Abstract

In a country with weak institutional constraints on the executive, the real power might belong to the government bureaucracy rather than to an autocratic leader. We combine the Aghion-Tirole definition of formal and real authority and Barro-Ferejohn model of political agency to study the relationship between accountability of elected officials and the extent to which their subordinate bureaucrats have real decision-making power. Normatively, we show that the lower is the level of political accountability; the lower should be the level of real authority at the bottom of the government hierarchy. Positively, we find that in lower political accountability countries the political powers have less authority over the public administration. On the contrary, higher accountability countries have bigger governments in terms of administration employment. Our cross-country study supports these conclusions.

JEL: D72, D73, D83, H00

Key words: Political accountability, bureaucracy, real authority, decision-making, government employment
1 Introduction

In any political regime real authority over policy decisions resides in hands of the political elite. Even in mature democracies, relatively few decisions are made directly by the public; typically the decision-making power is delegated to political representatives. In an institutionalized autocracy, it might be a more narrow body, e.g., a ruling party, that have not only real, but also formal authority over most policy decisions. However, in any regime the political bodies carry out a policy through the multi-tiered government hierarchy. The crucial issue is whether the political bodies have the effective control over policy decisions that are implemented by appointed bureaucrats.

This paper studies the scope of the real decision-making power with which politicians endow their bureaucratic subordinates. Aghion and Tirole (1997) recognize that formal authority to take a decision does not always imply real authority “that is an effective control over decisions”. The authors note that “the president of a country really controls only a small number of the decisions made by the executive branch”. Similarly, “shareholders have limited control over their board of directors, which itself may be subject to the domination of the top executives, who in turn often rubber-stamp the divisions’ projects, and so forth”. A principal who has formal authority over decisions or activity can override her subordinate’s proposal, but very often under a comparative uniformity of their goals a poorly informed principal refrains from doing so. Hence, a principal places real authority over decisions at the disposal of an agent. If formal authority resides as a rule at the top of any hierarchy (Baker, Gibbons and Murphy, 1999), actually real authority does not necessarily pertain to the top. Max Weber (1968, p. 217-225) mentions that “officials, employees and workers attached to the administration staff of a bureaucracy do not themselves own the nonhuman means of production and administration, yet they may exert substantial control over the bureaucratic machinery”. We consider this phenomenon of real authority in the political agency and argue that politicians are more tempted to rubber-stamp the decisions of their appointed bureaucrats if they care more for rent seeking. As a result, under low political accountability real decision authority is expanded downward along the government hierarchy.

Acting on behalf of their constituency politicians have not only formal authority over policy decisions but also a range of administrative instruments to extract rents for benefiting themselves. We argue that benevolence of a ruler, or on the contrary, the level of extracted rents, strongly affects the structure of the government bureaucracy and the nature of agency problems within it.

In reality a policymaker may be more interested in rent seeking than in policy efficiency thus distorting incentives of his bureaucrats. When politicians are concerned more with rent seeking bureaucrats get greater discretion that they use to enrich themselves. Moreover, they have a strong incentive to increase this discretion because this often results in greater chances for them to participate in policy decision-making. Otherwise, politicians care more for economic efficiency of policy outcomes, therefore, they control bureaucrats more thoroughly and thus reduce their possibilities to extract rents. In this case, bureaucrats find favorable for themselves to expand their formal administrative charges because it puts more administrative resources and barriers of influence at their disposal. The study of formal and real authority within the government hierarchy undertaken in this paper arises from this basic insight.

We consider the government hierarchy composed of a politician accountable to citizens through elections and the two-tier bureaucratic structure\(^1\). The politician is elected to conduct a policy, which provides for citizens a certain level of public welfare. Politicians are disciplined by their future election prospects in a retrospective-voting model (e.g. Persson and Tabellini, 2000). The two-tier bureaucracy helps the politician to take policy decisions by acquiring information about different policy outcomes (e.g., Egorov, Guriev, and Sonin, 2008). The policy

\(^1\)We include only two levels of bureaucrats in our model but such a scheme can be easily extended to the multi-tiered government bureaucracy.
course is shaped by implementing approved projects on each level of bureaucracy. Besides improving re-election prospects by successfully implementing policy projects, the politician may benefit by extracting rents; e.g., a non-benevolent policy-maker may prefer not to make effort on implementing policy projects but extract the maximum possible rents. The decision rights mainly are not contractible; elected officials may rubber-stamp their appointed bureaucratic subordinates’ decisions and proposals without effective control.

Our modelling approach inherits the main building blocks of Barro-Ferejohn political accountability model (Barro, 1973, Ferejohn, 1986) and the Aghion-Tirole authority model (Aghion and Tirole, 1997). We extend Aghion-Tirole’s analysis by considering the three-level hierarchy of both strictly vertical and flat structure\(^2\). In doing this, we keep to the positive approach and neglect the case of the agent’s formal authority: here the span of formal authority is fixed for each tier of the hierarchy. We combine this authority model with the Barro-Ferejohn accountability model by allowing the politician to choose between rent-seeking and costly efforts to provide a good policy. We use the model of retrospective voting for demonstrating how the level of rents extracted by a policy-maker affects on incentives of bureaucratic agents to acquire information and implement government projects.

Our analysis suggests two main patterns of the disposal of authority and incentives of bureaucrats. First, we argue that the more a politician pursues rent seeking behavior, i.e. the lower is the level of political accountability in a country; the more often the bureaucrats-superiors rubber-stamp propositions of their bureaucrats-subordinates and thus the more real authority is expanded downward along the hierarchy. As a result of rent seeking behavior of policymakers, the bureaucrats dispose of more real authority and actually affect more decisions that are being formally made by politicians. Normatively, we observe that in low accountability countries the level of real authority at the bottom of the government hierarchy should be low. Second, we demonstrate that in countries with high political accountability one can observe more often the process of bureaucratization. Indeed, under high accountability the government bureaucracy tends to enlarge because it gets optimal for the higher-level bureaucrat to expand his formal authority and be in greater overload.

Hence, we reveal two important features of the government bureaucracy subject to the level of the policymaker’s benevolence. Firstly, under lower accountability the government bureaucrats are more likely to participate in policy decisions in comparison with higher political accountability regimes. Secondly, in higher accountability regimes, the government bureaucracies are bigger than in lower accountability regimes in terms of government administration employment. The cross-country data on institutional development in democratic countries from the World Bank and French Ministry of the Economy, Finances, and Employment (MINEFE)\(^3\) allows to corroborate our theoretical predictions. It appears that in low accountability countries the bureaucratic machinery is likely to be smaller and less controlled by the political powers.

The paper proceeds as follows. Section 2 describes political agency problems and contains a literature review. Section 3 presents the model. Section 4 contains the results of the cross-country study and produce empirical evidence for different accountability – bureaucratization political regimes. Section 5 concludes.

2 Related Literature

The conflict of interests between politicians and bureaucrats is a classic topic in political economy. One of the main problems distinguished by many scholars is information asymmetry between them which gives bureaucrats the possibility to manipulate political outcomes. To inform themselves about costs and benefits from different alternative policies politicians rely on

\(^2\)Within the flat hierarchy a higher-level bureaucrat hires several agents, so that each of them is charged with its own range of projects.

\(^3\)The dataset “Institutional profiles” is presented on the site of the Center of perspective studies and international information http://www.cepis.fr/anglaisgraph/bdl/institutions.htm
bureaucrats as experts. This cause at least two effects. On the one hand, policymakers aim to buy loyalty of bureaucrats by doing them a favor (e.g. Gregory and Lazarev, 2003). On the other hand, rulers prefer loyal rather than capable viziers (Egorov and Sonin, 2006).

The bureaucratic power in the political decision-making process has been broadly discussed in the literature, especially in a variety of case studies. Johnson (1982) describes the case of Japan and mentions the great role of bureaucrats in policymaking. Whereas Pempel (1984) argues that this country has developed an effective balance between the extremes of total bureaucratic control and total political control. In the case of the United States, Hugh Heclo (1984) argues that the balance has not yet been found. In France it has also been recognized that top-level bureaucrats affects policy decisions considerably. Suleiman (1972) describes the relationship between the French higher civil servants and the French politicians as a complex ritual structured dance.

