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The Optimal Size of Bureaucracy: Theory and Evidence

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(Very Preliminary)

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This paper studies an optimal size of bureaucracy subject to various political regimes and political institutions' performance. We review such reasons of enlarging bureaucracy as patronage, welfare state requirements and rent-seeking behavior. The results help to understand why regimes of higher accountability have larger government bureaucracies. Further, using a panel data on government administration employment from the International Labor Office "Laborsta" we find some evidence for a non-monotonic relationship between the level of political accountability and the size of government, which could be explained by the dominance of different incentive mechanisms between politicians and bureaucrats.

JEL: D72, D73, D78, H00

Key words: Political accountability, bureaucracy, size of government, administration employment

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1 Introduction

Bureaucracy is one of pillar matters of political, economical and social spheres of a country. Its nature and role have been broadly studied in the literature and places one of major subjects for understanding since centuries. However, the power of the bureaucracy in policy making has been often underestimated as well as its structure and expansion remain not properly understood.

The government bureaucracies in many countries extend in size and there are ambiguous explanations why it happens, especially in democracies (see Figure 1). It is intriguing that the latter regimes are characterized by larger bureaucracies in terms of the number of bureaucrats (see Figure 2). So the conventional belief that big bureaucracies reside in inefficient governments is under doubt. Why bureaucracies grow up over time without a limit? Or may be there exist some bounds for its expansion? Does democracy inevitably leads to more bureaucracy? If so, what is the role of the government bureaucracy in democratic regimes? Such questions seem extremely important and needs further in-depth research.

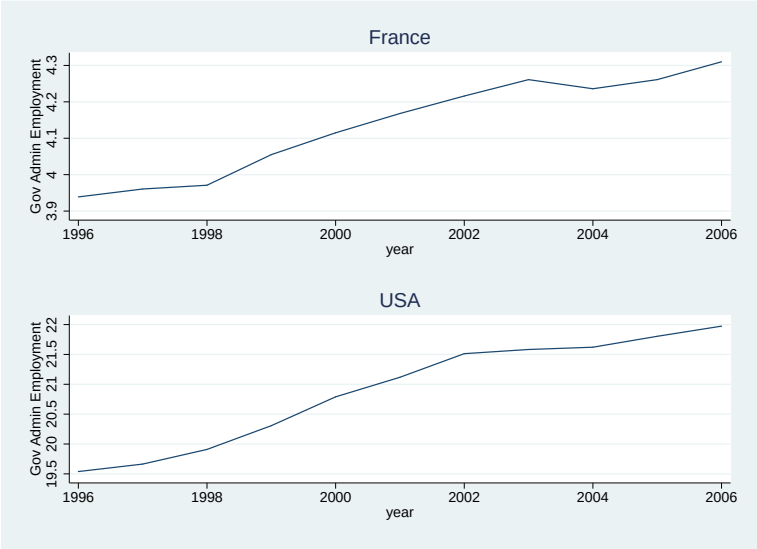

Figure 1: Government Administration Employment in France and the USA in 1996-2006 (in millions)

It has been mentioned that government bureaucracies have increased dramatically during the 20th century all over the world. Max Weber (1968) states that the bureaucracy grows up with the increase of state and government intervention. Downs (1967) and Tullock (1965) find that excessive growth is a appropriate feature of organizational problems within government. Niskanen (1971) also concludes that government bureaucracies are

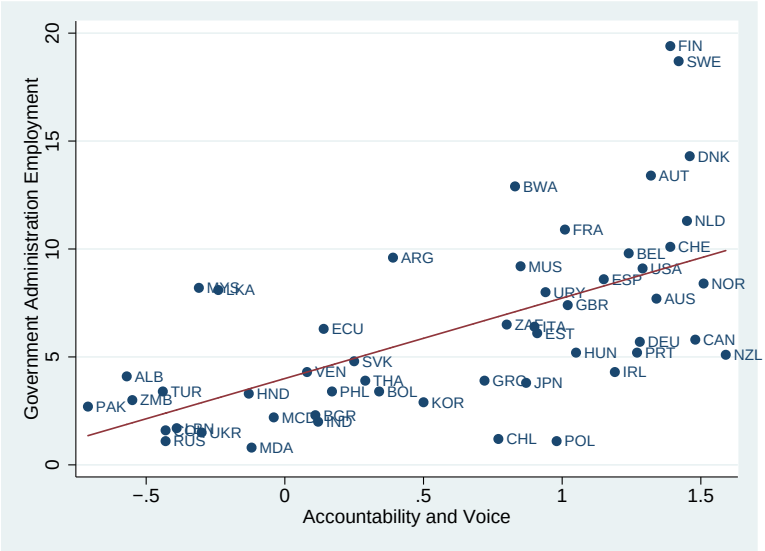

Figure 2: Government Administration Employment (to Population) versus Political Accountability and Voice Index

oversized due to the soft budget constraint.

One of the traditional points of view is that government bureaucracies have an inherent tendency to expand due to inefficiency per ce: work creates more work. This law was proposed by Cyril Northcote Parkinson who believed that bureaucracies always grow about 6 percent annually. The bureaucrats create more paper work and rules and hire more assistants to seem to be busy. The appointed bureaucrats are concerned with career advancement and increasing their resources, budget and power. This angle of view is related to patronage and nepotism widespread in governments.

Laurence Peter explains the phenomenon of growing bureaucracies by the incompetence principle. The bureaucrats strive for career promotion until a position of their competence limits and then they remain in this position until death or retirement.

The more economic standpoint is the concept of the welfare state, under which the federal government is charged by the major responsibility for the well-being of citizens. A higher demand for some public goods as security creates a room for an extensive growth of administrative agencies. In particular, in the United States "the national security bureaucracy includes the Federal Bureau of Investigation (FBI), the Central Intelligence Agency (CIA), the National Security Agency (NSA), and the Defense Intelligence Agency (DIA). As well responding to public concern about violent crime, drugs, and illegal immigration into the United States, agencies such as the Bureau of Alcohol, Tobacco, and Firearms (ATF), the Drug Enforcement Administration (DEA), and the Immigration and

Naturalization Service (INS) have increased in size"[1].

An intriguing question about the limits of the growth of bureaucracies remains open. If there are so many causes for its expansion whether the bureaucracy does stop to grow up at a certain threshold? This paper suggests to explain this puzzle by studying the growth of government bureaucracies through such mechanisms as patronage, rent seeking behavior of actors within government and political institutional constraints. This paper proposes to study whether there is an optimal size of bureaucracy subject to various political regimes and political institutions' performance. We proceed from the political agency theory, and the paper contributes to understanding why regimes of higher accountability have larger government bureaucracies.

The main tension of a political agency model is a hierarchy of principal-agent relationships. In democracies the political course is determined by politicians who are elected by citizens and so due to present their interests and tastes. However, politicians are limited in expertise information about the link between political choices and outcome and they have to implement policy by relying on a multilayered government bureaucracy. Sometimes they even formally delegate responsibilities and duties to the higher-level bureaucrats who in their turn set tasks to and control the lower-level bureaucrats. Thus, we get a chain of principals and agents such as Citizens - Politicians - Higher-level bureaucrats - Lower-level bureaucrats. The activity of the lower-level bureaucrats can be also controlled directly by citizens (Rose-Ackerman, 1986), however due to the performance measurement difficulties and heterogeneity of dispersed tastes of clients the process of control is hard to realize. As a result, there is a problem of double accountability: external, between politicians and citizens, and internal, within government (Przeworski et al. 1999). Hence, the literature on political agency focuses on two main problems, first, how we can induce politicians to act in public interests, and second, how much is the effective control of politicians over bureaucrats.

In some sense, this study contributes to this literature by analyzing how external accountability affects the size of government bureaucracies, which is in our understanding might be a consequence of the internal accountability problem solution within government. We define external accountability as either the political regime (democracy or autocracy) or the strength of the election disciplining mechanism. Hence, more precisely, we analyze the effect of political institutions that shape the level of accountability in a country on the features of government bureaucracies, namely, the number of bureaucrats and the type of the hierarchical structure of bureaucracies. Our conclusions come from the argument

[1] American Government: The Growth of the Federal Bureaucracy // Cliffsnotes.

that the level of external accountability affects the level of internal accountability between politicians and bureaucrats so that the general structure and size of government bureaucracies differ subject to performance of political institutions disciplining the political leaders.

On the one hand, the concept of political or electoral accountability has been widely developed in the literature. According to Fearon (1999) "relations involving accountability are agency relationships in which one party is understood to be an "agent" who makes some choices on behalf of a "principal" who has powers to sanction or reward the agent". In this sense politicians are accountable to their constituency, and this approach allows to address the incentives of elected official to work for public welfare. The fundamental work in this field is made by Barro (1973), Ferejohn (1974, 1986), Persson, Roland and Tabellini (1997). The seminal investigation was conducted by Barro (1973) who analyzed elections as a means to control political representatives when their interests do not coincide automatically with those of the constituents. One of the fundamental conclusions of his work is that this "electoral control is only partially effective as a mechanism for inducing the officeholder to advance the interest of his constituents" (Barro, 1973, p. 20) i.e. politicians will never be perfect agents of citizens and voters support the incumbent on the basis of the satisficing principle. Ferejohn (1986) proves that the conflict between voters might weaken electoral accountability because the incumbent can use the different platforms of voters to play one group off of another. On the contrary, Persson, Roland and Tabellini (1997) demonstrate that the separations of powers within government i.e. conflict among elected officials would encourage achieving full accountability. In this paper we use these findings to capture the level of accountability in a country. As Persson and Tabellini (2000) argue political accountability is lower in dictatorships than in democracies so that we apply a number of proxies for the level of political accountability such as the level of democracy according to Polity database, the competitiveness of elections, the extent of the separation of powers in government.

On the other hand, the features of government bureaucracies have been recognized as crucial for economic performance because " the bureaucrats are not only experts who have the information leverage over their political superiors but also successful lobbyists exploiting the privileges of the institutional structure of democratic systems"(Bennedsen and Feldmann, 2004). Thus, the bureaucrats may manipulate the political outcomes in their interests. Further, Alesina and Tabellini (2007) argue that "the rise of the regulatory state has made the bureaucracy a key player in both the decisions and the execution of a large amount of legislation" (p. 170). While the bureaucracy has been widely studied in the literature the questions of the connection of its features and political institutions

and so economic growth remain vague. In particular, it is interesting why in France the bureaucracies are large and flat with effective horizontal mechanisms of accountability while in the USA the government bureaucracies are characterized by the more vertical structure and lower government administration employment.

We use the data on the number of bottom government units from Treisman (2008) and the public administration employment mainly from the International Labor Office Department of Statistics. The originality of the dataset used is that we look at a panel of data with the level of government administration employment across countries through time and a variety of political data. There is no work has been done examining a change in the number of bureaucrats in countries with different political institutions.

This paper empirically argues that there is a positive relation between political accountability and the structure and size of bureaucracies. In strong autocracies the government bureaucracies are larger presumably because of some patronage effects. Then at the stage of transition the size of bureaucracies decreases while the country becomes more democratic. What is most intriguing is that we find the positive correlation between the level of political accountability and the size of government for mature democracies. This is a relatively new established result that we hope launches more studies on explaining this distinguishing pattern of democratic regimes. More precisely, we get that from a certain threshold regimes with the higher level of democracy and more competitive elections are characterized by higher government administration employment. Further, there is evidence that flatter bureaucracies with more numerous bottom government units associated with big governments are likely to be in higher accountable regimes.

The paper proceeds as follows. The next section appeals to some related literature. Section 3 presents a theoretical framework and formulates a number of empirical hypotheses. Section 4 describes the empirical strategy and data. Section 5 contains the results of our empirical analysis. Section 6 concludes.

2 Related Literature

The literature on political economy describes several effects between the size of government and political institutions. These conclusions base on the different incentives of politicians and bureaucrats. In particular, the only true incentive for politicians is reelection that leads to distorting their activity and goals. They, for example, may choose to do highly visible things, even when fully informed voters would prefer less visible areas (Frant, 1996; the effect of "pandering" in Maskin and Tirole, 2004) and they can be engaged in vote

buying activities (Enikolopov, 2006). Financial incentives are not very significant because of soft and often low observable trial budget. So incentives are rather mostly implicit and the only sanction available for politicians comes to be not re-elected. The incentives of appointed officials are more formal and as it is well recognized in the literature career concern serves a good stimulation tool (Alesina and Tabellini, 2007a,b). Furthermore, reputation should be remembered because it proves one of the political mechanisms that substitutes standard monitoring and control for bureaucrats. While pecuniary motivation is of little importance for higher bureaucrats because "financial rewards and opportunities are much more limited and rigidly structured in government, and they are much less contingent upon individual productive effort or bureaucratic outcomes" (Moe, 1984).

