) and political (*Civillib*, *Yrsend*) determinants of government consumption. In what follows we comment on the results for the three main variables of our analysis while we will describe the results for the other variables included in the empirical analysis in the next paragraph.

The Herfindahl Index for Government (*Herfgov*) shows negative and statistically significant coefficients either in the whole sample and in the sample restricted to countries with proportional electoral rule. As stated above we would expect the coefficient estimate of this variable to be very relevant in presence of a proportional election rule, given that majority rule and/or presidential system lower the number of parties both in the parliament and in the government. In particular, the negative sign of the coefficient in column 3 is coherent with the theoretical prediction according

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[19]Countries are listed in table 6.

to which an increase in the degree of preference homogeneity in government (an increase in *Herfgov*) due to a reduction in the number of groups represented within the government, generates a reduction in government consumption.

In the current model specification, *System* shows a positive and statistically significant coefficient in the majority subsample (column 2), which is the significant one for our analysis. An increase in this variable captures the effect of the shift from a presidential to a parliamentary system passing through a regime where the President is elected by an assembly. We expect this variable to have a positive effect on public spending. In parliamentary systems the government depends on parliament approval and parliaments are expected to be more heterogeneous than governments. Furthermore, government consumption is expected to be targeted on the degree of heterogeneity of the parliament rather than on the degree of heterogeneity of the government, so that both these effects go in the same direction: government spending increases together with *System*. In case of proportional systems (column 3), the coefficient estimate is not statistically significant. Consider the case of a country with proportional election rule and presidential system (i.e. Russian Federation and Brazil) where the parliament is elected following proportional rule and the president is elected through majority rule. In this case the government is (typically) independent from parliament approval and the president represents one group (or, at most, homogeneous groups) even if in the parliament there is high fragmentation. Therefore, government consumption will be targeted on the group(s) that support the president rather than on groups represented in the parliament. As a consequence, the relation between *System* and *Govcon* is less significant.

The coefficient estimates for the Gini Index is not significant in case of majority rule and positive and statistically significant in case of proportional rule. In winner-take-all systems public spending is targeted on the pivotal group that supports the government. Under the assumption that median-voter theorem holds under majority election rule, the share of total population represented by the pivotal group is independent of variation in income inequality in the whole population. De facto, the government care less of an increase in inequality rather than in case of proportional electoral rule. When a proportional electoral rule is in force public spending is targeted on the coalition supporting the government, which is typically overweighed. The government represents different groups with heterogeneous preferences on public spending, therefore if income inequality increases the government needs to take care of more heterogenous preferences within its supporting coalition and an increase in public expenditure occurs. Although the debate on this issue is controversial within the literature, our results, obtained making use of a larger number of observations with respect to previous empirical studies, confirm the theoretical analyses by Metzeler and Richard (1981) and Persson and Tabellini (2000).

5.2 Panel IV

In table 5 we present the results of the panel IV model described in section 4. The signs of the estimate coefficients for the variables *Herfgov*, *System* and *Gini* are the same as in table 4 and similar in magnitude. Nonetheless, differently than in table 4, we notice that for this specification the coefficient estimate for *Herfgov* turns out to be negative and statistically significant for the majority rule subsample and positive although not statistically significant in the entire sample. In order to clarify this unexpected outcome we run a test to verify whether the coefficient estimated for *Herfgov* over the group of countries with proportional rule is equal to the coefficient estimated over the group of countries with majority electoral rule (Chow test). When we analyse the entire sample in fact we are "pooling" together two models that predict government spending within each group based on certain characteristics that vary within the group. We do this under the assumption that each group's behavior is unique. Therefore, we test whether the fitted models for the two groups of countries have the same intercepts (knowing that they have similar and negative slope) because if the two fitted models have different intercepts then the positive sign for *Herfgov* in the complete sample might be due to the fact that the "pooled" linear model fits a line with positive slope between the two groups of data. The outcome of the Chow-test goes in this direction in that we reject the null hypothesis that the intercepts for the models estimated for the two different subsamples are equal.

