

# The Size and Composition of Government Expenditure

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## Abstract

This paper tests several leading hypotheses on determinants of government expenditure. The purpose is to avoid omitted variables bias by testing the prominent theories in a comprehensive specification, to identify persistent puzzles for the current set of theories, and to explore those puzzles in greater depth by looking at the composition of government expenditure and the level of government at which it takes place as well as its magnitude. Using Global Financial Statistics data from the IMF covering over 100 countries from 1970-2000, I look at cross-sectional and inter-temporal variation in government expenditure and both individual categories of expenditure (such as defense, education, health care) and different levels of government (central, state, and local). Among other results, I find a new explanation for Wagner's Law, widespread evidence that preference heterogeneity leads to decentralization rather than outright decreases in expenditures, that a great deal of the expenditure associated with increased trade openness is not in categories that explicitly insure for risk, and evidence that both political access and income inequality affect the extent of social insurance.

## 1 Introduction

Because of a paucity of data and correlation among the explanatory variables, theories of government size are often difficult to test. This paper makes headway in two directions. First, gathering the leading hypotheses and testing them together in a unified specification avoids omitted variables bias and the temptation to data-mine by playing with the specification. Second, using spending data disaggregated both by category of expenditure (education, healthcare, social security, etc.) and by level of government (central and local) enables more nuanced tests of many of these theories. Two explanatory variables which tend to correlate with similar behavior of total expenditure may correlate with very different patterns in the disaggregated data.

This approach yields a variety of interesting new results.

1. Much of the increase in total expenditure associated with greater trade openness is attributable to categories that do not insure for risk. This is especially true in less-developed countries.
2. In less-developed countries, greater trade openness is associated with a centralization of expenditure: the increase in central government expenditures is partially offset by a decrease in local government expenditures.

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3. In more populous countries and countries with greater ethnic fractionalization, spending on many categories of public goods (education, healthcare, public order and safety) is decentralized: lower spending by the central government is significantly offset by higher spending by local governments.
4. A greater fraction of the population over 65 is associated with large and significant increases in local government expenditure in almost every category.
5. Wagner's Law is shown to be driven by demographics: richer countries are older and spend more on social security which boosts total expenditure. Total spending net of social security actually declines with per capita income.
6. In industrialized democracies, better political rights and greater inequality are each associated with more redistribution, though the interaction term is negative.
7. Majoritarian governments do not display a clear bias towards or against any type of spending: they simply correlate with reduced expenditure across the board.

Theories of government size tend to focus either on determinants of demand for government services or, more recently, on the structure of the supply of these services. Most theories identify a variable thought to shift demand for government spending and hypothesize that *ceteris paribus*, a shift in this variable leads to a corresponding change in equilibrium expenditure on a certain class of public goods or transfers. For example, a larger population of elderly in a country implies a greater demand for social security (as well as a larger fraction of the population receiving it) and thus higher public expenditure on social security in equilibrium. Demand-driven theories have nominated a variety of demographic factors as explanatory variables: demographics, ethnic fragmentation, and trade openness are popular examples.

While demand-side theories usually treat the formation of policy as a black-box, supply-side theories construct political economy models of representative government to give structure to the supply of public goods. They seek to explain variation in the pattern of expenditure as a function of political organization: electoral rules, the type of government, and the degree of political participation.

Many of the explanatory variables nominated by these theories are correlated: trade shares tend to be smaller in more populous countries, richer countries tend to have better political rights (or vice-versa), and richer countries tend to have an older populace to name a few. Table 7 lists sample correlations between explanatory variables. In the basic sample, 7 of the 15 sample correlations have an absolute value in excess of 0.5. As a result, tests which focus solely on one or even just a few of these variables almost surely suffer from omitted variables bias. The first purpose of this paper is to gather the prominent theories and test them collectively to avoid such bias.

The second purpose is to use data breaking out public expenditure into categories (defense, education, health care) and different levels of government (central and local) to formulate more nuanced tests of the leading theories. Theories which lead to similar predictions at the aggregate level are distinguishable at a finer level. An omitted variable may produce a coarse pattern at the aggregate level but it is less likely to reproduce the more intricate pattern predicted in data disaggregated by category and government level. While previous contributions have, in pursuit of a particular point, looked at the behavior of subcategories of public expenditure, the contribution of this paper is the consistent application of this technique to a broad set of explanatory variables. Moreover, while work on fiscal federalism commonly examines different levels of government, most empirical work on theories of government size examines only central government expenditures.

The choice of which variables to include was a judgement call made after an examination of the literature on government size. It was made prior to the regression analysis and kept fixed. The goal was to include those demographic and political variables which have generated widespread interest among economists, have repeatedly been shown to be correlated with patterns in government expenditure, and for which a causal mechanism has been proposed which would inform ex-ante predictions of regression coefficients.

Nine theories articulating the effects of eight independent variables were selected: Rodrik's theory of trade openness; the Alesina-Wacziarg theory of country size; Wagner's Law concerning the relationship between income and government; Easterly and co-authors' theory on the role of ethnic fractionalization; Meltzer and Richard's theory of the role of inequality and Benabou's extension of this theory to include political rights; the theories of Persson and Tabellini and Milesi-Feretti, Perotti and Rostagno on the role of electoral rules and government type; and the work of Oates and many others highlighting the role of a federal system in shaping patterns of expenditure. The first five variables—trade openness, population, per capita income, ethnic fractionalization, and income inequality—may be characterized as demand shifters. The last four—the extent of political representation, the type of electoral system (majoritarian or proportional), government type (presidential or parliamentary), and a dummy for a federal system—capture aspects of the supply of public goods: the manner in which the political system operates on a fixed demand.

The plethora of candidates for country-specific fixed effects that might be correlated with regressors are a constant temptation for those inclined to a kitchen sink approach. Geographic characteristics such as whether a country is an island or landlocked or split by a large mountain-range may be correlated with its trade openness as inter-national trade is made easier or harder relative to intra-national trade. Features of national history such as the date of independence may be correlated with the institutional structure as new constitutions are written with an eye to concurrently popular political ideas. Cultural and religious identification may be correlated with population growth through shared views on birth control. The prevalence of corruption may affect the composition of government expenditure as certain types of expenditure may be more easily siphoned off for graft (see Mauro 1998) Since the list is inexhaustible, some degree of bias is inevitable. I have made the choice to stick with those variables which have been repeatedly demonstrated to have first-order effects on patterns of expenditure.

Section II reviews the previous results on the explanatory variables of interest. Sections III and IV lay out the empirical strategy and discuss the data. Sections V and VI present the results of this study and the implications of those results. Section VII concludes. The paper may be read in order, following the entire set of explanatory variables simultaneously. Alternately, sections II, V, and VI are each broken down by variable so a reader who is interested in following the results for a single explanatory variable may do so by reading the relevant subsections.

## 2 Literature Review

### *Openness*

David Cameron (1978) was the first to convincingly demonstrate a connection between trade openness and government finance. In a sample of 18 OECD countries<sup>1</sup>, Cameron found openness in 1960 to be a strong predictor of the increase in government tax revenues as a share of GDP between 1960 and 1975. He postulated that more open countries were more heavily unionized which,

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<sup>1</sup>Cameron's sample includes: Netherlands, Sweden, Norway, Denmark, Belgium, Canada, Britain, Ireland, Austria, Finland, Switzerland, France, Australia, Germany, Spain, Italy, Japan, and the United States.

through collective bargaining, lead to greater demand for government transfers in the form of social protection and reeducation. Rodrik (1998) noted that the correlation extends to countries of all income levels and exists for all available measures of government consumption. He asserts that Cameron's collective bargaining explanation is unlikely to explain the correlation in the broader sample of countries due to the relative weakness of organized labor in developing countries. Rodrik hypothesizes that government expenditure may serve as a form of insurance against external risk. In more open countries, the income streams of households are derived from firms which do more overseas business and are thus subject to greater external risk such as exchange rate risk or supply or demand fluctuations abroad. Assuming some portion of this risk cannot be diversified away, this would generate demand for public insurance against external risk. Rodrik surmises that advanced countries with the requisite administrative capacity mitigate this undiversified external risk through spending on social protection while developing countries, lacking the capacity to administer large-scale social transfer programs, rely on simpler, less-targeted solutions including public employment.

#### *Country Size*

Alesina and Wacziarg (1998) offer an explanation for the observed fact that larger countries have smaller government consumption as a share of GDP. Their argument is built on two ideas taken from the literature on country formation.<sup>2</sup> First, sharing non-rivalrous public goods over larger populations results in lower per-capita costs of provision. Second, larger populations tend to exhibit greater heterogeneity in preferences over public goods provision. Equilibrium country size emerges as a tradeoff between the costs of increasingly heterogeneous preferences and the benefits of sharing non-rivalrous public goods over larger populations. The result is that larger countries tend to exhibit lower per capita expenditure on public goods.

Meanwhile, smaller countries are more open to trade. To the extent that market size influences productivity<sup>3</sup>, smaller countries are more negatively impacted by a closed world trading system. Put differently, smaller countries are more viable under open trading systems because they can benefit from spillovers due to foreign production. Thus not only are small countries more likely to be open to trade, but small countries will be more common during periods of greater trade integration. Together, these effects imply that smaller countries are both more open to trade and spend more on public goods.

Alesina and Wacziarg supply a pair of results that support their assumptions. First, in the regression of per capita government consumption on log of population, the latter has a negative and significant coefficient, supporting the conjecture that larger countries spend less on public goods. Second, when transfers and interest payments are added to government consumption and the regression is rerun, the point estimate is relatively stable but the significance drops markedly suggesting that per capita transfers are unrelated to country size. The effect exists in public goods but not in transfers. Next, both Wacziarg (2001) and Alesina and Wacziarg demonstrate that country size and openness are negatively related in the presence of a wide range of controls. And these results are replicated in regressions in which more direct measures of trade policy such as tariffs and measures of "outward orientation" are substituted for openness (see Sachs-Warner 1995).

