

HOW DOES THE DURATION OF
BUREAUCRATIC PROCEDURES
AFFECT THE EFFICIENCY OF
GOVERNMENT SPENDING?

by

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Abstract

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In this thesis, we focus on how the duration and number of bureaucratic procedures one has to complete to receive a benefit from the government affect the efficiency of government benefits allocation. As a proxy of the duration and quantity of bureaucratic procedures, we use the number of days and procedures needed to register a property provided by the Doing Business Index. The estimates of government spending efficiency perception are taken from the World Economic Forum dataset.

We estimated our model on panel macro-level data for 2008, 2011, 2014, and 2017 years by using the correlated random effects technique. The results showed a statistically significant but practically small negative effect of the number of days needed to register a property on the efficiency of government spending. While the number of procedures required for registering property positively affects the efficiency of the budget resources allocation. However, the results slightly vary once we estimate the model for different subsets.

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GLOSSARY

Bureaucracy. An organization, whether publicly or privately owned, made up of several policymaking departments or units.

Proceduralism. A rigid adherence to established procedures.

Red tape. A series of actions or complicated tasks that seem unnecessary but that a government or organization requires you to do in order to get or do something.

*Conquering the universe one has to solve two problems:
gravity and red tape. We could have mastered gravity.*

Wernher von Braun

Chapter 1

INTRODUCTION

In 2018, a big agrarian company received almost one-fourth of the whole budget for supporting agricultural enterprises in Ukraine (Andrushko 2019). Though the aim of such policy, as a rule, is to help small farms to develop (the relevance of government support is questionable, but it is not the scope of this research), the latter often are not able to receive the money from the government. Keeping aside other reasons such as the inability of small farms to meet all the requirements needed to receive the dotation, possible corruption in the committee that decides which farm will receive the money, there is one more reason we would like to highlight. Small farms may not even apply for government support due to the complicated procedure required to do so. The complexity consists of the list of the documents that are necessary to apply for a production subsidy and the costs associated with receiving these documents.

Small farmers may find this process too difficult to complete, for instance, due to the lack of knowledge about needed bureaucratic procedures. Oppositely, big companies have enough recourses to pay a lawyer who will prepare all the documents that are essential for obtaining a production subsidy. In the case described above the excessive bureaucracy serves as a barrier to achieving a policy goal, that is supporting small agrarian enterprises. The money goes to large producers, which perform well without any help. As a result, the government wastes money.

In this thesis, we are going to check whether excessive bureaucracy harms the efficiency of government spending. We propose three possible channels that may facilitate the relationship. The first channel through which the

bureaucracy may affect the efficiency of government spending is corruption that rather thrives on the ground of redundant procedures (Amin and Chong Soh 2020). Once corruption enters the game, government benefits like contracts, concessions, and subsidies may come not to those who deserve them most, but to those who offer higher bribes (Rose-Ackerman 1997). However, the effect may go not only from excessive bureaucracy to corruption but in the opposite direction as well. As corrupt bureaucrats tend to complicate the procedures (Fredriksson 2014). A possible purpose is to motivate the applicant to speed the wheel of the bureaucratic machine and save some time. There is room for a vicious circle: when the system is corrupt, the number of procedures rises to tough control. Simultaneously, the too entangled process of fulfilling bureaucratic procedures catalyzes occurring bribes.

Let us consider the situation when the government simplifies the procedures to the extent when there will be no motivation to pay the bribe to jump through the procedures and save time. In this case, only those applicants that do not match the requirements for getting a benefit from the government will pay the bribe (Fredriksson 2014). In other words, even if we simplify the bureaucratic procedures enough, there still will be applicants that do not mind bribing the bureaucrat.

What is the guarantee that the target receiver of government benefits will not be rejected in favor of those that do not match the requirements and continue to pay bribes? First, assume that in a particular case, three different agencies are involved in the process of evaluating the candidate who wants to receive the benefit from the government. Each of these agencies may request a bribe from the candidate (Shleifer and Vishny 1993). If the number of the agencies decreases from three to one, it allows us to suppose that it may be easier to control the only agency that evaluates the candidate instead of three different.

Second, accelerating bureaucratic procedures is possible not only by cutting the number of organizations involved but also by introducing digital technologies which allow completing the procedure faster and with a lower level of dependence on the human factor. According to Mouna et al. (2020), implementing information communication technologies (ICT) in public management positively affects economic growth. Moreover, the net contribution of corruption controls to economic growth is lesser in the presence of better-developed ICT. Therefore, we can suggest that introducing digital technologies decreases corruption.