As it has been demonstrated in the literature elected officials differ from appointed officials not only in their incentive specificities. The difference in methods of selection (election or appointment) does affect on policy conducted by a policymaker. In particular Besley and Coate (2003) show that when regulators are appointed regulation is likely to be bundled with other policy issues that encourages the interests of special groups. Such inefficiency can be mitigated through elections. Maskin and Tirole (2004) emphasize the trade-off between election and appointment consisting in that elections allow to discipline public officials better than the appointment but the elected officials are more tempted to yield to "pandering" (they prefer popular actions to those of real public interest). Enikolopov (2009) demonstrates that the level of public employment is likely to be higher in those local governments that are headed by elected chief executives rather than appointed chief executives because the former are more likely engaged in vote buying activities one form of which is the excessive level of public employment. In light of our study by recognizing that elected officials are more accountable to citizens than those who are appointed by the center this contribution if consistent with that the level of government employment is greater in regions with higher accountability.

Therefore, the scholars recognize that the effect of political accountability on the size of government differs in democracies and autocracies. On the one hand, patronage and vote buying activities reside in most authoritarian regimes, so that the excessive government employment might become the way of preserving the power, e.g. Senegal (Acemoglu et al., 2007). On the other hand, higher accountability countries demonstrate the effect of enlarging bureaucracies while satisfying a variety of needs of population (Brousseau et al., 2010). Thus, we argue that two effects coexist and this paper focuses on studying the latter pattern in democratic countries because it is a rather new result in the political economy literature.

However, there exist a number of studies that indirectly justify this result of larger bureaucracies in higher accountability regimes in democracies. The detail possible explanations for this pattern differ in the literature and we review them below after establishing the positive association between the level of accountability and the number of bureaucrats.

First, Lassen (2000) demonstrates that high political accountability countries are characterized by larger governments in terms of tax revenues. Actually, he follows the great result of Persson and Tabellini (1997) that presidential regimes that empirically are less accountable have smaller governments in terms of government spending.

Another interesting result belongs to Acemoglu and Verdier (2000) who focus on government intervention and the extent of government regulation to correct market failures. They stress that government intervention requires the use of agents, bureaucrats, who may be corrupt and demand bribes. The authors come to the conclusion that the optimal size of government in the case, when bureaucrats can be corruptible, is greater than in the case, when corruption is not possible in the economy. Acemoglu and Verdier (2000) normatively show that "when monitoring of bureaucrats becomes more difficult, they should receive higher wages, and government intervention should become relatively rare. But if government intervention continues to be required despite the increased difficulty of monitoring, the number of bureaucrats and their wages should increase, very much as if the bureaucracy were expanding to seek additional rents".

Further, we contribute to an emerging literature arguing that economic performance may be positively related to the size of the bureaucracy. In particular, Brown, Earle, and Gehlbach (2007) study the relationship between the size of bureaucracies and reform results in Russian regions. They find that privatization has a more positive effect on firm performance in regions with relatively large state bureaucracies. This partly supports that larger bureaucracies are likely to be in the higher accountability regimes.

There is a growing evidence that the size and other features of government bureaucracies prove crucial for economic growth (Mauro, 1995; Evans and Rauch, 1999; Rauch and Evans, 2000). For example, Schiavo-Campo, de Tomasso, Mukherjee (1997) demonstrate that the government administration employment is greater in richer countries with higher gross domestic product per capita that is a good proxy for the level of political accountability. However, Brym and Gimpelson (2004) show that this is true only for countries with a certain level of democracy. That is exactly our hypothesis for the type of positive relationship between political accountability and the size of government. As Brym and Gimpelson (2004) argue for countries of Eastern Europe and Former USSR one may observe the negative relationship between the size of the bureaucracy and economic

growth. Moreover, it is consistent with the contribution of Libman (2009) who studies the cross-country differences between the number of bureaucrats and the rate of economic growth in Russian regions.

3 Theoretical Framework and Empirical Hypotheses

3.1 Model

This section presents a simple model of the government hierarchy with one politician disciplined by the constituency through elections and a number of bureaucrats who help the politician in implementing policies and public good provision. The more numerous bureaucracies provide three main effects for a politician: first, the politician gets more chances to be reelected (patronage); second, the government produces public goods of higher quality (welfare state); finally, the politician needs to put more time and resources into the control of bureaucrats to limit their discretion (bureaucratic rent-seeking).

3.1.1 Set up

Politician. Assume an elected politician appoints m bureaucrats to implement some policy projects and produce public goods. However, along with the gain from the public welfare provision, the politician benefits from staying in office R and extracting rents (ρ). The idea is that if she is reelected, she receives a value from holding office in the next period (δR), where δ is the discount factor. Thus, we assume that citizens can control the politician through elections[2]. The voters coordinate on the same retrospective voting strategy $\overline{W}$, punishing the incumbent for bad behavior and rewarding her for good behavior by reelection.

There is a continuum of identical voters of mass 1, who could be either entrepreneurs (n) or bureaucrats (m). Each entrepreneur produces the same income y and they finance the government through proportional income taxes τ. The entrepreneurs receive the income available after taxes ($(1-\tau)ny$) and some benefits from the state's activity, in other words, from the public good production $H(m, B, S)$, where m is a number of bureaucrats, B is a private gain of bureaucrats from implementing a policy, and S is a concern of a politician about a policy. We assume that the interests of the politician and bureaucrats are congruent in some way with those of the citizens. We do not specify the function $H(m, B, S)$, but it is known that any concern of the politician and bureaucrats about the

[2]The political accountability model is based on Persson and Tabellini (2000), Chapter 4.

policy leads to some positive outcomes for citizens, although may be it is not a maximum beneficial outcome for citizens.

We suppose that the incumbent and the challenger have identical preferences, so that the citizens are indifferent to the incumbent and challenger. However, they weakly prefer to vote for the incumbent if the utility she provides them will be no less than a certain level of reservation welfare $\overline{W}$. We assume that this reservation utility is equal for all citizens. This proposition is strict because we require the full homogeneity of voters but $\overline{W}$ can be interpreted as a certain "focal" threshold that is the most expected from the incumbent.

We focus on the subgame perfect Nash equilibrium: citizens announce $\overline{W}$ to maximize their utility, anticipating that the incumbent will then choose ρ to maximize her expected utility, given the constraint that she will be re-elected if and only if she provides voters with a utility of no less than the welfare reservation level $\overline{W}$.

Bureaucrats. We assume that there are m bureaucrats, and the politician can vary their number to increase of the quality of the state activity or public good provision. If a policy is implemented by the bureaucrat with effort e, then with probability e it yields a private verifiable monetary gain or profit B for each bureaucrat. Without any effort e, a bureaucrat gets nothing except a flat wage $w > 0$, so that a bureaucrat is protected by limited liability. However, it is not free of cost to implement a policy by a bureaucrat. Thus, in order to extract a private gain B, a bureaucrat spends $g_B(e)$. To limit the bureaucrat's discretion the politician can control his activity by spending $g_P(E)$. Then, with probability E she punishes a bureaucrat with $S < B$ so that this amount of penalty enriches the government budget. Because there are m bureaucrats, due to their symmetry the politicians spends totally $g_P(mE)$.

The cost and effort functions of the politician and bureaucrats $g_k(\cdot)$ are increasing and strictly convex and satisfy $g_k(0) = 0$, $g_k'(0) = 0$, $g_k'(1) = \infty$, where $k = P, B$.

Preferences. The politician's utility is composed of the extracted rents ρ and value from holding office δR in the case of reelection: $\rho + p_I \delta R$, where p_I is a probability of reelection. One bureaucrat's utility is then $w + eB - eES - g_B(e)$, where w is an amount of wage, B is a private gain of the bureaucrat and S is a penalty if the politician controls the bureaucratic activity.

Timing. We consider the two-period game. In the first period citizens announce a level of reservation utility $\overline{W}$, and then a politician defines a sum of extracted rents ρ. Then, the bureaucrats define at what extent to use their discretion. The politician determines an optimal number of bureaucrats and efforts to control the bureaucrats E. At the end

of the first period elections are held. In the second period, if the incumbent wins, she receives an exogenous payoff from holding office, R, that is discounted to the factor δ.

3.1.2 Optimal size of government bureaucracy

The politician's utility is composed of rents (ρ) and a value of holding office in the next period (δR):

$$u_P = \rho + p_I \delta R. \tag{1}$$

The politician's efforts for controlling the bureaucrats are financed through proportional income taxes τ. The government's budget constraint is the following:

$$\tau n y + mEeS = \rho + mw + g_P(mE). \tag{2}$$

The reelection probability is based on the retrospective strategy, so it equals one if the utility of citizens will be no less than the reservation level $\overline{W}$. However, the bureaucrats are considered as loyal agents so they vote for the incumbent regardless her performance (patronage):

$$p_I = m + n \begin{cases} 1, & \text{if } W(m, \rho, g_P(mE)) \geq \overline{W}; \\ 0, & \text{otherwise.} \end{cases}$$

As mentioned before, we define identical citizens' preferences as the sum of income available after taxes and benefits from the public good provision $H(m, B, S)$. Then, using the budget constraint (2), it can be written as:

$$\begin{aligned} W(m, \rho, g_P(E)) = (1 - \tau) n y + H(m, B, S) = \\ n y - g_P(mE) - \rho - mw + mEeS + H(m, B, S). \end{aligned} \tag{3}$$

The voting strategy of the constituency creates a trade-off for the politician between rents and benefits from reelection.

Since our problem consists of a number of strategic choices by the politician, bureaucrats and citizens, we consider the game from end to beginning. First we find the strategies of the politician and bureaucrats under the given level of reservation utility $\overline{W}$. Second, we define the equilibrium level of reservation utility, announced by citizens.

Let us assume that the voters announce a comparatively low level of reservation utility. Then, the politician not only extracts rent but also is interested in reelection. More precisely, the politician chooses to please voters and so extracts a maximum possible level

of rent that allows her to be reelected. Taking into account (2) and (3), we get the optimally chosen rents extracted by the politician if she wants to be reelected as:

$$\overline{\rho} = ny - g_P(mE) - \overline{W} - mw + mEeS + H(m, B, S). \tag{4}$$

Because all bureaucrats are identical, there is a symmetry between them and it is enough to consider the utility and strategy of only one bureaucrat. Therefore, the utilities of the politician and one bureaucrat are following:

$$u_P = (m+n)\delta R + ny - g_P(mE) - \overline{W} - mw + mEeS + H(m, B, S), \tag{5}$$

$$u_B = w + eB - eEs - g_B(e). \tag{6}$$

It is held that $B > S$, $m+n \leq 1$, $0 \leq e \leq 1$ and $0 \leq E \leq 1$. Moreover, for simplicity we specify the cost function $g_k(\cdot)$ so that it satisfies all mentioned above properties $g_k(0) = 0$, $g_k'(0) = 0$, $g_k'(1) = \infty$, where $k = P, B$. We define that $g_B(e) = \frac{e^2}{1-e}$ and $g_P(mE) = m\frac{E^2}{1-E}$.

Let us now consider the optimal strategy of a bureaucrat.

$$\frac{\partial u_B}{\partial e} = B - ES - g_B'(e) = 0,$$

and

$$B - ES = g_B'(e) = \frac{2e - e^2}{(1-e)^2}.$$

It follows that

$$e = 1 - \sqrt{\frac{1}{B - ES + 1}}. \tag{7}$$

The optimal choice of effort by the politician is described as:

$$\frac{\partial u_P}{\partial E} = eSm - g_{P_E}'(mE) = 0,$$

or

$$eSm = g_{P_E}'(mE) = m\frac{2E - E^2}{(1-E)^2}.$$

Hence,

$$E = 1 - \sqrt{\frac{1}{1 + eS}}. \tag{8}$$

The equations (7) and (8) are reaction curves of the politician and bureaucrats. Given the properties of the cost functions $g_k(\cdot)$, $k = P, B$ and $S < B$, the solutions of 7) and (8) are only solutions and are found between 0 and 1. They help to understand that the more the bureaucrat is interested in using his discretion to enrich himself ($\uparrow e$), the more the politician limits the bureaucratic discretion ($\uparrow E$). However, the higher control from the politician ($\uparrow E$) leads to the less initiative of the bureaucrat ($\downarrow e$).

The optimal choice by the politician of the number of bureaucrats can be described as:

$$\frac{\partial u_P}{\partial m} = \delta R + H'_m(m, B, S) - g'_{P_m}(mE) - w + eES = 0,$$

so that

$$\delta R + H'_m(m, B, S) + eES - w = g'_{P_m}(mE) = \frac{E^2}{1 - E},$$

and using the budget constraint (2):

$$m = \frac{\tau ny - \rho}{\delta R + H'_m}.$$

The number of bureaucrats grows up with higher tax revenue and lower extracted rents, lower value of staying in office, and lower return from the number of bureaucrats for public good provision. The main interesting effect is that regimes with lower rents that is regimes with higher accountability have governments with the greater number of bureaucrats.