#### *Fragmentation*

Other demographic factors may also lead to greater heterogeneity of preferences and thus lower levels of public expenditure. Easterly and Levine (1997) report a strong negative correlation be-

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<sup>2</sup>See Alesina-Spolaore (1997) and Alesina-Spolaore-Wacziarg (1997)

<sup>3</sup>See here the vast literature on monopolistic competition with a variety of goods and inputs and the resulting increasing returns to scope and economy size.

tween indices of ethnic fragmentation and measures of public goods (telecommunications networks, transportation network, electricity grids, and education) in African countries. This may happen either because different ethnic groups have different preferences over the set of public goods to be provided and so fail to agree on expenditure or because an ethnic group's utility from public goods declines when the public goods are shared with other ethnic groups. Alesina, Baqir, and Easterly (1999) document a body of work suggesting that preferences about public policy are correlated with ethnicity. They then submit that, in the presence of heterogeneous preferences (in this case driven by ethnicity), interest group activity may encourage, via log-rolling, an increase in targeted expenditure at the expense of public goods provision.<sup>4</sup>

The evidence is based on US fragmentation and expenditures data from three levels of aggregation—cities, metropolitan areas, and counties. Their primary result is the negative correlation between ethnic fragmentation and several measures of public goods expenditure including per capita spending on public education. They also note that ethnic fragmentation is positively correlated with police spending, possibly due to increased violent crime. Surprisingly, expenditure on health and hospitals increases with ethnic fragmentation. Total spending per capita is positively related to ethnic fragmentation in all three samples, consistent with the log-rolling theory.

Interestingly, the authors rerun the regressions including both the ethnic fragmentation variable and a similar variable capturing only black vs. non-black heterogeneity. The broader fragmentation coefficient is still significantly different from zero, implying that the impact of ethnic fragmentation on public expenditure in American cities is not just a black vs. non-black issue.

In a follow-up, Alesina, Baqir, and Easterly (2000) suggest that increased fragmentation may lead to higher levels of public employment as public officials circumvent opposition to explicit tax and transfer schemes by employing individuals who would otherwise receive transfers. They find some support using US city-level data.

Among their results, Alesina et al (2003) report that ethnic fragmentation is negatively associated with the ratio of transfers to GDP, confirming similar results found by Alesina, Glaser, and Sacerdote (2001) and Alesina and Wacziarg (1998). They propose that achieving consensus necessary for redistribution to the needy is more difficult in ethnically diverse societies. They achieve similar but less significant results for their index of linguistic fragmentation. Interestingly, they report a positive relationship between religious fragmentation and redistribution. To explain the difference between the result for religious fragmentation and those for ethnic and linguistic fragmentation, the authors note that while ethnicity and language are largely fixed, religious affiliation is flexible and therefore endogenous. Observed religious fragmentation is often the result of greater tolerance by the government or majority. And this tolerance (or factors leading to it) may explain both observed religious fragmentation and increased transfers.

### *Income*

One of the earliest hypotheses in the literature on government size is the view that the public sector tends to grow as a society becomes wealthier, commonly known as Wagner's Law. Wagner gave two main reasons in his original work. First, he postulated that as states grow more wealthy they simultaneously grow more complex, increasing the need for public regulatory and protective action to ensure the smooth workings of a modern, specialized economy. Second, he postulated that certain public goods, such as education and cultural enhancements, are luxury goods. The essence of Wagner's Law is the assertion that the ratio of civilian government expenditure (excluding defense

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<sup>4</sup>The authors note that when measured by expenditure share rather than in levels, the effects will appear even stronger.

spending) to GDP is positively related to GDP per capita.<sup>5</sup> Baumol's Law would imply a similar relationship if productivity growth in the government sector were slower than the economy-wide average.

Henrekson (1993) notices that the bulk of the support for Wagner's Law derives from regressions in levels and, invoking Granger and Newbold (1974), cautions that regression equations specified in levels of time series often lead to erroneous inferences if the variables are non-stationary. He contends that income and the share of government expenditure, while correlated, are not, in fact, cointegrated, and demonstrates this in Swedish time series data from 1861-1990. He concludes that the correlation reported by other researchers may be spurious.<sup>6</sup> However, Oxley (1994) examines data on Britain from 1870-1913, and finds evidence that Wagner's Law holds and does satisfy Granger causality.<sup>7</sup> Per capita income and government size are also correlated in the modern period. In a broad sample of 115 countries from 1950-80, Ram (1987) finds evidence for Wagner's Law in some of the time-series though not in the cross-section. However, other authors have found evidence in the cross-section. Comparing Latin America with the OECD, Stein, Talvi, and Grisanti (1998) observe, "the size of government in the lowest income quartile of Latin America averages 20% of GDP compared to 30% of GDP in the highest and 48% of GDP in OECD countries. In other words, richer countries tend to have larger governments." And Easterly and Rebelo (1993) find strong evidence for Wagner's Law in both cross-sectional data covering 105 countries from 1970-1988 and historical data covering 26 countries from 1870-1988. The correlation between per capita income and government size is frequently found in both longitudinal and cross-sectional data in both historical and current periods.

#### *Income Inequality*

Not only the average level of income, but also the distribution of income in society may affect public spending. In their seminal paper, Meltzer and Richard (1981) construct a general equilibrium model connecting the size of public sector redistribution (not public sector consumption) to the extent of the franchise and the distribution of wealth. Individuals in their model are endowed with heterogeneous labor productivity. They perform two activities: they vote on a linear income tax rate whose proceeds are used to finance lump-sum redistribution and they make a labor-leisure choice. Tax preferences are single-peaked about an ideal point which is weakly monotonically decreasing in productivity (and thus in income). Under direct democracy with universal suffrage and majority rule, the voter with the median income is decisive. To the decisive voter, the cost of taxation is proportional to his own income while the benefits are proportional to the mean income. Thus Meltzer and Richard conclude that redistribution in majority rule societies is positively related to a particular measure of skew in the income distribution: the ratio of mean to median income.<sup>8</sup>

Using annual data for the United States for the period 1936-1972, Meltzer and Richard (1983) estimate the elasticity of the income tax rate with respect to the ratio of median to mean income. They report coefficients that are significantly different from zero, indicating that the general effect they describe is present, but which fall short of the value predicted by theory, indicating that the particular structural form they test is not a perfect description of the mechanism at work.

#### *Political Rights*

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<sup>5</sup>See Henrekson for a discussion of interpreting Wagner's theories and how to bring them to data.

<sup>6</sup>See Oxley for a list of papers testing Wagner's Law

<sup>7</sup>Oxley admits that the country and period were chosen to give cointegration of income and government expenditure the best possible chance.

<sup>8</sup>Krussel and Rios-Rull (1999) extend the MR model to a dynamic setting which allows them to account for the distorting effects of a tax on capital. The result is an extension of the basic MR result to the distribution of wealth as well as income. They conclude that the basic MR framework over-predicts taxation by omitting this second distortion.

Meltzer and Richard (MR) implicitly assumed the median income and the decisive vote belonged to one and the same citizen. But in many countries political rights are, either de jure or de facto, restricted to a privileged minority. And even in the most established democracies, the overwhelming evidence is that the wealthy are more active in a wide variety of forms of political participation: voting, campaign contributions, contacting and working for lawmakers, boycotts, and demonstrations.<sup>9</sup> Lijphart (1997) notes that while voter turnout is less skewed toward the rich than other measures of participation, the pattern is persistent across advanced countries since the time of universal suffrage, and has widened over the past few decades as turnout in advanced democracies has declined. Benabou (1996) notes that if wealthier citizens are better represented in the political process, then the gap between mean and median income exaggerates the extent to which redistribution via the proposed mechanism will take place. In a cross-country sample, then, testing for the MR effect requires inclusion of an index of political rights as well as a measure of the skewness of the income distribution.

Furthermore, poll taxes, literacy requirements, and suffrage limitations can drive a wedge between the statutory and effective franchise. Assuming the newly enfranchised earn a lower income than those who already enjoy political rights, an expansion of the franchise will result in a decline in the income of the median voter and thus an increase in the tax rate and level of transfers preferred by the median voter.

Using US state level data on expenditure and turnout from 1870-1940, Lott and Kenny (1999) find that the increase in voter turnout due to women's suffrage explains on the order of 20% of a 90% increase in expenditure over the period: a large but not overwhelming part of the drastic increase in state expenditures. Husted and Kenny (1997) look at the effects of the removal of poll taxes and literacy tests (effectively extensions of the franchise to poorer voters) on government expenditure using biennial US state and local data for 1950-1988. They document a strong increase in the size of welfare spending (transfers) as the decisive voter becomes poorer but little effect in public goods.

However, recent work by Mulligan, Gil, and Sala-i-Martin (2002, 2004) calls into question the impact of political rights on transfers. In a pair of studies questioning the difference between democracies and autocracies, the authors find that, controlling for income level, income inequality, and demographics, government type has no effect on social security expenditures. Mulligan, Gil, and Sala-i-Martin (2002) have particularly strong results based on data and methods which are quite similar to mine. Their table (1) column (10) includes the Gini coefficient, a democracy index, and an interaction term as well as controls for retirees, per capita income. They use the Polity IV measure of democracy but note that in their sample it correlates highly with the Gastil index for political rights. They find little effect of either inequality or democracy on social security expenditures in the cross-section for the period 1960-1990. In their more detailed work on the institutional design, they find little difference between democracies and non-democracies. This mirrors the results of an earlier study by Easterly and Rebelo (1993) who also find, "no significant differences in the fiscal policies adopted by democracies and non-democracies once we control for the level of income."

#### *Institutions of Government*

The Meltzer-Richard model is an early attempt to understand how the structure of government affects the equilibrium level of expenditures. It is a model in which direct democracy implies a role for income inequality. More recent political economy models focus on how different types of

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<sup>9</sup>See Lijphart (1997) for references documenting inequality in political participation in the US and other industrialized countries over the last century.

representative democracy affect the composition of government expenditure. Milesi-Feretti, Perotti, and Rostagno (2002), Persson, Roland, and Tabellini (1998), Austen-Smith (2000) each discuss the role of majoritarian vs. proportional electoral systems. And Persson and Tabellini (1999) compare presidential and parliamentary systems of government. One important difference between various theories is their assumption about the target-ability of different categories of public expenditure.