Two arguments above show how simplifying bureaucratic procedures allow to decrease the bribes that come not only from those applicants that want to save their time but also from those that do not fit the conditions, which are essential for getting a benefit. Ideally, we make bribes leave the game. Consequently, evaluations of the applicants will rely on their characteristics rather than on the thickness of the envelope proposed.

The second channel between the bureaucracy and public spending efficiency runs inside the organizations in charge of the government projects' implementation. Particularly, internal proceduralism slows down the decision-making process. As a result, projects are finished with delays and at higher costs (Kaliba et al. 2009). Hold-ups also hinder the very goals' achieving, most obviously in medicine (Salonga-Reyes and Scott 2015, Beer et al. 2002). For instance, it was found that postponing reimbursement payments from the government budget to the public service provider demotivates her to provide a service (Cunningham and O'Malley 2008). Sometimes, the volume of paperwork may even affect the number of benefits the bureaucrat decides to assign to the receiver (Scott and Pandey 2000).

Here again one may argue that corrupt civil servants may deliberately slow down projects' realization to escalate the costs and extract the rent. Another reason of internal delay may be low qualification of the public officers. As a low-skilled bureaucrat checks whether the applicant for a benefit from the government matches all the requirements slower than a high-skilled one. At the same time, we are aware of the cases when a relatively big amount of bureaucratic procedures during the project implementation may be justified by the project complexity (e.g. building the storage for radioactive wastes).

The third channel references the example provided at the beginning of this chapter. Specifically, when it comes to social benefits programs that aim to support people with low income, poor health conditions, etc., the intricacy of applying process may discourage the target group to apply for the benefits (Christensen et al. 2020, Moynihan et al. 2015). As a result, money devoted to a particular government support program is under-used, while target receivers are under-covered and certain policy goals are not achieved. From the other point of view, too simple procedures in the selection process of eligibility programs may lead to an “error of inclusion”. As a result, the benefits again may come not to those who need them most.

Considering all the above, we hypothesize that with the bureaucratic procedures' complexity and duration decreasing, the efficiency of government spending goes up. However, some necessary procedures still should be completed. Hence, we will also investigate quadratic relationship between the efficiency of government spending and bureaucracy. We want to know if is there an optimal amount of time the bureaucracy takes or the number of procedures to be done at which the efficiency of government spending reaches its maximum.

To conduct empirical analysis on the relationship we are interested in, we are going to use proxy variables. As a measure of efficiency, we will use the “Efficiency of government spending” variable from the dataset of the Global Competitiveness Index computed by the World Economic Forum. The variable reflects the subjective perception of efficiency of government spending by the experts from each country in the survey. As a proxy of bureaucratic procedures duration, we will use the “Registering property” variable from the Doing Business index of the World Bank. Two kinds of this variable are available. The first one reveals the number of procedures needed to register a property, the second one shows how many days are needed to fulfill all the procedures to register a property. The details of the estimation procedure are provided in the methodology section of this thesis.

It is important to study the determinants of the efficiency of government spending due to several reasons. First, government spending facilitates national reforms. Therefore, if government spending is inefficient, i.e. policy goals are not achieved, reforms that might increase the overall quality of life will not (or at higher costs) be implemented. Second, to finance its expenditures, the government uses taxes and borrows money. If sufficient reforms were not implemented and the country’s economy did not develop due to this, the harder it would be for future generations to repay the debt. Either the price of it will be further borrowings under higher interest rates or shrinking the government spending that may negatively affect people’s well-being. Third, focusing on the time of bureaucratic procedures or the number of the procedures potentially may allow us to derive clear policy recommendations on enhancing the efficiency of government spending.

The thesis contributes to the existing literature in two ways. First, there were not many attempts to define the determinants of the general efficiency of

government spending regardless of the sector (De Simone et al. 2019, Montes et al. 2019). The authors mostly focused on the association between spending and performance in particular spheres like education and healthcare (Hauner and Kyobe 2010, Rayp and Van De Sijpe 2007). While research at the macro-level allows detecting a set of general weak points that could be then investigated more carefully in any field by accounting for the sphere-specific features. Second, in none of the papers we reviewed, the impact of red tape on the efficiency of government spending was explored. While we will do this by including to our model proxy variables that try to capture the presence of excessive bureaucracy in each country.