3.2 Empirical Hypotheses

The idea of fast-growing government is not new and has been elaborated by scholars for a long time. One major explanation is a concept of welfare state connected with increasing demands of heterogenous citizens. Indeed, the current trend of luxury and excessive consumption lead to societies with high living standards so that public good provision requires more qualitative expertise exercised in fact by the government bureaucracy.

Further, one might think that it is a trivial trend of developed countries to have larger governments because of higher migration to these countries for a better life and as a consequence of more populous states. However, controlling for total population as well as the structure of population helps to reveal a trend of enlarging bureaucracy without migration and population effects.

Second, one can hardly explain the permanent growth of government bureaucracy with time. The increase of scope and size of government bureaucracy was mentioned still by

Weber (1968). For example, an open question is why the bureaucracy grows up to a certain limit if it may enlarge without control and how this limit is defined. The analysis of time variations allows to account for the history tendency of the bureaucracy growth.

Controlling all these effects we focus on the influence of political institutions on the number of bureaucrats in government administration to study whether higher accountability regimes are associated with larger governments.

The first hypothesis is stated as following:

Hypothesis 1. In establishing democratic countries higher accountability leads to larger governments in terms of government administration employment.

The first possible explanation is rational and refers to the argument of Brousseau et al. (2010) that the state-as-an-organization might grow at a sustained pace as the demand addressed to the state meets the legitimacy and the resources to supply public goods. Providing a high quality of public goods requires more expertise information about the process and so more bureaucrats are involved in public good provision.

The other explanations directly concern the effects of political institutions. The second explanation refers to the alternative approach of considering the political agency problems and the politicians' and bureaucrats' rent-seeking behavior (Dodlova, 2009). The idea is that in higher accountability regimes politicians control their bureaucratic agents more thoroughly so thus reducing their possibility to manipulate the policy outcomes. Therefore, the bureaucrats find optimal to enlarge their formal responsibilities and charges that imply more administrative resources and barriers of influence at their disposal.

Third, in democratic countries the bureaucracy may serve a tool of manipulation by the politicians in view of their reelection incentives. There are two kinds of behavior of politicians under lower probability of reelection. First, the politicians could aim to increase the reelection probability by enlarging the bureaucracy using patronage and vote buying activities. Second, the bureaucracy could be used to preserve the agenda of the incumbent politicians. In other words, the current politicians may enlarge the bureaucracy in order to that they sustain and implement their precedent agenda.

Further, political leaders without any constraints like autocratic leaders are also tempted to use bureaucratic support to sustain their power, so that the excessive government employment might become a way of preserving the power, e.g. Senegal (Acemoglu et al., 2007). In transition regimes while a country becomes less autocratic and more democratic the patronage effect slackens and so the government bureaucracy starts to coarct and the government administration employment decreases.

Hypothesis 2. In transition periods the effect of political accountability on the number

of bureaucrats is negative; while a country becomes more democratic the size of government bureaucracy is reduced.

The first and second hypotheses state for a U-shaped relationship between political accountability and the number of bureaucrats. Figure 3 contrasts a long-difference trend in the accountability and voice index of Kaufmann et al. (2008) and government administration employment according to the System of National Accounts'93 dataset for 32 countries for 1996-2006. It shows explicitly this stated above U-shaped relationship. Figure 4 illustrates the same change in government administration employment along with a change in political accountability but only in countries with positive switch in accountability. In this case one might trace the dominant positive effect between accountability level and government administration employment. This could run counter to the conventional logic about smaller governments in higher accountability regimes. But Figure 5 gives evidence for this negative relationship if we control for the level of general government employment. Thus, what we argue is that the size of government bureaucracy and not general government increases with the level of accountability of politicians in a country.

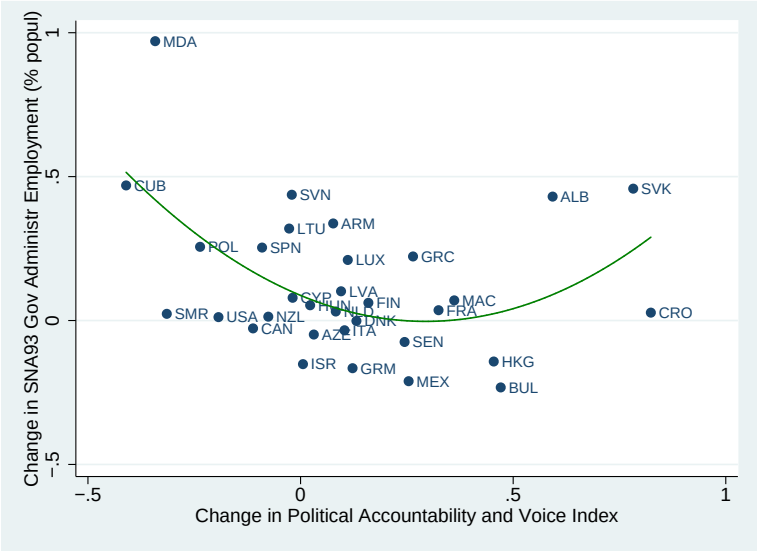

Figure 3: Long-Difference Trend in Government Administration Employment along with a Change in Political Accountability

The main purpose of elections is to discipline politicians and so to make political leaders more accountable to citizens. Therefore, during election periods the politicians prove to be more responsible for their policy. Election years present in some sense surges of high accountability. So according to our theory these periods should be characterized by higher level of government administration employment.

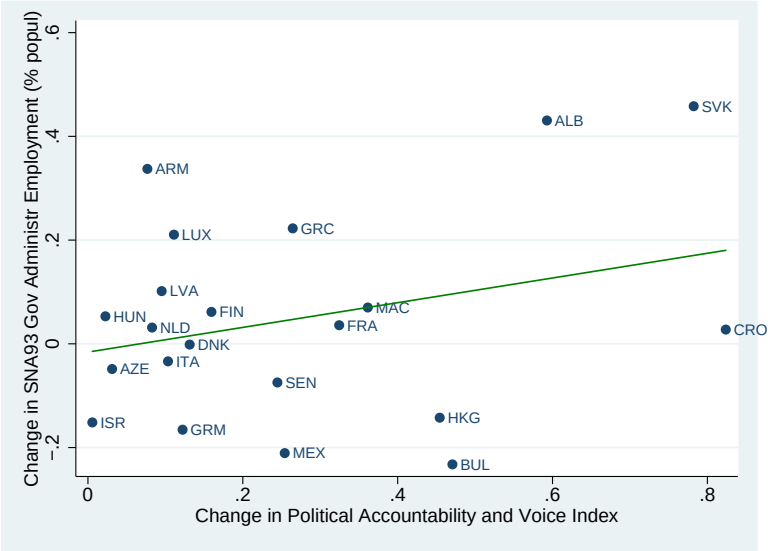

Figure 4: Long-Difference Trend in Government Administration Employment along with a Change in Political Accountability in Countries with Positive Switch in Accountability

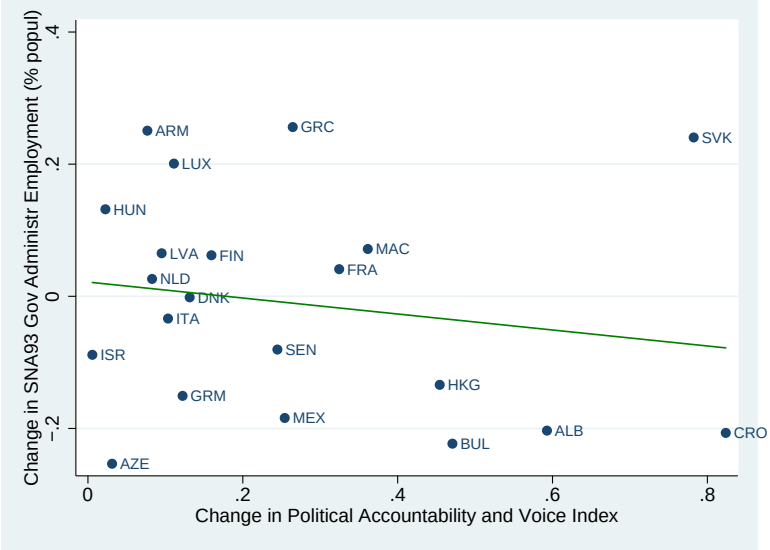

Figure 5: Long-Difference Trend in General Government Employment along with a Change in Political Accountability in Countries with Positive Switch in Accountability

Thus, the first channel why the government administration employment level is higher during election periods consist in that during these periods the politicians control their bureaucratic agents more efficiently and thus reduce their opportunities for rent seeking. Therefore, bureaucrats are looking for other ways of enrichment and could increase their formal authority by enlarging their barriers of influence and the number of subordinate projects (Dodlova, 2009). This mechanism leads to greater division and overload and so to the growth of bureaucracy.

On the other hand, the political leaders rely on the bureaucracy as an interest group that supports them and their current agenda so that excessive number of bureaucrats increases the chances of reelection for the incumbent leaders. In addition, under lower reelection perceptions the incumbent politicians are interested in greater number of bureaucrats because in case of non-reelection the bureaucrats are those who would sustain the agenda of previous political leaders. For example, it is not without reason that traditionally a new president replace a cabinet of ministers. Thus, an excessive number of bureaucrats not only exercises support in being reelected but also helps to preserve the current agenda under new political leaders. The third hypothesis states for the following.

Hypothesis 3. The number of bureaucrats in democracies is higher during election years.

Political accountability is achieved not only by election mechanism but also by checks and balances system within government. Regimes with greater checks and balances discipline the political leaders better by creating a conflict between politicians. Therefore, such regimes should yield higher accountable politicians whence it appears that the fourth hypothesis is true.

Hypothesis 4. The higher level of checks and balances in establishing democracies leads to larger government bureaucracies in terms of government administration employment.

One of implications is a number of veto players in the legislative process. Although, the greater number of veto players create more conflict between politicians, it reduces chances to implement a new policy and leave a status quo. Therefore, it is not evident that the greater number of veto players provide higher accountability. The same is true for the checks and balances system. The conflict between politicians might narrow a set of available policy courses and so the greater checks and balances does not imply automatically higher accountability regime.

Nevertheless, one can formulate the additional hypothesis about the number of veto players.

Hypothesis 4a. The greater number of veto players in establishing democracies leads

to larger government bureaucracies in terms of government administration employment.

In addition, the effect of veto players should become apparent when the number of veto players changes. We check robustness of results by addressing to the percent of veto players who drop from the government in any given year. In other words, this measures an effect of political stability on the level of government administration employment.

To isolate the patronage effect we test whether the age of the executive in office or the tenure of veto players lead to larger government bureaucracies. First, we suspect that regardless of a particular regime a personalized-based leadership is likely associated with larger bureaucracies. The autocratic leaders are tempted to seek support in their viziers (Egorov and Sonin, 2009). The excessive number of bureaucrats allows the leaders to remain in power. Second, it is logically to assume that democratic regimes with the younger political leaders have smaller government bureaucracies because the politicians do not have enough time to be involved in vote buying and patronage effects. Third, the tenure of veto players may be crucial for our analysis because they might manipulate the bureaucracy's support in power bargaining games so that both the greater number of veto players and the higher tenure of major veto players could positively affect on the number of bureaucrats. Along with the main hypothesis about the age of the executive we can formulate the similar ones for the party of the chief executive and veto players.

Hypothesis 5. The higher age of the executive in office is associated with larger government bureaucracies.

Hypothesis 5a. The higher age of the party of the chief executive in office is associated with larger government bureaucracies.

Hypothesis 5b. The higher tenure of the veto players with the longest and shortest tenures is associated with larger government bureaucracies.

4 Data and Empirical Strategy

We test the nonmonotonic relation between political accountability and the size of government bureaucracy in terms of government administration employment. The main focus is whether in relatively mature democracies higher accountability is associated with larger bureaucracies. We are interested in that whether providing higher political accountability in a country requires more bureaucrats to conduct a policy or may be higher political accountability launches the other mechanisms between bureaucrats as, for example, rent-seeking that leads to enlarging bureaucracies. Political accountability has been broadly defined through performance of a number of political institutions. Therefore, our study

refers to the effect of political institutions on the size of government bureaucracy.

4.1 Target Data

The data on the structure of government bureaucracy is extracted from the Treisman dataset on decentralization (2008). The number of bottom government units allows to account for the type of the hierarchical structure that is much flatter in one countries and more vertical in other countries. The data does not change in time so the cross-country analysis based on this data is conducted.

To generate the panel dataset we have relied on the data of government administration employment from several international labor statistics sources like IloLaborsta (International Labor Office database on labor statistics operated by the ILO Department of Statistics[3]), SNA (the System of National Accounts) and Unidata (the United Nations Database). The data on government administration employment includes all employees of all government units and social security funds. In other words, it combines the public administration employment and compulsory social security personnel without university or high school professor positions as well as without public health service employment and military forces. We build two databases subject to different statistical classifications of economic activities.