There are different treatments of the information asymmetry problem in the political agency literature. One of the interesting approaches belongs to Boadway and Sato (2006) who consider a model of bureaucratic advice to compare the efficacy of centralized versus decentralized modes of governance. As the authors argue politicians may find it useful to decentralize the bureaucracy so that different dimensions of the project or policy are examined by different bureaucrats and policy advice comes from more than one source. Unlike in this model where bureaucrats provide advice while the politician retains decision-making power, there are a lot of models of delegation of authority. For example, Li and Suen (2004) focus on the benefit of delegating decision-making on a given project to an expert in nonmarket organizations. They consider delegation as a result of similar preferences of decision-makers and experts. Alesina and Tabellini (2007, 2008) in their most related study argue that the allocation of tasks between politicians and bureaucrats depends on their different motivation (reelection versus career concerns) originating from different accountability mechanisms.

Our second result about greater bureaucratization refers to the issue of the scope and size of government and it is consistent with earlier empirical evidence in this field. In particular, Persson and Tabellini (1999) examined government spending under presidential and parliamentary regimes and Lassen (2000) considered the link between political accountability and the size of government measuring by the level of tax revenue. They show that “as presidential regimes empirically are associated with less political accountability voters have less control on politicians, leading to smaller governments” (Lassen 2000, p. 5), specifically, smaller government spending and tax revenue. We focus on the government administration employment in countries with low and high accountability so our conclusion does not contradict to their findings and fills in the gap in the comparative analysis of regime types: less accountability is associated not only with smaller government spending and smaller tax revenue, but also with smaller government employment. Acemoglu and Verdier (2000) 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”. They come to 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.

Our conclusions are consistent with the result of Enikilopov (2006) who 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. We suggest that the lower is political accountability, the more influential are appointed officials and the smaller is the size of government bureaucracy. Hence, we confirm his result.

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4 These essays are a part of the book edited by Ezra Suleiman (1984) that contains several essays studying the degree of influence that civil servants exert on the political process in the United States, Italy, Japan, France, Britain, Germany, Norway, and Chile.
in the sense that in countries with the powerful bureaucracy, where appointed officials play a larger role in decision-making, the level of the government employment is lower. 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.

A particular body of the literature related to the size of government bureaucracy and the level of political accountability concerns the effects from decentralization within government. For example, the study of Gurgur and Shah (2000) suggests that decentralization supports greater accountability in the public sector and reduced corruption. Treisman (2000) finds that countries with smaller first-tier jurisdictions tend to be perceived as more corrupt.

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 employment in government administration 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. So for countries of Eastern Europe and Former USSR one may observe the negative relationship between the size of the bureaucracy and economic growth.

Summing up, political agency and phenomena of empowerment and delegation have been extensively studied in both organizational and information economics literature. These issues also constitute a growing research subfield in political economy, although it rarely considers power over decisions of politicians and bureaucrats through the prism of both political and organizational economy. Furthermore, there is a scarce literature focusing on the internal multi-tier structure of the government bureaucracy controlling for agency problems expanded along the hierarchy of appointed bureaucrats. For example, Dixit (2006, 2008) mentions that “the need to operate through intermediate layer or layers of administration creates the usual agency problems for the rulers” (2006, p. 4) but “most models of democracy as well as dictatorship, by ignoring this aspect, implicitly assume that the policy chosen at the top level will be implemented efficiently by a Weberian bureaucracy” (2008, p. 2). We extend this view to encompass the constraints with which the top-level decision-makers confront at the stage of policy implementation because we take into account the complex internal structure of the government bureaucracy.

3 Model

This section presents a simple model of the two-layer government hierarchy. The sequent assumptions of the strict vertical and flat hierarchical tiers allow to demonstrate the two important incentive patterns of top bureaucrats subject to accountability regimes; in particular, the expansion of rubber-stamping phenomenon downward along the hierarchy as well as the expansion of formal span of control. The model allows to formulate the testable predictions concerning these two issues.

3.1 General set up

Let an elected politician (she) (e.g. president, mayor) appoint a higher-level bureaucrat (he) (e.g. premier, deputy mayor) for collecting information about and implementing the policy project. A higher-level bureaucrat appoints a lower-level bureaucrat, (e.g. minister, headquarter) for executing the project of the lower order that can be connected or not with the upper project. The upper project is set to be of type \( r \) and the lower-level project is of type \( f \). In the sequel,
we consider the case of independent projects $r$ and $f$ because bureaucrats at each level perceive them in such a way.\footnote{The case of nesting projects can be easily studied. What is important is that it yields the same general conclusions. At the same time, we do not present here its results in view of the complex algebra. Nevertheless, they can be sent at your request.}

**Hierarchy.** The politician is a principal for the higher-level bureaucrat who is an agent for the politician but a principal for the frontline bureaucrat. The latter is simply an agent. We first consider the case of vertical hierarchy with one frontline bureaucrat and then we examine the case of flat hierarchy with $m$ frontline bureaucrats where each of bureaucrats is charged with its own range of projects. We proceed from incomplete contract theory and assume that projects cannot be described and contracted ex ante. We suppose that the politician has formal authority to choose the project of type $r$ and the higher-level bureaucrat has formal authority to take a decision over the project of type $f$.

**Projects.** Suppose that at each level $j = r, f$ agents (higher-level and frontline bureaucrats) screen among $n_j \geq 3$ identical projects on behalf of the principals (politician and higher-level bureaucrat). Each project $\lambda_j \in 1, ..., n_j$ is associated with a verifiable monetary gain or profit $B_{\lambda_j}$ for the principal of the corresponding level, and a private benefit $b_{\lambda_j}$ for the agent of this level (e.g. perquisites on the job or valuable experience). If no project is implemented, the benefits of both the principal and agent come to zero.

At least one project from the range produces a negative payoff. This implies that an uninformed agent may prefer inaction rather than to recommend a specific project. As well an uninformed principal would not choose to undertake a project.

Suppose that among all the projects at each level there is the principal’s preferred project, which if it is chosen, yields the benefit $B_j > 0$ for the principal, $j = r, f$. This principal’s preferred project brings the corresponding agent the expected benefit of $\beta_j b_j$ (the expectation refers to the ex ante uninformed situation in which all projects look alike). Similarly, at each level there is the agent’s preferred project, which if it is chosen, yields for the agent the private gain of $b_j > 0$ and the principal, in this case, receives the expected benefit of $\alpha_j B_j$. This implies that $\alpha_j, \beta_j \in (0, 1]$ are congruence parameters. Thus we assume that the preferred projects yield positive payoffs not only for this party but also for the other party. All these gains and benefits are a common knowledge.

**Information.** Suppose that the nature of projects $r$ and $f$ is unknown to both the principals and agents. The agents among private cost $g_k(e_j), k = HB, FB, j = r, f$ perfectly learn the payoffs of all candidate projects with probability $e_j$. With probability $1 - e_j$ the agents learn nothing and still look at the projects as identical.

Similarly, the principals choose how much time or effort to expend for learning payoffs. At private cost $g_k(E_j), k = P, HB$, the principals become perfectly informed about the payoffs with probability $E_j$ and learn nothing with probability $1 - E_j$. We focus on the simultaneous case of acquiring information by principals and agents\footnote{The sequential model of acquiring information yields essentially the similar result. “Sequential investigations usually are less time-consuming for the principal, who can already build on an existing report. On the other hand, the principal may not want to wait until the report accrues to start her investigation, since otherwise she may be forced to accept the agent’s proposal by lack of time” (Aghion and Tirole 1997, p. 7).}.

The function $g_k(\cdot)$ is increasing and strictly convex and satisfy $g_k(0) = 0, g_k'(0) = 0, g_k'(1) = \infty$, where $k = P, HB, FB$.

In the model we assume that information is soft, that is it cannot be verified by the other party. The communication is thus interpreted as a pure suggestion to choose a specific project. Furthermore, it is realistic to assume that the bureaucrat who is principal over one type of projects ($f$), and is agent over the other type ($r$), is limited in his physical capabilities to acquire information in both directions, so that $e_r + E_f \leq 1$. Indeed, any employee in a hierarchical structure has to allocate his time between the upper and lower tiers’ charges.

**Authority.** The formal authority gives the right to the politician over projects of type $r$ and to the higher-level bureaucrat over projects of type $f$ to overrule the agents, i.e. the higher-
level and frontline bureaucrats, respectively. The principal at each level overrides the agent’s suggestion if she is informed and the agent’s recommendation is not “congruent”. In this case the principal has both the formal and real authority over the choice of project. Otherwise, she rubber-stamps the agent’s proposal since $\alpha_j > 0$. And then the agent has real authority.

Accountability.

