Political Accountability and the Size of Government: Theory and Cross-Country Evidence*

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Abstract

We examine the effect of political accountability on the size of government. Political contestability and transparency increases political accountability, increasing the attractiveness of public goods provision, which in turn makes voters vote for higher taxes. The hypothesis is strongly supported by robust empirical evidence from a cross-section of democratic countries in 1995: Higher political accountability is associated with higher general government tax revenue.

Keywords: political accountability, control of politicians, size of government, democracy

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“Where the control of officials is weak, one would not expect citizens to allow officials to command many resources.” John Ferejohn (1990, p. 8).

1 Introduction

The size of government differs greatly across democracies. In 1995, tax revenue was 8.0 percent of GDP in Guatemala, and 49.5 percent of GDP in Sweden. At the same time, the scope for holding politicians in check differed greatly. In 1995 there were, according to the classification by Freedom House based on political rights and civil liberties, 76 “free” countries, while 62 were “partly free”, and 53 were “not free”. This paper explores the link between the degree of political accountability in democracies and the size of government.

La Porta, Lopez-de-Silanes, Shleifer and Vishny (1999) examine the determinants of “the quality of government” and they find “consistently ... that the better performing governments are also larger, and collect higher taxes. Poorly performing governments, in contrast, are smaller and collect fewer taxes ... [This] tells us that identifying big government with bad government can be highly misleading.” [p. 266]. The analysis and empirical results in this paper can be seen as providing an explanation for this phenomenon: In democracies, bad governments do not get to be big.

The basic argument presented here is that increasing political accountability increases public control of politicians. Politicians concerned with being reelected will respond by increasing public goods provision for a given level of tax revenue. This increase in productivity, in turn, makes voters vote for higher taxes. Political accountability measures the degree to which voters can control elected leaders in a principal-agent relationship. Two central features of political accountability are political contestability and transparency. Political contestability makes it possible for voters to punish incumbents, come election time, if the incumbent’s actions or the resulting outcomes fail voter standards. Transparency makes it possible for voters to distinguish whether bad outcomes are due

1 Data from this paper; see appendix B.
2 Karatnycky (1996, p. 3)
to corrupt politicians or adverse external circumstances. Both transparency and political contestability are necessary for control of politicians: Lack of transparency makes it harder for voters to infer the behavior of politicians from observables, in which case the degree of political contestability is less important. On the other hand, lack of contestability makes the issue of transparency moot, as it does not matter whether voters can observe the politician’s actions if they cannot punish him at the polls anyway.

Ferejohn (1999) shows that greater transparency in public decision making increases voter control over political agents which, in turn, increases the size of government demanded by voters in a democracy, but he does not test his hypothesis empirically. In this paper, I present a simple theoretical model showing that political contestability has similar effects: by increasing political accountability it increases public control of politicians which, in turn, increases the share of resources allocated by voters to public goods production. Together, the models of Ferejohn (1999) and this paper implies the testable hypothesis that more political accountability should lead to larger governments, measured by tax revenue to GDP.

I test the hypothesis that greater political accountability in democracies leads to larger governments on a sample of 62 democratic countries in 1995. The size of government is measured by tax revenue of general government to GDP. Existing studies measure the size of government by tax revenues or expenditures of central government only; using a variety of sources, I add data for sub-national government tax revenue to get a consistent measure of the size of general government corresponding to that of the theoretical model. The predictions of the model find strong and robust support: Countries with a higher degree of political accountability, measured by a composite index estimated by Kaufmann, Kraay and Zoido-Lobatón (1999a,1999b), have significantly higher general government tax revenues, controlling for potential endogeneity of democratic institutions and a variety of other potential determinants of public sector size. In the literature, the general result (see below) has been that democracy measures turn out insignificant. The different result obtained in this paper stems from two things: First, I focus on degrees of political accountability within democratic countries, rather than a binary measure of
democracy vs. autocracy. Second, the use of general, rather than central, government data: Results are robust in the former but not in the latter case, suggesting that the institutional unit of analysis should be chosen with care in empirical studies of public finance.

The paper is organized as follows: The next subsection briefly discusses related literature. Section 2 contains the theoretical model. Section 3 presents up the empirical specification, instruments and data, and section 4 presents the empirical results and their robustness. Section 5 concludes.

1.1 Relation to the Literature

There exists a large literature, and several excellent surveys thereof, seeking to explain the growth of government over time as well as cross-country differences in the size of government from economic, political and cultural factors; see Holsey and Borcherding (1997) for a recent overview.

A number of empirical studies, among the more recent ones Easterly and Rebelo (1993), Becker and Mulligan (1998) and Cheibub (1998), have found no statistically significant differences between democratic and autocratic regimes with respect to the size of government. These studies follow an influential literature in political science and employ a dichotomous definition of democracy: either a country is democratic, or it is not.\textsuperscript{3} The model set up in this paper is concerned only with democratic regimes, but suggests that, given that a country is democratic, different degrees of political accountability can help explain differences in the size of government. In a recent paper, Elkins (2000) demonstrates that graded measures of democracy have more validity and reliability than dichotomous measures. To the best of my knowledge, the present paper is the first to employ such graded measures to study the size of government. Use of the graded measures further carries with it the benefit that it allows me to correct in a convincing way for the endogeneity of democratic institutions, as observed in a number of studies

\textsuperscript{3}Lee (2003) finds democracies to have significantly larger tax revenues than dictatorships in some econometric specifications, while the effect is insignificant in other specifications. Boix (2001) reports similar findings, though neither study accounts for the endogeneity of democracy.
Becker and Mulligan (1998) find that tax systems that are more efficient, i.e. induce less economic distortions, lead to larger government. The results in this paper can be seen as extending this argument to political efficiency: Political regimes that are more efficient, i.e. reduce agency costs, lead to larger government.

Persson, Roland and Tabellini (1997, 2000) and Persson and Tabellini (1999) focus on the effects of political institutions, in particular whether a country is presidential or parliamentary, on the size of government. They identify two effects: An indirect effect, where presidentialism increases political accountability, which, in turn, decreases the size of government; and a direct effect in which legislative cohesion, typically found in parliamentary democracies as a consequence of vote of confidence procedures, leads to larger governments. Persson and Tabellini (1999) present empirical evidence supporting the hypothesis that presidential democracies have smaller public sectors.4

The hypothesis of Persson et al. (1997) that more political accountability leads to smaller public sectors is in contrast to the result of the model presented in this paper, where more political accountability increases the size of government. The different predictions stem from differences in the specification of preferences. When accountability increases, rents to politicians decrease, which, other things equal, decreases the size of government. However, in this paper the decrease in rents is off-set by the willingness of voters to supply more funds for public goods. Survey evidence supports the idea that more control of the public sector can increase voters’ willingness to pay taxes: A Harris poll of U.S. voters on the federal income tax (Wall Street Journal, January 8, 1997) reported that “64% [of voters] said they would be willing to pay more if they were sure the money would be spent ‘effectively’ on public needs.” Similarly, a survey of Tanzanian tax payers shows that more than 90 % of respondents indicated willingness to pay more

4Empirically, the correlation between presidentialism and the political accountability measure is -.45, such that presidential systems are associated with lower political accountability (see also Linz (1994)). This means that the theory presented in this paper can account for the empirical finding that presidential systems have smaller governments: If presidential systems in reality have less political accountability, voters have less control of politicians, leading to smaller governments, ceteris paribus, in presidential regimes.
taxes if services were improved (Fjeldstad and Semboja, 2001).

The sign of the effect of political accountability is the subject of the empirical analysis of sections 4 and 5. Further, the hypothesis of a direct effect of presidentialism on the size of government is tested by including it in the regression analysis; see the section on robustness of the empirical results.

2 The Model

The relationship between citizens and their leaders can be seen as a principal-agent relationship. Voters, the principals, choose leaders, the agents, who in turn rule the principals. Barro (1973), and later Ferejohn (1986) and Persson et al. (1997), examine the possibilities for voters to control elected politicians. Compared to the elaborate incentive schemes found in standard economic principal-agent problems, the main instrument available to voters for controlling their leaders is somewhat blunt: Elections. If performance is “unsatisfactory,” voters can vote for someone else.