Persson, Roland, and Tabellini (1998) and Milesi-Feretti, Perotti, and Rostagno (2002) generate contradictory hypotheses concerning the effects of electoral rules on public expenditure. Persson, Roland, and Tabellini construct a Downsian model of electoral competition with forward-looking voters. Contrasting majoritarian and proportional voting rules, they find that the former focuses electoral competition on a few key districts, leading to fewer public goods but more redistribution than the latter. In a related model Austen-Smith (2000) generate similar predictions. The assumption which drives the result is that public goods are broadly enjoyed while transfers are more explicitly targetable to a particular district.

Milesi-Feretti, Perotti, and Rostagno derive their hypothesis from the differences between socially defined constituencies and geographically defined constituencies. Majoritarian systems elect one representative from each geographically-defined district. If the distribution of social groups is reasonably stable across districts, this results in a socially homogenous legislature in which legislators differ and thus are judged based on support delivered to their geographic constituency. For example, Barbara Boxer and Diane Feinstein are held accountable more for their representation of California than for their representation of women. As a result, representatives in a majoritarian system will be more concerned with obtaining fiscal support for their geographic constituency than for their social group. In contrast, proportional systems elect representatives who are beholden to a national constituency defined along social lines and so focus on payments to this socially defined constituency. Finally, they assume that redistributive transfers (unemployment, reeducation, welfare) are more easily targeted to social groups while public goods (military bases, highways, dams) are more easily targeted to geographic groups. They conclude that representatives under a majoritarian electoral system will pay more attention to spending which can be targeted to their constituents—public goods—while proportionally elected representatives will favor transfers to their social constituency. Hence the hypothesized association between electoral rules and the pattern of public expenditure depends on the presumed targetability of various types of government spending.

Persson and Tabellini (1999) test their hypotheses on both electoral systems and legislative structure using cross-country data from a sample of 64 countries classified as democracies in the period 1985-1990.<sup>10</sup> They find that majoritarian electoral systems are associated with less expenditure in public goods but the results are weak and they don't look at the effect on transfers. Milesi-Feretti, Perotti, and Rostagno construct three measures of the degree of proportionality of electoral systems for 40 OECD and Latin American countries. They split government expenditure into three categories: primary expenditure, transfers, and public goods. They proceed to regress each category of government expenditure on each of the three measures of the electoral system. They find strong support in OECD countries for the proposition that governments elected under a majoritarian rule spend less on transfers than those elected under a proportional rule. Support in Latin American countries is weaker: coefficients are of the right sign but small in magnitude. Support for their hypothesis that majoritarian governments spend more on public goods is similarly weak.

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<sup>10</sup>Their threshold for democracy is a raw score of 5 or less in the Gastil index of political rights (lower means better rights).

These results seem directly contradictory but in fact they are each consistent with the fact that majoritarian governments simply spend less across the board. Both studies offer incomplete support for their theories. On the one hand, Persson and Tabellini work with a full range of controls, but document an effect on public goods only, ignoring transfers. On the other hand, Milesi-Ferretti, Perotti, and Rostagno do look at both transfers and public goods but include only minimal controls. Furthermore, they find a strong effect only in transfers.

Persson and Tabellini (1999) analyze legislative structure (presidential vs. parliamentary) in a model of legislative bargaining with retrospective voting. They conclude that the separation of powers which defines a presidential regime results in more competition between policy-makers and thus in smaller, more efficient government with less waste, less redistribution and lower expenditure on public goods. Because it places weight on legislative cohesion, the parliamentary regime facilitates log-rolling and therefore produces larger, more wasteful government but with higher levels of public goods expenditures and more broadly targeted transfers. They conclude that there is a tradeoff between accountability and public-goods provision in legislative design. And the resolution of this tradeoff has implications for patterns of government expenditure.<sup>11</sup> In empirical work, they find that a presidential system is associated with a great deal less spending, especially on public goods, in the presence of either electoral system.

### 3 Methodology

The core exercise of this paper is to regress various measures of government expenditure on a vector of explanatory variables in a cross-country panel. There are complications in the data: measurement error in both the left and right hand side variables and country-specific effects that are correlated with regressors.<sup>12</sup> The technique is random effects on data averaged over multi-year periods.

The first source of measurement error is simply in collection and transmission. The data used in this paper are macro-indicators collected for roughly one hundred countries are sometimes several steps removed from first hand data collection. They often involve estimation rather than measurement. A second source of measurement error is the distance between the measure used and the theoretical concept it is meant to capture. This problem is reflective of both the paucity of available data and the lack of direct measures for many of the theoretical concepts.

Another important issue concerning measurement error is the differential quality of data. Not only is data more widely available for rich countries, it is also undoubtedly of better quality. This means there is heteroskedasticity in the error term, which I adjust for by using a robust standard error. The differential availability I deal with by running two specifications: a restricted one including the variables with the widest coverage and a complete specification with fewer countries.

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<sup>11</sup>See Persson-Tabellini 2004, Persson-Roland-Tabellini 2000, Persson-Tabellini 1999. For a description of the majoritarian and presidential variables, see Persson-Tabellini 2004. Because of the rarity of major constitutional design, these variables display almost no time-variation in the sample.

<sup>12</sup>Hauk and Wacziarg (2003) use Monte Carlo methods to assess the tradeoff between unobserved heterogeneity and measurement error in the human-capital augmented version of the Solow neo-classical growth model. No such study exists for the literature on government size, at least in part because no prominent model exists to inform the specification, but some of these lessons are likely to be valid. Specifically, choosing between fixed effects and estimators that use some degree of between country variation is a tradeoff between omitted variables bias and measurement bias. Fixed effects solves omitted variables bias but tends to exacerbate bias from measurement error when the right-hand side variables are more persistent than the errors in measurement. Mindful of this tradeoff and without a study for this specific example, I have chosen to use random effect but average the data over five-year periods.

The expenditures data is probably more accurate for richer countries, which further contributes to heteroskedasticity. This constitutes another reason for robust standard errors. Otherwise, LHS measurement error simply increases the standard errors which stacks the deck against significant effects.

Government spending in any given year (or five year span) is influenced by demographic and constitutional factors that produce long-run supply and demand. But on top of this there are short-run shocks to the supply and demand for public goods due to events and due to the fact that the “market” for public goods doesn’t clear immediately but does so in fits and starts as spending is approved. The current theories of government size speak to factors which influence the long-run, persistent supply and demand so other fluctuations are properly characterized as error. Whether you think of this as econometric error or LHS measurement error depends on what you think you’re trying to measure and explain. We are trying to measure and explain the persistent equilibrium expenditure due to the underlying persistent supply and demand factors advanced by theories of government size. So in this case, most of these short-run shocks due to discreteness of expenditure and political shocks ought to be thought of as measurement error rather than econometric error.

As a result we average annual data across a period of  $y > 1$  years. On the other hand, factors affecting long-run supply and demand aren’t stationary over a thirty year period so we can’t simply take the between estimator. There exists a tradeoff: a longer period reduces the measurement error to the extent that such error is not autocorrelated, but makes it less likely that the RHS variables (and hence the equilibrium) are stationary over the period. The choice  $y = 5$  (leaving 4-6 periods per country) is a common compromise and is the baseline for this study.

Because some of the explanatory variables are persistent to the point of being almost constant (e.g. political institutions), I have checked the results using the between effects estimator (essentially  $y=30$ ) to see whether coefficients for these variables are significant only because the same observation is taken multiple times over the 30 year period. Most of the results are robust: I mention those that are not.

The basic specification is

$$\text{Expenditure}_{it} = \alpha + \beta * \text{Explanatory Variables}_{it} + u_i + \epsilon_{it}$$

Of which a specific example would be

$$\begin{aligned} \text{Transfers (central government)}_{it} = & \alpha + \beta_1 * \ln(\text{population})_{it} \\ & + \beta_2 * \ln(\text{GDP per capita})_{it} \\ & + \beta_3 * \text{openness}_{it} \\ & + \beta_4 * \text{openness}_{it} * \text{OECD membership in 1975}_{it} \\ & + \beta_5 * \text{index of ethnic fractionalization}_{it} \\ & + \beta_6 * \text{fraction of population over 65}_{it} \\ & + u_i + \epsilon_{it} \end{aligned}$$

Where  $i$  indexes the country and  $t$  indexes the 5 year period.

The extended specification simply adds explanatory variables.

## 4 Data

The primary source of data for this study is the IMF Government Financial Statistics (GFS) dataset. The GFS is a standardized collection of annual national accounts for over one hundred countries. I use the GFS data on government expenditures, which includes all non-repayable payments by any level of government for either current or capital purposes. GFS classifies expenditure by two methods: either by economic characteristics or by the function or purpose served. Both are used in this study. The former is called the economic classification of government expenditure (ECOG) and breaks total spending into current and capital expenditure and then further into goods and services vs. transfers. The latter is called the classification of the functions of government (COFOG) and breaks total expenditure into categories such as healthcare, education, and defense, each of which include both current and capital expenditure.<sup>13</sup> In addition to being cut according to one of two methods of classification, total expenses are also classified according to the level of government: central or local. So a sample GFS series would be expenditure by the central government on education as a share of GDP and observations would be by country-year. The raw data is gross expenditure in local currency so I divide by the contemporaneous GDP in local currency to achieve expenditure as a share of GDP, which is a unit-less measure.

The fractionalization data is care of Alesina et. al. (2003) and is described in their appendix. Data on political systems is care of Persson and Tabellini (1999) and is described in their appendix. Openness data come from the Penn World Tables and are measured in current prices. My political rights variable is derived from the Gastil index of the same name. The list of questions from which the political rights index is composed and the ranking methodology are available at the Freedom House website. The raw index runs from 1 to 7, with lower numbers indicating greater political freedom. I have taken the inverse of the index to obtain a variable which runs from 1/7 to 1 and in which larger numbers indicate greater political freedom. Some demographics data (per capita GDP and population) come from the Penn World Tables. Other demographics data (Over65, Under15) are taken from the World Bank World Development Indicators Database. Gini coefficients come from the United Nations Development Program World Income Inequality Database (WIID) which includes and builds upon the well-known Deininger-Squire data. Documentation is available from the UNDP website. The UN groups these data into reliable and unreliable data and further categorizes them by the source of the accounts and the population over which they are valid. I have used only data marked reliable and stemming from income or expenditures data covering the entire population.