Along with the gain from the upper project of type $r$, the politician benefits from extracting rents ($\rho$). In addition, if she is reelected, she receives a value from holding office in the next period ($\delta R$), where $\delta$ is the discount factor. Thus we assume that citizens can control the politician through elections. The voters coordinate on the same retrospective voting strategy $\overline{w}$, punishing the incumbent for bad behavior and rewarding him for good behavior by reelection.

There is a continuum of identical voters of mass 1, where each produces the same income $y$. They finance the government through proportional income taxes $\tau$. Thus, the voters receive the income available after taxes and some benefits from the state’s activity, $H(e_r + E_r, e_f + E_f)$. We assume that the interests of politician and bureaucrats are congruent in some way with those of citizens. Although the function $H(e_r + E_r, e_f + E_f)$ is not specified, it is known that any effort on project implementation of the politician or/and bureaucrats leads to some positive policy outcomes for citizens, although it is not the maximum possible policy outcome.

We suppose that the incumbent and the challenger have identical preferences, so that citizens are indifferent between the incumbent and challenger. But 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 voters. This proposition is strict because we require the full homogeneity of voters but $\overline{w}$ can be interpreted like a certain “focal” threshold that is the most expected from the incumbent.

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

Preferences. The politician and higher-level bureaucrat are risk-neutral in projects $r$ and $f$, respectively. The agents are protected by limited liability, and they receive not only the benefits from projects $r$ and $f$, but also the wages $w_j$, $j = r, f$.

Thus the politician’s utility is composed of the extracted rents $\rho$, value from holding office $\delta R$ in the case of reelection, and the payoff from the chosen project of type $r$ less the wage paid to the higher-level bureaucrat $w_r$: $\rho + p_f \delta R + B_{\lambda_j} - w_r$. The higher-level bureaucrat’s utility is then $u(w_r) + b_{\lambda_j} + B_{\lambda_j} - w_f$, if at each level the project $\lambda_j$, $j = r, f$, is approved. The frontline bureaucrat’s utility is $u(w_f) + b_{\lambda_j}$, where $u(\cdot)$ is increasing and concave.

We do not focus on the impact of government wages, so we can assume without loss of generality that the higher-level and frontline bureaucrats as agents are infinitely averse to income risk in projects $r$ and $f$, respectively, so that they receive a constant wage equal to their reservation wage of zero.

Timing. We consider the two-period game. In the first period voters announce a level of reservation utility $\overline{w}$, and then a politician defines the sum of rents extracted and benefits from the implemented project $r$. Then bureaucrats define the levels of their effort. The politician and bureaucrats communicate to each other about the structure of projects’ payoffs, and the controlling party at each level $r$ and $f$ finally chooses the project. In the end of the first period elections are held. In the second period, if the incumbent wins, she receives an exogenous payoff $R$ from holding office that is discounted to the factor $\delta$.

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7. $R$ is taken as the exogenous future payoff from holding office. By following the strategy of Persson, Roland and Tabellini (1997) we relax this proposition by endogenizing $R$ as the expected present value of rents $\rho$ and benefits from $r$ projects in future periods. The results of this case can be sent at your request.

8. The political accountability model is based on Persson and Tabellini (2000), Chapter 4.
3.2 Real authority under high and low accountability

We consider the strict vertical hierarchy as depicted in Figure 1 to examine the real authority expansion. The citizens vote for the only politician who appoints the bureaucrats for implementing government projects. There are two-levels of bureaucrats and the higher-level bureaucrat is an agent over projects of type “r” for the politician and a principal over projects of type “f” for the frontline bureaucrat.

![Figure 1: Vertical Hierarchy](image)

The politician’s utility is composed of rents ($\rho$), a value of holding office in the next period ($\delta R$) and benefits from implementing the project of type $r$:

$$u_P = \rho + p_I \delta R + E_r B_r + (1 - E_r)e_r \alpha_r B_r. \quad (1)$$

The politician’s efforts are financed through proportional income taxes $\tau$. The government’s budget constraint is the following

$$\tau y = g_P(E_r) + \rho. \quad (2)$$

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 $\bar{w}$:

$$p_I = \begin{cases} 1, & \text{if } W(g(E_r), \rho) \geq \bar{w}; \\ 0, & \text{otherwise.} \end{cases}$$

As mentioned before, we define identical citizens’ preferences as the sum of income available after taxes and benefits from the adopted projects within government. Then using the budget constraint (2) it can be written as:

$$W(g_P(E_r), \rho) = (1 - \tau)y + H(e_r + E_r, e_f + E_f) = y - g_P(E_r) - \rho + H(e_r + E_r, e_f + E_f). \quad (3)$$

The voting strategy of the constituency creates a trade-off for the politician between rents and benefits from reelection. Thus the politician has two alternatives. One is to please the voters to win reelection. Then taking into account (2) and (3), we get the optimally chosen rents extracted by her as:

$$\bar{\rho} = y - g_P(E_r) - \bar{w} + H(e_r + E_r, e_f + E_f). \quad (4)$$

We call this case by the high accountability regime.
The other alternative of the politician is not to please voters. The best policy in this case of low accountability is to extract rents fully in the first period and forget about reelection, i.e. to follow the Leviathan-like policy, that is
\[ \rho = y, \quad \tau = 1, \quad E_r = 0 \quad \text{and} \quad g_P(E_r) = 0. \] (5)

**Proposition 1.** In the high accountability regime a politician extracts rents at the level
\[ \rho^* = \max \{ 0, y - \delta R - E_r B_r (1 - e_r \alpha_r) \}. \]

Proof. The politician chooses to satisfy the voters if her utility under high accountability is no less than the utility under low accountability:
\[ \rho + \delta R + E_r B_r + (1 - E_r) e_r \alpha_r B_r \geq y + e_r \alpha_r B_r, \] (6)
\[ \rho \geq y - \delta R - E_r B_r (1 - e_r \alpha_r). \] (7)

Given this politician’s strategy, it will be optimal for voters to announce the maximal possible level of the reservation utility and the rents to be as small as possible that is in equilibrium
\[ \rho^* = \max \{ 0, y - \delta R - E_r B_r (1 - e_r \alpha_r) \}. \quad \text{q.e.d.} \]

To define completely the equilibrium let us consider the strategies of bureaucrats. The higher-level bureaucrat is an agent over projects of type \( r \) and principal over projects of type \( f \). We assume that he is limited in his physical capabilities to acquire information in both directions, i.e. \( e_r + E_f \leq 1 \). The frontline bureaucrat is simply an agent in implementing the project of type \( f \). The higher-level and frontline bureaucrats’ utilities can be written as
\[ u_{HB} = E_r \beta_r b_r + (1 - E_r) e_r b_r - g_{HB}(e_r) + E_f B_f + (1 - E_f) e_f \alpha_f B_f - g_{HB}(E_f), \] (8)
\[ u_{FB} = E_f \beta_f b_f + (1 - E_f) e_f b_f - g_{FB}(e_f), \] (9)
s.t. \( e_r + E_f \leq 1 \) is the physical constraint of the higher-level bureaucrat.

The second component in (8) \((1 - E_r)e_r b_r\) describes real authority of the higher-level bureaucrat over the choice of the \( r \) project whereas the fifth component \((1 - E_f)e_f \alpha_f B_f\) indicates his action of rubber-stamping of the frontline bureaucrat’s proposal of the \( f \) project.

The reaction curves of the politician and both bureaucrats under two accountability regimes will be following:
under high accountability:
\[ (1 - \alpha_r e_r) B_r = g'_P(E_r), \] (10)
\[ g'_{HB}(e_r) - g'_{HB}(E_f) = (1 - E_r) b_r - B_f (1 - \alpha_f e_f), \] (11)
\[ (1 - E_f) b_f = g'_{FB}(e_f). \] (12)

under low accountability\(^{10}\):
\[ \rho = y, \quad \tau = 1, \quad E_r = 0 \quad \text{and} \quad g_P(E_r) = 0, \]
\[ g'_{HB}(e_r) - g'_{HB}(E_f) = b_r - B_f (1 - \alpha_f e_f), \] (13)
\[ (1 - E_f) b_f = g'_{FB}(e_f). \] (14)

\(^{10}\)Under low accountability when the politician extracts the higher rents the system of equations (10)-(12) similarly holds until \( E_r \to 0 \) is very small. Nevertheless, since there is no need for the politician to care for reelection, we assume that it is optimally for her not to make effort for projects at all, so that \( E_r = 0 \).
The equations (11) and (13) show that the higher-level bureaucrat increases effort \( e_r \) and care for projects over which he has real authority more than for projects over which he has formal authority, if his benefit from implementing the project of type \( r \) is higher, the politician’s effort is lower, the benefit from implementing the project of type \( f \) is lower and the effort of the frontline bureaucrat is higher as well as the higher is the congruent parameter \( \alpha_f \).