Thus, one central feature of elections is to provide a check on elected leaders by holding them accountable for their decisions and the outcomes resulting from these decisions. If the possibilities for holding leaders accountable through elections are limited, voters lose control over their leaders and, as suggested by Ferejohn (1990, 1999), this can influence the degree to which citizens are willing to entrust their leaders with authority and resources.

In the model, a representative voter gets utility from a private and a public good. The political agent uses taxes paid by voters to finance public goods provision. The interests of the voters and the politician are not perfectly aligned; indeed, this is what gives rise to a principal-agent problem. Further, there is asymmetric information. The politician privately observes the realization of a stochastic variable which influences the rate of transformation from tax revenue to public goods. Come election day, voters evaluate the outcome and reelect the politician if the outcome is “satisfactory.” The

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5 This can easily be generalized to a population of voters, differing in income or their relative preferences for public goods. This does not yield additional insights, though.
relationship between politicians and voters continues indefinitely. The model is one of purely retrospective voting: politicians can make no credible commitments to platforms or honesty, but are judged solely by their performance in the current term.\footnote{There is no adverse selection in the model – potential politicians are all equally good at providing public goods.}

A feature of the model sets it apart from standard principal-agent models of government: It is voters, not politicians, who decide the size of government. When choosing the size of government, voters have an outside option: they want also to consume private goods. Therefore, the agent – the government – is constrained in its actions, as the outside option creates competition for funds. That voters choose the size of government is a defining feature of democracies, according to Przeworski and Limongi (1993, p. 58). They classify political regimes along two dimensions: Who decides the size of government, and who has the rights to the fiscal residuum that is left after public expenditures have been paid for, and they define a democracy as a regime in which “citizens both decide the size of government and have a right to the fiscal residuum.” Thus, the theory developed in this paper applies only to democratic regimes, but argues that political accountability differs within the group of democratic regimes.

While voters decide the size of government, it is politicians and bureaucrats who determine expenditure allocations; in this case between private rents and the public good. This assumption reflects the observation that tax rates and burdens are directly observable, and the implementation of new tax laws has to approved by the legislature. Furthermore, taxes and the size of government are generally thought to be salient issues in elections; expenditure decisions, on the other hand, require detailed information collection and administration, as well as expertise by politicians and bureaucrats; therefore, expenditure decisions are normally less salient and delegated to politicians and government administration.
2.1 Voters and Politicians

The voter gets utility in each period from a public good $x$ and a private good $c$ according to the per period preferences

$$U = x + H(c)$$

It is assumed that $H$ is increasing and strictly concave, and that $\lim_{c \to 0} H'(c) = \infty$. The voter has income $I$ in each period and pays taxes $\tau$, leaving $c = I - \tau$ to be used for private consumption. In any period, expected utility can be written as current utility plus future utility

$$EU = x_e + H(c) + \delta V$$

(1)

where $\delta V$ is the discounted expected continuation value and $x_e$ is the expected amount of public goods provided. In a stationary state, $EU = V$.

Tax revenue is transformed into the public good according to the public budget constraint

$$x = \theta (\tau - r)$$

where $\theta$ is a stochastic variable distributed according to a distribution function $F$, and $r$ denotes rents appropriated by the politician. The shock $\theta$ captures the fact that voters are not always able to thoroughly monitor the public machinery and that politicians can use this leeway for their own benefit. The politician observes $\theta$ before choosing rents; rents, therefore, are a function of $\theta$, $r(\theta)$. Voters observing a low realization of $x$ cannot determine whether this is due to a bad shock (low $\theta$) or a high amount of rents appropriated (high $r$). The expected amount of public good provided is

$$x_e = \int \theta (\tau - r(\theta)) dF(\theta).$$

The politician’s preferences are given by

$$EU^A = Wr + p(x) \delta V^A$$

where $p(x) \in [0,1]$ is the probability that the politician is reelected and can enjoy the discounted expected continuation value, $\delta V^A$, and $W \in [0,1]$ is the fraction of rents
appropriated by the politician that can actually be used for consumption; this suggests that there is a “leaky bucket” in transferring public funds to be used for the politician’s own consumption. In the model, voters and politicians have conflicting interests over rents, capturing the real world phenomenon that preferences of politicians and voters are not perfectly aligned. Rents should be thought of broadly as representing the loss to voters (consumers) from policies enacted by politicians for their own self-interest.\footnote{In this simple model, rents drive a wedge between taxes paid and public goods received. However, trade protection, e.g. import quotas, enacted to receive campaign funds from protected industries – see Grossman and Helpman (1994) – increases rents to the politician by affecting consumer prices. In this case, abolishing trade protection would benefit consumers, increasing income and increasing consumption of both private and public goods in a model with general preferences. A famous example is the U.S. sugar industry, see Dixit (1996) for this and other examples.}

The timing of the model is shown in Figure 1. First, the representative voter determines the share of resources to be used for public goods (in a standard voting model, this would be the median voter). Then, the politician observes the shock $\theta$ and chooses a level of rents $r(\theta)$. Thereafter, payoffs are realized for both voters and politician and, finally, elections take place on whether to replace the politician.

### 2.2 Voting

Aiming for a stationary subgame perfect Nash equilibrium, the model is solved backwards. At election day, voters choose whether to vote for the incumbent politician or an opponent. Since voters cannot observe neither $r$ nor $\theta$, they cannot condition their vote on these variables. As is standard in the literature (see, e.g., Banks and Sundaram (1998)), we assume that voters employ a cut-off rule when deciding whether to vote for the incumbent or not, voting for the incumbent if public goods provision $x$ is above some threshold $x^*$.\footnote{That voters are able to control the politician at all hinges on the policy space being one-dimensional. If the policy space has two or more dimensions in a model with many voters, problems akin to those of applications of the median voter theorem in multiple dimensions arise, since the politician, using personalized transfers, can effectively pit the voters against each other, leaving the voters with no or very little control of the politician (see Ferejohn, 1986). Empirical research, however, suggests that people vote on the basis of aggregate variables (the state of the economy, say) rather than pure “pocketbook” considerations (Lewis-Beck (1988)).} The probability that the voter votes for the incumbent politician is given...
by
\[ p(x) = \begin{cases} 1 & \text{if } x \geq x^* \\ \xi(E) & \text{if } x < x^* \end{cases} \]

However, in this formulation it is implicitly assumed that voters can costlessly vote for an identical opponent. To capture that this is not always the case, we posit the following voting rule:
\[ p(x) = \begin{cases} 1 & \text{if } x \geq x^* \\ \xi(E) & \text{if } x < x^* \end{cases} \]

If the incumbent politician satisfies the threshold level set by voters, he is reelected. If, however, he does not satisfy this threshold, he may be reelected anyway, depending on the degree of political contestability (or, more broadly, degree of democracy), denoted \( E \). Formally, \( \xi(E) \in [0,1] \) is the probability that there is no change of power even though voters vote against the incumbent. \( E \) can take on values in \([0,\infty)\), from no democracy to full democracy, and it is assumed that \( \xi(0) = 1, \xi'(E) < 0 \) and \( \lim_{E \to \infty} \xi(E) = 0 \).

The probability should not necessarily be interpreted as the probability that the incumbent will nullify the election should he lose, but rather that, for example if political competition is low, it may not be possible for voters always to find viable alternatives to the incumbent, in which case the incumbent stays in power.

Examples of less than ideal elections in democracies abound. For example, Przeworski and Limongi (1993, p. 58) note that “[p]arty competition must be easily the most protected industry in the United States.” In the US Presidential Election 2000, the Libertarian Party sued the Federal Election Commission, contending “that rules for participation in presidential debates are so restrictive that they unfairly exclude minor-party candidates and independents.”

In the Mexican presidential contest in 2000, which was thought to be the fairest and most open yet, pro-government media executives banned opposition commercials for

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9 An implicit assumption, made for tractability, in this formulation is that \( \xi \) is the same regardless of how much smaller \( x \) is compared to the threshold \( x^* \).

weeks, visas for foreign election observers were delayed, and campaign finance control was stymied. It was the first election with voting booths that had curtains and that fit only one person.\textsuperscript{11} In the 2000 presidential election in Yugoslavia, the official election result of the first round was such that the incumbent, president Milosevic, was to have a run-off against the main opponent, Vojislav Kostunica, despite reports that the opposition had won by a clear majority. In the end, however, the opposition leader took office without a second round run-off.