I follow Persson and Tabellini (1999) in defining expenditures on public goods as the sum of transportation, education, and public order and safety, citing these as the expenditures categories with high public goods content.<sup>14</sup> Government consumption, wages and salaries, and transfers are all categories from ECOG.

To form five year panels from annual data, I took the arithmetic averages of the available annual values for each variable.<sup>15</sup> Summary statistics for the variables can be found in tables 8, 9, and 10. With a slew of variables and a bevy of countries, there are, inevitably, gaps in the data. Many variables are available for a wide swath of countries: GDP, population, and many of the broader expenditure categories. But some variables, most notably the inequality data (Gini) and the

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<sup>13</sup>The detailed analysis of how each category is defined and how expenditures are classified is available in A Manual on Government Financial Statistics 1986

<sup>14</sup>They justify their omission of defense spending by noting that it depends on geopolitical variables that are beyond the scope of the theory and difficult to control for.

<sup>15</sup>Because my data stretches 31 years from 1970-2000, the first panel is six years from 1970-1975.

political institutions data (majoritarian, presidential), suffer from more limited coverage. In order to evaluate the role of each theory in the broadest possible sample, I have run two specifications: a basic specification including those variables available for all countries in the GFS and an extended specification including all of the independent variables.

Including the limited variables in the regressions cuts the number of countries from 90-100 in the basic specification to 40-45 in the more inclusive specifications and the total number of country-years in the panel by a factor of 2.5-3.<sup>16</sup> Were the availability of these variables random across countries, this sample cut would imply loss of precision but no bias in the estimates. However, not surprisingly, data for richer countries is more easily come by so the data cuts resulting from the inclusion of these limited-coverage variables can imply significant changes in the coefficients due to sample selection rather than the inclusion of an extra control variable. Hence the importance of considering both basic and extended specifications: those variables which are more widely available ought to be examined in the more representative broad sample.

## 5 Results

Tables 1, 2 and 3 report the results of the three main regressions: the basic specification for central government expenditures, the basic specification for local expenditures, and the extended specification for central government expenditures. The corresponding results from the between estimators are given in tables 4, 5, and 6

### *Openness*

A look at the coefficients on openness and its interaction with OECD membership in column (1) of table 1 reveals that total expenditure increases strongly with openness in both industrialized and less-developed countries. The point estimates from column 1 suggest that one standard deviation increase in openness (46%) is associated with an increase in total central government expenditure of over 3% of GDP in less-developed countries and almost 4% of GDP in industrialized countries. However, columns (2) through (12) reveal the puzzle: a great deal of the increase, especially in less-developed countries, is attributable to categories which do not clearly constitute social insurance. Roughly two thirds of the increase in industrialized countries comes from transfers of some sort, a little less than half of which appears to be social security. However, virtually none of the increase in less-developed countries comes from social security, transfers, wages and salaries, or other likely candidates for social insurance. Public goods also respond strongly to openness in industrialized countries suggesting that much of the effect is not a form of public insurance.

Table 1 suggests three areas for this missing expenditure. First, in less-developed countries and even more strongly in industrialized countries, greater openness is associated with more spending on transportation. Second, in less-developed countries, there is an increase in spending on education. Third, columns (1) and (3) of table 2 show that some of the increase in central government expenditure associated with more openness in less-developed countries is due to a centralization of expenditure. The one standard deviation increase in openness that is associated with a 4% increase in expenditures at the central government level is simultaneously associated with a 1.2% *decrease* in expenditures at the local level. However, a large fraction (over 40%) of the increase in total spending remains unaccounted for, even by these three significant trends.<sup>17</sup>

### *Country Size and Fragmentation*

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<sup>16</sup>These numbers are ranges because the precise sample size depends on the category of expenditure.

<sup>17</sup>Meanwhile, in industrialized countries, greater openness is associated with significant increased expenditure at the local level, largely in public wages and salaries.

Comparing columns (2)-(7) from tables 1 and 2 shows that in many categories of public spending—education, healthcare, public order and safety, and general public services—the decrease in central government expenditure associated with a larger population is partially mitigated by an increase in expenditure at the local level. Government consumption and public sector wages confirm this story holds at higher levels of aggregation and tables 4 and 5 show that it is robust to a between estimator. The total effects are quite large. A one standard deviation increase in the log of population leads to a decrease in total expenditures of almost 1%, some portion of which is simply diverted to the local level. Depending on the category, the increase at the local level can be from 10 to 60% of the decrease at the central level. In the aggregate categories—government consumption and wages and salaries—it is between 40 and 45%.

Ethnic fractionalization is associated with a similar pattern though in this case, the increases at the local level are stronger and more significant than the decreases at the central level. Education is the only category that is robust to the between effects estimator.

#### *Income*

Richer countries tend to have more elderly and thus tend to spend more on social security and other forms of social protection which drives greater total spending. Column (1) of table 1 shows that when controlling for the fraction of the population over 65, richer countries tend to have smaller government—the exact opposite of Wagner’s Law. Digging a little further shows first, that the negative relationship is indeed from within country variation rather than between country variation (see column (1) of table 4) and second, that removing the control for demographics results in a large and significant coefficient on income. Finally, I regressed the difference between total expenditure and expenditure on social security on the same set of controls. This non-social-security expenditure declines with income, indicating that while social security is a luxury, the rest of government is a necessity. At least during the period 1970-2000, the correlation between income and government size is driven by demographics.

#### *Demographics*

A greater fraction of the population over 65 is associated with large and significant increases in local expenditure in every single category save transportation (table 2). This correlation may be caused by some omitted variable simultaneously causing both effects. For the moment, this is a puzzle in search of an explanation.

#### *Institutions of Government*

The extended specification in table 3 gives a chance to examine the effects of explanatory variables with narrower coverage such as inequality and political variables.

Governments elected under majoritarian electoral systems spend less across the board than those elected under proportional systems. This holds true in the presence of either parliamentary or presidential system of government.

#### *Income Inequality and Political Rights*

Both increased political rights and increased inequality (as measured by the Gini coefficient) result in strong increases in transfers (or social protection). A one standard deviation increase in the Gini (9.4 points) is associated with an increase in transfers of 0.25% of GDP at the mean level of political rights. The magnitude of the coefficient on political rights is a bit harder to interpret because it’s an ordinal index of dubious cardinality. Furthermore, because the index has been normalized to run between 1/7 and 1, the full coefficient looks enormous because it represents a difference slightly greater than between the most and least democratic nations. A one standard deviation change in political rights (.33) would result in a 0.9% increase in transfers at the mean level of inequality.<sup>18</sup>

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<sup>18</sup>In the robustness checks using the between estimator (table 6 columns 4 and 9) the point estimates are rather

The actual effect of increasing political rights or increasing inequality on transfers are smaller than the raw partial effect because of a strong and significant negative interaction between inequality and democracy. In essence, if the country displays a highly unequal distribution of wealth, enfranchising additional poor voters does very little to change the income of the median voter (and thus redistribution) because the median voter is already poor. On the other hand, if the country has a relatively even distribution of wealth, enfranchising additional poor voters moves the decisive voter from the upper-middle class towards the lower-middle class, signaling a real change in the tax rate preferred by the decisive voter.

Meltzer and Richard's theory most clearly applies to vertically redistributive transfers like social protection. However, any public good with benefits which are more progressive than the tax code ought to be subject to the MR effect though the effect should be more pronounced the more redistributive the good. Nonetheless, columns (2)-(8) and (10) show little evidence of an effect on other categories of expenditure. This suggests that demand for redistribution is met with the most transparently redistributive type of spending: direct transfers.

## 6 Interpretation

### *Openness*

The puzzle here is that the increased expenditures associated with increased openness in developing countries do not look much like social insurance. Developing countries likely have a *greater* need for social insurance as they have less-developed domestic financial markets, poorer access to international capital markets, and more volatile terms of trade. Rodrik argues the supply of social insurance in these countries may be inelastic as they simply don't have the necessary infrastructure of collection, distribution, and enforcement. This inelastic supply means that even though greater openness stimulates higher demand for social insurance, there is no movement in the equilibrium expenditure.

However, social security expenditures in developing countries average 4.4% of GDP in my sample; certainly less than the 12.4% in industrialized countries but a considerable fraction of government expenditure nonetheless.<sup>19</sup> Establishing the relevant infrastructure is largely a fixed cost. Thus if these countries already spend 4.4% of GDP on social security, the infrastructure is likely in place and constitutes little barrier to increasing spending in response to an increase in demand for public insurance.

Recall that a great deal of the increase in expenditure associated with greater trade openness is not associated with a particular functional category of spending but is simply a higher level across the board. This suggests that rather than a demand factor, which would likely affect some categories of expenditure more than others, it may be a change in the *supply* of government spending (the institutions of government) which accounts for the partial effect of openness on total spending in developing (and to a lesser extent, developed) countries. Rather than an increase in pressure for any *particular* type of good, trade openness affects the way general pressure for the entire array of spending is accommodated.

Several papers in recent years have noted that fiscal policy in developing countries is markedly procyclical (Gavin et. al. (1996), Gavin and Peroti (1997), Talvi and Vègh (2000)). In fact, Talvi and Vègh note that it is procyclical in most industrialized countries too: that only the G7 display

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larger and the results for political rights while the significance levels drop from 1 and 5% to 5 and 10%.

<sup>19</sup>Countries who were not members of the OECD in 1975 are classified as developing countries.

acyclical fiscal policy. Talvi and Vègh propose a mechanism to explain this departure from the traditional tax-smoothing prescription. They note that exogenous windfalls lead to greater political pressure to spend and cite a number of studies demonstrating central governments' spectacularly high marginal propensities to consume out of tax windfalls. As a result, they predict that, in the presence of common pool problems, tax base volatility leads to pro-cyclical fiscal policy. Developing countries experience greater volatility of the tax base and hence have more procyclical fiscal policy.