We assume that two systems of equations (10)-(12) and (13)-(14) have unique stable intersections \((E_r, e_r)\) and \((E_f, e_f)\). Taking into account the properties of the function \( g_k(\cdot) \), that \( g_k(\cdot) \geq 0, g_k''(\cdot) > 0 \), where \( k = P, HB, FB \), one can formulate the second proposition.

Proposition 2. The higher is the level of rents and the lower is the politician’s effort on the project activity, the higher is the higher-bureaucrat’s initiative on projects of type \( r \) and the lower is his initiative on projects of type \( f \).

Proof. Using equation (10) and \( e_r + E_f \leq 1 \), we obtain

\[
\frac{\partial e_r}{\partial E_r} < 0, \quad \frac{\partial E_f}{\partial E_r} > 0, \quad \text{and so} \quad \frac{\partial (e_r - E_f)}{\partial E_r} < 0. \quad \text{q.e.d.} \tag{15}
\]

We get the first result that for the higher-level bureaucrat the difference between efforts for screening projects of type \( r \) and \( f \) is greater under low accountability than under high accountability regime. Thus, in low accountability government the higher-level bureaucrat cares more for projects over which he has real authority \((r)\) and is tempted more to rubber-stamp the projects over which he has formal authority \((f)\). Indeed, if the politician pursues only rent-seeking, this increases the higher-level bureaucrat’s initiative in implementing projects of type \( r \) resulting in crowding out his effort in acquiring information about the lower-level projects over which he has formal authority \((f)\).

Generalizing this result we get that for any middle link within the hierarchy (in our case the higher-level bureaucrat) the increase of efforts of the higher-level actor reduces the initiative of the lower-level actor. This result is based on Aghion and Tirole’s conclusion that the agent demonstrates more initiative, the lower is the principal’s interference. The downward sloping of the agent’s reaction curve contrary to the upward sloping of the standard monitoring model is crucial for this result\(^{11}\).

Within the multilevel government hierarchy, if the highest-level actor places full discretion to the next-level actor (politician who extracts rents fully), she places him (higher-level bureaucrat) real authority over decisions and thus reinforces his initiative. Then the next-level actor increases efforts for projects over which he has real authority and decreases efforts for projects over which he has formal authority. This produces the same incentive trade-off for the next-level actor and so on. Thus the lower is the level of accountability, the more real authority is expanded downward along the hierarchy.

Taking into account the reaction curves, we can define the level of equilibrium rents \( \rho^* \). The politician chooses the high accountability regime, if

\[
\rho \geq y - \delta R - E_r B_r (1 - e_r, \alpha_r) = y - \delta R - E_r g_P(E_r). \tag{16}
\]

The voters prefer that rents will be as small as possible. Given this politician’s strategy, the voters’ best choice is to set the reservation utility so as to satisfy (16) with equality. The equilibrium rents will be equal to \( \rho^* = \max[0, y - \delta R - E_r g_P(E_r)] \). Thus, the rents are extracted to a lower extent, the less is the income \( y \), the more is the value from holding office \( R \), the more is the value of future benefits \( \delta \), and the more is the cost for supervision \( E_r g_P \). From the reaction curve of the politician (10), we see that the rents are higher, the lower is her benefit from implementing the project \( B_r \), the more is the effort on this project of the higher-level bureaucrat \( e_r \), and the more is the congruent parameter \( \alpha_r \).

Let us verify that under high accountability giving up \( \rho^* \) leaves enough revenue for the optimal policy activities:

\[
\rho < y - g_P(E_r),
\]

\(^{11}\) For details see Aghion and Tirole (1997), p. 10-11.
\[ y - \delta R - E_r g_P(E_r) \leq y - g_P(E_r), \]

\[ g_P(E_r) - E_r g'_P(E_r) \leq \delta R. \]  \hspace{1cm} (17)

It holds always because \( \delta R > 0 \) and \( g_P(E_r) - E_r g'_P(E_r) \leq 0 \). The latter is always less or equal to zero under initially defined properties of the function \( g_k(\cdot) \), that \( g'_k(\cdot) \geq 0 \), \( g''_k(\cdot) > 0 \), \( g_k(0) = 0 \), \( g'_k(1) = \infty \), where \( k = P, HB, FB \).

### 3.3 Overload by formal authority under high and low accountability

Regulation in large organizations is too bureaucratized and the headquarters are responsible for too many units. This leads to deterioration of regulation strategies and control loss (Aghion and Tirole 1997, p. 19). Furthermore it has been recognized that for government agencies this is a more crucial problem than for the private organizations because they function in the specific environment of the soft budget constraint and the absence of the market’s pressure. Governments have the multiprincipal and multitasking nature (Tirole, 1994; Besley and Ghatak, 2003; Dixit, 2002; Burgess and Ratto, 2003). In this subsection we consider the potential for bureaucratization in governments in high and low accountability regimes.

Suppose that a higher-level bureaucrat appoints \( m \) identical agents for \( m \) sets of projects. Each frontline bureaucrat \( i \) screens in a set of tasks of type \( f_i \) as described earlier and learns the payoff structure with probability \( e_{fi} \). The higher-level bureaucrat’s disutility of efforts is \( g_{HB}(\sum_i E_{fi}) \) and \( E_{fi} \) is the higher-level bureaucrat’s probability of learning the payoff structure of subordinate \( i \) ’s activity. We assume that the frontline bureaucrats’ tasks are independent. There is a fixed cost \( f \) per frontline bureaucrat.

\[ u_{HB} = E_r \beta_r b_r + (1 - E_r)e_r b_r - g_{HB}(e_r) + \sum_i [E_{fi} B_{fi} + (1 - E_{fi})e_{fi} B_{fi} - f] - g_{HB}(\sum_i E_{fi}), \]

\[ u_{FB} = E_{fi} \beta_f b_f + (1 - E_{fi})e_{fi} b_f - g_{FB}(e_{fi}) \hspace{1cm} \forall i, \]  \hspace{1cm} (18)

subject to the physical constraint of the higher-level bureaucrat, \( E_r + \sum_i E_{fi} \leq 1 \).
Each frontline bureaucrat’s reaction curve is still given by:

\[(1 - E_r) b_r = g_{FB}(e_r) \quad \forall i.\]

We assume that the equilibrium is symmetric and stable. In a similar manner to the previous section the equilibrium equations under high and low accountability can be written as:

under high accountability:

\[g'_P(E_r) = (1 - \alpha_r e_r) B_r, \tag{20}\]

\[g'_{HB}(e_r) - \frac{g'_{HB}(mE_f)}{m} = (1 - E_r) b_r - \frac{B_f (1 - \alpha_f e_f)}{m}, \tag{21}\]

\[g'_{FB}(e_f) = (1 - E_f) b_f. \tag{22}\]

under low accountability:

\[\rho = y, \quad \tau = 1, \quad E_r = 0 \quad \text{and so} \quad g_P(E_r) = 0,\]

\[g'_{HB}(e_r) - \frac{g'_{HB}(mE_f)}{m} = b_r - \frac{B_f (1 - \alpha_f e_f)}{m}, \tag{23}\]

\[g'_{FB}(e_f) = (1 - E_f) b_f. \tag{24}\]

Similarly to the case of the single frontline bureaucrat, using equation (21) and \(e_r + mE_f \leq 1\), we obtain

\[\frac{\partial e_r}{\partial E_r} < 0, \quad \frac{\partial (mE_f)}{\partial E_r} > 0, \quad \text{and so} \quad \frac{\partial (e_r - mE_f)}{\partial E_r} < 0. \tag{25}\]

Our first result that the higher-level bureaucrat has more real authority in low accountability government holds as the difference between efforts for screening projects of type \(r \) and \( f \) is greater, the higher effort the politician make. It means that in the high accountability regime the higher-level bureaucrat exerts effort on projects of type \( f \) over which he has formal authority in a greater extent than in the low accountability regime. This follows from that under high accountability the politician discourages the higher-level bureaucrat to devote more efforts for screening projects of type \( r \) by overruling his recommendations.

**Proposition 3.** Under high accountability for the higher-level bureaucrat it is optimal to expand formal authority rather than real authority.