The de facto voting rule can perhaps be thought of in terms of barriers to entry in the political market. In the Besley-Coate model of representative democracy (Besley and Coate, 1997), citizen-candidates can enter the political market at some utility cost. Obviously, the higher is this cost, the fewer will contemplate candidacy. Further, the cost is presumably lower for incumbents (Tullock (1965); Crain (1977)). Entry costs are influenced by the degree of political rights and civil liberties. In societies with infringements of such rights and liberties, either de jure or de facto, the costs of entering the political markets can be high, perhaps prohibitively so, leading to limited political contestability.

Given this voting rule, the politician must choose between diverting all tax revenue as rents and winning with probability $\xi (E)$ and diverting an amount $r (\theta)$ and being reelected with probability 1.

2.3 Equilibrium

Consider first the case of symmetric information. In this case, voters observe, before they decide on the size of government, the realization $\theta$ along with the politician, and we have

**Result 1** Assume that the realization $\theta$ of the stochastic shock is observed by both voters and the politician. In a stationary equilibrium, the politician diverts

$$r^{sym} = \frac{(1 - \delta)}{1 - \xi \delta} \tau > 0 \text{ for } \tau > 0.$$

and is reelected with probability $1$.\footnote{Proof: In the case of symmetric information, voters know the utility of the politician, $V^A$. Hence, the politician must be allowed to divert rents $r^*$ such that $W r^* + \delta V^A = W r^* + \xi \delta V^A \Leftrightarrow W r^* + \delta (1 - \xi) V^A = W r^*$ where (in stationary equilibrium) $V^A = W r^* + \delta V^A \Leftrightarrow V^A = W r^*/(1 - \delta)$ since the politician is reelected with certainty if $r = r^*$. Inserted above, we have $W r^* + \delta (1 - \xi) W r^*/(1 - \delta) = W r^*$, which, rearranging, gives the result.}

Even under complete information, the politician is able to divert some rents. This was also the message of Persson et al. (1997, Proposition 1). Note, however, that the presence of imperfect electoral contestability ($\xi > 0$) increases equilibrium rents; the threat that the politician can divert all tax revenue and still be reelected with positive probability increases the politician’s expected utility from not providing, which increases the amount that voters must give up to obtain a positive supply of public goods.

Consider now to the case of asymmetric information, where the realization $\theta$ is observed only by the politician. Let $\theta^*$ be the threshold of the realization of the shock such that the public budget constraint is satisfied with equality given $x^*$ and $r^*$,

$$r^* = \tau - x^*/\theta^*.$$ \hfill (2)

The politician will choose to go for $r^*$ and be reelected with certainty if

$$W r^* + \delta V^A \geq W \tau + \xi \delta V^A$$

which, using (2), translates into a threshold value for the stochastic shock

$$\theta^* = \frac{x^*}{\delta V^A (1 - \xi)/W}$$ \hfill (3)

If the realization of the shock is greater than $\theta^*$ the politician diverts $r(\theta)$ and stays in power with certainty. If the realization is less than $\theta^*$, the politician diverts all tax revenue and stays in power with probability $\xi$.

A choice of a threshold $x^*$ thus corresponds to a choice of a threshold value for the shock, $\theta^*$. Given the politician’s behavior, the voter chooses $x^*$ to maximize current period utility: If the threshold is set too high, the politician will divert the maximum amount of rents and forego election in most cases. If the threshold is too low, the
politician will be able to capture rents from asymmetric information and still be elected in most cases. The optimal threshold maximizes

$$EU^i = \frac{1}{1 - \delta} \left[ x^* \text{Prob} \{ \theta \geq \theta^* \} + 0 \cdot \text{Prob} \{ \theta \leq \theta^* \} + H (I - \tau) \right]$$

which, using (3), yields the first order condition (see appendix A for a full derivation of the model)

$$\theta^* = \frac{1 - F(\theta^*)}{f(\theta^*)}.$$ 

The right hand side of this expression is the inverse of the “hazard rate” of the distribution function $F$. The inverse hazard rate is decreasing monotonically in $\theta^*$ for a number of common distributions, including the normal and the uniform, and, therefore, this expression has a unique solution $\theta^*$ and, therefore, a unique threshold $x^*$.

For the remainder of the paper, we will, to get an explicit solution, assume that $\theta$ is uniformly distributed on $[0, 1]$. This yields

$$\theta^* = \frac{1}{2}$$

and, using (3) again, this provides an expression for the optimal threshold level of the public good,

$$x^* = \frac{\delta V^A (1 - \xi) / W}{2}.$$ (4)

Invoking stationarity ($EU^A = V^A$), the incumbent’s utility $V^A$ is given by

$$V^A = \int_0^{1/2} \left[ W\tau + \xi \delta V^A \right] dF(\theta) + \int_{1/2}^1 \left[ W\tau - W\frac{x^*}{\theta} + \delta V^A \right] dF(\theta)$$

which reduces to

$$V^A = \frac{2W\tau}{2 - \delta \left[ 1 - \ln 2 + \xi \left( 1 + \ln 2 \right) \right]}.$$ (5)

Invoking stationarity once again ($EU = V$), we find, using (1) and (4), voter utility to be

$$EU = \frac{1}{1 - \delta} \left[ \frac{\delta (1 - \xi) \tau}{4 - 2\delta \left[ 1 - \ln 2 + \xi \left( 1 + \ln 2 \right) \right]} + H (I - \tau) \right].$$ (6)

This is the utility function of the voter when choosing the size of government in the beginning of the period. The voter chooses $\tau$ to maximize utility in a stationary equilibrium.
The first order condition is
\[ \frac{\delta (1 - \xi)}{4 - 2\delta [1 - \ln 2 + \xi (1 + \ln 2)]} = H' (I - \tau). \tag{7} \]

The interpretation of this is completely standard: at an optimum, the marginal utility of public goods must equal the marginal utility of private goods. Solving for \( \tau \) we find
\[ \tau = I - h \left( \frac{\delta (1 - \xi (E))}{(4 - 2\delta [1 - \ln 2 + \xi (E) (1 + \ln 2)])} \right). \tag{8} \]
where \( h \equiv (H')^{-1} \).

2.4 Comparative statics

The comparative statics of the representative voter’s preferred choice of tax rate, \( \tau \), follows directly.13

**Proposition 1** The amount \( \tau \) that a voter wishes to invest in the public sector increases as the degree of political contestability \( (E) \) increases.

The greater is political contestability, the greater is the electoral threat and, hence, the control of politicians. This, in turn, leads to larger government. Note that it is not necessarily the case that the problem has an interior solution (i.e. \( \tau, c > 0 \)). From the assumption on the shape of the \( H \) function, voters will always want to consume private goods. However, they will not always want to consume public goods. Only if
\[ \frac{\delta (1 - \xi)}{4 - 2\delta [1 - \ln 2 + \xi (1 + \ln 2)]} > H' (I), \tag{9} \]

13 The comparative statics of this expression follows directly by differentiating (8) in the text:
\[ \frac{\partial \tau}{\partial \xi} = -h' \cdot \left( \frac{2\delta (\delta - 1)}{(4 - 2\delta [1 - \ln 2 + \xi (1 + \ln 2)])^2} \right) < 0, \]
noting that \( h' < 0 \) since \( H \) is strictly concave, that \( \lim_{z \to 0} h(z) = \infty \) and that \( (4 - 2\delta [1 - \ln 2 + \xi (1 + \ln 2)]) > 0 \); the strict parenthesis is monotonically increasing in \( \xi \). At \( \xi = 1 \), the entire parenthesis becomes \( 4 - 4\delta > 0 \) as \( \delta < 1 \). The numerator is negative as \( \delta < 1 \). Relating the result to the underlying political contestability parameter \( E \) we find that
\[ \frac{\partial \tau}{\partial E} = \frac{\partial \tau}{\partial \xi} \xi' (E) > 0. \]
that is, if the marginal utility of public goods is greater than the marginal utility of private goods at \( c = I \), will the voter wish to consume a positive amount of public goods.