Stein, Talvi, and Grisanti (1998) find that institutional factors which exacerbate the common pool problem are associated with pro-cyclical fiscal policy. This builds on a longer line of work showing that certain types of regimes run larger deficits or react to fiscal shocks differently (Grilli, Masciandaro, and Tabellini 1991, Alesina and Peroti 1995). The Talvi and Vègh model predicts an increase in the cyclicity of fiscal policy without a change in the level. However, they assume that spending can be cut as easily as it can be increased and that governments have infinite horizons. In fact, spending increases are politically easier than spending cuts and this hysteresis, coupled with the fact that government horizons are finite would likely lead to bias for larger average government in countries with more volatile tax bases. This accords with the empirical findings of Stein, Talvi, and Grisanti.

These strands can be woven into an alternate explanation for the association of openness with higher government expenditure. If trade openness is associated with tax-base volatility, we would expect to see higher total expenditure in more open countries. Because the increase would come from common pool problems which are endemic to all types of government spending, we would expect the effect to be a general increase across all functional categories rather than a spike in any particular category. This is at least consistent with the pattern in table 1.

Alternately, if trade openness exacerbates the common pool problem, then a given level of tax-base volatility would translate into a higher level of government expenditure again producing a correlation between trade openness and a broad measure of government spending.

The jury is still out on whether trade openness increases the volatility of the tax-base.<sup>20</sup> On the other hand, trade policy is the classic arena for common pool problems. Policies of protection and relief have narrow benefits, broad costs, and fiercely active lobbies. It is plausible that more open countries are characterized by broader political mobilization for trade protection. But this does not necessarily translate into greater equilibrium levels of protection (see Grossman and Helpman 1994). Moreover, it is not clear how a greater intensity of lobbying over trade policy translates into broad increases in government expenditure unless political organization for trade lobbying leads to lobbying over a broader array of government policies.

To summarize, the large and robust increases in total expenditure associated with greater trade openness are seen in very different categories in industrialized and less-developed countries. In developed countries, the increases are concentrated in social security and transportation infrastructure and wages at the state and local level. In less-developed countries, greater openness is associated with greater spending on transportation infrastructure and education, and with a general increase in central government consumption fueled by a centralization of expenditures across the board.

I submit that Rodrik's hypothesis explains only a small part of the effects of trade openness on government expenditure. Another small part of the effect is due to increased expenditure on the transportation networks that enable trade. But a large part of the effect is across-the-board increases. These are more likely explained by the structure of government than by a shift in the demand for a given type of expenditure. One possibility is that openness exacerbates the common

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<sup>20</sup>The literature on trade openness and volatility is largely driven by a slightly different question: whether trade openness exacerbates the likelihood of financial crises.

pool problem. Another possibility is that openness increases the volatility of the tax base and, because of hysteresis in tax rates, leads to larger average government. For the moment the puzzle remains.

#### *Country Size and Fragmentation*

The basic tenet of fiscal federalism is that increased heterogeneity in preferences should lead to a devolution of fiscal policy prerogatives to lower levels of government where heterogeneity may be less severe. If we assume that ethnic or linguistic affiliation is correlated with preferences over public goods provision, then the results are consistent with this tenet: increased heterogeneity as measured by the index of fractionalization is accompanied by decentralization of expenditure. Is there also support for the Easterly-Levine hypothesis that an ethnic group's utility from public goods declines when forced to share the public good with other ethnic groups? On the one hand, education and healthcare involve significantly more interaction between consumers than do transportation networks and public safety. The fact that the fireman protects the homes of another ethnic group can hardly diminish the utility of having the fireman protect one's business. Transportation, telecommunications, and energy grids are similarly impersonal. By contrast, education and healthcare not only involve greater personal interaction in the classroom and clinic, but may involve a significant skewing of benefits for one group or another. If rich white Californians see their tax dollars being spent on public schools from which they have largely withdrawn their children or hospitals which cater mainly to poorer Hispanics, they may be reluctant to spend public money on these goods. On the other hand, this is not really an example of a disutility to sharing, evidence of an ethno-centric utility function. It can be explained simply by allowing for differences in preferences across ethnicities, driven by persistent differences in wealth. The story about Californian voters does not require that white voters suffer a disutility from having their children in the same classrooms as Hispanic children. It simply requires that white voters be richer and less likely to enroll their children in public schools than Hispanic voters. The conclusion that can be drawn is that education and healthcare policy are more complex than policy over transportation and public safety and thus that the costs of heterogeneous preferences—driven by ethnicity, incomes, or any other source of heterogeneity—are higher. Thus we see a greater decentralization of expenditure in these complex categories in the face of fragmentation. To disentangle ethnocentric utility from a simple correlation between ethnicity and preferences over public goods requires a different approach.

The results in table 1 are consistent with the fact that both population and fragmentation lead to increased heterogeneity of preferences which is coped with by devolution to the local level. Nonetheless, decentralization does not account for the entirety of the effect: the decline in central government expenditures associated with increased population is only partially mitigated by the increase at the local level. Thus the results are also consistent with the existence of scale effects. More tenuously, there is a correlation between the extent to which a decline in central government expenditure on category X is reversed by an increase in local government expenditure on X and the degree to which category X is likely to be subject to heterogeneous preferences. The effects of country size on transportation, general public services, and public order and safety seem to be less about decentralization and more about scale effects. In contrast, decentralization plays a larger role in explaining the decline of central government spending in the more complex areas of education and healthcare. This is not statistically rigorous, but it is suggestive.

Finally, the conjecture by ADEKW that increased tolerance of minorities positively influences both measured religious heterogeneity and the extent of transfers, thereby explaining the (surprisingly) *positive* correlation between the two is dealt a minor blow. Political rights—a decent proxy for “tolerance of minorities”—is uncorrelated ( $\rho = -0.02$ ) with religious fractionalization in my sample.

## *Income*

The results suggest that Wagner's Law is driven solely by demographics: older countries are both richer and spend more on social security. This increases in social security drive the observed increases in total expenditure and deliver the correlation between total expenditure and per capita income. Total expenditure net of social security does not grow with per capita income.

It is instructive to note that those countries without a greying population have not seen the same steady increase in government expenditure during the post-war period that OECD countries have. Stein, Talvi, and Grisanti (1998) note that while average government spending in OECD countries has jumped from 26.6% in 1960 to 49% in 1995, "Latin American governments grew very rapidly through the seventies and early eighties, collapsed in the late eighties in the aftermath of the debt crisis, and have remained fairly stable since the beginning of the nineties."

Of course, evidence for Wagner's Law can be found in earlier periods, sometimes in studies delving back into the later nineteenth century (e.g. Easterly-Rebelo, Oxley). One might question whether the same demographic trends explain Wagner's Law in earlier periods. While I do not have the data to test the assertion, it is possible that the correlation of per capita income and government size runs through social security spending in these studies as well. Oxley studies the UK, where expenditures on social services already exceeded 16% of government expenditure by 1920 (compared to 43% in 1987).<sup>21</sup> Easterly and Rebelo study the entire period from 1870-1988 so it is entirely possible that their findings are driven by the later period. Moreover, their sample contains most of the countries with early establishment of social security. Most other studies finding evidence for Wagner's Law (e.g. Ram) examine the post-WWII period by which time social security programs were widely established. The possibility that causality runs through demographics would also explain why income and expenditure are only loosely co-integrated, as noted by Henrekson.

This seems like a demand-side explanation for Wagner's Law, but there may also be a supply-side explanation concerning the technology of taxation. It is possible that the expansion of government is enabled by advances in the ability of the state to raise revenue which then translates disproportionately into increases in social security spending by lowering the relative price of such programs. Easterly and Rebelo note that in the period 1870-1988, "countries with higher incomes tend to resort less to trade taxes and more to income taxes." They hypothesize that this may be due to the relative costs of taxation: custom taxes require little overhead to establish but are costly to administer while income tax collection requires a costly system of reporting and surveillance but little marginal cost per extra dollar. Margaret Levi's *Of Rule and Revenue* (1988) lends support for this view. Discussing the establishment of the income tax systems in Britain, she notes that the state must overcome the natural reluctance of its citizens to be monitored and to grant the power of the purse to the central government. This is a lengthy exercise in state-building requiring significant investment in legitimacy and establishment of checks and balances to ensure executive restraint. Without such an exercise, the state cannot collect taxes except by force which renders the raising of revenue a costly endeavor. Levi further notes that the state must also give individual citizens reason to believe that other citizens will also be paying: they must engender the proper expectations to solve the collective action problem. Finally, the state must establish the system of information collection and surveillance. Levi notes that in the past, war was often the catalyst which convinced citizens that concentration of power was necessary. Income taxation was established in Britain in 1798 (Napoleonic Wars), in Australia in 1942 (WWII), and while established in 1913 in the US, income tax revenues remained at a paltry 1% of GDP as late as 1939, rising to

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<sup>21</sup>Figures are from Liesner 1989

8.5% of GDP in 1944 (WWII). Easterly and Rebelo note that a higher level of income makes the high fixed cost of establishing the system worthwhile.

Once the institutions of surveillance and collection are established, they remain despite the lapse of the original impetus. The marginal cost of taxation declines and thus the relative price of public goods declines. It is possible that increases in the efficiency of taxation are responsible for the rise of government. At the same time, such increased efficiency may also affect the relative prices of different types of government spending and thus affect the composition of government expenditure as well as its magnitude. In particular, a social security system requires much of the same infrastructure of surveillance and trust which Levi describes as prerequisite for income taxation. Citizens must believe the system will be ably managed—funds will be maintained rather than raided for other public programs, fellow citizens will contribute their share and receive no more than their share—and the government must have information about its citizens' income, age, address, and employment status to collect the proper taxes and pay out the proper benefits. These expensive prerequisites for modern social security are all emplaced by the establishment of the income tax system.

In this story, the connection between per capita income and social rests on three main factors. In the first stages, the establishment of income taxation, often in response to wartime need for revenue, reduces the relative price of public goods leading to an expansion of government spending. At the same time, the price of social security relative to other public goods is particularly affected, possibly leading to an early expansion of social security (though I am not aware of any studies on the matter). Subsequently, the demand for social security is a function of demographics and as richer countries age, their spending on social security, enabled by relatively efficient income taxation, drives the correlation between income and total government spending.