The structure of this paper is the following. Chapter 2 represents an overview of related literature. Chapter 3 explains the methodology we are going to use. Chapter 4 contains descriptive statistics of the data. In Chapter 5, we provide estimation results. Chapter 6 concludes the study.

Chapter 2

LITERATURE REVIEW

In this section, we review the literature on the channels between the bureaucracy and efficiency of government spending. The first subsection goes into detail about the impacts of bureaucracy on corruption and corruption on spending efficiency. The second subsection highlights the consequences of administrative delays. The third subsection explains how red tape influences the behavior of potential applicants for government benefits.

2.1. Corruption as a channel between the bureaucracy and the efficiency of government spending

The first part of this subsection shows how inefficient government tends to make bureaucratic procedures longer, the second part explains the nexus between the bureaucracy's complexity and bribes, and the third part demonstrates how corruption harms the efficiency of government spending.

2.1.1. An inefficient government tolerates longer bureaucratic procedures

According to the World Bank Enterprise Surveys (2012) on senior management time spent in handling government regulation requirements (cited in Fredriksson 2014), on average in the world, executives spent 9.8% of the workweek to fulfill the procedures. In high-income OECD countries, it takes on average 4.2% of a workweek, while in Latin America/Caribbean – 12.7%. In parallel, in 2017-2018 the aggregate score of government efficiency in Europe and North America was 3.81, while in Latin America and The

Caribbean 2.86 at a world average of 3.64 (The Global Competitiveness Index Historical Dataset 2007-2017 World Economic Forum). These data points show that in countries where the government is less efficient, the bureaucratic procedures take more time. However, the ability of senior management to handle government regulation requirements may also differ across the regions and affect the time the managers spend doing so.

In keeping with Myrdal's 1968 study (cited in Méon and Sekkat 2005), rent-seeking bureaucrats may deliberately increase the waiting period to get a bribe. Similarly, Fredriksson (2014) argues that to maximize corruption profits, civil servants tend to complicate the procedures. Other authors, including Rosenn (1971), de Soto (1989), Tanzi (1998), and La Porta et al. (1999) agree with that (cited in Fredriksson, 2014). Jain (2001) also argued that within a friendly to petty corruption environment, bureaucrats enact regulations that require increased interaction between the managers and the bureaucracy. In consonance with Shleifer and Vishny (1993), when more decision centers are involved in assigning a benefit to the applicant, the more time it will take to complete the procedure. The reason is that at each stage, the bureaucrats may slow down the project to seek rent for private gain.

2.1.2. Longer bureaucratic procedures lead to corruption

Fulfilling bureaucratic procedures raises, despite legitimate ones (e.g. payment for obtaining a license), the other costs like monetary costs for transport, time costs of queuing, waiting, and going to the offices (Fredriksson 2014). Paying a bribe to the bureaucrat may eliminate the time costs that the civil servant has an impact on. For example, the bureaucrat may help an applicant to jump through the queue or to process the application within the office faster. This confirms the previous findings by Lui (1985), who has

derived Nash equilibrium strategies for the customers and has shown that the civil servant is ready to provide the service faster in exchange for a bribe.

Conforming to the recent research by the World Bank, which is based on firm-level survey data for 131 countries, there is a positive effect of regulatory burden on corruption (Amin and Chong Soh 2020). In the study, the regulatory burden is represented by the percentage of senior management's time spent on dealing with business regulations. The amount of bribes firms pay to "get things done" is measured as a percentage of the firm's annual sales. Following the results, the bribery rate is higher by about 0.03 percentage points for each percentage point increase in the regulatory burden. The magnitude of this effect does not seem to be high, however, it still leaves the space for considering excessive bureaucracy as a rather fruitful ground for corruption.

2.1.3. Corruption causes inefficiency of government spending

In the Introduction to this thesis, we have already discussed that, when the bribes come into a game, the bureaucrat, while deciding to whom to assign the benefit, counts more the amount of the bribe than the applicant's compliance with the requirements to receive the benefit. This may have negative consequences. As Rose-Ackerman (1997) explained, under the payoffs, the benefits like government contracts, privatized firms, or concessions may come not to the most efficient contractors. For instance, when it comes to a construction or infrastructure project that has to be completed by a private firm, the order may be assigned not to the best, in terms of production quality, company, but to the one that proposed the highest payoff. In Rose-Ackerman (1997), this idea is supported by the examples from Pakistan and India, where contractors who maintained irrigation systems were found to skimp on quality.