As noted in the introduction, Ferejohn (1999) finds a similar effect of transparency: increasing transparency reduces the informational rents enjoyed by the politician, leading voters to invest more in government. Ferejohn, though, makes no attempt at testing his model. Ideally, one would want to evaluate the two theories separately; however, in practice the available proxies for political contestability and transparency are very highly correlated (with pairwise correlation coefficients of almost 0.9). Including them in the same regression, therefore, would lead to severe multicollinearity problems.

However, having shown that the two components of political accountability influence voter control of politicians in the same way, I can test the hypothesis that increasing political accountability increases the size of government. To do this, I use an aggregated index of political accountability which treats the observed proxies for political contestability and transparency as different realizations of the common, latent, concept of political accountability. The next section sets up the empirical model and presents the data.

3 The Econometric Model

3.1 Specification, Identification, and Estimation

The relationship between the size of government and political accountability is given by

\[
SIZEGOV = \alpha_S + \beta_S \cdot POLACCT + \gamma_S X_S + \varepsilon, \tag{10}
\]

where \( POLACCT \) is a measure of political accountability and \( X_S \) denotes other, exogenous variables affecting the size of government (see below).

There are two reasons why a simple OLS specification could be inappropriate in this case. First, there is the problem of measurement error: as will become clear below, the index measuring accountability is a composite of several general and expert opinion
surveys. Both surveys in themselves as well as the aggregation procedure give rise to imprecision in the independent variable; letting $POLACCT^*$ be the observed measure of political accountability, what we observe is

$$POLACCT^* = POLACCT + u$$

(11)

where $u$ is a random measurement error. It is well known that measurement error in an independent variable leads to attenuation bias, a downward bias of the OLS estimate of that variable.

Second, there could be a problem of endogeneity or feed-back. In the theory outlined above, the causal mechanism is from accountability to the size of government. If there is a feed-back effect from the size of government to accountability, however, OLS estimates will be inconsistent (the simultaneous-equations bias). Such a feed-back could, perceivably, be both positive and negative. If the government suddenly expands its mode of operation to issues it had not influenced before, a demand for greater electoral control could arise. On the other hand, an increase in the “volume” of government operations to new issues could in itself decrease accountability, as the dimension of the issue space would increase (cf. footnote 8). In the case of endogeneity, the model (10) and (11) must be extended with

$$POLACCT = \alpha_P + \beta_P \cdot SIZEGOV + \gamma_P X_P + \epsilon.$$  

(12)

In addition to the size of government, other factors affect political accountability as well; these are captured in $X_P$, and will be discussed below.

Using (10) and (11) together, we obtain

$$SIZEGOV = \alpha_S + \beta_S \cdot POLACCT^* + \gamma_S X_S + \nu, \quad \nu \equiv \epsilon - \beta_S \cdot u$$

(13)

which together with (12) constitutes the econometric model.

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14 For example, it has been argued that the ratification of the Maastricht Treaty of the European Union, which increased the power of the European Commission (the executive branch of the EU) significantly, resulted in a “democratic deficit” as the Commission is only very indirectly accountable to citizens of the EU.
This simultaneous equations model is identified by assuming that the composite error term $\nu$ in (13) is uncorrelated with the other determinants of political accountability captured in $X_P$, i.e. that $E [X_P \cdot \varepsilon] = E [X_P \cdot u] = 0$. Under this assumption, which will be tested, any subset of $X_P$ can be used as instruments for the true accountability measure $POLACCT$ when estimating (13). The identifying assumption imposes the restriction that the subset of $X_P$ used as instruments does not affect the size of government directly, but only through its effect on political accountability ($E [X_P \cdot \varepsilon] = 0$), and that the instruments are uncorrelated with the measurement error ($E [X_P \cdot u] = 0$). This will be taken up in the discussion of the instruments below.

Below, I begin by estimating (13) by two-stage least squares, correcting for heteroscedasticity in the errors. The identifying assumption is tested by a specification test for overidentifying restrictions. From there, I then estimate the full system (12) and (13), explaining simultaneously the degree of political accountability and the size of government.

3.2 Controls

The agency model set up in the previous section is a very bare-bones one. Therefore, when estimating the model, a number of variables suggested in the literature is included in $X_S$ in (13): In addition to the standard income level of a country, I include the following controls: Openness of the economy (Cameron, 1978, and Rodrik, 1998), corrected for population size (Alesina and Wacziarg, 1998), the dependency ratio defined as the ratio of old and young to the working population (Rodrik, 1998; Alesina and Wacziarg, 1998), and the degree of urbanization (e.g. Oates, 1985, and North, 1985). Rodrik (1998) argues that in more open economies voters want more social insurance from the government to shield them from the increased variability owing to openness; along this vein, Alesina and Wacziarg (1998) argue that it could be country size that determines openness; therefore I correct the degree of openness for size of the country and, thus, includes openness beyond that predicted by country size. The dependency ratio is included to control for demographic structure; whether this or other measures of the age-distribution...
should be used is discussed in more detail below. Urbanization has long been held to influence the size of government: One version of the argument (Oates, 1985) is that increased urbanization increases the demand for (local) public goods, increasing the size of government. Finally, ethnolinguistic fractionalization has been found to be associated with smaller government, possibly due to voter disagreement over preferred public goods and services; see Alesina, Baqir and Easterly (1999).

3.3 Instruments

The requirements for the instruments \((X_P \text{ in (12)})\) are that they are (i) correlated with the measure of political accountability, and (ii) uncorrelated with the disturbance term \(\nu\). The instruments used are distance from the equator, main religion population shares (Protestants, Catholics and Muslims as compared to “other”) and common vs. civil law systems.

These instruments are correlated with political accountability. As argued by Hall and Jones (1999), Western European influence is correlated with distance from the equator: Western European colonization was likely to take place in sparsely populated regions and in regions where the climate was similar to that of Western Europe, both of which points to regions away from the equator. There seems to be no reason why distance from the equator, in itself, would influence the size of government.

Further, a large literature argues that religious tradition is a major differentiating factor both in the transformation to, and in the maintenance of, democracy. Huntington (1991) and Lipset (1959, 1994), among others, note that protestantism (as opposed to catholicism, orthodox christianity, confucianism and islam) and democracy have been positively interlinked historically, due to the much greater emphasis on individualism found in protestantism and to traditionally strong links between religion and state in the other main religions. Barro (1999) and Boix and Stokes (2002) provide recent empirical evidence that, indeed, the share of protestants in the population is positively associated with the degree of democracy, and that the opposite holds for the share of muslims.

Finally, La Porta et al. (1999) argue that the anglo-american system of common law
has promoted democracy by providing better institutions and placing a greater emphasis on popular control of the state. The instrument is a dummy variable that takes on the value one if the country operates under a common law, as opposed to civil law, system.

The arguments above imply that the instruments influence the size of government only through the effect on political accountability. Due to the presence of overidentifying restrictions in the model, this hypothesis can be tested and, it turns out, can generally not be rejected.

3.4 Data
3.4.1 Measuring accountability

Most aspects of political accountability, including the concepts of transparency and political contestability considered in this paper, are difficult to measure. Political accountability is measured by an index of “political accountability and voice”, constructed by Kaufman et al. (1999a,1999b). This index is constructed by combining subjective indicators with survey evidence. It is cross-country only and based on data for 1997 and 1998.

The construction of the index is grounded in the idea that although various subjective measures of accountability do not focus on the exact same characteristics of the political regimes surveyed, they can be seen as reflecting (random) variations in an underlying, fundamental concept of accountability. Aggregating different measures in this way, using an unobserved components model, allows for (i) constructing a larger data set and (ii) assessing the precision of the various measures of governance.\(^\text{15}\)

The accountability index captures political contestability and transparency in the following way: The surveys and subjective indicators, described in detail in Appendix B, that constitutes the index are: Orderly political transfers, Transparency and Fairness of the Legal System (The Economist Intelligence Unit); Civil Liberties, Political Rights, Free Press (Freedom House); Military in Politics, Democratic Accountability (Political

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\(^{15}\)See Bollen (1980, 1993) for a thorough discussion of such models – sometimes called structural models with latent variables – and their statistical properties in the context of political democracy.
Risk Services); and Information to Business about Government Policies; Voice to Business to express concerns about policies (World Development Report). The accountability index is normalized such that, for the entire sample, it can take on values from -2.5 to 2.5, it has a mean of zero and a standard deviation of one.