**Proof.** Suppose that \( \{E_r^h, e_r^h, E_f^h(m), e_f^h(m)\} \) is the solution to the system of equations (20-22), and \( \{E_r^l, e_r^l, E_f^l(m), e_f^l(m)\} \) is the solution of (23-24). Then the utilities of the higher-level bureaucrat under high and low accountability will be

\[u_{HB}^h = E_r^h \beta_r b_r + (1 - E_r^h) b_r e_r^h - g_{HB}(e_r^h) + mR_f(E_f^h(m), e_f^h(m)) - g_{HB}(mE_f^h(m)), \tag{26}\]

\[u_{HB}^l = b_r e_r^l - g_{HB}(e_r^l) + mR_f(E_f^l(m), e_f^l(m)) - g_{HB}(mE_f^l(m)), \tag{27}\]

where \( R_f(E_f^\psi(m), e_f^\psi(m)) = E_f^\psi(m)B_f + [1 - E_f^\psi(m)]e_f^\psi(m)\alpha_f B_f - f \) is the revenue per frontline bureaucrat. We also know that the higher-level bureaucrat is constrained in his capabilities and under full charge we have \( e_r^h + mE_f^h = 1, \) where \( \psi = h, l \) signifies the high or low accountability regime. Since \( e_r^\psi \leq 1 - mE_f^\psi, \) it follows that

\[u_{HB}^h = E_r^h \beta_r b_r + (1 - E_r^h) b_r (1 - mE_f^h(m)) - g_{HB}(1 - mE_f^h(m)) + mR_f(E_f^h(m), e_f^h(m)) - g_{HB}(mE_f^h(m)), \tag{28}\]
\[ u^{l}_{HB} = b_r(1 - mE^l_f(m)) - g_{HB}(1 - mE^l_f(m)) + 
+ m R_f(E^l_f(m), e^l_f(m)) - g_{HB}(mE^l_f(m)). \] (29)

After the envelope theorem is used and \( m \) is treated as a real number, one can obtain the optimal span of control from

\[
\frac{du^{l}_{HB}}{dm} = (1 - E^l_r) b_r(-E^l_f(m)) + E^l_f(m) g^l_{HB}(1 - mE^l_f(m)) + [R_f(E^l_f(m), e^l_f(m)) - 
-E^l_f(m) g^l_{HB}(mE^l_f(m))] + m \frac{\partial R_f}{\partial e^l_f} \frac{\partial e^l_f}{\partial m} = 0 
\] (30)

\[
\frac{du^l_{HB}}{dm} = b_r(-E^l_f(m)) + E^l_f(m) g^l_{HB}(1 - mE^l_f(m)) + [R_f(E^l_f(m), e^l_f(m)) - 
-E^l_f(m) g^l_{HB}(mE^l_f(m))] + m \frac{\partial R_f}{\partial e^l_f} \frac{\partial e^l_f}{\partial m} = 0 
\] (31)

Rearranging, we get

\[
[R_f(E^l_f(m), e^l_f(m)) - E^l_f(m) g^l_{HB}(mE^l_f(m))] + E^l_f(m)[-b_r(1 - E^l_r) + 
+ g^l_{HB}(1 - mE^l_f(m))] + m \frac{\partial R_f}{\partial e^l_f} \frac{\partial e^l_f}{\partial m} = 0 
\] (32)

\[
[R_f(E^l_f(m), e^l_f(m)) - E^l_f(m) g^l_{HB}(mE^l_f(m))] + E^l_f(m)[-b_r + g^l_{HB}(1 - mE^l_f(m))] + 
+ m \frac{\partial R_f}{\partial e^l_f} \frac{\partial e^l_f}{\partial m} = 0 
\] (33)

The expression in first square brackets in (32) and (33) is a marginal profit from projects of type \( f \) associated with a unit increase in the span of control. An extra frontline bureaucrat brings revenue \( R_f \) but requires attention \( E^l_f \), which increases the cost of supervision by \( E^l_f g^l_{HB} \). The second components of (32) and (33) indicate that hiring an extra frontline bureaucrat decreases the cost of the effort for screening projects of type \( r \) and bereaves the upper project’s benefit. Aghion and Tirole call the second term in \( \frac{\partial R_f}{\partial e^l_f} \frac{\partial e^l_f}{\partial m} > 0 \) by the “initiative effect” that measures the increase in the frontline bureaucrat’s effort associated with a reduction in oversight. Note (32) differs from (33) by \( E^l_r b_r E^l_r(m) \) that signifies the decrease of the higher-level bureaucrat’s initiative because the politician can override his decision over the project of type \( r \).

Following Aghion and Tirole we define that a higher-level bureaucrat is in overload if the marginal utility of an extra employee from projects of type \( f \), i.e. the expression in first square brackets, with employee behavior held constant, is negative.

Equations (32) and (33) show that it is always optimal for the higher-level bureaucrat to be in overload. Equation (33) differs from (32) by \( E^l_r b_r E^l_r(m) \). This demonstrates that the marginal utility of an extra frontline bureaucrat is more negative in high accountability government. q.e.d.

Under high accountability the politician can override the higher-level bureaucrat’s decision what reduces real authority of the higher-level bureaucrat and creates an incentive for him to exert more effort for his formal responsibilities. This leads to the conclusion that the higher-level bureaucrat has an incentive to expand his formal authority and to be in greater overload in the high accountability regime.
4 Evidence

We focus on two main predictions from our model. First, in low accountability countries appointed bureaucrats are more influencing, the political powers have less control over the bureaucracy, and the more real authority expands downward along the government hierarchy. Second, lower political accountability is associated with the smaller size of the bureaucracy in terms of lower government administration employment in a country. This is connected, all else equal, with the larger control of appointed bureaucrats in policy decisions so that in such countries bureaucrats climb to real power rather than expand their span of formal authority. Hence, the process of bureaucratization is likely to develop in higher political accountability regimes where appointed bureaucrats are limited in benefiting themselves from real authority.

In this section we present some empirical evidence verifying our predictions from the model. We confront our two predictions with cross-country data and present a general corroboration of the derived patterns of accountability - bureaucratization regimes.

We conduct the empirical analysis of these two predictions separately mainly because of data availability. First, we analyze the authority of the political powers over the government administration among democracies. Second, we look at the cross-country association between the level of political accountability and government administration employment.

Measuring political accountability

Political accountability includes a lot of aspects and measuring it as electoral contestability is difficult. We use the data of two types to present political accountability in two different perspectives. First, to allow for the multilateral nature of political accountability we use the composite index of “political accountability and voice” constructed by Kaufmann et al. (2006, 2008) that 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). This measure is normalized so that it changes from -2.5 to 2.5, has a mean of zero and a standard deviation of one. The index embraces such components closest to our analysis and indicating the level of politicians’ concernment in public interests as Democratic Accountability (Political Risk Service), Political Rights and Civil Liberties (Freedom House), Voice to Business to express concerns about policies (World Development Research).

Second, the different measures of corruption could show the level of political accountability. In light of this we use the data on “corruption” from Transparency International and the data on “control of corruption” from Kaufmann et al.’s dataset on indicators of governance to see whether our results with using the accountability and voice index are robust. To focus on democracies we select countries with a degree of democracy no less than 4 according to Jaggers and Marshall’s (2000) Polity score.

Control variables and instruments

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 population heterogeneity we include the data on ethnical fractionalization (Easterly and Levine, 1997; La Porta, 1999). We also use the distance from the equator to allow for colonization effects (Hall and Jones, 1999). Following Lassen (2000) we argue that ethnical fractionalization and latitude could be comparatively good instruments for political accountability which could be used to avoid the endogeneity problem. On the one hand, as Rauch and Evans (1999, 2000) state ethnic diversity generates “more competition for government-created rents, leading to greater corruption and poorer bureaucratic performance generally”. In particular government patronage may be organized along ethnic lines, then ethnic diversity may promote corruption. Furthermore political interaction is more difficult in more fractionalized countries. On the other hand, Hall and Jones (1999) demonstrated that Western Europe colonization and influence were correlated with the distance from the equator. At the same time there seems to be no reason why these variables would influence the size of government.

On the basis of Polity dataset we take into consideration the level of democracy which points to higher political accountability. In the model of the size of government 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).

Authority of Politicians over the Government Administration

For measuring real authority of bureaucrats we use the variable of authority of the political powers over the administration from the “Institutional Profiles” dataset assembled by the French Ministry of Finance in 2006. The data combines the results of experts’ assessments and surveys of a representative population about the institutional situation in different segments. The assessments are ordered to form ranked qualitative variables which are integers from 1 to 4. Thus, the measure of politicians’ authority over bureaucrats represents a qualitative rating that changes from 1=low levels of authority to 4=high levels of authority.