#### *Institutions of Government*

The fact that majoritarian electoral systems correlate with reduced spending across the board in the presence of either system of government does not necessarily falsify the theoretical claims of either Persson and Tabellini (1999) or Milesi-Ferretti, Perotti, and Rostagno (2002). It could be the case that while a majoritarian government lowers government expenditure for all categories, it simultaneously “tilts” the incidence of expenditure in favor of some categories at the expense of others. Persson and Tabellini would argue that the tilt is in favor of transfers at the expense of public goods; Milesi-Ferretti, Perotti, and Rostagno the opposite. It is quite possible that both effects operate simultaneously. The question, of course, is how to measure the tilt in the face of the evident shift. Since it is not possible to rigorously compare the coefficients from the various regressions, a new approach is required.

The idea that majoritarian governments are less profligate is not new. Austen-Smith (2000) and Milesi-Ferretti, Perotti, and Rostagno (2002) both predict that total government expenditure is higher under proportional representation. Persson and Tabellini (2004) confirm these predictions in a panel of 80 democracies during the 1990s. But Persson and Tabellini (2004) limit their study to total expenditure and do not break out central government expenditure by category. This study shows that their results are replicated in each category of expenditure: that majoritarian government results in smaller expenditures *across the board*. It further shows that panel regressions of expenditure shares cannot distinguish between Milesi-Ferretti, Perotti, and Rostagno (2002) and Persson and Tabellini (2004).

#### *Income Inequality and Political Rights*

The most surprising aspect of my results on income inequality and political rights is that they seem to directly contradict the work of Easterly-Rebelo (1993) and Mulligan, Gil, and Sala-i-Martin

(2002, 2004) who find that the political regime has little effect on the extent of expenditures on social security.

The most likely explanation for the seeming contradiction is the difference in samples. Mulligan, Gil, and Sala-i-Martin (2002) use a cross-section of 65 countries. Because it is a cross-section, each country enters the same number of times. In contrast, my extended specification, while covering 52 countries, is heavily weighted toward industrialized countries. Over half of the country-periods are from current members of the OECD and roughly two thirds of the remaining country-periods are from Latin American countries. Seventy percent of the country-years score either a 1 or a 2 on the unmodified Gastil index. As a result, it is likely that my results speak to variation within democracies while those of Mulligan, Gil, and Sala-i-Martin speak to variation over a wider range of political systems. It would seem that, among democracies, political rights and participation do matter in the manner suggested by Benabou's extension of Meltzer and Richard, even if, as broad groups, autocracies and democracies do not differ much in levels of social protection.

## 7 Conclusion

By systematically testing the leading theories of government size, this paper has generated a variety of interesting results including a new explanation for Wagner's Law, evidence that fragmentation leads to decentralization rather than an outright decline in expenditure, evidence that the extent of the franchise affects the degree of redistribution in advanced democracies, and a puzzle for the role of trade openness.

These findings emphasize the importance of considering the structure of government: the supply side of government expenditure. Correlations in the government size literature defy explanation by a simple demand shift alone. Even Wagner's Law may be driven by changes in the technology of taxation as well as changing fiscal preferences of the polity. Increases in government expenditure associated with greater trade openness are not associated with any particular function (such as public insurance) but are simply increases across all categories. This suggests that, rather than by shifting demand, the influence of trade openness on government expenditure is likely due to a change in the way the pressure for any type of spending is accommodated by government. Factors which increase the heterogeneity of preferences— increased population and ethnic fragmentation— are associated with a decentralization of expenditure rather than an outright decline in expenditure. Redistributive spending correlates with measures of inequality but also correlates with a measure of the effective franchise.

Much of the past work on the literature on government size has focused on identifying various social and demographic variables and measuring their effect on government spending through an implicit shift in the demand for public goods. Many of the interesting questions for future research in this field concern the manner in which the structure of government— the mechanism by which public goods are supplied— channels this shifting demand for public expenditure. Here are a few that have arisen from this paper. To what degree does trade openness exacerbate the common pool problem in public expenditure by increasing the volatility of the tax base? Does fiscal federalism accommodate preference heterogeneity and solve deadlock better for certain types of expenditure? What are the differences both between democracies and autocracies and among democracies in their provision of social security? How does a change in the relative cost of provision affect the level of public goods provided? It is only through explicit attention to the supply of public goods as well as the demand for them that observed patterns of government expenditure will become clear.

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Table 1: Central Government Expenditure: Basic Specification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total Exp. (central)	Education (central)	Healthcare (central)	Social Sec. (central)	Public Order & Safety (central)	General Public Services (central)	Transport (central)	Defense (central)	Transfers (central)	Public Goods (central)	Govt. Cons. (central)	Wages & Salaries (central)
log(pop)	-0.472 (0.588)	-0.303 (0.097)**	-0.213 (0.109)	0.020 (0.224)	-0.240 (0.057)**	-0.437 (0.132)**	-0.192 (0.070)**	0.056 (0.208)	0.382 (0.327)	-0.013 (0.517)	-1.279 (0.288)**	-0.967 (0.185)**
Fraction <15	0.298 (0.143)*	0.028 (0.023)	-0.036 (0.024)	0.043 (0.050)	-0.047 (0.017)**	0.114 (0.038)**	0.096 (0.021)**	0.157 (0.054)**	0.003 (0.081)	-0.043 (0.159)	0.175 (0.071)*	0.037 (0.042)
Fraction 65+	1.585 (0.333)**	-0.072 (0.054)	0.079 (0.058)	1.049 (0.117)**	-0.051 (0.034)	0.059 (0.082)	0.135 (0.046)**	0.103 (0.119)	1.199 (0.185)**	0.886 (0.310)**	0.075 (0.162)	-0.211 (0.098)*
log(per cap. gdp)	-0.080 (1.139)	0.220 (0.189)	0.045 (0.203)	0.086 (0.418)	-0.070 (0.117)	-0.065 (0.275)	0.191 (0.151)	0.410 (0.402)	-0.744 (0.630)	-0.269 (1.069)	1.020 (0.554)	0.788 (0.342)*
trade openness	0.067 (0.017)**	0.007 (0.003)**	0 (0.003)	-0.001 (0.006)	0 (0.002)	0.006 (0.004)	0.007 (0.002)**	0.011 (0.006)	0.001 (0.009)	0.009 (0.014)	0.023 (0.008)**	0.003 (0.005)
open*OECD1975	0.019 (0.027)	0.002 (0.004)	-0.002 (0.005)	0.024 (0.009)*	-0.007 (0.002)**	0.005 (0.006)	0.006 (0.003)*	-0.005 (0.009)	0.058 (0.015)**	0.051 (0.021)*	-0.030 (0.013)*	-0.005 (0.008)
ethnic frac.	-0.020 (0.039)	-0.011 (0.007)	-0.012 (0.008)	-0.007 (0.014)	0.004 (0.004)	-0.001 (0.009)	0.003 (0.005)	-0.017 (0.013)	-0.050 (0.021)*	-0.071 (0.035)*	-0.008 (0.018)	-0.004 (0.012)
observations	448	379	378	365	212	377	371	358	420	207	419	400
countries	101	92	92	90	80	92	91	90	98	76	98	96

standard errors in parentheses

\*significant at 5%, \*\*significant at 1%

Regressions include a constant.

Table 2: Local Government Expenditure: Basic Specification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Total Exp. (local)	Education (local)	Healthcare (local)	Social Security (local)	Public Order & Safety (local)	General Public Services (local)	Transportation (local)	Govt. Cons. (local)	Wages& Salaries (local)
log(pop)	0.412 (0.328)	0.179 (0.108)	0.092 (0.087)	0.05 (0.119)	0.062 (0.026)*	0.043 (0.033)	-0.037 (0.055)	0.509 (0.235)*	0.443 (0.156)**
Fraction < 15	-0.103 (0.059)	0.019 (0.026)	0.019 (0.020)	0.022 (0.019)	0.003 (0.005)	-0.002 (0.008)	0.009 (0.017)	0.035 (0.056)	0.053 (0.040)
Fraction 65+	0.759 (0.148)**	0.322 (0.061)**	0.225 (0.047)**	0.262 (0.050)**	0.057 (0.011)**	0.076 (0.019)**	0.025 (0.034)	0.896 (0.130)**	0.583 (0.090)**
log(per cap. gdp)	-1.168 (0.540)*	0.108 (0.213)	0.013 (0.166)	0.204 (0.183)	0.010 (0.044)	-0.031 (0.066)	0.153 (0.115)	-0.150 (0.450)	-0.036 (0.307)
trade openness	-0.026 (0.008)**	-0.001 (0.003)	0 (0.002)	-0.001 (0.002)	0 (0.001)	0 (0.001)	-0.005 (0.002)*	-0.003 (0.007)	0 (0.004)
open*OECD1975	0.049 (0.015)**	-0.003 (0.005)	0.003 (0.004)	0.007 (0.005)	0.001 (0.001)	-0.001 (0.001)	0.003 (0.002)	0.018 (0.011)	0.015 (0.007)*
ethnic frac.	0.012 (0.023)	0.026 (0.007)**	0.014 (0.006)*	0.017 (0.008)*	0.005 (0.002)**	0.003 (0.002)	-0.001 (0.004)	0.034 (0.015)*	0.020 (0.010)*
observations	451	383	382	375	237	381	157	423	404
countries	101	92	92	91	81	92	46	98	96

standard errors in parentheses

\*significant at 5%, \*\*significant at 1%

Regressions include a constant.