According to Wade (1982, 1984), Murray-Rust, Hammond, and Vander Velde (1994) (cited in Rose-Ackerman 1997), the reason for this was the bribes the contractors paid the officials for ignoring inferior work. Rose-Ackerman (1997) also stressed the fact that a company actually might be able to pay the highest bribe at a cost of the quality of the goods it would produce (cited in Méon and Sekkat 2005).

The other string of arguments focuses on political corruption that causes government officials to allocate more public funds to the sectors, where rent-seeking activities are more likely to occur (e.g. due to the very complex bureaucratic procedures essential to these sectors). Corruption causes money to come rather to public services and order, fuel and energy, culture, and defense than to education, health, and social protection (Delavallade 2006).

The arguments presented above show that inefficient and corrupt governments might intentionally complicate the bureaucratic procedures to extract the rent. When the procedures are too intricate, corruption is commonplace. The latter distorts the system, fair evaluation of the benefit's applicants, and results in inefficient public funds allocation.

2.2. Administrative delays and internal proceduralism as a channel between the bureaucracy and the efficiency of government spending

Excessive bureaucracy inside organizations, and proceduralism in practice may lead to slow decision-making and therefore delays. One can explain the argument by the mean of particular cases.

For instance, in public construction projects, delays result in cost escalation (Kaliba et al. 2009) as the prices for labor and materials rise in time. Therefore, the road that might be built faster and at lower costs took more time and

money. Another example of the negative consequences of redundant procedures comes from medicine. According to the study conducted for Princess Alexandra Hospital in Brisbane (Australia), administrative delays caused by agencies outside the hospital were found to be responsible for 25% of days spent by non-acute patients in the hospital (Salonga-Reyes and Scott 2015). This means that acute patients were lack of beds in the hospital during that time. Another piece of evidence from the French administrative department (Côte-d'Or) demonstrated that direct calls to specialized Emergency Medical Services (*numéro «15»*) in case of suspected myocardial infarction cut as much as twice the time lag between symptom onset and first medical intervention and between a first medical intervention and hospital admission (Beer et al. 2002).

Excessive paperwork also affects the behavior of the bureaucrats who assign the benefits to those in need. For instance, Hattke et al. (2019) found that red tape rises such negative emotions as confusion, frustration, and anger among the participants of the experiment. While twenty years before Scott and Pandey (2000) experimentally showed that an increase in the level of red tape during the benefits applicants' assessment resulted in an average decrease of the bundle of benefits nearly by 21%. Finally, delayed payments for providing services demotivate a service provider to provide a service. Thus, Cunningham and O'Malley (2008), in their research on physicians' participation in the Medicaid program¹ observed that slow payment to physicians was followed by 13.1 percentage points drop in the number of new accepted patients. Although the authors acknowledge the other reasons why new patients were declined. Among them, particularly, high requirements for claims

¹ US public insurance program that provides health coverage to low-income families and individuals.

documentation.

2.3. Client motivation to apply for the benefits as a channel between the bureaucracy and the efficiency of government spending

In this subsection, we focus on the issue when potentially eligible receivers of the benefits either do not apply for them or do not receive enough of them. As the example in the Introduction section shows, target receivers of the benefit may forgo the latter due to the complicated paperwork they should do to receive it. Moynihan et al. (2015) have theorized learning, psychological and compliance costs the applicants face in the process of obtaining a benefit. The reason for not applying, the authors suggest, can be that people tend to overestimate “administrative burden costs” experienced at present and discount the benefits they would obtain in the future. Moreover, Christensen et al. (2020) highlighted that in means-tested programs, these costs are higher than in universal programs because the formers require proving eligibility for participation. At the same time, the target receivers of means-tested programs are those who experience some financial and health problems, usually retired aged people. These conditions make it more challenging to cope with bureaucratic procedures. For example, Deshpande and Li (2019) found that the closings of the offices that assist with filling disability applications led to a 10% decline in the number of applications.