Appendix B contains the data description statistics, country coverage and our results. The analysis is conducted on the basis of ordinary least squares estimation and ordered probit model in view of the categorical nature of the dependent variable. We use accountability and voice index for 2006. Also, we include the log of the gross national income per capita for 2006 to take into account the effect of country richness and economic development. Table 2 contains the results of these models. $R^2$ and the likelihood characteristics indicate the good fitness of models.

According to OLS estimation political accountability has a coefficient of 0.7099 which is significant at the 0.1% level and explains about 30% of the variation of authority of the political powers over administration. Including the log of gross national income per capita lowers the estimate to 0.3268 as well as its significance to 12%. The income is strongly significant at the 1% level. This confirms our prediction that the higher political accountability, the higher authority of politicians over administrations, i.e. the more they control their bureaucratic agents.

The results of ordered probit estimation are reported in the same table. They support our first conclusion only for the forth rank: the higher accountability regime provides higher authority of the political powers over government administration. It is interesting to note that for the first three ranks the relationship is negative. Thus, our prediction holds only in countries with relatively higher accountability. It can be explained by that our predictions are true only for countries with relatively high level of democracy. Including the income level reduces marginal effects and their significance but does not change the main results. Note that the log of the income has the same relationship sign as the political accountability index.

To ensure that our results are robust, we apply different model specifications by using the

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All variables and their sources are listed in Appendix A.
other measures of accountability regimes. Instead the political accountability index of Kaufmann et al. we consider the control of corruption index of Kaufmann et al. and the level of corruption from Transparency International. We do not present these results in detail because they are very similar to those based on the accountability and voice index. They support that corruption is higher (i.e. accountability is lower) in countries where politicians have less control over the government administration. The control of corruption and TI corruption indices are less significant in comparison with the accountability index. Whereas in models without the income level they are significant at 0.1%, in models including the log of the income per capita their significance is only at 32% and 36% levels. Nevertheless, these model modifications let us to confirm the positive association between politicians’ control of bureaucrats and accountability level.

Government administration employment

For measuring government administration employment and wage we took the data from the paper of Schiavo-Campo, de Tommaso and Mukherjee (1997) on government labor and wage. They extract these data through statistical yearbooks, yearly budget documents, personnel ministries or agencies, inquiries to embassy personnel. Government administration “includes executive and legislative administration by departments directly dependent on the Head of State or the Parliament, together with all other ministries and administrative departments. Consequently, government administration in their definition is general government less teaching and health personnel” (p. 47). The armed force is considered separately, so that the data we use concerns only the civilian government employment. We consider separately the central government employment which is by definition of Schiavo-Campo et al. a part of government administration which includes all employees paid by the central government budget.

From those countries for which the data on government administration employment is available, we select 50 countries that have a degree of democracy no less than 4 according to Jaggers and Marshall’s (2000) Polity score.

Appendix C contains the data description statistics and country coverage. Figure 3, 5, 6 plots different measures of political accountability against government administration employment for our sample of democratic countries. The data represents the positive association between political accountability and bureaucratization: the government administration is bigger in higher accountability countries.

We find that the simple correlations between total government administration and the accountability and voice index, the control of corruption index and the transparency international corruption index are 0.6722, 0.6745, 0.6428, respectively. Central government employment is less correlated with these measures of accountability, 0.4601, 0.4129, 0.5013. Nevertheless, below we present the result on both total and central government employment.

In this model of the size of bureaucracy the simple method of ordinary least squares could give inconsistent estimates because of the endogeneity problem. Indeed, the causal mechanism derived from our model is from accountability to the size of government. However, there could be a feed-back effect when the enlarging bureaucracies increase their influence on the economy and “a demand for greater electoral control could arise” (Lassen, 2000, p. 14). It becomes more difficult for the constituency to control public officials. Moreover, the greater span of government influence could give more possibilities for bureaucrats to use administrative resources in pursuing private interests. To take into account this feedback effect from the size of government to accountability we present the results of not only ordinary least squares but also two-stage least squares estimation.

Tables 4 and 5 contain our regression results. In the simple ordinary least squares (OLS) case without the log of income per capita political accountability is significant at the 1% level, and coefficient equal to 0.6764. Political accountability explains 40% of the variation in total government employment in the model without income. Only a weak increase of the estimate to 0.4817 is observed in the model with income. It is interesting to note that the income variable
is not significant and its inclusion does not substantially improve the OLS model.

The two-stage least squares (TSLS) estimation yields the coefficient of 0.6782 which is significant at the 1% level. The inclusion of the log of income per capita increases the coefficient of accountability to 1.009 but reduces the level of its significance to 7%. The sign of the log of income is negative but it is not significant. The coefficient of political accountability is the largest in the TSLS case with income. These results support our prediction that the higher political accountability, the higher level of total government employment.

We report two characteristics of TSLS estimation. First, F-test statistics of the first stage regression is normally larger than 10 if the instruments are considered as not “weak”. In our TSLS model without income this characteristic equals to 17.94, consequently, the instruments can be counted as sufficiently strong for the TSLS estimates to be reliable. Second, the hypothesis of “no overidentification” is usually tested for TSLS models. It should be examined for no overidentification because the number of instruments (ETHNIC, LATITUDE) is greater than the number of endogenous variables (POLAC). We list the “p-value” of this statistics to demonstrate that the null hypothesis of no overidentification cannot be rejected.

Figure 4 plots central rather than total government employment against political accountability. As in our model we consider larger government bureaucracies with the elected official at the top, it is interesting to compare the results on total government employment with those on central government employment. Table 4 presents these estimates on the right hand side. OLS and TSLS outcomes confirm the positive association between political accountability and central government employment, showing a small drop in significance of estimates. Nevertheless, the qualitative results are unchanged.

Table 5 presents the results of OLS and TSLS estimations with a full set of control variables. Even after their inclusion, a positive relationship between accountability and government employment is evident. The coefficients of the political accountability index are almost all statistically significant and positive. They are greater after TSLS estimation but less significant than after OLS estimation. Just as before central government employment regressions yield less significant estimates of political accountability (they are significant at 21% and 22% levels).

Our empirical results also support the conclusions of Rodrik (1998) and Lassen (2000) that more open economies have larger governments. Furthermore this relationship is much more stronger if we consider the size of central government. These models demonstrate the significance of coefficients on openness at 18% and 16% levels. The log of population size is negative. Thus in spite of its insignificance we confirm the finding of Alesina nd Wacziarg (1998) of the effect of economies of scale. This effect is also corroborated by the negative and strongly significant coefficient on urbanization. All model specifications reveal the effect of larger governments in countries with smaller fraction of urban population. The demographic structure of countries is not so significant but demonstrate the positive relationship: the greater number of older and younger people in an economy is associated with larger government. The log of average government wages enters negatively and significant more in total government employment cases. Its estimates are greater by value in TSLS estimation.

We test our results on robustness by two ways. First, we use the other measures of accountability regimes as in the case of authority of the political powers over government administration. The qualitative results remain the same. This model modification just decreases the significance of accountability measures but supports the positive relationship between them and the size of government.

Second, following Lassen (2000) we try to take into account the ambiguous triple relationship between accountability, the level of income and the size of government. In particular, at first because of the multicollinearity, we exclude separately the log of income per capita and the accountability index from our models. Excluding income does not change the sign of all variables but strengthens the significance of the political accountability coefficient. Excluding

\[ \text{The partial correlations between income and the size of government equals to 0.55 and income and the level of political accountability is 0.8.} \]
political accountability makes the coefficient on income significant at the 1% level, although it was insignificant in specifications with political accountability.

Then, we allow for the feedback influence of the size of government on the economic growth by considering the log of income per capita as an endogenous variable, instrumented in the same way as the political accountability index. In models with total government employment the political accountability index is positive and significant at the 1% and 5% levels while the coefficient on income is insignificant. In models with central government employment as a dependent variable both accountability and income are insignificant.

Thus, after the robustness analysis we corroborate that higher accountability countries have larger governments in terms of administration employment. Further, it is true for the size of central government although the central government estimates are less significant.