Turning to the results on country demographic composition of the population, it emerges that country size (*Pop*), when statistically significant is negatively correlated to public consumption.[20] This result confirms that in Alesina and Wacziarg (1998), according to which an increase of the population leads to a decrease in public spending. The results on *Pop65* is in line with what we expected. When *Pop65* is statistically significant, it is positively correlated to public consumption. In particular, this relationship holds in the subsample of countries with proportional electoral rule. This result can be explained considering that an aging population requires more public spending (in particular for health services). On the other hand, the coefficient is positive but not statistically significant for the majority subsample. These divergent results are based on the fact that in the majority subsample government spending is supposed to be based on the preferences of the pivotal group which are independent of the demographic composition of the population. On the contrary, the demographic composition of the (typically) overweighed coalitions that support the governments under proportional electoral rule counts: the higher the share of the aging population, the higher the demand for public spending, given that the average income of the aging population is lower that the one of the working-age population, thus the older ones benefits from redistribution from younger people through public spending.

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[20]In the previous analysis summarized in table 4, this result holds independently on the country sample considered.

The contrary occurs when we focus on working age individuals. The coefficient estimate for population share aged between "15" and "64" (*Pop1564*) shows negative and statistically significant coefficient in the subsample for proportional systems countries (column3) while it is not statistically significant for the subsample of countries where representatives are elected through majority rule. As for *Pop65*, in majority systems the government spending is supposed to be independent of the demographic composition of the population. The negative and statistically significant coefficient proportional subsample is the counterpart of the previous result for *Pop65*. In general, active individuals are expected to require less taxation instead of more public spending.

Given the definition of the variable *Govcon* and the theoretical results of Milesi-Ferretti, Perotti and Rostagno (2002), the coefficients for proportional systems and majority system diverge as we would expect. In proportional systems public spending depends upon the demographic composition of the population: higher aging individual share means more public spending; higher working-age individual share means less taxation. On the contrary, the choices in terms of public spending in majority systems are independent of demographic issues, given that such choices are fundamentally based on the pivotal group(s) that typically represent(s) a "small" share of the whole population. We conclude the discussion on the results for explanatory variables of demographic nature analyzing the effect of the level of urbanization on government consumption. The coefficient estimate for *Urbpop* shows a positive sign when it is statistically significant. The positive sign is coherent with the argument that local public goods are located more efficiently in cities where costs of distance are expected to decrease.

Per-capita GDP (*Gdppc*), when significant, enters with negative sign. Controlling for the quality of civil liberties, we find that the estimated coefficient for (*Civillib*) is negative, as expected, in the proportional subsample.[21] We need to take into account that in most cases wealth goes hand in hand with civil liberties. Nonetheless, the literature on politics shows that dictators use public spending to maintain consensus on their politics but the composition of government spending in a non-democratic environment is mainly given by non local public goods. Although it has to be stressed that our aggregate data do not allow us to distinguish among within-region heterogeneity and between regions heterogeneity as in the contribution of Alesina, Baqir, and Easterly (1999) [22], we are still able to provide an explanation

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[21]Recall that an increase in the index implies a lower the level of civil liberties within a country.

[22]In their paper Alesina, Baqir, and Easterly (1999) distinguish between public goods provided at national level and public good provided at county and municipality level in the U.S. finding that the effect of etnolinguistic fractionalization depends on the jurisdiction level where different public goods are provided. In our case, we collect data on ethnolinguistic fractionalization at national level. For example, we are not able to distinguish between a country where there are two regions where there is perfect ethnic homogeneity (i.e. a region with 100% of white people, and the other one with 100% of black people) and a country where there are two regions heterogeneous from the point of view of ethnic fractionalization

of our estimated coefficients for the variable *Ethno* in table 4. In this analysis the estimated coefficients enter with a positive sign. This result is in line with that found in Alesina and Wacziarg (1998) according to which a higher degree of ethnic and linguistic fractionalization, which is typically correlated to country size, puts an upward pressure on public consumption.