Three of the components, Free Press, Information to Business about Government Policies, and Voice to Business, measure if and how information about government actions and policies are made available to the public. Rose-Ackerman (1999, p. 162) argues that “[t]he public can be an important check on the arbitrary exercise of power by government. [...] [T]his check can operate only if the government provides information on its actions.” Information will only be efficient in controlling public officials, however, if individuals or the media is able to convey this information to the public without fear of reprisal. Thus, “a free press is an essential check, [...] [a]nd if elections are important, the media is also crucial.” (op.cit., p. 166).

The components Orderly Political Transfers, Civil Liberties, Political Rights, Military in Politics and Democratic Accountability concern what we have tried to capture in the $E$ parameter in the model. Finally, Transparency and Fairness in the Legal System is important for electoral control of politicians as “a corrupt judiciary is costly for democracy because it cannot credibly play the role of watchdog on constitutional values or monitor the honesty of the other branches of government.” (op.cit., p. 156).

The advantage of subjective indicators and surveys like these is twofold: First, as noted above, objective measures for political contestability and transparency may be difficult, if at all possible, to obtain. Second, economic and political decisions are taken based on subjective opinions of people involved – and these opinions may differ from objective measures of political and economic institutions, although they are certainly framed by such institutions. The flip side is that subjective measures, by definition, fail to meet standards of “reproducibility”, and further are imprecise, due to the polling and survey nature of the data. As noted above, the problem of measurement errors is addressed by using instrumental variables.

The main problem in using the accountability index is that several different effects
“work as one”, and therefore it can be difficult to disentangle exactly what the index is measuring. To address this problem, I performed robustness checks using single components of the aggregate index. While the results were generally similar to those found below, the instruments were less convincing in these cases.

3.4.2 Democratic countries

The model is developed within the context of democratic countries. To operationalize “democracy”, the classification suggested by Freedom House is used. On their scale of political rights and civil liberties, countries are assigned a value between 1 (the most free) and 7 (the most authoritarian); further, Freedom House classifies countries with a value greater than 5 as “not free”. Hence, in the present study a country is classified as “democratic” if in the period 1990-1995 it did not take on a value greater than 5 in neither the political rights nor the civil liberties index at any time. The selection of countries from that pool of democratic countries was based entirely on data availability; in particular, public finance data are often difficult to obtain. This procedure results in a sample of 62 democratic regimes. Employing narrower definitions of democracy, including only countries with scores less than four or three, does not change the results reported below in any significant way.

3.4.3 Measuring the size of government

The size of government is defined as tax revenue of all levels of government to GDP in 1995. The revenue data is from Government Finance Statistics Yearbook 2000 (2001), the most detailed source of public finance data available for a large number of countries. A problem with this data, however, is that for many countries regional and local government finances are not reported.

The problem is potentially serious as the lack of reports on regional and local government finances is not evenly spread across the sample but concentrated among the countries with low accountability. Failing to take into account local government finances thus underestimates the size of government in these countries, and could therefore bias
the results in favor of the hypothesis. Leaving out revenue collected by sub-national
governments is also problematic, however, as the theory implicitly – like most theories
of the size of government – concerns the level of general, not only central, government.

To deal with these problems, I have collected additional data on state and local
government tax revenues from a variety of sources. Figure 2 shows the covariation
between the degree of centralization (the share of central government tax revenue to
total tax revenue) and the degree of political accountability.

< Figure 2 around here >

As is clear from the figure, sub-national government tax revenue is substantial in
some countries: In Canada, Switzerland and Brazil, sub-national tax revenue accounts
for more than 40% of total tax revenue. The figure shows a tendency, without implying
causality, for countries with higher political accountability to be more decentralized.

This has profound effects on the results. When including the full range of control
variables, political accountability is sometimes insignificant when the size of central gov-
ernment is the dependent variable; however, it becomes significant once we estimate
the (correct) model using the size of general government; see the section on robustness
(below).

3.4.4 Controls

GDP per capita (1995) is taken at PPP, and openness of the economy is defined as the
volume of trade to GDP in 1995. The dependency ratio is the population aged 0-14 and
65+ to the population aged 15-64, and the degree of urbanization is defined as the share

\[16\] The data and sources on sub-national government revenues is described in appendix B. It was
possible to determine tax revenue of state and local governments for all the democratic countries for
which political accountability and central government tax revenues existed. Hence, the availability of
local government tax revenue data did not determine the sample of countries for the empirical analysis.

\[17\] An additional issue is the measurement of GDP. The existence of informal sectors implies that
official GDP is a lower limit for true GDP. The size of the informal sector is inversely related to polit-
cal accountability. Using informal sector data from Friedman, Johnson, Kaufman and Zoido-Lobatón
(2000), a simple regression of the size of the informal sector on the index of political accountability
reveals a significant negative relationship. Thus, an estimate of the size of government as resources
controlled by the state relative to economic activity will be (more) overestimated in less accountable
countries, implying that the effect of political accountability probably is larger than that found here.
of the population living in urban areas. These variables are from World Development Indicators, as is population in 1995. Data on latitude is from the Global Demography Project, used by Hall and Jones (1999). Religious population shares and common law indicators are from La Porta et al. (1999). For further information about the data, including sources and descriptive statistics, see the appendix.

4 Results

4.1 Basic results

Figure 3 plots the size of government against the measure of political accountability for the 62 countries in the sample. The simple correlation between the political accountability index and the size of general government is .79.

Estimating the univariate relationship of figure 2 yields

\[
\text{SIZEGOV} = 15.970 + 12.992 \cdot \text{POLACCT},
\]

\[
R^2 = .62, \quad F(1, 60) = 105.03,
\]

where robust standard errors are in parenthesis. In this simple case, political accountability (\text{POLACCT}) has a coefficient of 12.992, meaning that a one standard deviation increase in political accountability increases the size of general government by 13 percentage points of GDP.\(^{18}\) Political accountability is significant at the .1 % level (with a \textit{t}-statistic of 10.250), and it explains 62 percent of the variation in the size of government. This is a strong relationship, but, of course, it is necessary to control for other potential causes of government size.

\(^{18}\)In all regressions, the dependent variable is the ratio of tax revenue to GDP. As this is constrained to be between zero and one, a more correct econometric specification would employ the logistic transformation \text{log}(\text{tax}/(1-\text{tax})) as used by, e.g., Oates (1985). However, the statistical results are unaffected by this transformation, so the standard formulation has been used to facilitate interpretation of the results.
Table 1 presents the results when the full set of controls described above have been included: log(income), openness corrected for country size, urbanization, ethnolinguistic fractionalization and a demographic variable.

< Table 1 around here >

In the literature, a demographic measure is often included as an explanatory variable; however, there is no consensus on how to measure the impact of a country’s demographic composition on the size of its government. For example, Rodrik (1998) and Alesina and Wacziarg (1998) use the dependency ratio, whereas Persson and Tabellini (1999) use the shares of young and old in the population separately. To show that the general thrust of my argument does not depend on the choice of measurement with respect to demographics, I estimate the model using both measures separately.

The results of table 1 lend strong support to the hypothesis that more political accountability leads to larger government. The coefficient on political accountability is positive and estimated with significant precision, being significant at the .1 percent and the 1 percent levels.\textsuperscript{19} Regarding controls, the general picture is that openness and urbanization enter positively and significant, while income and the demographic variables – except the share of the population aged over 65 – are insignificant.\textsuperscript{20}

Columns two and five report the results of two-stage least squares estimates of the size of government.\textsuperscript{21} It is notable that the estimated coefficients increase, in both cases by approximately forty percent compared to the OLS estimations. This suggests that accounting for simultaneity and measurement errors is appropriate. Also reported in

\textsuperscript{19}The results shown in table 1 do not depend on outliers; the method suggested by Hadi (1994) identified no outliers in the multivariate analysis.