5 Concluding Remarks

We discuss political agency problems with a focus on the real authority expansion within the government hierarchy under high or low political accountability. We argue that in low accountability countries bureaucrats have more real authority over policy decisions being formally made by politicians as the latter care more for reelection and rents and not for meeting true public needs. Since in low accountability countries elected politicians are more engaged in rent seeking, they are more likely to rubber-stamp the decisions and proposals of their bureaucratic subordinates. It increases their initiative and discretion. As a result, at the next level of the hierarchy the bureaucrats would devote more time and effort for upper projects over which they have real authority rather than to those over which they have formal authority. This effect is passed from level to level within government bureaucracy so that real authority is expanded downward along the hierarchy. Second, our paper demonstrates that in countries with higher accountability the bureaucratic machinery is likely to enlarge because it is optimal for the higher-level bureaucrat to be in greater overload. The politician’s possibility to overrule the proposal of the bureaucrat under higher accountability decreases his initiative so that the latter is tempted to expand his formal authority horizontally rather than vertically.

Our empirical results support these claims and corroborates that the higher government administration employment is mainly observed in high political accountability countries. The paper drives to better understanding of existing regime types in the light of studies of political scientists. We extend the results of Persson and Tabellini (1999) and Lassen (2000) that less accountability leads to the more powerful bureaucracy but the smaller size of government in the terms of not only spending and tax revenue but also government employment.

Discussing our empirical results two points are worth to be raised. First, we should take into account the imperfection of the data we use especially those concerning measuring institutions like politicians’ authority over bureaucrats and political accountability and voice. We understand their imperfect conformity with our model ideas and that there may be measurement errors. Nevertheless, in the absence of any other data in this fields we believe they are comparatively good proxies. Second, it should be remembered that our empirical results can be explained by the alternative mechanisms rather than politicians’ and bureaucrats’ rent-seeking behavior. For example, Brousseau et al. (2008) argue 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.

Our results lead to two interesting implications for policy makers. In higher accountability regimes if rulers are interested in reducing excessive government employment they should slacken control over bureaucrats to increase their initiative and participation level. In other words, they should let bureaucrats to extract some rent from their activity. On the contrary, in lower accountability regimes rulers should control their bureaucratic agents more thoroughly if they want to hold their position. Otherwise, politicians might be kicked out from the office or bureaucrats might become so powerful that politicians prove to be their puppets.
Another important issue refers to possible further research. That is the type of political regime which should be take into account to deepen our finding. Persson and Tabellini (1999) demonstrate that the size of government is lower under presidential regime, which empirically proves to be less accountable than parliamentary regime. However, theoretically the presidential regime is characterized by less rents for politicians. This is so, because one of the main features of presidential regimes is the separation of decision-making power among different elected officials that allows voters to limit the agency problem, but in practice such a formal system of checks and balances can be undermined. Nevertheless, this regime implies lower taxes and a smaller size of government. Compared to presidential regimes, parliamentary regimes have less competition among the voters and are associated with larger governments. Thus, it is quite possible that the incentives of bureaucrats to expand their formal or real authority are really shaped by constraints imposed by the political regime and the existing form of government in a country. Future work should emphasize the system of checks and balances and different constraints on the executive to take decisions and extract rents.

Furthermore, as Persson and Tabellini (2000) argue political accountability should be lower in dictatorships than in democracies. It is another interesting question concerning different political regimes. It is recognized that authoritarian leaders employ repressions to remain in power and elections actually do not discipline political elites. In light of our predictions we should stress a normative point and a positive one. First, autocratic leaders should exercise more effective control the lower is their accountability, as the bureaucrats at each level of the government hierarchy in such countries are more tempted to rubber-stamp most policy decisions. Then a surprising phenomenon can be observed when a dictator indifferent to the public welfare unknowingly loses his authority. This can be one of explanations why all rulers fear so much to be overthrown (Egorov and Sonin, 2006). Second, we predict that influencing but smaller government bureaucracies are more peculiar to low accountability countries. However, patronage and vote buying activities reside in authoritarian regimes, so that the excessive government employment might become the way of preserving the power (e.g. Senegal, Acemoglu et al., 2007). Thus, the future analysis of the size of government should take into consideration whether a country is an autocracy or democracy. We implicitly controlled for this by using a sample of countries with the degree of democracy no less than 4 according to the Jaggers and Marshall’s database of political institutions. However, the detailed regard could allow to better understand the nature of expanding governments.
References


### A Data

Because of data availability we use two samples of democratic countries different in year. The data on government administration employment and population is taken from Schiavo-Campo et al. (1997) for 1992-1994. However the first year of Accountability and Voice index calculation is 1996. Thus we use the data on this index for 1996. All figures are for 1994 - 1996. All control variables are for 1994. Models of authority of government bureaucracies are constructed on the data for 2006.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Year(s)</th>
<th>Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLAC</td>
<td>Voice and Accountability index (from -2.5 to 2.5)</td>
<td>1996, 2006</td>
<td>Kauffman et al. (2008)</td>
</tr>
<tr>
<td>CONTROLCORR</td>
<td>Control of corruption index (from -2.5 to 2.5)</td>
<td>1996, 2006</td>
<td>Kauffman et al. (2008)</td>
</tr>
<tr>
<td>CORR</td>
<td>Corruption perceptions index (from 0 to 10)</td>
<td>1996, 2006</td>
<td>Transparency International (TI)</td>
</tr>
<tr>
<td>A5102</td>
<td>Authority of the political powers over the administration (from 1 to 4)</td>
<td>2006</td>
<td>“Institutional Profiles” database, Ministry of Finance in France</td>
</tr>
<tr>
<td>LNGNI</td>
<td>Log of gross national income per capita (at PPP in current international $)</td>
<td>1994, 2006</td>
<td>World Development Indicators (WDI)</td>
</tr>
<tr>
<td>DEMOC</td>
<td>Level of democracy (from 1 to 10)</td>
<td>1994, 2006</td>
<td>Polity IV, Jaggers and Marshall’s (2000)</td>
</tr>
<tr>
<td>ETHNIC</td>
<td>Ethnical fractionalization (from 0 to 1)</td>
<td>1994, 2006</td>
<td>La Porta et al. (1999)</td>
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<tr>
<td>LATITUDE</td>
<td>Distance from the equator (from 0 to 1)</td>
<td>1994, 2006</td>
<td>Hall and Jones (1999)</td>
</tr>
<tr>
<td>OPEN</td>
<td>Trade (in % of GDP)</td>
<td>1994, 2006</td>
<td>World Development Indicators (WDI)</td>
</tr>
<tr>
<td>URBAN</td>
<td>Urban population (in % of total population)</td>
<td>1994, 2006</td>
<td>World Development Indicators (WDI)</td>
</tr>
<tr>
<td>AGEDEPEND</td>
<td>Age dependency ratio (population 15 and 64 in % of population 15-64)</td>
<td>1994, 2006</td>
<td>World Development Indicators (WDI)</td>
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</tbody>
</table>
**B Authority of politicians over the government administration**

**Democratic country coverage (50):**

Argentina, Benin, Bangladesh, Bulgaria, Bolivia, Brazil, Botswana, Canada, Chile, Colombia, Czech Republic, Germany, Dominican Republic, Spain, Estonia, France, United Kingdom, Greece, Guatemala, Hong Kong, Hungary, India, Ireland, Israel, Italy, Japan, South Korea, Sri Lanka, Lithuania, Madagascar, Mexico, Mali, Mozambique, Mauritius, Malaysia, Niger, Norway, New Zealand, Philippines, Poland, Portugal, Romania, Russia, Sweden, Taiwan, Turkey, Ukraine, United States of America, Venezuela, South Africa.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N.Obs.</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
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<tbody>
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<td>1</td>
<td>4</td>
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<tr>
<td>POLAC</td>
<td>50</td>
<td>.5484</td>
<td>.6490695</td>
<td>-.97</td>
<td>1.54</td>
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<tr>
<td>LNGNI</td>
<td>49</td>
<td>9.249021</td>
<td>1.175178</td>
<td>6.44572</td>
<td>10.82118</td>
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<tr>
<td>DEMOC</td>
<td>49</td>
<td>8.510204</td>
<td>1.569533</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

*Without Taiwan*

Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N.Obs.</th>
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<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
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<tbody>
<tr>
<td>A5102</td>
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<td>10.82118</td>
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<tr>
<td>DEMOC</td>
<td>49</td>
<td>8.510204</td>
<td>1.569533</td>
<td>4</td>
<td>10</td>
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Table 2: Regression Results for Authority of Politicians over Administration