In table 4 we included the variable *Trade* to proxy for the degree of openness to international trade. We find trade openness to be negatively related to government spending. In table 5 we show the results obtained replacing the control variable for trade openness (*Trade*) with a group of variables aimed at capturing a more complex aspect relating trade to government spending as done by Rodrik (1998) in his popular paper. According to the author *"there exists a robust positive relationship between government spending and trade openness due to the role played by governments in mitigating, mostly through spending in social security and welfare, the external risk stemming from external shocks associated to trade"*. Following Rodrik's argument we add to our baseline regression the variables *Trade*, *Voltot* and *Trade*Voltot* which represent the lag of the ratio of trade volume over GDP, the volatility in the terms of trade and an interaction term between these two measures respectively, where, according to the author, the latter explanatory variable represents the *"theoretically appropriate measure of external risk for an open economy"*. While our results for the entire sample (column 1) cannot confirm the argument explained above, in that trade openness has a direct and negative effect on *Govcon*, we get to different conclusions when separating countries according to the electoral rule in force. In fact, both in column 2 and 3 of table 5 we find the coefficient for *Voltot* to be statistically significant, with negative sign, indicating that the risk associated with the volatility in the terms of trade is indeed a determinant of public expenditure in particular in countries characterized by proportional electoral rules. We also find results in line with those in Rodrik (1998) for the coefficient estimate of the interaction variable independently on the electoral rule in force in a country. The positive and statistically significant coefficient estimate for *Trade*Voltot* indicate how it is not trade *per se* to drive government consumption but the protecting behavior of the government in its attempt to protect the economy from terms of trade risk. To summarize, altogether our results support the view that government of economies more exposed to trade consume a larger share of GDP in order to mitigate external risk.

6   Conclusions

In this paper we have studied the effects of political, economic, demographic and social variables on size of public expenditure in a large sample of developed and developing countries from 1970 to 2005. We merged data from different databases obtaining a panel dataset that, although unbalanced, represents a significant im-

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(i.e. in both of the two regions there is the same percentage of white people and black people.

provement with respect to the data used in previous empirical analysis. In particular, we extended the time dimension and conducted our analysis on yearly data improving the exploitation of the time variations of all the variables in our data set. In our work, controlling for the effect of demographic composition of the population, macroeconomics and social country features, we provide a general explanation of public spending determinants focusing on the effects of different institutional settings and income inequality on government consumption.

We estimate two different model specifications applying a random-effects panel estimator and an IV panel estimator in order to control for potential endogeneity problems. Initially, we run our empirical analysis on a large sample of countries without distinguishing between the electoral rule in force, then we divide the original sample between countries characterized by majoritarian and proportional electoral rule in order to emphasize how differences in the electoral systems influence the size of government spending. Although we use a different estimation methodology, we can also compare our results with those in Persson and Tabellini (2003) which offers an extensive analysis of the role of institutional settings in determining policy-makers' decisions. We find that in countries with proportional electoral rule an increase in the heterogeneity of the government increases government consumption. This result is consistent with the argument according to which an increase in the degree of preferences homogeneity within the government coalition generates a reduction in government consumption. The second important finding relates to the effect of the political system on public spending. We find that in countries with majoritarian electoral rule, a shift from presidential to parliamentary system leads to an increase in government consumption. Moreover, our analysis explains how the link between income inequality and public spending depends upon institutional characteristics, in particular on electoral rule. We find that while income inequality does not effect public spending decisions in countries with majoritarian electoral rule, when a proportional electoral rule is in force, income inequality increases together with public expenditure because the government needs to take care of more heterogenous preferences within its supporting coalition. We also find interesting results stemming from economic and demographic country characteristics. In particular we find that an increase in the population is associated with a decrease in government consumption, where the same effects holds also for an increase in the share of people in their working age. Instead, an increase in the share of elderly people and of the share of population living in urban areas leads to an increase in public spending. Moreover, controlling for the effect of trade openness we are able to compare our results with other empirical works on this topic. Our results support the view that government of economies more exposed to trade consume a larger share of GDP in order to mitigate external risk as discussed in Rodrik (1998).

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Table 4: The determinants of government consumption: Panel Random-Effects.

	(1)	(2)	(3)
Herfindhal index (Herfgov)	-1.280***	0.893	-1.236**
	(0.43)	(1.22)	(0.50)
Political system (System)	-0.132	1.149***	-0.400
	(0.29)	(0.36)	(0.39)
Gini index (Gini)	0.026	0.031	0.011*
	(0.02)	(0.03)	(0.02)
Country size (Pop)	-1.221***	-0.906***	-1.576***
	(0.28)	(0.29)	(0.39)
Dependency ratio (Pop65)	0.253**	0.634***	0.074
	(0.11)	(0.15)	(0.13)
Working age population (Pop1564)	0.093	-0.124	0.094
	(0.06)	(0.10)	(0.08)
Urbanisation (Urbpop)	0.119***	0.052**	0.141***
	(0.02)	(0.02)	(0.03)
Trade (Trade)	-0.020***	-0.009	-0.025***
	(0.01)	(0.01)	(0.01)
GDP per-capita (Gdppc)	0.040	0.415	0.128
	(0.41)	(0.52)	(0.60)
Years left in current term (Yrsend)	-0.066	0.083	-0.124*
	(0.05)	(0.16)	(0.07)
Civil liberties (Civillib)	0.045	-0.120	0.047
	(0.12)	(0.33)	(0.17)
Ethnolinguistic (Ethno)	2.892	3.079**	6.299**
	(1.83)	(1.33)	(2.55)
R-squared	0.54	0.67	0.58
No. of Obs.	917	227	614
N. of Groups	98	40	57