As we can see, the impact of excessive bureaucracy either was studied experimentally or investigated in real cases. While we attempt to do cross-country research using the comparable across economies proxy variables for the overall efficiency of government spending and bureaucracy’s time-consumption and complexity.

Chapter 3

METODOLOGY

In this chapter, we explain the way we are going to test the impact of bureaucracy on the efficiency of government spending.

3.1. Notes on key explanatory variables

As a proxy of the representative time needed to deal with the bureaucracy in a country, we take the number of days and procedures needed to register a property in this country. The number of procedures data reflects rather the design of a bureaucratic system in a country. Whereas the number of days needed to register a property may also depend on a human factor as, for instance, a lower experienced bureaucrat works slower than a more skilled one². Both variables come from the Doing Business Index. The data points correspond to a standardized case of an entrepreneur who wants to purchase land and a building that is already registered and free of a title dispute. This assumption makes the data comparable across the economies.

Whether we want this or do not, some bureaucratic checks are necessary before obtaining a benefit from the government. Which number of checks is recommendable? After what amount of time taken by bureaucracy, one may fairly complain about the delays that led to the efficiency decreasing? We included squared values of the number of days and procedures in our regression to find whether there is such a quantity of it after which the efficiency of government spending goes down. However, the coefficients in

² Unobserved bureaucrats' ability is a potential source of endogeneity in our model.

front of quadratic terms turned out to be insignificant. And the relationship between our key variables is rather linear. From the figure below one may conclude that there is not any relationship between the number of days for registering property and government spending efficiency scores. However, it looks like there is a negative relationship between the number of procedures for registering property and efficiency of government spending.

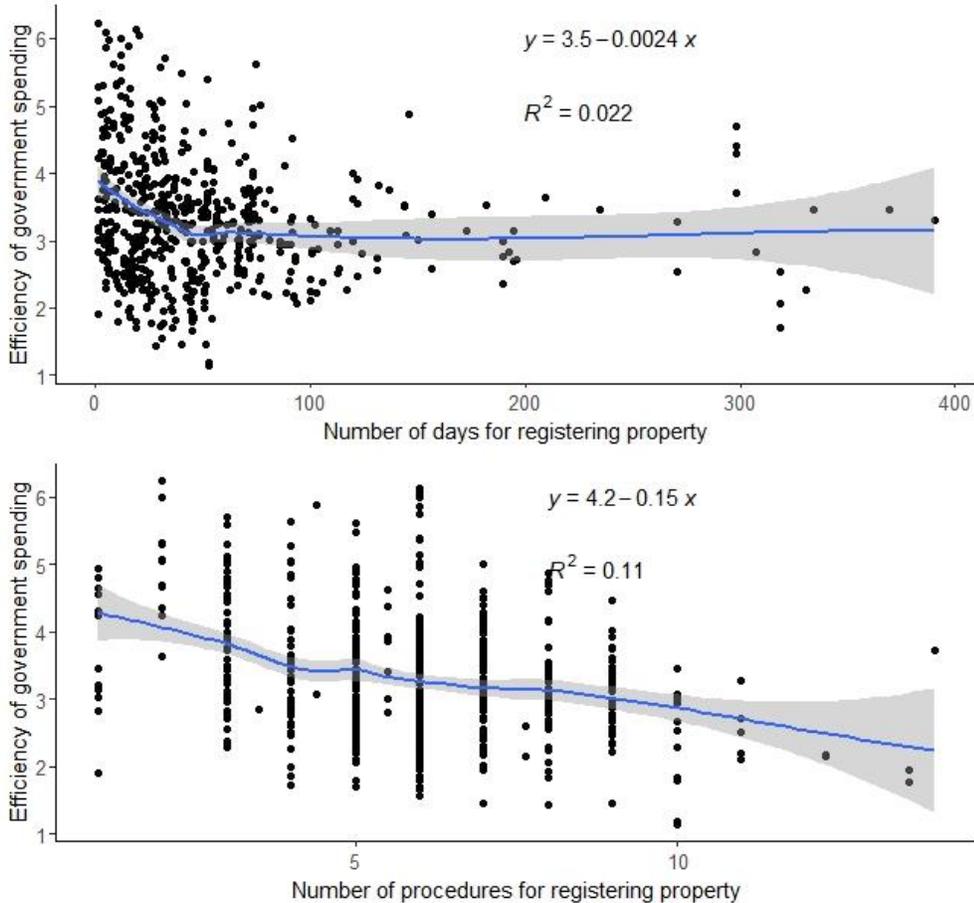


Figure 1. Linear relationship between the estimates of the efficiency of government spending and the number of days and procedures for registering property