Table 3: Central Government Expenditure: Extended Specification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total Exp. (central)	Education (central)	Healthcare (central)	Social Sec. (central)	Public Order & Safety (central)	General Public Services (central)	Transport (central)	Defense (central)	Transfers (central)	Public Goods (central)	Govt. Cons. (central)	Wages & Salaries (central)
log(pop)	1.122 (1.005)	-0.246 (0.164)	0.330 (0.190)	0.145 (0.420)	-0.094 (0.080)	-0.241 (0.162)	-0.351 (0.110)**	0.448 (0.386)	0.766 (0.602)	0.700 (1.074)	-0.365 (0.495)	-0.390 (0.291)
Fraction <15	0.338 (0.212)	0.003 (0.029)	-0.052 (0.042)	0.189 (0.095)*	0 (0.018)	0.006 (0.037)	0.002 (0.026)	0.172 (0.087)*	0.114 (0.132)	0.134 (0.247)	0.295 (0.105)**	0.129 (0.058)*
Fraction 65+	1.981 (0.489)**	-0.202 (0.070)**	-0.087 (0.096)	1.349 (0.214)**	-0.006 (0.037)	-0.121 (0.084)	-0.030 (0.059)	0.224 (0.198)	1.620 (0.298)**	1.405 (0.496)**	0.309 (0.239)	-0.262 (0.134)
log(per cap. gdp)	-3.374 (2.192)	0.005 (0.307)	-0.381 (0.415)	-0.599 (0.988)	0.101 (0.172)	0.070 (0.361)	-0.243 (0.256)	-0.477 (0.852)	-2.745 (1.354)*	-3.301 (2.482)	-0.270 (1.090)	1.099 (0.601)
trade openness	0.140 (0.035)**	0.009 (0.005)	0.011 (0.007)	0.018 (0.015)	0.001 (0.002)	0.001 (0.006)	0.005 (0.004)	0.029 (0.014)*	0.048 (0.022)*	0.060 (0.032)	0.052 (0.017)**	0.017 (0.009)
ethnic frac.	0.055 (0.076)	-0.005 (0.013)	-0.027 (0.014)	0.001 (0.029)	0.009 (0.005)	0.009 (0.012)	0.020 (0.008)*	-0.012 (0.028)	-0.015 (0.045)	-0.038 (0.068)	0.005 (0.037)	0.002 (0.022)
linguistic frac.	-0.090 (0.067)	-0.009 (0.011)	-0.024 (0.012)*	0.026 (0.026)	-0.008 (0.005)	-0.022 (0.010)*	-0.008 (0.007)	0 (0.025)	0.010 (0.039)	-0.016 (0.066)	-0.044 (0.033)	-0.037 (0.019)
religious frac.	0.116 (0.066)	0.002 (0.011)	0.039 (0.012)**	0.033 (0.025)	0.009 (0.005)*	0.019 (0.010)	0.001 (0.007)	0.030 (0.024)	0.046 (0.039)	0.061 (0.064)	0.031 (0.033)	0.00 (0.020)
Gini	0.285 (0.182)	0.034 (0.025)	-0.011 (0.036)	0.201 (0.084)*	-0.020 (0.014)	0.040 (0.032)	-0.024 (0.023)	-0.100 (0.075)	0.231 (0.112)*	0.137 (0.197)	-0.035 (0.089)	0.041 (0.048)
Pol. Rights	23.187 (9.514)*	2.367 (1.225)	-0.062 (1.828)	12.002 (4.262)**	-1.799 (0.760)*	1.647 (1.626)	-0.758 (1.187)	-3.605 (3.796)	19.464 (5.862)**	9.676 (10.457)	-1.163 (4.630)	4.043 (2.479)
Gini*Pol Rights	-0.555 (0.231)*	-0.042 (0.030)	0.022 (0.044)	-0.271 (0.102)**	0.034 (0.017)*	-0.042 (0.039)	0.021 (0.029)	0.043 (0.091)	-0.433 (0.142)**	-0.167 (0.235)	0 (0.112)	-0.099 (0.060)
Majoritarian	-7.063 (3.960)	-1.175 (0.664)	-0.616 (0.728)	-4.395 (1.520)**	-0.102 (0.255)	-0.807 (0.615)	-0.877 (0.412)*	-1.802 (1.466)	-5.249 (2.353)*	-8.052 (3.426)*	-0.714 (1.959)	-0.414 (1.161)
Presidential	-7.185 (3.975)	-2.021 (0.662)**	-0.612 (0.737)	-1.404 (1.538)	-0.221 (0.312)	-1.981 (0.624)**	-1.274 (0.425)**	-1.560 (1.486)	-3.681 (2.330)	-10.099 (4.159)*	-3.149 (1.931)	-2.546 (1.124)*
Maj*Pres	7.464 (7.239)	1.808 (1.228)	0.257 (1.307)	3.100 (2.686)	0.029 (0.452)	1.274 (1.098)	1.491 (0.736)*	4.306 (2.623)	5.610 (4.219)	8.965 (5.946)	3.487 (3.526)	2.181 (2.059)
Federal	-3.089 (3.368)	-0.551 (0.592)	-0.483 (0.634)	-1.105 (1.348)	-0.619 (0.227)**	-0.584 (0.534)	0.119 (0.358)	0.031 (1.274)	-1.019 (1.968)	-2.81 (3.000)	-0.502 (1.643)	-1.411 (0.982)
observations	168	151	151	145	90	151	146	150	164	89	164	158
countries	44	42	42	41	32	42	41	42	43	31	43	42

standard errors in parentheses

\*significant at 5%, \*\*significant at 1%

Regressions include a constant.

Table 4: Central Government Expenditure: Basic Specification: Between Estimator

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total Exp. (central)	Education (central)	Healthcare (central)	Social Sec. (central)	Public Order &Safety (central)	General Public Services (central)	Transport (central)	Defense (central)	Transfers (central)	Public Goods (central)	Govt. Cons. (central)	Wages & Salaries (central)
log(pop)	-0.315 (0.745)	-0.216 (0.118)	-0.258 (0.139)	-0.076 (0.277)	-0.250 (0.063)**	-0.365 (0.150)*	-0.201 (0.076)**	0.330 (0.230)	0.664 (0.401)	0.198 (0.570)	-0.973 (0.355)**	-0.768 (0.232)**
Fraction <15	0.643 (0.328)	0.163 (0.051)**	0.039 (0.061)	-0.197 (0.114)	-0.044 (0.028)	0.076 (0.065)	0.049 (0.033)	0.245 (0.095)*	-0.107 (0.180)	0.019 (0.262)	0.428 (0.160)**	0.198 (0.102)
Fraction 65+	1.937 (0.630)**	0.101 (0.098)	0.161 (0.116)	0.676 (0.217)**	-0.089 (0.049)	0.021 (0.125)	0.099 (0.063)	0.237 (0.182)	1.010 (0.338)**	0.980 (0.456)*	0.542 (0.300)	-0.019 (0.194)
log(per cap. gdp)	2.153 (1.628)	0.469 (0.267)	0.477 (0.314)	-0.496 (0.605)	0.099 (0.147)	-0.183 (0.339)	-0.180 (0.172)	1.525 (0.490)**	-0.067 (0.893)	0.492 (1.367)	1.905 (0.797)*	1.278 (0.510)*
trade openness	0.065 (0.026)*	0.013 (0.004)**	0.002 (0.005)	-0.002 (0.009)	0 (0.002)	0.006 (0.005)	0.004 (0.003)	0.014 (0.008)	0.013 (0.014)	0.017 (0.019)	0.030 (0.013)*	0.011 (0.008)
open*OECD1975	-0.001 (0.033)	0.005 (0.005)	-0.006 (0.006)	0.027 (0.011)*	-0.008 (0.003)**	0.005 (0.006)	0.011 (0.003)**	-0.014 (0.009)	0.047 (0.017)**	0.052 (0.024)*	-0.043 (0.016)**	-0.006 (0.010)
ethnic frac.	-0.025 (0.042)	-0.017 (0.007)*	-0.012 (0.008)	-0.002 (0.016)	0.002 (0.004)	0.001 (0.009)	0.003 (0.005)	-0.001 (0.013)	-0.034 (0.022)	-0.060 (0.036)	-0.006 (0.020)	-0.011 (0.013)
countries	101	92	92	90	80	92	91	90	98	76	98	96

standard errors in parentheses

\*significant at 5%, \*\*significant at 1%

Regressions include a constant.

Table 5: Local Government Expenditure: Basic Specification: Between Estimator

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Exp. (local)	Education (local)	Healthcare (local)	Social Security (local)	Public Order & Safety (local)	General Public Services (local)	Govt. Transportation (local)	Cons. (local)	Wages& Salaries (local)	
log(pop)	0.821 (0.467)	0.082 (0.132)	0.033 (0.109)	0.015 (0.165)	0.038 (0.031)	0.024 (0.040)	-0.016 (0.064)	0.266 (0.284)	
Fraction < 15	-0.073 (0.205)	-0.116 (0.058)*	-0.061 (0.048)	0.015 (0.070)	-0.002 (0.013)	-0.032 (0.017)	-0.018 (0.027)	-0.145 (0.128)	
Fraction 65+	0.773 (0.395)	0.038 (0.110)	0.021 (0.091)	0.142 (0.133)	0.016 (0.024)	0.005 (0.033)	0.002 (0.052)	0.324 (0.241)	
log(per cap. gdp)	0.825 (1.019)	-0.197 (0.298)	-0.191 (0.246)	0.262 (0.366)	0.084 (0.071)	-0.100 (0.090)	0.259 (0.137)	-0.268 (0.638)	
trade openness	-0.016 (0.017)	-0.004 (0.005)	-0.002 (0.004)	-0.003 (0.006)	-0.001 (0.001)	-0.001 (0.001)	-0.005 (0.003)	-0.012 (0.010)	
open*OECD1975	0.032 (0.021)	-0.003 (0.006)	0.006 (0.005)	0.004 (0.007)	0.001 (0.001)	0 (0.002)	0.005 (0.002)*	0.017 (0.012)	
ethnic frac.	0.040 (0.026)	0.021 (0.008)**	0.008 (0.006)	0.006 (0.009)	0.003 (0.002)	0.001 (0.002)	0.007 (0.004)	0.015 (0.016)*	
countries	101	92	92	91	81	92	46	98	

standard errors in parentheses

\*significant at 5%, \*\*significant at 1%

Regressions include a constant.