<table>
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<tr>
<th>Variable</th>
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<th>OPROBIT</th>
<th>OLS</th>
<th>OPROBIT</th>
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</thead>
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<tr>
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<td>.7099***</td>
<td>1.1352***</td>
<td>.3268†</td>
<td>.6201†</td>
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<tr>
<td>LNGNI</td>
<td>.3094**</td>
<td>.4729**</td>
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<tr>
<td>cut1</td>
<td>-1.3159</td>
<td>2.5683</td>
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<tr>
<td>cut2</td>
<td>-.41528</td>
<td>3.6083</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cut3</td>
<td>1.2096</td>
<td>5.3458</td>
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<tr>
<td>Pr(y=1)</td>
<td>.0263</td>
<td>.0160</td>
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<tr>
<td>ME POLAC</td>
<td>-.0692†</td>
<td>-.0248</td>
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<tr>
<td>Pr(y=2)</td>
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<td>.1188</td>
<td></td>
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<tr>
<td>ME POLAC</td>
<td>-.1951**</td>
<td>-.1096†</td>
<td></td>
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<tr>
<td>Pr(y=3)</td>
<td>.5717</td>
<td>.6019</td>
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<tr>
<td>ME POLAC</td>
<td>-.1169</td>
<td>-.0679</td>
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<tr>
<td>Pr(y=4)</td>
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<tr>
<td>ME POLAC</td>
<td>.3812***</td>
<td>.2024†</td>
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</tbody>
</table>

| \( R^2 \) | 0.2988 | 0.3943 |
| Adj. \( R^2 \) | 0.2842 | 0.3680 |
| LRI | 0.1508 | 0.2011 |
| Log likelihood | -49.2946 | -45.7826 |
OLS regressions include a constant. Robust standard errors are in parentheses. ***, **, * and † denote significance at the 0.1%, 1%, 5% and 12% levels, respectively. For the ordered probit estimation we present marginal effects only for POLAC. LRI is the likelihood ratio index, which represent ratios of maximum likelihoods for each model estimated with and without the explanatory variable sets. This index indicates overall model fit. It is known as McFadden’s $R^2$ or Pseudo $R^2$.

C Government administration employment

Democratic country coverage

For models including central government employment $N = 50$:

Albania, Argentina, Australia, Austria, Bangladesh, Belgium, Bolivia, Botswana, Bulgaria, Canada, Chile, Colombia, Denmark, Ecuador, Finland, France, Germany, Greece, Honduras, Hungary, India, Ireland, Italy, Japan, South Korea, Lebanon, Madagascar, Malaysia, Mauritius, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Paraguay, Philippines, Poland, Portugal, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Turkey, UK, USA, Uruguay, Venezuela, Zambia.

For models including central government employment with control variables $N = 45$:

As for models including central government employment missing Japan, Madagascar, Paraguay.

For models including total government employment $N = 46$:

As for models including central government employment missing Bangladesh, Madagascar, Nicaragua, Paraguay.

For models including total government employment with control variables $N = 43$:

As for models including total government employment missing Japan, Poland, Switzerland.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N.Obs.</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
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</thead>
<tbody>
<tr>
<td>LNTOTGOVEMP</td>
<td>52</td>
<td>.7786067</td>
<td>.7506002</td>
<td>-.6931472</td>
<td>2.292535</td>
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<tr>
<td>LNCGOVEMP</td>
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<td>.0644466</td>
<td>.832376</td>
<td>-2.302585</td>
<td>1.410987</td>
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<tr>
<td>POLAC</td>
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<td>-.717</td>
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<tr>
<td>LNGNI</td>
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<td>8.773263</td>
<td>1.05762</td>
<td>6.429719</td>
<td>10.26221</td>
</tr>
<tr>
<td>LNPOPUL</td>
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<td>11.38106</td>
<td>3.109305</td>
<td>7.01661</td>
<td>18.89702</td>
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<tr>
<td>LNWAGE</td>
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<td>.5853817</td>
<td>.6050112</td>
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<td>ETHNIC</td>
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<td>.2478943</td>
<td>0</td>
<td>.831</td>
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<tr>
<td>LATITUDE</td>
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<td>.1843968</td>
<td>.0229111</td>
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<td>AGEDEPEND</td>
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<td>.6023548</td>
<td>.1479284</td>
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<td>.9757223</td>
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</tbody>
</table>

Table 3: Descriptive Statistics

All regressions include a constant. Robust standard errors are in parentheses. ***, **, * and † denote significance at the 1%, 5%, 10% and 20% levels, respectively. For the two-stage least-squares (TSLS) estimation instruments are ETHNIC and LATITUDE. The included controls are also used as instruments. F(first) is the F-statistic with the first stage of the TSLS estimation. P-value (over) is the p-value associated with the null hypothesis of "no overidentification".
## Table 4: Regression Results for Government Administration Employment

<table>
<thead>
<tr>
<th></th>
<th>Total Government Employment (LNTOTGOVEMPP)</th>
<th>Central Government Employment (LNCGOVEEMPP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS (N=46) TSLS (N=46) OLS (N=46) TSLS (N=46)</td>
<td>OLS (N=50) TSLS (N=50) OLS (N=50) TSLS (N=50)</td>
</tr>
<tr>
<td>POLAC</td>
<td>.6764*** (.1257) .6782*** (.1865) .4817*** (.2254) 1.009* (.5354)</td>
<td>.4982*** (.1596) .4122* (.2345) .4182** (.2669) .4164 (.8035)</td>
</tr>
<tr>
<td>LNGNI</td>
<td>.1687 (.3621) −.1462 (.3388)</td>
<td>.0632 (.1681) .0641 (.4160)</td>
</tr>
<tr>
<td>R²</td>
<td>0.3967</td>
<td>0.1687</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.3830</td>
<td>0.1513</td>
</tr>
<tr>
<td>F(first)</td>
<td>17.94 42.29</td>
<td>20.56 32.00</td>
</tr>
<tr>
<td>P(Over)</td>
<td>.4034 .4565</td>
<td>.1078 .0790</td>
</tr>
</tbody>
</table>

## Table 5: Regression Results for Government Administration Employment (with controls)

<table>
<thead>
<tr>
<th></th>
<th>Total Government Employment (LNTOTGOVEMPP)</th>
<th>Central Government Employment (LNCGOVEEMPP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS (N=43) TSLS (N=43) OLS (N=43) TSLS (N=43)</td>
<td>OLS (N=45) TSLS (N=45) OLS (N=45) TSLS (N=45)</td>
</tr>
<tr>
<td>POLAC</td>
<td>.5662*** (.2150) 1.0497** (.4766) .5170** (.2129) .8419** (.4185)</td>
<td>.4959* (.2619) .8955 (.7069) .4476* (.2464) .7787 (.6365)</td>
</tr>
<tr>
<td>LNGNI</td>
<td>.0289 (.1640) −.2713 (.3129) .3520* (.2285) .1217 (.3459)</td>
<td>−.0552 (.1871) −.2822 (.4180) .3234 (.2611) .1034 (.4715)</td>
</tr>
<tr>
<td>LNPOPUL</td>
<td>−.0419 (.0613) −.0193 (.0682) −.0133 (.0691) .0115 (.0764)</td>
<td>−.1782** −.1608* −.1333† −.1057</td>
</tr>
<tr>
<td>LNWAGE</td>
<td>−.3428* (.1805) −.3806** (.1948) −.3504** (.1792) −.3852** (.1859)</td>
<td>−.2727 (.2311) −.3369 (.2446) −.2306 (.2135) −.2704 (.2296)</td>
</tr>
<tr>
<td>URBAN</td>
<td>−.0122** (.0063) −.0101† (.0068)</td>
<td>−.0191*** (.0075) −.0170** (.0086)</td>
</tr>
<tr>
<td>OPEN</td>
<td>.0022 (.0029) .0029 (.0031)</td>
<td>.0047† (.0035) .0057† (.0040)</td>
</tr>
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<td>AGEDEPEND</td>
<td>1.1092 (.9332) 1.1396 (.9643)</td>
<td>.8100 (1.1028) .8367 (1.1304)</td>
</tr>
<tr>
<td>R²</td>
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<td>Adj. R²</td>
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<td>0.2917</td>
</tr>
<tr>
<td>F(first)</td>
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<td>21.56 14.02</td>
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<tr>
<td>P(Over)</td>
<td>.3371 .5348</td>
<td>.1965 .6583</td>
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Table 5: Regression Results for Government Administration Employment (with controls)
Figure 3: Voice and Accountability and Government Administration Employment

Figure 4: Voice and Accountability and Central Government Administration Employment
Figure 5: Control of Corruption and Government Administration Employment

Figure 6: Corruption TI and Government Administration Employment