We also run our dependent variable on a set of one-year lagged predictors. This time the coefficient in front of the squared number of days was significant and positive, while the coefficient in front of just the number of days was significant and negative. This means that with the growth of time devoted to bureaucracy, the efficiency of government spending decreases. However, when the number of days reaches a particular value, the government resource allocation efficiency starts to rise. But the calculated turning point was close to 270 days. In our sample, for only about 2.4% of all of the observations, it takes at least 270 days to register a property. So, practically, we cannot talk about any quadratic relationship between the time spent on bureaucracy and the efficiency of government spending.

Still, the bureaucracy is inevitable. We assume that the maximum acceptable number of days and procedures for registering property should not exceed the sum of the sample median and one standard deviation. Greater than these values signal the presence of excessive undesired proceduralism. We will use this condition when estimating separate regressions for subsets of countries with and without redundant bureaucracy. We also admit the roughness of this assumption. It would be too naïve to assume that the number of days for registering property indeed averages the time needed to deal with the bureaucracy in a particular country. As well as the number of procedures for registering property may not reflect the bureaucracy design in any other field like social security, education, etc.

3.2. Notes on an explained variable

As a measure of the efficiency of government spending, we are going to use the “Efficiency of government spending” variable from the dataset of the Global Competitiveness Index by the World Economic Forum. The variable

is a score from 1 to 7 (where 1 means the worst and 7 the best) of the efficiency of government spending given by the executives, entrepreneurs, economists, and journalists. Per-country score is a continuous average value of all of the experts' estimates. The question to the experts sounds like "In your country, how efficiently does the government spend public revenue?" The main caveat of this variable is that it is a subjective perception of the efficiency of public spending. Each respondent may have a different understanding of it. Also, as the estimates are provided by local experts we cannot be 100% sure about the objectivity of their evaluations. Especially, this could be an issue for the countries with rather autocratic regimes and the practical absence of the freedom of speech. Namely, experts from these countries may not have the access to the information to make fair conclusions. Partially, we control for this by including in our model the variables standing for democracy and budget transparency.

3.3. Notes on an estimation technique

While conducting panel data analysis, first we estimated both fixed effects (FE) and random effects (RE) models. The results of the Hausman test suggested proceeding with the "within" method. However, the number of procedures needed to register a property does not vary over time for several countries. Therefore, a time-demeaning technique of the fixed effects approach would leave us without a decent amount of data. Hence, we need to stay within the random effects framework that uses quasi-demeaning of the data. Among other advantages of the random effects technique is the ability to estimate the coefficients for the categorical variables. Also, the "random" method removes serial correlation from the error term. After all, the random effects technique allows getting rid of at least some share of unobserved unit-

specific time-invariant effects. However, some fraction of them stays in the composite error and if it correlates with the predictors then the obtained coefficients are biased.

One may fairly assume that the unobserved individual time-invariant effects may influence the individual-specific time-average values of the explanatory variables. This is captured by the equation below (Wooldridge 2018).

$$a_i = \alpha + \gamma^* \bar{x}_i + r_i \tag{1}$$

Here a_i stands for the unobserved individual time-invariant effects from the composite error ($a_i + u_{it}$) in the panel linear model (see equation 2). Whenever γ is different from zero, we conclude that there is a relationship between the unobserved country-specific effects and the country-specific time-average values of explanatory variables and hence with the explanatory variables themselves. While r_i is uncorrelated with \bar{x}_i (and hence with x_i) following strict exogeneity assumption. Taking this into account, we are going to substitute a_i with the right-hand side of the equation 1. Idiosyncratic shock u_{it} is uncorrelated with the independent variables by the strict exogeneity assumption and therefore it is also uncorrelated with their unit-specific time-averages.