\textsuperscript{20}In general, the share of the population over 65 enters positively and is strongly significant. In contrast, the dependency ratio is never significant. Furthermore, \( R^2 \) of the OLS regression increases considerably when including the demographic shares separately. However, the demographic composition of the population is almost certainly an endogenous variable with respect to income, and probably also with respect to the size of government. In particular, the so-called demographic transition (defined by decreasing mortality rates followed by decreasing fertility rates) has lead to to the current demographic structure with relatively many elderly people found in advanced economies. This demographic transition is argued to be a consequence of economic development; see Galor and Weil (2000). The implications of this for empirical studies of public finance is left for future research.

\textsuperscript{21}IV-estimation was carried out using ivreg2 in STATA 7.0.
table 1 are the $F$-test statistics for excluded exogenous variables from the first stage of the IV estimation. Many standard results in instrumental variables regression rely on the instruments not being “weak”, that is, the partial correlation between instruments and the included endogenous variable POL should not be too low. The values reported suggest that the instruments are sufficiently strong for the IV-estimates to be reliable, though slightly less so in the right-hand side of the table.

Further, table 1 reports for each of the instrumental variables regressions the $p$-value associated with the test of the no overidentification hypothesis. As argued above, the effect of the instruments is not directly on the size of government, but rather through political accountability. Since the number of instruments (5) is greater than the number of endogenous variables (1), the equation is overidentified. If the test for overidentification fails, one or more of the instruments should be included as an exogenous variable directly in the estimated equation. As the $p$-values are all insignificant, the hypothesis of no overidentification cannot be rejected.

Finally, columns three and six report IV-estimates when the dependent variable is the size of central government only, the standard measure in analyses of public sector size. While political accountability continues to be significant in the first specification, it ceases to be so in the second. This confirms that using the correct institutional unit is important when trying to explain differences in public sector size.

One thing to note about the instrumental variables regressions: the coefficient of income is negative (though insignificant), although the simple correlation between income per capita and the size of general government is .68. This may be due to multicollinearity, as the correlation between income per capita and the political accountability index is .70. The next section tries to address this question in part by following Barro (1999) and Boix and Stokes (2002) in letting income be a determinant of the degree of political accountability.
4.2 System estimation

Although my main focus is the size of government, setting up the simultaneous equation system consisting of (12) and (13) allows for estimating the size of government and the degree of political accountability *jointly*, letting the size of government have a feedback effect on the degree of political accountability. This is done using three-stage least squares. Potentially, this can have an impact on results by allowing a more general covariance structure that makes use of cross-equation correlations of the disturbances.\(^{22}\)

The estimated model is similar in structure to the 2SLS model estimated above, except that log(income) is included as an explanatory variable for political accountability, following Barro (1999) and Boix and Stokes (2002). Table 2 reports the results.

In general, the standard errors of most estimates somewhat larger than in the 2SLS estimations reported above, perhaps owing to the relatively small sample size. However, the message regarding political accountability is the same: The political accountability index is positive and significant, with the level depending on the demographic specification. When the age-shares are included separately, the size of government affects the degree of political accountability in a positive and significant way; however, this results disappears when using the dependency ratio. Although it is not a robust result, it is also of interest to note that while the level of income does not appear to affect significantly the size of government directly, it does so indirectly through the positive effect on political accountability.

4.3 Robustness

To ensure that the results reported above are robust, a number of different specifications were used. First, I examined the impact of additional explanatory variables. As already

\(^{22}\)On the other hand, although full system estimation is asymptotically more efficient than single-equation estimators such as 2SLS, it is less stable in the presence of specification errors. Also, in finite samples one might not reap the benefits of 3SLS suggested by asymptotic efficiency results. See Greene (1997, ch. 16).
discussed above, Persson and Tabellini (1999) find that presidential systems have smaller governments; Becker and Mulligan (1998) argue that the share of the labor force not employed in agriculture constitutes a proxy for the efficiency of the tax system, which they find to increase the size of government. Further, I include a measure of fiscal decentralization, sometimes thought to decrease the size of government. I include these three variables one at a time, and the results are shown in Table 3, where I have reported only the coefficients of political accountability and the additional variables. The regressions were run using the full set of controls as above.

Including a dummy for presidential systems does not influence results; political accountability remains significant at the .1% level. The dummy for presidential systems has the expected sign and the result is stronger, though not significant, when dividing presidential countries into semi-presidential and pure presidential countries. A potential explanation for the insignificance of the presidentialism measure can be seen from Figure 2: Some of the countries with presidential systems also have large tax revenues generated by sub-national governments; therefore, leaving out sub-national governments can influence results. Indeed, when regressing public sector size only on political accountability and presidentialism, political accountability is positive and strongly significant when considering both general and central government tax revenues, but presidentialism is significant only in the central government tax revenue case. The measures of fiscal decentralization and tax effectiveness are nowhere near significant.

I also investigated single components of the index (civil liberties, political rights, press freedom), and while both the OLS and IV results were generally similar to those obtained above, the instruments were rather weak in this case and, hence, the estimates potentially unreliable. In addition, as noted above, I also investigated a more restrictive

\[23\] The classification of political regimes into presidential and parliamentary systems is based on Beck et al. (2000) and Lane and Ersson (2000), the fiscal decentralization measure is from Jaggers and Gurr (1995) and the share of the labor force not employed in agriculture is from WDI (1999). The regression including tax efficiency is based on 61 observations.
definition of democracy which reduced the group of countries by one third; the results were similar to those obtained here, though the coefficient on political accountability was much larger, as can be seen from figure 3.

5 Conclusion

This paper has investigated the effect of political accountability on the size of government in a democracy. In a principal-agent model of government it was shown that increases in political accountability, reflecting transparency and political contestability, leads to increases in the size of government. This, perhaps surprising, claim was investigated empirically on a cross section of 62 democratic countries using a recent index of political accountability, and was found to have strong and robust support in the data. Further, the results of this paper show that it is important to account for state and local governments in cross-country analyses of the public sector; I show that political accountability significantly increases the size of general government, but not that of central government. This suggests that determining the correct unit of analysis is important when evaluating theories of the public sector empirically.24

A key element in the empirical analysis was to introduce a graded measure of political accountability – rather than the standard dichotomous measures of democracy – into analysis of public sector outcomes. In addition, it was possible to correct for measurement error and potential endogeneity of the political accountability variable and, in all specifications, the use of IV increased the coefficient on political accountability, sometimes up to forty percent.

The general conclusion of the analysis is that the quality of government and public sector size goes hand in hand: in countries where citizens have few means to control politicians, they are less likely to trust politicians and, as the end result, will be reluctant to hand over resources to the government. Therefore, bad governments do not get to be big in democracies.

24 Potentially, measuring the size of the public sector by general rather than central government could also affect results in, for example, the literature on the effects of fiscal policy on economic growth.
The results of this paper also provide an explanation of why increasing decentral-
ization can have ambiguous effects on the size of government. One the one hand, de-
centralization can result in a “race to the bottom”, with tax competition resulting in
smaller governments. On the other hand decentralization typically increases political
accountability, which – by the logic advanced in this paper – can lead to increases in
the size of government, ceteris paribus. This could help explain the mixed finding of the
Leviathan literature, e.g. Oates (1985).
A Derivations and Proofs

The optimal threshold maximizes

\[ EU^i = \frac{1}{1 - \delta} \left[ x^*_i \Pr \{ \theta \geq \theta^* \} + 0 \cdot \Pr \{ \theta \leq \theta^* \} + \mu_i H(I - \tau) \right] \]

which yields the first order condition

\[ (1 - F(\theta^*)) = \theta^* \delta V^A (1 - \xi) / W \cdot f(\theta^*) \]

and, rearranging,

\[ \theta^* = \frac{1 - F(\theta^*)}{f(\theta^*)}. \]

Assuming that \( \theta \) is uniformly distributed (in which case \( F(\theta^*) = \theta^* \) and \( f(\theta^*) = 1 \) on \([0, 1]\) yields

\[ \theta^* = 1 - \theta^* \leftrightarrow \theta^* = \frac{1}{2} \]

which, using (3), provides an expression for the optimal threshold level of the public good,

\[ x^* = \frac{\delta V^A (1 - \xi)}{W}. \]