The first dataset is composed from the data according to the International Standard Industrial Classification of all Economic Activities classification (ISIC)[4], section L which reports the public administration and compulsory social security employment[5]. We extract this data for 68 democratic and autocratic countries over 12 years from 1995 until 2006.

Then to isolate from social security funds we use the most important source for the public sector employment, the System of National Accounts (SNA93)[6], to extract the data on Government Units. The sources include Labor Force Survey, Establishment Survey, Administrative registers as well as Combination of Different Sources. This data is available on 30 countries for the period of 11 years from 1996 until 2006.

On the basis of the data availability on the public administration employment we enrich these two samples of countries by the Database of Political Institutions (DPI), the

[3] http://laborsta.ilo.org/

[4] Yearbook of Labour Statistics

[5] Compulsory social security activities includes funding and administration of government-provided social security programmes: sickness, work-accident, and unemployment insurance, retirement pensions programmes covering losses of income due to maternity, temporary disablement widowhood, etc.

[6] "System of National Accounts", Commission of the European Communities, International Monetary Fund, Organization for Economic Cooperation and Development, United Nations, World Bank, Bruxelle/Luxembourg, New York, Paris, Washington, D.C., 1993.

Polity IV dataset, Kaufmann governance indicators and a number of economic indicators from World Bank World Development Indicators. These samples are also enlarged by the index of corruption from Transparency International[7].

To capture a level of political accountability in a country we base on several approaches to measure the level of accountability, and consequently, we test a number of interesting hypotheses.

(1). *Polity index* is a good proxy for the level of political accountability. As Persson and Tabellini (2000) argue political accountability should be lower in autocracies than in democracies. To distinguish between political regimes we control for democratic transitions using Polity code. Following Rodrick and Wacziarg (2005) we separate the early phase of the transitions from the subsequent phase to capture various kind of regime change. The dummy variable *New Democracy* takes on a value of 1 in the year(s) and subsequent five years of any transition to democracy unless the regime is changed again, in which case the dummy is coded as 1 until this change. The variable *Established Democracy* is defines similarly for the years following the first five years of democratic transitions. The sum of these variables is labeled as *Democratic Transition*. *New Autocracy*, *Established Autocracy* and *Autocratic Transition* are defined in a similar way for a reverse regime change. The dummy variable *Small Regime Change* captures any small change in the Polity score not qualified as the major move toward democracy or autocracy.

(2). *Competitive elections* and years of continuous competitive elections according to Keefer (2009) demonstrate the capability of citizens to act collectively and stand out on political arena with their opinion. This is one of the main indications of high democratic regime and so higher political accountability.

(3). *Checks and balances* index reports a number of veto players and so it indicates the extent of political conflict which leads to higher accountability level.

(4). *The dates of elections* are vital to show the election surge of accountability.

(5). *Political accountability and voice* composite index constructed by Kaufmann et al. (2006, 2008) combines a number of subjective surveys to cover different dimensions closely related to political accountability. It embodies "the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media" (p. 4).

[7]Country coverage in two samples is presented in Appendix B.

In addition, we test how political stability affects the level of government employment that is whether the leaving of one veto player influences on the size of government. As well we study the effect of the age of the executive or the party in office to distinguish the patronage effect.

4.2 Control variables

We allow for the cross-country variation by including variables traditionally considered as controls in the literature. We use the gross national income per capita based on the purchasing power parity to take into account that richer countries are characterized by higher accountability as well as bigger government.

Testing the conjecture of larger bureaucracies in greater political accountability regimes we use the log of government administration employment and include the log of total population to control for two effects considered in the literature. Along with the direct effect of larger bureaucracies in more populous countries the effect of economies of scale in public administration should be taken into account. As Alesina and Wacziarg (1998) argue economies of scale in supplying public goods lead to smaller government in larger countries.

In order to control for national differences and the size of general government we include the data on government expenditures in the model. This data is from the World Bank dataset of Development Indicators (WDI).

To overcome the endogeneity problem we use an instrument approach following Persson and Tabellini (2009) and Acemoglu and Yared (2010). As an instrument to capture the potential level of accountability in a target country we take the incidence of democracy in neighbor countries. Specifically, we calculate a weighted average of democratic indices using the inverse distance in kilometers between capitals as the relative weight of a target country.

We also control for the degree of urbanization (Oates, 1985; North, 1985; Lassen, 2000; Rauch and Evans, 2000; Brown, Earle and Gehlbach, 2007), openness of the economy (Cameron, 1978; Rodrik, 1998; Lassen, 2000; Brown, Earle and Gehlbach, 2007) and the age dependency ratio which is a percentage of people younger than 15 and older than 60 years to people 15-64 (Lassen, 2000)[8].

[8] All variables and their sources are listed in Appendix A.

4.3 Empirical Methodology

We apply several methodological approaches. First, we start with long-difference specifications to capture medium-run trends as opposed to annual fluctuations. To appraise the causes of variations in government administration employment and political accountability we estimate the following long-difference regression model[9]:

$\Delta GOVEMP_i = \alpha \cdot \Delta POLIT\_ACCOUNT_i + \Delta \cdot CONTROLS_i'\beta + e_i$

where $POLIT\_ACCOUNT$ is measured by Kaufmann et al.'s political accountability and voice index[10]. We believe that time-constant unobserved heterogeneity is no longer a problem. In any case we make the standard errors robust by using Huber-White sandwich estimator.

Second, to avoid the between-country comparison we focus on within-country changes by using fixed-effects estimation. These regressions have been also made instrumenting the polity index by polity scores in neighbor countries. We apply the instrumental variable approach to eliminate the endogeneity problem on the basis of the weighted inverse democratic index in neighbor countries. If z_{ij} represents the inverse distance in kilometers between capitals of country i and country j then the instrument for political accountability is a weighted average of the polity index of country i's neighbors using z_{ij} as a relative weight of country j ($\neq i$).

To capture the nonmonotonic effect of political accountability on government administration employment we consider the absolute value of the Polity score to assure that with increasing the regime score that is with establishing a particular regime, either democracy or autocracy, the government becomes larger.

Time-constant unobserved heterogeneity is no problem for the fixed-effect estimator, but time-varying unobserved heterogeneity could be possible, however, we hope that the most omitted variables are time-constant (in view of that T is not too large).

Although the assumption of the zero covariance between the independent variables and errors is suspected, we report also the random-effects estimators to compare our results with the fixed-effect approach.

In some cases we compare the estimates of fixed and random-effect approaches with those of the pooled regression. To verify which specification is better we use the Breusch-Pagan Lagrange multiplier to test the null hypothesis of the pooled regression against the alternative hypothesis of the random-effect estimation. Then, the Hausman test is applied to compare random and fixed-effect models.

[9]The long difference implies the end date value minus the beginning date value.

[10]The polity score does not provide enough variability in the data

Third, we use the difference-in-difference technique to show that in potential periods of higher political accountability one can observe the growth in the number of bureaucrats. Indeed the dates of elections may be characterized by increasing political accountability in a country because in tending to be reelected the politicians are engaged both in populist activities and in activities pursuing the true needs of the constituency to increase their reelection probability. Thus we argue that the dummy variable of the dates of elections shows the election surge of accountability. We distinguish between autocracies and democracies as control and treatment groups while the dates of elections are to analyze the potential effect of elections on the increase of the size of government.

Finally, the results are tested by using the most common dynamic panel model as the Arellano-Bond dynamic panel, where country or fixed effects are accounted for by differencing the data so that the model becomes

$\Delta GOVEMP_{it} = \theta \Delta GOVEMP_{i,t-1} + \alpha \cdot \Delta POLIT\_ACCOUNT_{it} + \Delta CONTROLS'_{it} \cdot \beta + u_{it}$.

The Arellano – Bond estimator was designed for small-T large-N panel datasets. Although by construction the unobserved panel-level effects are correlated with the lagged dependent variables, making standard errors inconsistent, Arellano and Bond (1991) derived a consistent generalized method-of-moments (GMM) estimator for the parameters of this model.

5 Regression Results

We investigate separately the link of political accountability on the structure of government bureaucracies and the level of government administration employment.

5.1 The Structure of Government Bureaucracies

Exploring the structure of the government bureaucracy we use the data on the number of bottom government units. We assume that the flatter government structure are characterized by greater bottom government units. Then, our hypothesis about larger governments in more accountable regimes is corroborated by using Polity index as a measure of accountability (see the regression results in Table 1 in Appendix C). The coefficients before Polity in specifications 1 and 2 are positive and strong significant with and without control variables. The control variables include the level of gross national income, the level of government wage, total and urban population, the structure of population in proportion of young and old people, the level of openness of a country. Table 1 reports the signifi-

cant positive sign before the logarithm of total population that indicates that larger more populous countries have larger governments. At the same time the countries with a higher share of labor age population have lower number of bottom government units. What is interesting is that the countries with more vertical structure that is less number of bottom government units are reacher. This is indicated by the negative sign before the logarithm of gross national income. It is reasonable that the government wage is lower in governments with the flatter structure. The logarithm of the volume of trade refers to higher accountability because the literature recognizes that politicians are more disciplined by citizens and checks and balances in open countries. Thus, the positive sign before openness indirectly confirms our hypothesis about flatter countries in accountable regimes.

Specification 3 reports the effect of executive constraints on the structure of government. This variable of *ex_constr* refers to the extent of institutionalized constraints on the decision-making powers of chief executives, whether individuals or collectivities. The coefficient is positive but not very significant (at the 13% level) so that the prediction about greater bottom government units in higher accountable countries is confirmed.

Specifications 4 and 5 present the interesting results about the effect of the duration of the party of chief executive in office. These results support the idea that in countries with longer service of the party of chief executive the government bureaucracies are smaller with less number of bottom government units. Thus, this finding refers to the idea that the less probability of reelection induce politicians to enlarge bureaucracies in order to that they sustain the current politicians' agenda. The similar result is obtained from studying the effect of the longest tenure of a veto player on the structure of the government (specifications 6 and 7). In countries with the longest tenure of a veto player the bureaucracy is more vertical.

5.2 Government Administration Employment

The regression results on government administration employment are analyzed for both samples parallelly with a focus on the level of employment of government units according the System of National Accounts (SNA93) because it is supposed to present better the layer of bureaucrats excluding employment in the social security and others' additional branches of government. In particular, the results differ for government administration employment and general government employment which equals the former one plus the level of employment in social security funds and other non profit institutions.

5.3 Long-difference trends

Table 2 presents the regression results for long difference OLS estimation with the logarithm of government administration employment according to SNA93 classification and the political accountability and voice index of Kaufmann et al. (2008). In the first two specifications we take into consideration all countries and then we focus only on democratic countries which experience small changes in the democratic score[11]. The control variables are the gross national income per capita, total population and the level of government expenditures. All specifications are estimated with robust standard errors according to Huber-White sandwich estimator.

For a sample of all countries the coefficient before the political accountability index is negative and non significant in a case of two control variables of national income and total population. It becomes significant when we include government expenditures in the model. This result is ambiguous and we can not conclude anything. However, if we extract only democratic countries the coefficient is strongly positive for both the level of government administration employment and general government employment with and without all three control variables. Furthermore, specification (3) confirms a nonmonotonic relationship between political accountability and government administration employment that is along with the decreasing size of government bureaucracy while a country becomes more democratic there is a positive significant association between the growth of political accountability and the size of government bureaucracy for comparative democracies.

Thus, our main tension is that in any established regime (even in democracy) higher political accountability leads to larger government bureaucracies could be not rejected at this stage.

5.4 Fixed and Random-effects estimation

The next results also provide some evidence for the validity of our first hypothesis. Table 3 and 4 report the results for the logarithm of government administration employment according to SNA93 classification in the different specifications using fixed-effects and random-effects estimation. Fixed-effect model overcomes random-effects estimation by Hausman test but we present the results of two approaches for their comparison. The control variables are gross national income per capita, total population and government expenditures.

The measure of political accountability is either the ordinary Polity score (specifications

[11] We consider that democratic countries are those with a political accountability index higher or equal to 1

(1) and (2)) or the Polity score instrumented by a weighted average of polity scores of neighbor countries (specification (3)). In specification (2), (5) and (6) we use a square and absolute value of the polity score to capture the nonmonotonic effect of accountability without any reference to either democracy or autocracy. Further, specification (6) presents the results of an IV model with the absolute value of the polity score instrumented by a weighted average of absolute polity scores of neighbor countries.