Thus, controlling, in addition to predictors, also for their country-specific time-average values \bar{x}_i allows us to avoid the correlation of the composite error term with the independent variables (Wooldridge 2018). This technique is called correlated random effects (CRE). Our equation on the full sample has the specification presented below (see equation 2). A detailed description of the variables is provided in the next Chapter of this thesis.

$$\begin{aligned}
\text{Efficiency of government spending}_{it} = & \alpha + \beta 1 * \text{Number of procedures}_{it} + \\
& \beta 2 * \text{Number of days}_{it} + \beta 3 * \text{Absence of corruption}_{it} + \\
& \beta 4 * \text{Government effectiveness}_{it} + \beta 5 * \text{Budget transparency}_{it} + \\
& \beta 6 * \text{Democracy}_{it} + \beta 7 * \ln \text{GDP per capita}_{it} + \beta 8 * \text{GDP growth}_{it} + \\
& \beta 9 * \text{Unemployment}_{it} + \beta 10 * \text{Government budget balance \% of GDP}_{it} + \\
& \beta 11 * \text{Government debt \% of GDP}_{it} + [z] * \text{Year}_t + [k] * \text{region}_i + \\
& [\gamma] * \bar{x}_i + r_i + u_{it}
\end{aligned} \tag{2}$$

Among other controls, we included in the model time dummies for each year except the earliest one. Random effects estimator allows us also to control for regional dummies.

Correlated random effects technique is easy to implement on a balanced panel. In this case the calculation of the unit-specific time-averages is straightforward as each unit has the observations for all of the periods. However, when one need to run a regression on a subset, usually the panel turns to be unbalanced. If we want to proceed with the correlated random effects technique, we have to create a new set of the unit-specific time-averages for each subset. This is simply inconvenient when we have many explanatory variables and a bunch of conditions of interest by which we divide our sample on subsets for estimating several regressions. However, instead of using correlated random effects technique, we can use just fixed effects. Both produce identical estimates (Wooldridge 2018). Although, this handiness has its price. Within fixed effects framework we cannot estimate the effect of categorical variables.

3.4. Potential issues

As it was already mentioned, initially corrupt bureaucrats may tend to slow down the decision-making process. Therefore, the time needed to deal with the bureaucracy is not exogenous anymore. Partially, we handle the endogeneity problem by including in our model control for the absence of corruption.

Besides, the time of the government benefits' application processing may depend on the abilities and the motivation of the bureaucrats. We cannot control for these factors. Unfortunately, we also did not find enough data on the ratio of salaries in the public versus private sector across the countries. While this data could serve as a proxy for the bureaucrats' professionalism and motivation.

One should be cautious while making policy recommendations based on the estimation results we expect to receive. Whenever the impact of the number of days and procedures for registering property on the efficiency of government spending is negative, one has to keep in mind that oversimplifying bureaucratic procedures may lead to the error of inclusion. Hence, the benefits will come to those without the actual need for them. Oppositely, in case we obtain a positive effect, we have to remember that excessive proceduralism may exclude target receivers of the government benefits due to the reasons described in Chapter 2.

Also, we cannot conduct a robustness check using the number of days for obtaining a permit for construction or the number of procedures for getting electricity from the Doing Business Index. As, for instance, in mountainous terrain, this will take more time than in plain areas for meaningful reasons. Hence, in a list of cases, proceduralism is justified.

Chapter 4

DATA DESCRIPTION

The panel data set consists of four panels for 2008, 2011, 2014, and 2017 years. While the government spending efficiency was falling and rising again, the share of the government debt to GDP was almost constantly increasing.