Note: Dependent variable is government consumption as percentage of GDP (Govcon). Estimation method is pamel random-effects. Column (1) shows the results obtained using the entire sample, columns (2) and (3) report the results for the majority and proportional electoral rule sub-samples, respectively. ***,**,* denote significance at the 1, 5 and 10 percent levels respectively. Time dummies included but not reported.

Table 5: The determinants of government consumption: Panel IV and "Rodrik effect".

	(1)	(2)	(3)
Herfgov	0.219	-3.635**	-4.054***
	(0.46)	(1.67)	(0.75)
System	0.078	2.507***	0.746
	(0.38)	(0.45)	(0.72)
Gini	0.018	0.048	0.085**
	(0.02)	(0.04)	(0.04)
Pop	-1.228***	0.506	-0.212
	(0.45)	(0.40)	(0.26)
Pop65	0.419***	-0.005	0.349***
	(0.13)	(0.21)	(0.10)
Pop1564	0.120	-0.026	-0.366***
	(0.08)	(0.13)	(0.10)
Urbpop	0.177***	0.051	0.108***
	(0.04)	(0.04)	(0.02)
Trade	-0.026***	0.011	-0.010
	(0.01)	(0.01)	(0.01)
Voltot	-0.016	-0.113**	-0.218**
	(0.03)	(0.05)	(0.09)
Trade*Voltot	0.035	0.201*	0.266*
	(0.06)	(0.11)	(0.15)
Gdppc	-1.785*	-2.002**	0.502
	(1.01)	(0.99)	(0.50)
Yrsend	-0.112**	0.013	-0.193
	(0.06)	(0.16)	(0.15)
Civillib	-0.104	-0.314	-0.699**
	(0.14)	(0.33)	(0.28)
Ethno	0.123	2.095	-0.878
	(2.51)	(1.71)	(1.36)
R-squared	0.55	0.79	0.69
No. of Obs.	691	176	468
N. of Groups	71	26	43

Note: Dependent variable is government consumption as percentage of GDP. Estimation method is panel IV where *Gdppc* has been instrumented with its own value at the beginning of each 5 years sub-period and with country' s capital latitude. Column (1) shows the results obtained using the entire sample, columns (2) and (3) report the results for the majority and proportional electoral rule sub-samples, respectively. ***,**,* denote significance at the 1, 5 and 10 percent levels respectively. ***,**,* denote significance at the 1, 5 and 10 percent levels respectively. Time dummies included but not reported.

Appendix

Table 6: List of countries.

Armenia	Germany	Norway
Australia	Greece	Panama
Austria	Guatemala	Paraguay
Belarus	Honduras	Peru
Belgium	Hungary	Poland
Bolivia	Ireland	Portugal
Bosnia & Herzegovina	Israel	Romania
Botswana	Italy	Russia
Bulgaria	Kazakhstan	Slovak Republic
Canada	Kenya	Slovenia
Chile	Korea	Somalia
China,P.R.: Mainland	Kyrgyz Republic	South Africa
Colombia	Latvia	Spain
Costa Rica	Lesotho	Sweden
Croatia	Lithuania	Switzerland
Cyprus	Luxembourg	Tajikistan
Czech Republic	Macedonia, FYR	Turkey
Denmark	Mexico	US
Dominican Republic	Moldova	Ukraine
Ecuador	Nepal	United Kingdom
El Salvador	Netherlands	Uzbekistan
Estonia	New Zealand	Venezuela, Rep. Bol.
Finland	Nicaragua	
France	Nigeria	

Table 7: Electoral rules and forms of government.