The fixed-effects estimation results confirm a significant positive association between political accountability and the size of government bureaucracies for comparative democracies. Only in the first specification we have not an expected positive sign but the coefficient is not significant. Further, the estimates of this model may be inconsistent because of an endogeneity problem due to simultaneity of accountability change and change of the size of government bureaucracy. First, to avoid this problem we include the level of government expenditures as a control variable. Second, we apply an instrumental variables approach by using an average of polity scores of land-border countries. As one can see, the model for the instrumented Polity score yields the expected result of a positive relation between larger government bureaucracies in higher accountable countries (specification (3)). Specification (2) presents evidence in favor of a nonmonotonic relation as the coefficient before the square of the polity index is positive and significant that confirms both our first and second hypotheses. The nonmonotonic effect is also confirmed by the results of specifications (4) and (5) because the absolute value of polity is associated with the higher level of government administration employment in both specifications with and without the instrumented absolute polity score.

The values of coefficient before the polity score varies from 0.2% to 2%. One can distinguish the highest effect of positive change in political accountability in the fixed-effects IV model because the increase of the polity index by 1 might leads to the increase of the number of bureaucrats by about 2%.

The control variables are significant and have the expected signs. First, richer countries have larger governments. Second, there is an effect of economies of scale subject to total population because supplying public goods lead to smaller government in larger populated countries. Third, higher government expenditures are associated with less government administration employment. This relation might be explained by larger government intervention and regulation in regimes with a smaller but stronger bureaucracy. On the contrary, the regimes with larger bureaucracies have less government intervention and bureaucrats prove to be ordinary civil servants without a power in political decision-making and other government activities. Further, this result argues for a difference in dimensions

of the size of government and a necessity to account for all of them.

The results from random-effects estimation are qualitatively similar to those from fixed-effects estimation but slightly less significant. This is consistent with less crucial findings of random-effects estimation according to the Hausman test and do not contradict our conclusion about the validity of our first and second hypothesis.

The regression results using government adminstration employment according to ISIC3 classification are more diverse. The first specification presents the negative significant association between accountability and government administration employment for all countries. However, the estimates might be inconsistent because of endogeneity problem. Therefore, the third specification presents the results of two-stage fixed-effects estimation. One can see that the coefficient becomes positive although non significant. Thus, for a sample of all countries there is no clear conclusion. Specification (2) contains evidence in favor of a nonmonotonic relation because both coefficients before the polity score and its square are significant. Moreover, the positive association between accountability and the number of bureaucrats is also confirmed by the results of specification (4) in which the regression is estimated only for democratic countries. One can see the strongly significant positive coefficient before the polity score so that for the democratic countries the growth of the democratic score by 1% leads to the increase of government administration employment by about 2%. The regression results are similar for the absolute value of the polity score. For a sample of all countries the coefficient is negative in fixed-effects estimation but positive in two-stage fixed-effects estimation with the instrumented polity score. Further, specifications (4) and (7) are identical because we consider only democratic countries with the positive polity score. The regression results on the basis of government administration employment according to ISIC3 classification confirm a significant positive relation between the level of democracy and the size of government bureaucracy.

5.5 Competitive elections

Another measure of high accountability of politicians is the extent of electoral effectiveness. The competitive elections embody the major idea of democracy about the capability of voters to coordinate their political preferences to influence on policy. Therefore, following Keefer (2009) we construct a dummy variable that equals 1 if the legislative and executive indices of electoral competitiveness come to 7, and 0, otherwise. The data is extracted from the World Bank Database of Political Institutions. The legislative index of electoral competitiveness is 7 if the largest party got less than 75%. The same rules are applied to the executive index of electoral competitiveness. Further, the executives are those who

are "elected directly by population, or elected by an electoral college that is elected by the people and has the sole purpose of electing the executive, are scored on the above scale."

Tables 6 and 7 contain the outcomes of pooled regression and fixed and random-effects estimation for government administration employment according to ISIC3 and SNA93 classifications, respectively. The results for ISIC3 data are less significant although both data support the idea of larger government in regimes with higher competitive elections. We present three specifications of the pooled regression and fixed- and random effects models with and without control variables that is the level of income in a country, total population and government expenditures as a share of the gross domestic product. For both data the use of the Breusch-Pagan Lagrange multiplier testifies that random-effects estimation proves to be a better specification as opposed to pooled regression. Then, the Hausman test favors for fixed effects as against to random effects model. To avoid the tests' misidentification we present the results of all three specifications.

The positive association between competitive elections and the level of government administration employment is strong significant for the data according to SNA93 classification. For the data according to ISIC3 classification the results are confirmed in specifications (3)-(6). The estimate of the pure effect of competitive elections in this case comes to about 1% that is supported by other methods' evaluations.

5.6 Accountability surges due to elections

The difference-in-difference approach helps us to test the hypothesis whether the election surge of accountability because of benevolent activity of the incumbent politicians in their preelection campaign lead to the increase of government administration employment. The first possible reason is patronage and vote buying activities that increase the number of government bureaucrats. The second reason is an aspiration of the incumbent politicians to increase their reputation and please the voters in a possible maximum way by producing high quality public goods and satisfying the needs of the constituency to a greater extent. Then the larger bureaucracy is necessary for acquiring more information and implementing the politicians' benevolent projects.

Tables 8 and 9 contain the difference-in-difference results with and without control variables. Although in the case of estimation with control variables the results are less significant, one can see that both specifications produce the results in favor of the third hypothesis that the level of government employment is higher during election years. The treatment variable is coded as 1 if a country has a strong democratic index ($democ \geq 4$) so that in these countries competitive elections are possibly realized. The after variable

signifies namely the dates of elections so that the product of these two variables produces the true effect of the accountability surge before elections on the size of government bureaucracies.

For the model estimated on the basis of the data according to the SNA93 classification the results confirm better that the election dates are associated with a strong increase of the number of bureaucrats. The government administration employment according to the ISIC3 classification is more general and is associated rather with the general government employment so that specifications (3) and (4) yield non-significant results and testify to the smaller growth of government employment (about 5% or 6%) during election years.

5.7 Dynamic panel analysis

Finally, to take into account a number of possibly omitted variables and endogeneity we address to the classical dynamic panel-data model designed by Arellano and Bond (1991). The inclusion of the lagged dependent variable allows to forget about the possible other influences of omitted variables. Further, the Sargan test output reports the strong evidence against the null hypothesis that the overidentifying restrictions are valid and the model does not need to be respecified. Table 10 presents the results of Arellano-Bond estimation that also corroborate that the increase in the polity score leads to the increase of about 1% of the government adminstration employment. All 4 specifications are realized for the Polity score, the instrumented Polity score defined as a weighted average of polity scores of neighbor countries and the absolute value of the polity score and the instrumented absolute value of the polity score to capture the effect of establishing regime.

Thus, all approaches to a greater or lesser extent support the idea of larger governments in terms of government administration employment in higher accountability regimes. This is especially true rather in established democracies. The worse results for the specifications estimated on the basis of the data according to the ISIC3 classification are induced by the larger coverage of government and social security employees. It is rather refer to the general government employment but our intuition concerns basically government administration employment.

As to control variables they report the predicted and significant signs. The gross national income affects positively and this supports the hypothesis that countries with higher economic growth have larger governments. The significant negative sign before the logarithm of total population demonstrates the effect of the economy of scale described by Alesina and Wacziarg (1998)[12]. The level of government expenditures has a negative

[12]Because the dependent variable is presented as a share of government administration employment to

significant sign to capture the effect of the smaller but more powerful bureaucracy in less accountability regimes (Dodlova, 2009). The regimes with higher government intervention are characterized by the smaller bureaucracy. This might be caused by the unwillingness of the politicians to disperse power and share information rent with the bureaucracy.

5.8 Veto players and checks and balances system

Checks and balances system is defined by the 'checks' variable from the Database of political institutions (DPI) which equals one if legislative or executive indices of electoral competitiveness (LIEC or EIEC) is less than 5. In particular, if LIEC is less than 5, legislatures are considered as not competitive.

Table 11 contains fixed and random-effects estimation results for the change of government administration employment according to the ISIC3 classification due to checks and balances system[13]. One can see that for all countries higher political competition leads to smaller government bureaucracy but for established democratic countries ($democ \geq 7$) greater political competition is associated with the larger number of bureaucrats. The latter confirms our fourth hypothesis. The effect of checks on the level of government administration employment in both specifications (3) and (4) is significant.

The ambiguous influence of the number of veto players is possibly revealed by the effect of polarization and the percent of veto players who drop from the government in any given year. Indeed, if polarization is high then the checks and balances system does not reduce a set of possible policy outcomes and a greater number of veto players increases political accountability in a country. Tables 12 and 13 show that greater checks and balances and greater polarization between the major political parties increase the size of government bureaucracy but their joint effect is negative for both samples of all and democratic countries. However, the results are especially significant for established democracies (specifications (3) and (4) of Table 12) that is in favor of our fourth hypothesis that a greater number of veto players and high polarization are associated with the greater number of bureaucrats but their multiplied effect yields a negative influence. Indeed, the number of bureaucrats decreases if the politicians may easily discipline each other and may share information rent between themselves. They do not share power with the bureaucracy so that this does not remain a room for government bureaucracies to enlarge. The regression results for government administration employment according to the SNA93 classification are much more

either total population or labor force.

[13]The analogous specifications for government administration employment according to the SNA93 classification produce the same but nonsignificant results so we do not report them

convincing. For both samples of all and democratic countries there is a strong positive association between checks and polarization and the number of bureaucrats but a negative association between their multiplied effect and the size of government. A higher number of veto players and their tight relations that allow the politicians to come to agreement creates a highly political competitive environment. High political competition reduces the number of bureaucrats as it is not beneficent for the politicians to enlarge such a crucial interest group as the bureaucracy.

The share of veto players who drop from the government in any given year does not exert any significant effect on the size of government bureaucracy and do not reveal an interesting pattern so we do not report these results.

5.9 Regime duration

The age of a particular regime, democracy or autocracy, is critical for the size of government in terms of government administration employment because the excessive level of government employment can be a result of patronage and vote buying activities in government. Therefore, according to our hypotheses the regime duration affects positively on the number of bureaucrats.

Tables 14 and 15 demonstrate the positive effect of the regime duration on the level of government adminstration employment. Thus, our conjecture about patronage seems to be true. The regression results are presented for both government administration employment and general government employment (including employment in social security funds). According to the data of government administration employment the regime duration exerts a strongly significant and positive effect on the number of bureaucrats for all countries (specifications (1) and (2) of Table 14). However, if we extract only established democracies that have a Polity score more than 9 during the whole considered period then the results become inverse (specifications (3) and (4) of Table 14). This evidence confirms that in democratic countries there is no patronage effect.

For the data of general government employment this conclusion is not so evident. The sample of all countries also yields a positive and significant effect of the regime duration but the sample of democratic countries produces an ambiguous result (see Table 15). Thus, general government employment is supposed to reveal the patronage effect to a lesser extent.

The age of a regime is also measured by years of the chief executive and his party in office as well as the tenure of major veto players. Tables 17 and 18 present the regression results for the effect of these variables on government administration employment

according to both classifications of professional occupations. It appears to be a positive significant effect of all measures of tenure of major players on the number of bureaucrats. The exception is a significant negative effect of the tenure of a veto player with the shortest tenure for the data of SNA'93 classification. Thus, the hypotheses 5 and 5a are strongly confirmed for both all countries and comparative democracies while the hypothesis 5b is only partly supported by the data. The negative influence of the tenure of a veto player with the shortest tenure might be explained by that the frequent turnover of weak political players only lead to slackening of a conflict within government and so strengthening of the players with longer tenures so that this only promotes larger government bureaucracies.

5.10 Government forms

Government forms are also crucial for the level of government administration employment. Presidential and parliamentary regimes differ in their institutional bargaining environment. In dependence on chances to negotiate between themselves political principals are intended to exert more or less effective control over their bureaucratic agents. The more effective political control leads to the limited discretion of bureaucrats who then might strive for enlarging formal barriers of influence. As a result, the government bureaucracy may grow up.

Table 16 presents the evidence that presidential regimes are characterized by smaller government bureaucracies. We report the results of the pooled regression and fixed and random-effects estimation for the data of administration employment from both sources. The regression outcomes on the basis of the ISIC3 classification data are less obvious but also favor for the lower number of bureaucrats in presidential regimes. The coefficient in the fixed-effect model has the inverse sign but it is not significant. Meanwhile, the results obtained on the basis of the SNA'93 classification data strongly support our hypothesis about larger governments in parliamentary regimes. The pooled regression does not contradict to the random-effects model findings. Thus, our results are consistent with the conclusion of Persson and Tabellini (1999) about smaller governments in presidential regimes in terms of rents and government spending.

6 Concluding Remarks

The paper presents some evidence that in establishing regimes even in comparative democracies higher accountability leads to larger and flatter bureaucracies in terms of the public administration employment and the number of bottom government units.

In a principal-agent framework politicians are intended to convey public interests and tastes and thus they are accountable to their constituency. Bureaucrats, on the other hand, are appointed by politicians and so they are accountable to politicians. Because bureaucrats are better informed than politicians about the true necessary budgets and policy outcomes they may manipulate this to their advantage by proposing policies that suit better their own ends. We argue that these dual accountability effects are linked and yield an intriguing result about numerous bureaucracies in higher accountability regimes.