The politicians’s utility is given by

\[ V^A = \int_0^{\frac{1}{2}} \left[ W\tau + \xi \delta V^A \right] dF(\theta) + \int_{\frac{1}{2}}^1 \left[ W\tau - W \frac{x^*}{\theta} + \delta V^A \right] dF(\theta) \]

\[ V^A = W\tau + \xi \delta V^A F(\theta^*) + (1 - F(\theta^*)) \delta V^A - \frac{\delta V^A (1 - \xi)}{2} \left[ \ln \theta \right]_{\frac{1}{2}}^1 \]

and, rearranging,

\[ V^A = \frac{2W\tau}{2 - \delta \left[ 1 - \ln 2 + \xi (1 + \ln 2) \right]}. \]

Inserting this expression into the utility function directly yields (6) in the text, and from this straightforward maximization yields equations (7) and (8) in the text.
## B Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIZEGOV</td>
<td>Tax revenue of general/central government to GDP at market prices</td>
<td>GFS*, WDI**</td>
</tr>
<tr>
<td>POLACCT</td>
<td>Political accountability index</td>
<td>Kaufman et al. (1999b)</td>
</tr>
<tr>
<td>LNINC</td>
<td>Log of income per capita (at PPP in international $)</td>
<td>WDI</td>
</tr>
<tr>
<td>LNOPEN</td>
<td>Log of volume of trade (imports + exports) to GDP</td>
<td>WDI</td>
</tr>
<tr>
<td>LAT</td>
<td>Latitude of the center of the county or province with the largest number of people</td>
<td>Hall and Jones (1999)***</td>
</tr>
<tr>
<td>FEDERAL</td>
<td>=1 if sub-national governments have substantial fiscal authority</td>
<td>Polity III, Gurr et al. (1995)</td>
</tr>
<tr>
<td>REL</td>
<td>Religious population shares</td>
<td>La Porta et al. (1999)</td>
</tr>
<tr>
<td>PRES</td>
<td>= 1 if presidential system</td>
<td>Beck et al. (2000)***</td>
</tr>
<tr>
<td>ELF</td>
<td>Ethnolinguistic fractionalization</td>
<td>Easterly and Levine (1997)</td>
</tr>
<tr>
<td>COMLAW</td>
<td>= 1 if common law system</td>
<td>La Porta et al. (1999)</td>
</tr>
<tr>
<td>URBAN</td>
<td>Fraction of midyear population living in areas defined as urban in each country</td>
<td>WDI</td>
</tr>
<tr>
<td>DEPEND</td>
<td>Age dependency ratio =</td>
<td>WDI</td>
</tr>
<tr>
<td></td>
<td>(population &lt; 15 and &gt; 64) / (population 15-64)</td>
<td></td>
</tr>
<tr>
<td>&gt;65</td>
<td>Share of population aged 65 or over</td>
<td>WDI</td>
</tr>
<tr>
<td>&lt;15</td>
<td>Share of population aged 14 or less</td>
<td>WDI</td>
</tr>
</tbody>
</table>

*** From the Global Demography Project at University of California, Santa Barbara, used by Hall and Jones (1999). Normalized to [0,1].
**** Based on the classification in Beck et al. (2000).
B.1 Revenue data

To ensure that 1995 is not an exceptional year regarding public finances, one could have taken averages of several years. However, in the democratic regimes focused on here, tax revenues to GDP are relatively stable. Further, averaging over countries in the 1990s would be difficult due to a “wave of standardization” of national accounts that has created structural breaks in the time series of many countries. All figures, except where noted, are for 1995. The discrepancy between the dating of public finance data and accountability data is entirely due to data availability, in particular with respect to sub-national revenues. Also, the selection among democratic countries is entirely due to data availability. Missing data excludes, e.g., Honduras, Jamaica and PNG.

Countries included are: Argentina, Australia, Austria, Belgium, Bulgaria, Belize, Bolivia, Brazil, Botswana, Canada, Switzerland, Chile, Colombia, Costa Rica, Denmark, Germany, Dominican Republic, Ecuador, Spain, Finland, France, Great Britain, Greece, Guatemala, Hungary, India, Ireland, Iceland, Israel, Italy, Jordan, Japan, South Korea, Sri Lanka, Luxembourg, Madagascar, Mexico, Malta, Mongolia, Mauritius, Malaysia, Nicaragua, Netherlands, Norway, Nepal, New Zealand, Pakistan, Panama, Philippines, Poland, Portugal, Paraguay, Singapore, El Salvador, Sweden, Thailand, Trinidad and Tobago, Turkey, Uruguay, United States, Venezuela, South Africa. (Superscripts a and b indicate that data are from 1994 and 1993, respectively).

Table B.2 presents the additional data on sub-national government tax revenues. The table includes information for countries for which no local government data was available from Government Finance Statistics. \( T_{sub}/T_{total} \) is sub-national government tax revenue in percent of total tax revenue.
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>$T_{sub}/T_{total}$</th>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
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<tr>
<td>CRI</td>
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<td>1995</td>
<td>[3]</td>
</tr>
<tr>
<td>DOM</td>
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<td>1995</td>
<td>[3]</td>
</tr>
<tr>
<td>ECU</td>
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<td>1992</td>
<td>[4]</td>
</tr>
<tr>
<td>GRC</td>
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<td>1997</td>
<td>[5]</td>
</tr>
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<td>GTM</td>
<td>3.7</td>
<td>1993</td>
<td>[3]</td>
</tr>
<tr>
<td>JOR</td>
<td>0</td>
<td></td>
<td>[6]</td>
</tr>
<tr>
<td>JPN</td>
<td>24.9</td>
<td>1997</td>
<td>[5]</td>
</tr>
<tr>
<td>KOR</td>
<td>19.0</td>
<td>1997</td>
<td>[5]</td>
</tr>
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<td>1986</td>
<td>[3]</td>
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<td>MDG</td>
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<td>1995</td>
<td>[7]</td>
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<td>[1]</td>
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<td>1995</td>
<td>[3]</td>
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<td>MYS</td>
<td>15.6</td>
<td>1995</td>
<td>[3]</td>
</tr>
<tr>
<td>NPL</td>
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<td>1990s</td>
<td>[8]</td>
</tr>
<tr>
<td>PAK</td>
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<td>1987</td>
<td>[9]</td>
</tr>
<tr>
<td>PAN</td>
<td>2.5</td>
<td>1994</td>
<td>[3]</td>
</tr>
<tr>
<td>SGP</td>
<td>0</td>
<td></td>
<td>[1]</td>
</tr>
<tr>
<td>SLV</td>
<td>3.0</td>
<td>1990</td>
<td>[4]</td>
</tr>
<tr>
<td>TTO</td>
<td>4.19</td>
<td>1995</td>
<td>[3]</td>
</tr>
<tr>
<td>TUR</td>
<td>12.4</td>
<td>1997</td>
<td>[5]</td>
</tr>
<tr>
<td>VEN</td>
<td>3.2</td>
<td>1989</td>
<td>[2]</td>
</tr>
</tbody>
</table>

Sources and notes:


B.2 The measurement of political variables

This section gives a description of the political accountability index used in the analysis. The source of both the political accountability index and the description of the variables is Kaufmann et al. (1999a, 1999b).

1. Orderly Political Transfers (EIU)
2. Transparency and fairness of the legal system (EIU)
3. Political rights (FH)
4. Civil liberties (FH)
5. Freedom of the Press (FH)
6. Military in Politics (PRS)
7. Democratic Accountability (PRS)
8. Information to Business about Government Policies (WDR)
9. Voice to Business to express concerns about policies (WDR)

(1) and (2) are subcomponents of indices for Political Stability and Political Effectiveness, constructed by the for-profit The Economic Intelligence Unit, which produces forecasts of political, economic and business environment in more than 180 countries. The assessments are based on regular contributions from a global network of more than 500 information gatherers. A panel of regional experts checks the accuracy, consistency and impartiality of these assessments. Political stability asks whether the political scene is free of internal and external threats to security, including if change in government takes place without social unrest (1). Political effectiveness examines the quality of governance, including if the legal system is transparent and fair (2). http://www.eiu.com.