Table 6: Central Government Expenditure: Extended Specification: Between Estimator

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Total Exp. (central)	Education (central)	Healthcare (central)	Social Sec. (central)	Public Order & Safety (central)	General Public Services (central)	Transport (central)	Defense (central)	Transfers (central)	Public Goods (central)	Govt. Cons. (central)	Wages & Salaries (central)
log(pop)	2.016 (1.585)	0.059 (0.278)	0.741 (0.293)*	0.425 (0.597)	-0.188 (0.105)	-0.144 (0.251)	-0.171 (0.145)	0.742 (0.539)	1.231 (0.919)	1.111 (1.378)	-0.074 (0.732)	0.167 (0.456)
Fraction <15	0.918 (0.566)	0.152 (0.100)	0.070 (0.105)	-0.174 (0.210)	0.043 (0.038)	-0.064 (0.090)	-0.033 (0.054)	0.523 (0.194)*	0.205 (0.325)	0.128 (0.500)	0.588 (0.259)*	0.124 (0.157)
Fraction 65+	2.614 (1.006)*	0.066 (0.188)	-0.005 (0.198)	0.742 (0.395)	0.022 (0.078)	-0.172 (0.170)	0.023 (0.101)	0.695 (0.365)	0.900 (0.582)	0.491 (1.047)	1.462 (0.463)**	0.276 (0.302)
log(per cap. gdp)	0.180 (3.883)	0.238 (0.700)	-0.094 (0.738)	-1.211 (1.602)	-0.076 (0.304)	0.053 (0.632)	-0.557 (0.375)	3.432 (1.359)*	0.750 (2.316)	4.607 (4.678)	0.013 (1.846)	-0.215 (1.132)
trade openness	0.177 (0.078)*	0.026 (0.013)	0.032 (0.014)*	0.035 (0.028)	-0.002 (0.004)	0.006 (0.012)	0.015 (0.007)*	0.020 (0.026)	0.045 (0.045)	0.053 (0.057)	0.066 (0.036)	0.053 (0.022)*
ethnic frac.	0.043 (0.081)	-0.004 (0.014)	-0.029 (0.015)	-0.018 (0.031)	0.007 (0.006)	0.009 (0.013)	0.024 (0.008)**	0.011 (0.028)	-0.063 (0.048)	-0.052 (0.075)	0.053 (0.038)	0.027 (0.023)
linguistic frac.	-0.092 (0.098)	-0.005 (0.017)	-0.041 (0.018)*	0.013 (0.037)	-0.011 (0.007)	-0.018 (0.016)	-0.018 (0.009)	0.008 (0.033)	0.045 (0.056)	0.003 (0.096)	-0.059 (0.045)	-0.056 (0.027)
religious frac.	0.144 (0.072)	0 (0.013)	0.041 (0.013)**	0.020 (0.027)	0.014 (0.005)*	0.015 (0.011)	0 (0.007)	0.031 (0.025)	0.026 (0.041)	0.087 (0.068)	0.043 (0.033)	0.001 (0.020)
Gini	-0.159 (0.729)	0.057 (0.130)	-0.131 (0.137)	0.492 (0.274)	0.002 (0.051)	0.045 (0.117)	-0.061 (0.068)	-0.493 (0.252)	0.853 (0.424)	0.845 (0.674)	-0.742 (0.337)*	-0.315 (0.203)
Pol. Rights	-17.253 (41.358)	1.103 (7.214)	-3.199 (7.601)	31.747 (15.192)*	0.562 (2.747)	-1.054 (6.516)	-2.293 (3.790)	-30.593 (13.923)*	60.645 (23.745)*	50.000 (36.253)	-54.469 (18.918)**	-23.625 (11.364)*
Gini*Pol Rights	0.251 (0.855)	0.008 (0.148)	0.108 (0.156)	-0.731 (0.312)*	-0.031 (0.058)	0.032 (0.134)	0.045 (0.076)	0.572 (0.287)	-1.276 (0.491)*	-1.136 (0.772)	1.098 (0.391)**	0.517 (0.235)*
Majoritarian	-9.563 (4.817)	-1.292 (0.833)	-0.340 (0.878)	-2.636 (1.758)	-0.257 (0.284)	-0.826 (0.752)	-0.369 (0.446)	-1.561 (1.616)	-4.143 (2.763)	-7.647 (3.767)	-1.244 (2.201)	-0.259 (1.310)
Presidential	-10.504 (5.333)	-2.130 (0.940)*	-0.003 (0.990)	0.583 (1.985)	-0.539 (0.390)	-2.003 (0.849)*	-0.527 (0.504)	-0.933 (1.825)	-2.341 (3.082)	-4.939 (5.414)	-4.020 (2.455)	-2.168 (1.449)
Maj*Pres	10.100 (8.376)	1.879 (1.438)	0.492 (1.515)	0.351 (3.029)	0.666 (0.535)	0.848 (1.299)	0.973 (0.766)	3.038 (2.790)	2.039 (4.838)	2.036 (7.300)	4.880 (3.855)	2.499 (2.281)
Federal	-3.335 (3.619)	-0.646 (0.644)	-0.459 (0.679)	-1.465 (1.429)	-0.409 (0.247)	-0.706 (0.582)	0.133 (0.346)	-1.311 (1.250)	-3.234 (2.077)	-7.699 (3.480)*	-0.007 (1.655)	-0.955 (1.009)
countries	44	42	42	41	32	42	41	42	43	31	43	42

standard errors in parentheses

\*significant at 5%, \*\*significant at 1%

Regressions include a constant.



Table 8: Summary Statistics

	Variable	Obs	Mean	Std. Dev. (panel)	Std. Dev. (between)	Std. Dev. (within)	Min	Max	Source
LHS general	total expenditure	227	43.545	15.087	13.619	5.664	9.223	86.938	IMF GFS
	defense	393	2.938	3.728	2.576	2.322	0.043	46.154	IMF GFS
	education	121	5.578	1.843	1.610	0.944	1.076	10.471	IMF GFS
	health	116	5.008	2.607	2.103	0.777	0.338	14.980	IMF GFS
	social security	116	13.232	6.874	6.594	1.688	0.570	35.062	IMF GFS
	public order and safety	85	1.559	0.526	0.759	0.232	0.696	2.878	IMF GFS
	general public expenditure	121	2.952	1.545	2.255	1.233	0.520	10.450	IMF GFS
	wages and salaries	175	9.435	3.203	3.146	1.791	2.957	18.024	IMF GFS
	goods and services	190	16.699	5.466	5.338	2.962	4.210	40.530	IMF GFS
	central	total expenditure	501	29.789	11.801	10.472	5.117	8.406	96.220
defense		393	2.931	3.727	2.575	2.322	0.043	46.154	IMF GFS
education		428	3.486	1.833	1.690	0.656	0.184	12.184	IMF GFS
health		427	2.296	1.753	1.703	0.609	0.130	7.927	IMF GFS
social security		409	6.549	5.999	5.827	1.455	0.059	23.837	IMF GFS
public order and safety		231	1.288	0.805	0.808	0.222	0.100	4.330	IMF GFS
general public expenditure		426	3.197	2.601	2.369	1.208	0.248	15.892	IMF GFS
wages and salaries		443	6.729	3.729	3.644	1.335	0.422	21.519	IMF GFS
goods and services		462	11.391	5.778	5.418	2.344	2.190	39.602	IMF GFS

Table 9: Summary Statistics cont.

	Variable	Obs	Mean	Std. Dev. (panel)	Std. Dev. (between)	Std. Dev. (within)	Min	Max	Source
LHS state	total expenditure	506	1.576	4.132	3.758	0.843	0.000	25.207	IMF GFS
	defense	427	0.003	0.025	0.020	0.009	0.000	0.300	IMF GFS
	education	434	0.375	1.066	0.946	0.383	0.000	5.511	IMF GFS
	health	433	0.231	0.805	0.646	0.372	0.000	6.810	IMF GFS
	social security	432	0.163	0.570	0.475	0.247	0.000	4.856	IMF GFS
	public order and safety	261	0.114	0.308	0.234	0.046	0.000	1.302	IMF GFS
	general public expenditure	432	0.120	0.383	0.348	0.126	0.000	2.941	IMF GFS
	wages and salaries	447	0.455	1.300	1.084	0.549	0.000	7.692	IMF GFS
	goods and services	466	0.777	2.126	1.783	0.813	0.000	12.936	IMF GFS
	local	total expenditure	257	7.809	7.031	6.442	1.313	0.160	36.787
defense		428	0.004	0.021	0.022	0.006	0.000	0.181	IMF GFS
education		142	1.899	1.608	1.353	0.460	0.000	6.089	IMF GFS
health		137	1.326	1.863	1.118	0.359	0.005	8.824	IMF GFS
social security		131	1.507	3.323	1.630	0.394	0.001	18.184	IMF GFS
public order and safety		119	0.265	0.290	0.191	0.057	0.002	1.402	IMF GFS
general public expenditure		142	0.645	0.396	0.370	0.168	0.008	1.919	IMF GFS
wages and salaries		202	3.321	3.142	2.285	0.984	0.040	15.148	IMF GFS
goods and services		213	5.194	4.490	3.617	1.381	0.058	19.167	IMF GFS

Table 10: Summary Statistics cont.

Variable	Obs	Mean	Std. Dev. (panel)	Std. Dev. (between)	Std. Dev. (within)	Min	Max	Source
RHS								
log(population in thousands)	630	8.93	1.81	1.85	0.16	3.73	14.02	Penn World Tables 6.1
Openness (M+X)/Y	630	71.48	46.24	44.43	11.11	11.01	380.10	Penn World Tables 6.1
log(GDP per capita)	629	8.44	1.03	1.01	0.19	6.22	10.51	Penn World Tables 6.1
Religious fractionalization	693	43.27	23.52	23.31	0.00	0.20	86.00	ADEKW
Ethnic fractionalization	689	43.30	25.94	25.93	0.00	0.00	93.00	ADEKW
Linguistic fractionalization	672	38.01	28.89	28.80	0.00	0.20	92.30	ADEKW
Political rights	708	0.47	0.33	0.31	0.13	0.14	1.00	Freedom House
Gini coefficient	311	38.69	9.39	9.53	2.74	16.63	63.00	UN WIID
% Under 15 years old	687	35.11	10.11	10.06	2.48	14.59	50.44	World Bank WDI
% Over 65 years old	687	6.35	4.31	4.22	0.68	1.20	17.86	World Bank WDI
Majoritarian electoral system	341	0.34	0.47	0.48	0.06	0.00	1.00	Persson-Tabellini
Presidential system of government	347	0.36	0.48	0.49	0.00	0.00	1.00	Persson-Tabellini
Federal system	347	0.21	0.41	0.40	0.00	0.00	1.00	Persson-Tabellini