References

Acemoglu, D., D. Ticchi, and A. Vindigni (2007): "Emergence and Persistence of Inefficient States," Working Papers 0707, University of Urbino Carlo Bo, Department of Economics.

Acemoglu, D., and T. Verdier (2000): "The Choice Between Market Failures and Corruption," *American Economic Review*, 90(1), 194–211.

Acemoglu, D., and P. Yared (2010): "Political Limits to Globalization," *American Economic Review (Papers and Proceedings)*, 100(2), 83–88.

Adam Przeworski, Susan C. Stokes, B. M. (ed.) (1999): *Democracy, Accountability, and Representation*. Cambridge: Cambridge University Press.

Alesina, A., and G. Tabellini (2007): "Bureaucrats or Politicians? Part I: A Single Policy Task," *American Economic Review*, 97(1), 169–179.

——— (2008): "Bureaucrats or Politicians? Part II: Multiple Policy Tasks," *Journal of Public Economics*, 92(3-4), 426–447.

Alesina, A., and R. Wacziarg (1998): "Openness, Country Size and the Government," *Journal of Public Economics*, 69(3), 305–321.

Arellano, M., and S. Bond (1991): "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," *Review of Economic Studies*, 58(2), 277–97.

Barro, R. J. (1973): "The Control of Politicians: An Economic Model," *Public Choice*, 14(1), 19–42.

Bennedsen, M., and S. E. Feldmann (2006): "Lobbying Bureaucrats," *Scandinavian Journal of Economics*, 108(4), 643–668.

Besley, T., and S. Coate (2003): "Elected Versus Appointed Regulators: Theory and Evidence," *Journal of the European Economic Association*, 1(5), 1176–1206.

Brousseau, E., and Y. S. et Jerome Sgard (2010): "Constitutions, States and Development," *Journal of Comparative Economics*, forthcoming.

Brown, D. J., J. S. Earle, and S. Gehlbach (2009): "Helping Hand or Grabbing Hand? State Bureaucracy and Privatization Effectiveness," IZA Discussion Papers 3958, Institute for the Study of Labor (IZA).

Bruno, G. S. F. (2005): "Estimation and Inference in Dynamic Unbalanced Panel-data Models with a Small Number of Individuals," *Stata Journal*, 5(4), 473–500.

Brym, R. J., and V. Gimpelson (2004): "The Size, Composition, and Dynamics of the Russian State Bureaucracy in the 1990s," *Slavic Review*, 63(1), 90–112.

Cameron, D. R. (1978): "The Expansion of the Public Economy: A Comparative Analysis," *American Political Science Review*, 72(4), 1243–1261.

Dodlova, M. (2009): "Political Accountability and Real Authority of Government Bureaucracy," Working paper.

Egorov, G., and K. Sonin (2009): "Dictators and Their Viziers: Endogenizing the Loyalty-Competence Trade-Off," *Journal of European Economic Association*, forthcoming.

Enikolopov, R. (2009): "Politicians, Bureaucrats and Targeted Redistribution: The Role of Career Concerns," Working paper.

Evans, P., and J. E. Rauch (1999): "Bureaucracy and Growth: A Cross-National Analysis of the Effects of 'Weberian' State Structures on Economic Growth," *American Sociological Review*, 64(5), 748–765.

Fearon, J. (1999): "Electoral Accountability and the Control of Politicians: Selecting Good Candidates versus Sanctioning Poor Performance," in *Democracy, Accountability, and Representation*, ed. by A. Przeworski, S. C. Stokes, and B. Manin, pp. 55–98. Cambridge: Cambridge University Press.

Ferejohn, J. (1986): "Incumbent Performance and Electoral Control," *Public Choice*, 50(1/3), 5–25.

Ferejohn, J., and M. P. Fiorina (1974): "The Paradox of Not Voting: A Decision Theoretic Analysis," *American Political Science Review*, 68(2), 525–536.

Frant, H. (1996): "High-Powered and Low-Powered Incentives in the Public Sector," *Journal of Public Administration Research and Theory*, 6(3), 365–381.

Hall, R. E., and C. I. Jones (1999): "Why Do Some Countries Produce So Much More Output Per Worker Than Others?," *Quarterly Journal of Economics*, 114(1), 83–116.

Kaufmann, D., A. Kraay, and M. Mastruzzi (2009): "Governance Matters VIII: Aggregate and Individual Governance Indicators, 1996-2008," Policy Research Working Paper Series 4978, The World Bank.

Lassen, D. D. (2000): "Political Accountability and the Size of Government: Theory and Cross-Country Evidence," EPRU Working Paper Series 00-20, Economic Policy Research Unit (EPRU), University of Copenhagen.

Libman, A. (2010): "Democracy, Size of Bureaucracy, and Economic Growth: Evidence from Russian Regions," Working paper, CDSE, University of Mannheim, and Department of Economics, Frankfurt School of Finance and Management.

Maskin, E., and J. Tirole (2004): "The Politician and the Judge: Accountability in Government," *American Economic Review*, 94(4), 1034–1054.

Mauro, P. (1995): "Corruption and Growth," *Quarterly Journal of Economics*, 110(3), 681–712.

Moe, T. M. (1984): "The New Economics of Organization," *American Journal of Political Science*, 28(4), 739–777.

North, D. C. (1985): "The Growth of Ggovernment in the United States: An Economic Historian's Perspective," *Journal of Public Economics*, 28(3), 383–399.

Oates, W. E. (1985): "Searching for Leviathan: An Empirical Study," *American Economic Review*, 75(4), 748–57.

Persson, T., G. Roland, and G. Tabellini (1997): "Separation of Powers and Political Accountability," *Quarterly Journal of Economics*, 112(4), 1163–1202.

Persson, T., and G. Tabellini (1999): "The Size and Scope of Government: Comparative Politics with Rational Politicians," *European Economic Review*, 43(4-6), 699–735.

——— (2000): *Political Economics: Explaining Economic Policy*. Cambridge: The MIT Press.

Rauch, J. E., and P. Evans (2000): "Bureaucratic Structure and Bureaucratic Performance in Less Developed Countries," *Journal of Public Economics*, 75(1), 49–71.

Rodrik, D. (1998): "Why Do More Open Economies Have Bigger Governments?," *Journal of Political Economy*, 106(5), 997–1032.

Rodrik, D., and R. Wacziarg (2005): "Do Democratic Transitions Produce Bad Economic Outcomes?," *American Economic Review*, 95(2), 50–55.

Rose-Ackerman, S. (1986): "Reforming Public Bureaucracy through Economic Incentives?," *Journal of Law, Economics and Organization*, 2(1), 131–61.

Schiavo-Campo, S., G. de Tommaso, and A. Mukherjee (1997): "An International Statistical Survey of Government Employment and Wages," Policy Research Working Paper Series 1806, The World Bank.

Treisman, D. (2002): "Decentralization and the Quality of Government," Discussion paper, Department of Political Science, University of California, Los Angeles.

——— (2008): "Decentralization Dataset," Discussion paper, Department of Political Science, University of California, Los Angeles.

Weber, M. (1968): *Economy and Society: An Outline of Interpretive Sociology*. New York: Bedminster Press.

A Data

Variable	Description	Year(s)	Source(s)
BOTTIER	Number of bottom tier government units	the 1990th	Treisman (2008)
LNISIC3LP	Log of public administration employment and compulsory social security (in % of population)	1995-2006	Laborsta and UNdata
LNISIC3LLF	Log of public administration employment and compulsory social security (in % of labor force)	1995-2006	Laborsta and UNdata
LNSNA1P	Log of employment in government units (in % of population)	1996-2006	System of National Accounts
LNSNA4P	Log of employment in general government (in % of population)	1996-2006	System of National Accounts
DEMOC	Level of democracy (from 1 to 10)	1995-2006	Polity IV, Jaggers and Marshall (2006)
AUTOC	Level of autocracy (from 1 to 10)	1995-2006	Polity IV, Jaggers and Marshall (2006)
POLITY	Democracy-Autocracy index (from -10 to 10)	1995-2006	Polity IV, Jaggers and Marshall (2006)
CHECKS	Checks and balances (from 1 to 7)	1995-2006	Database of Political Institutions (DPI)
SYSTEM	Political regime (0 - presidential, 1 - assembly-elected president, 2 - parliamentary)	1995-2006	Database of Political Institutions (DPI)
SYSTEM_PRES	Dummy variable for the presidential regime (from 0 to 1)	1995-2006	Database of Political Institutions (DPI)
CORR	Corruption perceptions index(from 0 to 10)	1995-2006	Transparency International (TI)

Variable	Description	Year(s)	Source(s)
XCONST	Executive constraints (Decision rules) (from 1 - unlimited authority to 10 - executive parity)	1995-2006	Polity IV, Jaggers and Marshall (2006)
STABS	The percent of veto players who drop from the government in any given year (from 0 to 2)	1995-2006	Database of Political Institutions (DPI)
TENSYS	Years of regime duration (either democratic or autocratic)	1995-2006	Database of Political Institutions (DPI)
YRSOFFC	Years of the chief executive in office	1995-2006	Database of Political Institutions (DPI)
PRTYIN	Years of the chief executive's party in office	1995-2006	Database of Political Institutions (DPI)
TENLONG	Tenure of a veto player with the longest tenure	1995-2006	Database of Political Institutions (DPI)
TENSHORT	Tenure of a veto player with the shortest tenure	1995-2006	Database of Political Institutions (DPI)
LEGELEC	Dummy variable that equals 1 if there was a legislative election in this year (from 0 to 1)	1995-2006	Database of Political Institutions (DPI)
EXELEC	Dummy variable that equals 1 if there was an executive election in this year (from 0 to 1)	1995-2006	Database of Political Institutions (DPI)
ELECT	Dummy variable that equals 1 if there was an election in this year (either parliamentary or presidential)	1995-2006	IDEA (2008)
POLARIZ	Maximum polarization between the executive party and the four principle parties of the legislature (from 0 to 2)	1995-2006	Database of Political Institutions (DPI)

Variable	Description	Year(s)	Source(s)
LIEC	Legislative Index of Electoral Competitiveness (from 1 to 7)	1995-2006	Database of Political Institutions (DPI)
EIEC	Executive Index of Electoral Competitiveness (from 1 to 7)	1995-2006	Database of Political Institutions (DPI)
COMP_ELEC	Competitive Elections (1 if LIEC=7 and EIEC=7, 0 otherwise)	1995-2006	Database of Political Institutions (DPI)
WAGE	Average government wages to GDP per capita	1992-1994	Schiavo-Campo et al. (1997)
LNGNI	Log of gross national income per capita (at PPP in current international $)	1995-2006	World Development Indicators (WDI)
LNOPEN	Log of trade (in % of GDP)	1995-2006	World Development Indicators (WDI)
LNPOPUL	Log of total population (in thousands)	1995-2006	World Development Indicators (WDI)
LNLABORFORCE	Log of labor force (in thousands)	1995-2006	World Development Indicators (WDI)
LNURBAN	Log of urban population (in % of total population)	1995-2006	World Development Indicators (WDI)
LNAGEDEPEND	Log of age dependency ratio (population <15 and >64 in % of population 15-64)	1995-2006	World Development Indicators (WDI)

B Country Coverage

58 countries for studying the structure of the government bureaucracy by considering the number of bottom tiers:

Albania, Argentina, Australia, Austria, Bangladesh, Benin, Belgium Bolivia, Botswana, Brazil, Bulgaria, Canada, Chile, Colombia, Czech Republic, Denmark, Ecuador, El Salvador, Estonia, Finland, France, Germany, Greece, Honduras, Hungary, India, Ireland, Italy, Japan, Macedonia, Madagascar, Malaysia, Mauritius, Moldova, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Paraguay, Philippines, Poland, Portugal, Russia, South Africa, Slovak Republic, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Turkey, Ukraine, UK, USA, Uruguay, Venezuela, Zambia.

68 countries for studying the level of public administration employment according to the ISIC3[14] *classification:*

Argentina, Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Botswana, Brazil, Bulgaria, Canada, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Ecuador, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hong Kong, Hungary, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, South Korea, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Macau, Macedonia, Malta, Mauritius, Mexico, Micronesia, Moldova, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, San Marino, Senegal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom, United States, Uruguay, Venezuela, West Bank.

30 countries for studying the level of public administration employment according to SNA93[15] *classification:*

Albania, Armenia, Azerbaijan, Bulgaria, Canada, Croatia, Cuba, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, Latvia, Lithuania, Luxembourg, Mexico, Moldova, Netherlands, New Zealand, Poland, San Marino, Senegal, Slovakia, Slovenia, Spain, United States.