(3), (4) and (5) are indices constructed by the not-for-profit institution Freedom House (FH). Freedom House experts evaluate political rights, civil liberties and press freedom around the world, on a yearly basis. They define political rights as those freedoms that enable people to participate freely in the political process, civil liberties as the freedom to develop views, institutions, and personal autonomy apart from that of the state, and press freedom as freedom of the press from political (including legal) and economic influence over media content. Additional information is available from http://www.freedomhouse.org.

(6) and (7) are produced by the commercial Political Risk Services (PRS). The indicators are part of the PRS’ International Country Risk Guide which provides assessments of political, economic and financial risks in developed and developing countries. The assessments are based on analysis of a worldwide network of experts, and is subject to peer-review at subject and regional levels. (6) asks if there is military participation (or threat thereof) in politics, as this reduces accountability since the military is not elected.

Finally, (8) and (9) is from a survey by the World Bank for the 1997 World Development Report of approximately 3000 enterprises in 69 countries. The survey was designed to measure the perception of firms regarding the constraints imposed on them by government. Available from http://www.worldbank.org/wbi/governance/ent_surveys.htm.
References


Table 1. Political accountability and the size of government.

<table>
<thead>
<tr>
<th>N = 62</th>
<th>Tax revenue of general and central government / GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEPVAR</td>
<td>GTAX</td>
</tr>
<tr>
<td>POLACCT</td>
<td>10.303*** (1.746)</td>
</tr>
<tr>
<td>log(INC)</td>
<td>1.776 (1.669)</td>
</tr>
<tr>
<td>OPENCORR</td>
<td>3.746§ (2.076)</td>
</tr>
<tr>
<td>DEPEND</td>
<td>0.078 (10.190)</td>
</tr>
<tr>
<td>&lt; 15</td>
<td></td>
</tr>
<tr>
<td>&gt; 65</td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td>0.075 (0.505)</td>
</tr>
<tr>
<td>ELF</td>
<td>-4.107 (2.869)</td>
</tr>
<tr>
<td>Method</td>
<td>OLS</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.71</td>
</tr>
<tr>
<td>$F$ (1st ST)</td>
<td>8.34</td>
</tr>
<tr>
<td>$p$(OVER)</td>
<td>.146</td>
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</tbody>
</table>

Estimated using Stata 7.0. A constant term (not reported) was included in all regressions. Robust standard errors are in parentheses, ***, **, * and § denote significance at the .1%, 1%, 5% and 10 % levels, respectively. $F$ (1st ST) is the $F$-statistic from the first stage of the TSLS regression. $p$(OVER) is the $p$-value associated with the null hypothesis of “no overidentification”.
Table 2. Joint estimation of the size of government and political accountability.

<table>
<thead>
<tr>
<th></th>
<th>System 1</th>
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<th>System 2</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Dep. variable</strong></td>
<td><strong>GTAX</strong></td>
<td><strong>POLACCT</strong></td>
<td><strong>GTAX</strong></td>
<td><strong>POLACCT</strong></td>
</tr>
<tr>
<td>POLACCT</td>
<td>14.438***</td>
<td>(2.566)</td>
<td>6.979*</td>
<td>(2.743)</td>
</tr>
<tr>
<td>GTAX</td>
<td>0.018</td>
<td>(0.018)</td>
<td>0.023*</td>
<td>(0.011)</td>
</tr>
<tr>
<td>log(INC)</td>
<td>-0.263</td>
<td>(2.119)</td>
<td>0.162</td>
<td>(0.100)</td>
</tr>
<tr>
<td>OPENCORR</td>
<td>3.996*</td>
<td>(1.855)</td>
<td>4.525***</td>
<td>(1.396)</td>
</tr>
<tr>
<td>DEPEND</td>
<td>-2.368</td>
<td>(8.265)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 15</td>
<td></td>
<td></td>
<td>26.408</td>
<td>(19.423)</td>
</tr>
<tr>
<td>&gt; 65</td>
<td></td>
<td></td>
<td>150.712***</td>
<td>(37.832)</td>
</tr>
<tr>
<td>URBAN</td>
<td>0.054</td>
<td>(0.049)</td>
<td>0.040</td>
<td>(0.042)</td>
</tr>
<tr>
<td>ELF</td>
<td>-2.465</td>
<td>(2.993)</td>
<td>-2.357</td>
<td>(2.499)</td>
</tr>
<tr>
<td>LATITUDE</td>
<td>1.182*</td>
<td>(0.593)</td>
<td>0.866§</td>
<td>(0.418)</td>
</tr>
<tr>
<td>COMMONLAW</td>
<td>0.133</td>
<td>(0.096)</td>
<td>0.169§</td>
<td>(0.101)</td>
</tr>
<tr>
<td>PROTESTANT</td>
<td>0.004</td>
<td>(0.002)</td>
<td>0.004§</td>
<td>(0.002)</td>
</tr>
<tr>
<td>CATHOLIC</td>
<td>0.000</td>
<td>(0.001)</td>
<td>0.000</td>
<td>(0.002)</td>
</tr>
<tr>
<td>MUSLIM</td>
<td>-0.007***</td>
<td>(0.002)</td>
<td>-0.008***</td>
<td>(0.002)</td>
</tr>
<tr>
<td>“R²”</td>
<td>.67</td>
<td>.75</td>
<td>.81</td>
<td>.77</td>
</tr>
<tr>
<td>χ²</td>
<td>130.5</td>
<td>199.9</td>
<td>253.3</td>
<td>205.9</td>
</tr>
</tbody>
</table>

Estimated by three-stage least squares using Stata 7.0. A constant term (not reported) was included in all regressions. Standard errors are in parentheses, ***, **, * and § denote significance at the .1%, 1%, 5% and 10 % levels, respectively.
Table 3. Robustness: Additional explanatory variables.

<table>
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<tr>
<th></th>
<th>IV</th>
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<tbody>
<tr>
<td>N = 62</td>
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<td></td>
</tr>
<tr>
<td>Tax revenue of general government / GDP</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.880)</td>
<td>(3.052)</td>
<td>(3.003)</td>
<td>(2.705)</td>
</tr>
<tr>
<td>PRESIDENTIAL</td>
<td>-1.242</td>
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</tr>
<tr>
<td></td>
<td>(2.312)</td>
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<tr>
<td>PURE PRES</td>
<td>-3.297</td>
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<td></td>
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<tr>
<td></td>
<td>(2.242)</td>
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<td></td>
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<td>SEMI-PRES</td>
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<td>(3.240)</td>
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<td>FEDERAL</td>
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</tr>
<tr>
<td></td>
<td>1.076§</td>
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<tr>
<td></td>
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<td>TAX EFFICIENCY</td>
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<td>-0.006</td>
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<tr>
<td></td>
<td>(0.098)</td>
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<td></td>
<td></td>
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<tr>
<td>F (1st ST)</td>
<td>8.23</td>
<td>6.54</td>
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<tr>
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<td>(1st ST)</td>
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<tr>
<td>p(OVER)</td>
<td>0.087</td>
<td>0.112</td>
<td>0.154</td>
<td>.136</td>
</tr>
</tbody>
</table>

Estimated using Stata 7.0. A constant term (not reported) was included in all regressions. Robust standard errors are in parentheses, ***, **, * and § denote significance at the .1%, 1%, 5% and 10% levels, respectively. F (1st ST) is the F-statistic from the first stage of the TSLS regression. p(OVER) is the p-value associated with the null hypothesis of “no overidentification”. Controls included in all regressions but not shown are: openness (corrected for size), log(income), urbanization, dependency ratio, ethno-linguistic fractionalation.
Figure 1: The structure of a period

Voters choose $\tau$ by majority vote
Politician observes $\theta$
Politician chooses $r$
Payoffs are realized
Elections
Figure 2: Political accountability and the degree of tax revenue centralization

[Graph showing the relationship between political accountability and the degree of tax revenue centralization, with country codes and values plotted along the x and y axes.]
Figure 3: Political accountability and the size of general government