MAJ and PRES	PROP and PRES	MAJ and PARL	PROP and PARL
Belarus	Armenia	Botswana	Australia
Chile	Costa Rica	Canada	Austria
Kazakhstan	Croatia	France	Belgium
Kenya	Cyprus	Lesotho	Bulgaria
Tajikistan	Dominican Republic	Macedonia, FYR	Czech Republic
Ukraine	Ecuador	Nepal	Denmark
United States	El Salvador	New Zealand	Finland
	Guatemala	United Kingdom	Germany
	Honduras		Greece
	Israel		Hungary
	Kyrgyz Republic		Ireland
	Lithuania		Israel
	Mexico		Italy
	Moldova		Latvia
	Nicaragua		Lesotho
	Nigeria		Luxembourg
	Panama		Macedonia, FYR
	Paraguay		Netherlands
	Peru		New Zealand
	Poland		Norway
	Russian Federation		Portugal
	Ukraine		Romania
	Venezuela, RB		Slovak Republic
			Slovenia
			South Africa
			Spain
			Sweden
			Switzerland
			Turkey

Note: PARL = parliamentary system; PRES = presidential system; MAJ = majoritarian electoral rule and PROP = proportional electoral rule

Table 8: Country characteristics and constitutions.

	MAJ (Prop=0)	PROP (Prop=0)	PRES (System=0)	PARL (System=2)
Gdppc	8.38	8.62	7.43	9.23
	(1.73)	(1.19)	(1.13)	(1.14)
Trade	67.57	75.92	67.03	79.15
	(32.96)	(39.97)	(34.07)	(41.97)
Pop65	9.14	9.90	5.74	12.19
	(4.64)	(4.86)	(3.40)	(4.03)
Civillib	2.39	2.11	3.51	1.60
	(1.67)	(1.23)	(1.60)	(0.97)

Note: Means and standard deviations (in parenthesis) of some prominent policy determinants by political regimes ("PARL" parliamentary; "PRES" presidential) and electoral rules ("MAJ" majoritarian; "PROP" proportional).

Table 9: Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Govcon	4830	16.565	7.440	2.154	94.237
Gini	2021	38.780	11.079	15.900	73.900
Herfgov	3996	0.804	0.288	0.002	1.077
System	4748	0.770	0.902	0.000	2.000
Pop	6505	15.204	2.054	9.903	20.977
Pop65	5883	6.057	4.033	0.000	18.997
Pop1564	5883	58.476	6.548	45.347	73.599
Urbpop	6689	49.160	24.490	2.391	100.000
Trade	5038	75.159	43.957	1.531	330.596
Voltot(t-1)	2592	10.073	11.660	0.000	135.881
Voltot*Trade(t-1)	2435	5.830	6.973	0.000	71.336
Gdppc	5172	7.486	1.549	3.799	10.901
Civillib	5356	3.831	1.919	1.000	7.000
Yrsend	3596	2.047	1.534	-1.000	9.000
Ethno	5542	0.336	0.301	0.000	1.000

Table 10: Pairwise correlation coefficients between different variables.

	Govcon	Gini	Herfgov	System	Pop	Pop65	Pop1564	Urbpop	Trade	Gdppc	Gastil	Ethno
Govcon	1.0000											
Gini	-0.6337	1.0000										
Herfgov	-0.1897	0.2667	1.0000									
System	0.4429	-0.6727	-0.1692	1.0000								
Pop	-0.1238	0.0790	0.2010	-0.0347	1.0000							
Pop65	0.4445	-0.7336	-0.2439	0.6242	0.0297	1.0000						
Pop1564	0.3200	-0.6687	-0.2191	0.4962	0.0973	0.8042	1.0000					
Urbpop	0.3709	-0.2968	-0.1459	0.3448	0.1142	0.6070	0.5745	1.0000				
Trade	0.3132	-0.1406	-0.2399	0.1497	-0.6110	0.2207	0.2274	0.0883	1.0000			
Gdppc	0.3956	-0.5205	-0.1441	0.5967	-0.0294	0.7203	0.5985	0.7864	0.0863	1.0000		
Civilib	-0.3162	0.3882	0.2125	-0.4867	0.1714	-0.5714	-0.4324	-0.5880	-0.1414	-0.7601	1.0000	
Ethno	-0.0866	0.3076	-0.0263	-0.2233	0.0993	-0.3753	-0.3900	-0.3587	-0.0486	-0.4372	0.2280	1.0000