[14] International Labor Office database on labor statistics operated by the ILO Department of Statistics. http://laborsta.ilo.org/

[15] "System of National Accounts", Commission of the European Communities, International Monetary Fund, Organization for Economic Cooperation and Development, United Nations, World Bank, Bruxelle/Luxembourg, New York, Paris, Washington, D.C., 1993.

C Bottom Government Units

OLS	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Polity	0.191*	0.188**					
	(0.0985)	(0.0898)					
Executive			0.298				
constraints			(0.197)				
Years of the executive's				-0.0492***	-0.0423**		
party in office				(0.0170)	(0.0206)		
Tenure of an older						-0.0532*	-0.0709**
veto player						(0.0290)	(0.0273)
Log GNI per capita	-0.267	-0.889**	-0.711**	0.0244	-0.503	0.0738	-0.362
	(0.207)	(0.341)	(0.329)	(0.164)	(0.338)	(0.180)	(0.322)
Log population	1.205***	1.281***	1.291***	1.223***	1.257***	1.220***	1.282***
	(0.125)	(0.143)	(0.147)	(0.121)	(0.147)	(0.127)	(0.140)
Log government		-0.592*	-0.611*		-0.279		-0.347
wage		(0.311)	(0.325)		(0.325)		(0.303)
Log urban		-0.105	-0.140		-0.218		-0.546
population		(0.662)	(0.677)		(0.674)		(0.664)
Log trade		0.0382	-0.0891		0.0397		-0.0296
		(0.427)	(0.429)		(0.433)		(0.410)
Log age		-4.108***	-3.947***		-4.258***		-4.297***
dependance		(1.272)	(1.320)		(1.334)		(1.237)
Constant	-3.533*	-0.377	-1.653	-4.327**	-1.485	-4.737**	-1.188
	(1.951)	(3.645)	(3.815)	(1.853)	(3.776)	(2.010)	(3.566)
Observations	58	50	50	57	50	57	50
R-squared	0.654	0.804	0.795	0.680	0.796	0.651	0.814

Table 1: Bottom Government Units

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

D Government Administration Employment

Long Difference (LD) OLS with robust s.e. for SNA93	all countries (1)	all countries (2)	all countries (3)	democratic countries (4)	democratic countries (5)
Dependent Variables	Log Gov Admin Employment	Log Gov Admin Employment	Log Gov Admin Employment	Log Gov Admin Employment	Log General Gov Employment
Politic Account index	-0.056	-0.470***	-0.610**	0.505***	0.412***
	(0.150)	(0.114)	(0.275)	(0.149)	(0.112)
Politic Account index^2			0.805*		
			(0.473)		
Log GNI per capita	0.0531	-0.146	-0.0700	1.222***	1.044***
	(0.198)	(0.151)	(0.200)	(0.302)	(0.228)
Log population	-0.826	-1.698***	-1.256**	1.698**	1.754***
	(0.560)	(0.426)	(0.598)	(0.622)	(0.470)
Log gov expenditures		-0.845***	-0.688**	0.167	0.631*
		(0.208)	(0.296)	(0.391)	(0.296)
Constant	0.102	0.262**	0.174	-0.649***	-0.559***
	(0.139)	(0.105)	(0.141)	(0.179)	(0.135)
Observations	30	30	30	17	17
R-squared	0.132	0.652	0.500	0.713	0.679

Table 2: Long Difference OLS estimation with robust standard errors

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Fixed-effects estimation	(1)	(2)	(3)	(4)	(5)
for SNA93	FE	FE	FE(IV)	FE	FE(IV)
Dependent	Log Gov Admin	Log Gov Admin	Log Gov Admin	Log Gov Admin	Log Gov Admin
Variables	Employment	Employment	Employment	Employment	Employment
Polity	-0.00256	-0.0114**	0.0209*		
	(0.00348)	(0.00466)	(0.0112)		
Polity^2		0.00234***			
		(0.000834)			
Absolute polity				0.00947*	0.0577**
				(0.00664)	(0.0276)
Log GNI per capita	0.220***	0.200***	0.155***	0.199***	0.128**
	(0.0311)	(0.0316)	(0.0446)	(0.0310)	(0.0519)
Log population	-0.943***	-0.946***	-0.944***	-0.945***	-0.952***
	(0.0288)	(0.0284)	(0.0311)	(0.0287)	(0.0316)
Log gov expenditures	-0.201***	-0.216***	-0.135	-0.188***	-0.161**
	(0.0710)	(0.0704)	(0.0822)	(0.0703)	(0.0783)
Constant	3.400***	3.552***	3.652***	3.482***	3.761***
	(0.569)	(0.564)	(0.625)	(0.567)	(0.639)
Observations	301	301	301	301	301
R-squared	0.807	0.812		0.808	
Number of groups	28	28	28	28	28

Table 3: Fixed-Effects Estimation for Government Administration Employment (according to SNA93 classification)

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.15$.

Random-effects estimation	(1)	(2)	(3)	(4)	(5)
for SNA93	RE	RE	RE(IV)	RE	RE(IV)
Dependent	Log Gov Admin	Log Gov Admin	Log Gov Admin	Log Gov Admin	Log Gov Admin
Variables	Employment	Employment	Employment	Employment	Employment
Polity	-0.00241	-0.0110**	0.0204*		
	(0.00407)	(0.00542)	(0.0130)		
Polity^2		0.00227**			
		(0.000970)			
Absolute polity				0.00880	0.0575*
				(0.00774)	(0.0322)
Log GNI per capita	0.248***	0.227***	0.187***	0.228***	0.160***
	(0.0357)	(0.0362)	(0.0514)	(0.0356)	(0.0600)
Log population	-0.864***	-0.870***	-0.856***	-0.867***	-0.861***
	(0.0323)	(0.0318)	(0.0344)	(0.0322)	(0.0350)
Log gov expenditures	-0.167**	-0.185**	-0.102	-0.157*	-0.126
	(0.0822)	(0.0811)	(0.0939)	(0.0811)	(0.0896)
Constant	1.710***	1.956***	1.786**	1.831***	1.859**
	(0.659)	(0.653)	(0.712)	(0.656)	(0.728)
Observations	301	301	301	301	301
Number of groups	28	28	28	28	28

Table 4: Random-Effects Estimation for Government Administration Employment (according to SNA93 classification)

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.15$.

Fixed-effects estimation for ISIC3	all countries (1) FE	all countries (2) FE	all countries (3) FE(IV)	democratic countries (4) FE	all countries (5) FE	all countries (6) FE(IV)	democratic countries (7) FE
Polity	-0.0164***	-0.0188***	0.00973	0.0227***			
	(0.00292)	(0.00396)	(0.0174)	(0.00852)			
Polity^2		0.000510					
		(0.000583)					
Absolute polity					-0.0193***	0.0912	0.0227***
					(0.00488)	(0.157)	(0.00852)
Log GNI per capita	0.281***	0.276***	0.243***	0.239***	0.281***	0.142	0.239***
	(0.0229)	(0.0235)	(0.0346)	(0.0250)	(0.0236)	(0.199)	(0.0250)
Log population	-0.961***	-0.960***	-0.991***	-0.612***	-0.949***	-1.124***	-0.612***
	(0.122)	(0.122)	(0.131)	(0.131)	(0.124)	(0.297)	(0.131)
Log gov expenditures	-0.150***	-0.152***	-0.115**	-0.165***	-0.136***	-0.0914	-0.165***
	(0.0442)	(0.0443)	(0.0523)	(0.0425)	(0.0446)	(0.0866)	(0.0425)
Constant	9.640***	9.658***	10.18***	4.123**	9.440***	12.51**	4.123**
	(1.932)	(1.932)	(2.076)	(2.077)	(1.958)	(5.073)	(2.077)
Observations	725	725	725	647	725	725	647
R-squared	0.229	0.230		0.211	0.211		0.211
Number of groups	61	61	61	57	61	61	57

Table 5: Fixed-Effects Estimation for Government Administration Employment (according to ISIC3 classification)

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

for ISIC 3	(1)	(2)	(3)	(4)	(5)	(6)
	pooled reg	pooled reg	FE	FE	RE	RE
Competitive Elections	0.0829*	-0.0418	0.0943***	0.0352*	0.0916***	0.0560**
	(0.0521)	(0.0388)	(0.0279)	(0.0262)	(0.0274)	(0.0265)
Log GNI per capita		0.314***		0.247***		0.214***
		(0.0168)		(0.0230)		(0.0205)
Log population		-0.0303***		-0.948***		-0.0818***
		(0.00770)		(0.123)		(0.0283)
Log gov expenditures		0.0939**		-0.121***		-0.101**
		(0.0438)		(0.0438)		(0.0434)
year	0.0113**	-0.00676*				
	(0.00489)	(0.00375)				
ident	0.00269***	0.00201***				
	(0.000862)	(0.000689)				
Constant	-26.60***	6.881	-3.957***	9.429***	-3.939***	-4.346***
	(9.785)	(7.454)	(0.0228)	(1.931)	(0.0627)	(0.500)
Observations	807	756	807	756	807	756
R-squared	0.026	0.423	0.015	0.188		
Number of groups			68	64	68	64

Table 6: Competitive Elections and Government Administration Employment (according to ISIC3 classification)

Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.17$.

for SNA 93	(1)	(2)	(3)	(4)	(5)	(6)
	pooled reg	pooled reg	FE	FE	RE	RE
Competitive Elections	0.662***	0.228*	0.169**	0.109***	0.181**	0.108**
	(0.123)	(0.130)	(0.0792)	(0.0389)	(0.0780)	(0.0461)
Log GNI per capita		0.620***		0.174***		0.200***
		(0.0377)		(0.0301)		(0.0350)
Log population		-0.0178		-0.940***		-0.848***
		(0.0207)		(0.0281)		(0.0318)
Log gov expenditures		0.506***		-0.223***		-0.184**
		(0.180)		(0.0679)		(0.0799)
Year	0.00211	-0.0350***				
	(0.0156)	(0.0123)				
Ident	0.00901	-0.00260				
	(0.00655)	(0.00418)				
Constant	-15.24	52.51**	-10.47***	3.652***	-10.46***	1.749***
	(31.13)	(24.70)	(0.0664)	(0.551)	(0.176)	(0.646)
Observations	344	318	344	318	344	318
R-squared	0.083	0.499	0.014	0.807		
Number of groups			32	30	32	30

Table 7: Competitive Elections and Government Administration Employment (according to SNA93 classification)

Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	Log Gov Empl (SNA93) (in % popul)	Log Gov Empl (SNA93) (in % labor force)	Log Gov Empl (ISIC3) (in % popul)	Log Gov Empl (ISIC3) (in % labor force)
	(1)	(2)	(3)	(4)
Established Democ	1.066***	1.004***	0.561***	0.462***
	(0.404)	(0.402)	(0.114)	(0.145)
Elect Date	-0.615***	-0.643***	-0.129	-0.189*
	(0.163)	(0.168)	(0.115)	(0.120)
Establ Democ*Elect Date	0.566***	0.593***	0.0547	0.0886
	(0.169)	(0.173)	(0.117)	(0.122)
Year	-0.00933	-0.0101	0.00742*	0.00163
	(0.0113)	(0.00980)	(0.00491)	(0.00462)
Country	0.000272	0.000137	0.00104	0.000870
	(0.0216)	(0.0211)	(0.00251)	(0.00266)
Constant	7.411	9.704	-19.24*	-6.784
	(22.56)	(19.59)	(9.792)	(9.217)
Observations	344	341	807	792
Number of clusters	30	30	68	66
R-squared	0.157	0.156	0.175	0.147

Table 8: Difference-in-Difference

Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Regressions are clustered by country.

	Log Gov Empl (SNA93) (in % popul)	Log Gov Empl (SNA93) (in % labor force)	Log Gov Empl (ISIC3) (in % popul)	Log Gov Empl (ISIC3) (in % labor force)
	(1)	(2)	(3)	(4)
Established Democ	0.0950	0.0926	0.212*	0.199*
	(0.403)	(0.402)	(0.127)	(0.138)
Elect Date	-0.310**	-0.311**	-0.111*	-0.151**
	(0.140)	(0.134)	(0.0776)	(0.0779)
Establ Democ*Elect Date	0.292*	0.293*	0.0568	0.0951
	(0.160)	(0.154)	(0.0803)	(0.0807)
Log GNI per capita	0.478***	0.479***	0.270***	0.172***
	(0.110)	(0.153)	(0.0673)	(0.0586)
Log population	-0.962***		0.0671	
	(0.266)		(0.203)	
Log labor force		-0.963		-0.278**
		(0.731)		(0.155)
Log gov expenditures	0.688*	0.686*	0.130	0.170
	(0.455)	(0.467)	(0.130)	(0.133)
Log trade	-0.130	-0.131	0.159**	0.169**
	(0.102)	(0.110)	(0.0796)	(0.0794)
Log urban popul	0.887***	0.887	-0.0574	0.277*
	(0.276)	(0.758)	(0.200)	(0.160)
Year	-0.0154	-0.0152	-0.0102*	-0.00927*
	(0.00995)	(0.0119)	(0.00561)	(0.00556)
Country	-0.00168	-0.00162	0.00132	0.00154
	(0.0138)	(0.0139)	(0.00223)	(0.00225)
Constant	16.12	15.79	12.61	12.30
	(19.63)	(23.83)	(10.52)	(10.54)
Observations	318	318	756	756
Number of clusters	30	30	64	64
R-squared	0.580	0.553	0.462	0.387

Table 9: Difference-in-Difference with control variables

Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Regressions are clustered by country.

Arellano-Bond estimation	(1)	(2)	(3)	(4)
Log gov admin employment(-1)	0.612***	0.603***	0.597***	0.605***
	(0.0847)	(0.0824)	(0.0851)	(0.0826)
D.Polity	0.00627*			
	(0.00368)			
D.Polity(instrumented)		0.0141***		
		(0.00519)		
D.Absolute polity			0.0126*	
			(0.00802)	
D.Absolute polity(instrumented)				0.0124***
				(0.00520)
D.Log GNI per capita	0.153**	0.127*	0.149**	0.131*
	(0.0755)	(0.0720)	(0.0750)	(0.0721)
D.Log laborforce	-0.596***	-0.529**	-0.673***	-0.527**
	(0.229)	(0.227)	(0.230)	(0.229)
D.Log gov expenditures	-0.171***	-0.151**	-0.186***	-0.167***
	(0.0656)	(0.0617)	(0.0646)	(0.0613)
D.Log trade	-0.166**	-0.165**	-0.171**	-0.163**
	(0.0685)	(0.0648)	(0.0683)	(0.0649)
Constant	0.00140	0.00131	0.00228	0.00144
	(0.00532)	(0.00513)	(0.00523)	(0.00515)
Observations	245	258	245	258
Number of groups	28	30	28	30
Sargan test P-value	0.3499	0.3381	0.3088	0.3004

Table 10: Dynamic panel estimation

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

for ISIC3	all countries (1) FE	all countries (2) RE	democratic (≥ 7) countries (3) FE	democratic (≥ 7) countries (4) RE
Checks	-0.000145***	-0.000137***	0.0144**	0.0186***
	(4.98e-05)	(5.16e-05)	(0.00558)	(0.00567)
Log GNI per capita	0.267***	0.234***	0.308***	0.256***
	(0.0232)	(0.0208)	(0.0255)	(0.0223)
Log population	-0.984***	-0.0780***	-0.916***	-0.0767***
	(0.125)	(0.0294)	(0.137)	(0.0293)
Log gov expenditures	-0.115**	-0.0858*	-0.108**	-0.0933**
	(0.0448)	(0.0445)	(0.0456)	(0.0452)
Constant	9.876***	-4.591***	8.372***	-4.843***
	(1.967)	(0.519)	(2.139)	(0.527)
Observations	732	732	608	608
R-squared	0.199		0.232	
Number of groups	62	62	56	56

Table 11: Checks and balances

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

for ISIC3	all countries (1) FE	all countries (2) RE	democratic (≥ 7) countries (3) FE	democratic (≥ 7) countries (4) RE
Checks	0.0155	0.0187*	0.0452***	0.0511***
	(0.0105)	(0.0109)	(0.0110)	(0.0111)
Polarization	0.0104	0.0101	0.0586**	0.0648***
	(0.0244)	(0.0254)	(0.0241)	(0.0245)
Checks*polarization	-0.00644	-0.00638	-0.0198***	-0.0216***
	(0.00616)	(0.00640)	(0.00613)	(0.00622)
Log GNI per capita	0.278***	0.214***	0.266***	0.212***
	(0.0287)	(0.0239)	(0.0298)	(0.0242)
Log population	-1.086***	-0.0793***	-0.769***	-0.0742**
	(0.136)	(0.0305)	(0.143)	(0.0307)
Log gov expenditures	-0.185***	-0.102*	-0.144***	-0.104**
	(0.0543)	(0.0536)	(0.0538)	(0.0525)
Constant	11.64***	-4.374***	6.419***	-4.520***
	(2.119)	(0.541)	(2.212)	(0.552)
Observations	631	631	542	542
R-squared	0.182		0.200	
Number of groups	61	61	54	54

Table 12: Polarization and government administration employment according to ISIC3 classification (fixed and random-effects estimation)

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Dependent Variables	Log Gov Admin Employment	Log Gov Admin Employment	Log General Gov Employment	Log General Gov Employment
for SNA93	(1)	(2)	(3)	(4)
	FE	RE	FE	RE
Checks	0.0365**	0.0353*	0.0830***	0.0772**
	(0.0157)	(0.0185)	(0.0289)	(0.0341)
Polarization	0.103**	0.100**	0.236***	0.217**
	(0.0398)	(0.0471)	(0.0733)	(0.0869)
Checks*polarization	-0.0302***	-0.0286**	-0.0637***	-0.0568**
	(0.0102)	(0.0121)	(0.0189)	(0.0223)
Log GNI per capita	0.259***	0.292***	0.0916	0.182**
	(0.0356)	(0.0410)	(0.0655)	(0.0714)
Log population	-0.953***	-0.886***	-0.943***	-0.720***
	(0.0268)	(0.0306)	(0.0493)	(0.0524)
Log gov expenditures	-0.160**	-0.138	-0.591***	-0.527***
	(0.0723)	(0.0847)	(0.133)	(0.153)
Constant	3.097***	1.460**	6.206***	1.397
	(0.555)	(0.650)	(1.023)	(1.088)
Observations	267	267	267	267
R-squared	0.850		0.639	
Number of groups	28	28	28	28

Table 13: Polarization and government employment according to SNA93 classification (fixed and random-effects estimation)

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

for SNA93	all countries	all countries	democratic (≥ 9) countries	democratic (≥ 9) countries
Gov Administration	(1)	(2)	(3)	(4)
Employment	FE	RE	FE	RE
Years of regime duration	0.0112**	0.0140***	-0.0168***	-0.00792*
(democracy or autocracy)	(0.00468)	(0.00453)	(0.00495)	(0.00515)
Log GNI per capita	0.0517	0.0363	0.665***	0.503***
	(0.0735)	(0.0738)	(0.0968)	(0.102)
Log population	-0.960***	-0.891***	-0.944***	-0.929***
	(0.0293)	(0.0326)	(0.0169)	(0.0200)
Log gov expenditures	-0.210***	-0.185**	0.295**	0.221*
	(0.0700)	(0.0800)	(0.115)	(0.134)
Constant	4.859***	3.666***	-1.352	-0.381
	(0.821)	(0.883)	(1.022)	(1.125)
Observations	301	301	210	210
R-squared	0.810		0.950	
Number of groups	28	28	22	22

Table 14: Regime duration and government administration employment according to SNA93 classification (fixed and random-effects estimation)

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

for SNA93	all countries	all countries	democratic (≥ 9) countries	democratic (≥ 9) countries
General Government	(1)	(2)	(3)	(4)
Employment	FE	RE	FE	RE
Years of regime duration	0.0242***	0.0184***	-0.000705	0.00634
(democracy or autocracy)	(0.00785)	(0.00612)	(0.00547)	(0.00572)
Log GNI per capita	-0.289**	-0.144	0.197*	0.0641
	(0.123)	(0.106)	(0.107)	(0.115)
Log population	-0.971***	-0.747***	-0.940***	-0.905***
	(0.0492)	(0.0519)	(0.0187)	(0.0235)
Log gov expenditures	-0.589***	-0.507***	0.143	0.0509
	(0.118)	(0.134)	(0.127)	(0.157)
Constant	9.460***	4.419***	3.476***	3.999***
	(1.377)	(1.333)	(1.129)	(1.271)
Observations	301	301	210	210
R-squared	0.612		0.936	
Number of groups	28	28	22	22

Table 15: Regime duration and general government employment according to SNA93 classification (fixed and random-effects estimation)

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Gov Administration	(1)	(2)	(3)	(4)	(5)	(6)
Employment	SNA93	SNA93	SNA93	ISIC3	ISIC3	ISIC3
	pooled reg	FE	RE	pooled reg	FE	RE
Dummy for system	0.161*	0.347***	0.346***	0.150***	-0.105	0.111*
(0 if pres, and 1 if parl)	(0.0937)	(0.0503)	(0.0581)	(0.0330)	(0.0920)	(0.0663)
Log GNI per capita	0.592***	0.174***	0.197***	0.240***	0.258***	0.221***
	(0.0537)	(0.0279)	(0.0320)	(0.0204)	(0.0228)	(0.0207)
Log population	-0.00633	-0.930***	-0.863***	-0.0145*	-0.997***	-0.0714**
	(0.0219)	(0.0266)	(0.0300)	(0.00841)	(0.126)	(0.0296)
Log gov expenditures	0.574***	-0.282***	-0.254***	0.139***	-0.124***	-0.101**
	(0.203)	(0.0662)	(0.0765)	(0.0477)	(0.0448)	(0.0446)
Year	-0.0306**			-0.00271		
	(0.0124)			(0.00377)		
Ident	-0.00175			0.00182**		
	(0.00414)			(0.000727)		
Constant	43.64*	3.618***	2.205***	-1.024	10.25***	-4.597***
	(24.88)	(0.524)	(0.613)	(7.489)	(1.993)	(0.520)
Observations	301	301	301	737	737	737
R-squared	0.499	0.835		0.429	0.193	
Number of groups		28	28		62	62

Table 16: Government forms and government administration employment

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

FE estimation for ISIC3	all countries	democ(≥ 9) countries	all countries	democ(≥ 9) countries	all countries	democ(≥ 9) countries
	(1)	(2)	(3)	(4)	(5)	(6)
Years of the chief executive in office	0.00337***	0.00592***				
	(0.00121)	(0.00163)				
Years of the chief executive's party in office			0.000170***	0.000134***		
			(2.78e-05)	(4.09e-05)		
Tenure of a veto player with the longest tenure					0.00109	0.00366**
					(0.00121)	(0.00145)
Tenure of a veto player with the shortest tenure					0.00670***	0.00108
					(0.00223)	(0.00233)
Log GNI per capita	0.254***	0.303***	0.271***	0.320***	0.259***	0.305***
	(0.0228)	(0.0307)	(0.0224)	(0.0311)	(0.0233)	(0.0312)
Log population	-0.901***	-1.009***	-0.986***	-1.052***	-0.936***	-1.033***
	(0.126)	(0.176)	(0.121)	(0.178)	(0.124)	(0.179)
Log gov expenditures	-0.135***	-0.0790	-0.0958**	-0.0102	-0.115***	-0.0435
	(0.0447)	(0.0849)	(0.0439)	(0.0841)	(0.0444)	(0.0864)
Constant	8.682***	9.724***	9.830***	10.08***	9.160***	9.987***
	(1.985)	(2.641)	(1.908)	(2.661)	(1.942)	(2.687)
Observations	737	446	736	446	711	445
R-squared	0.201	0.223	0.234	0.219	0.217	0.214
Number of groups	62	43	62	43	62	43

Table 17: Tenure of veto players and government administration employment according to ISIC3 classification (fixed-effects estimation)

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

FE estimation for SNA93	all countries	democ (≥ 9) countries	all countries	democ (≥ 9) countries	all countries	democ (≥ 9) countries
	(1)	(2)	(3)	(4)	(5)	(6)
Years of the chief executive in office	0.00400*	0.00366**				
	(0.00215)	(0.00164)				
Years of the chief executive's party in office			4.33e-05*	-1.27e-05		
			(3.09e-05)	(3.95e-05)		
Tenure of a veto player with the longest tenure					0.00573***	0.00647***
					(0.00218)	(0.00166)
Tenure of a veto player with the shortest tenure					-0.00530*	-0.00496*
					(0.00364)	(0.00304)
Log GNI per capita	0.213***	0.344***	0.217***	0.347***	0.224***	0.356***
	(0.0294)	(0.0259)	(0.0296)	(0.0264)	(0.0300)	(0.0259)
Log population	-0.949***	-0.963***	-0.944***	-0.957***	-0.944***	-0.961***
	(0.0288)	(0.0170)	(0.0287)	(0.0170)	(0.0288)	(0.0168)
Log gov expenditures	-0.200***	0.112	-0.199***	0.121	-0.157**	0.166
	(0.0701)	(0.105)	(0.0703)	(0.106)	(0.0721)	(0.105)
Constant	3.522***	1.922***	3.412***	1.771***	3.213***	1.599***
	(0.567)	(0.462)	(0.566)	(0.463)	(0.581)	(0.468)
Observations	301	210	301	210	299	209
R-squared	0.809	0.948	0.808	0.947	0.811	0.951
Number of groups	28	22	28	22	28	22

Table 18: Tenure of veto players and government administration employment according to SNA93 classification (fixed-effects estimation)

Standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.15$.