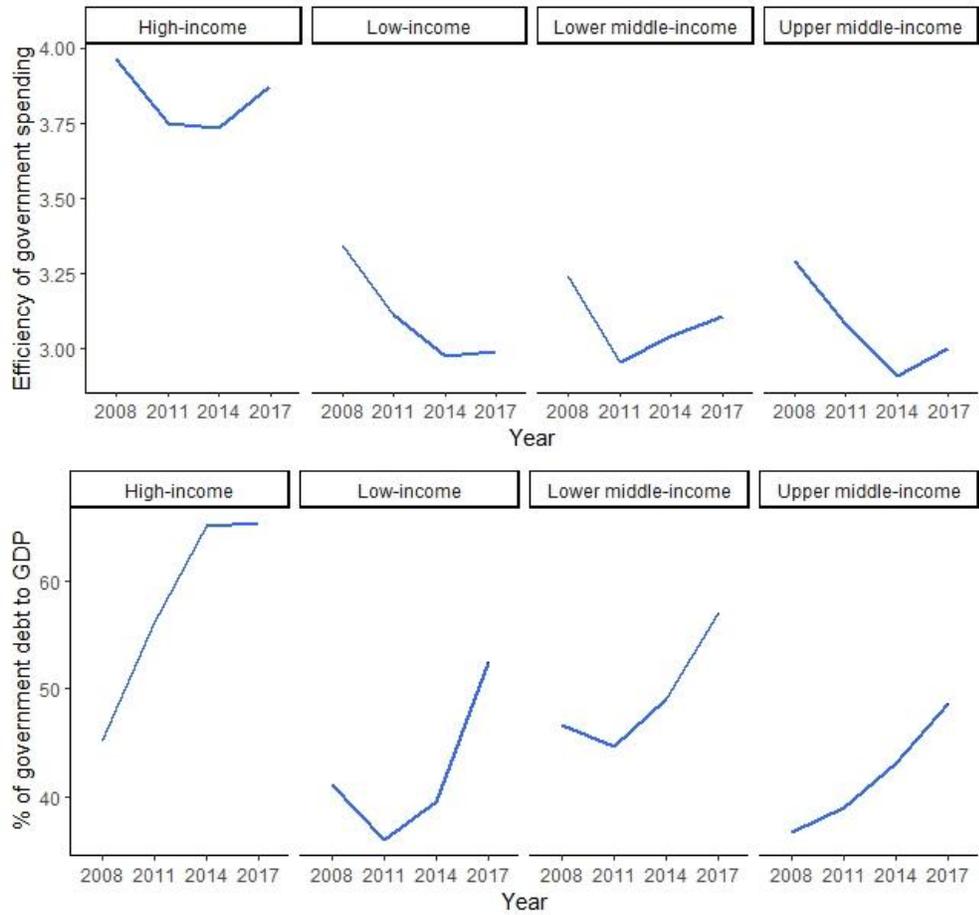


Figure 2. Trends in the Efficiency of government spending and Share of the government debt to GDP by income group

From figure 2, one may conclude that in high-income countries both the average estimate of the government spending efficiency and the average share of government debt to GDP are higher compared to the countries from the other income groups. In lower middle-income countries, the average level of government spending efficiency started to rise already in 2011. While for the other income groups it either was continuing to decrease or were quite flat till the 2014 year. Also, in high-income countries, the average share of the government debt to GDP from 2014 to 2017 almost did not change. While it kept rising within the other income groups. In Appendix A, one may find this figure drawn for the different regions.

Besides the key variables of interest that were described in detail in the previous chapter, we control for other factors that may affect the efficiency of government spending. To account for corruption, we use the Absence of corruption score from the World Governance Indicators dataset collected by the World Bank. The score ranges from -2.5 (worst) to 2.5 (best) and shows the perception of the extent to which public power is exercised for private gain, including petty and grand corruption. Experts' assessments of government effectiveness are taken from the International Country Risk Guide provided by Political Risk Services. The estimates vary from 0 (worst) to 1 (best). Democracy score, which ranges from (-10) (strongly autocratic regime) to 10 (strongly democratic regime), goes from the Polity5 Project held by the Center for Systemic Peace. GDP per capita, PPP (constant 2017 international \$) and GDP growth (%) data come from the World Bank database. Data on unemployment (%) is provided by International Labor Organization. Finally, the shares of government budget balance and government debt to GDP are taken, as well as the dependent variable, from the Government

Competitiveness Index dataset collected by World Economic Forum.

Table 1 explains the motivation for including particular variables in the model. We mostly refer to De Simone et al. (2019) who investigated the impact of budget transparency and democracy on the efficiency of government spending.

Table 1. References from the literature to the variables

Variable	Reference	Coefficient sign	Significance
Government spending efficiency	De Simone et al. (2019)		Dependent variable
Number of days for registering property		Assumed to be negative	To be investigated
Number of procedures for registering property		Assumed to be negative	To be investigated
Corruption	Rose-Ackerman (1997)	Negative	Theoretical study
Democracy	De Simone et al. (2019)	Negative	***
Budget transparency	De Simone et al. (2019)	Positive	*
Government effectiveness	De Simone et al. (2019)	Positive	***
GDP per capita	De Simone et al. (2019)	0	0
GDP growth	De Simone et al. (2019)	Positive	***
Unemployment	De Simone et al. (2019)	Negative	0
Government budget balance % of GDP	De Simone et al. (2019)	Positive	***
Government debt % of GDP	De Simone et al. (2019)	Negative	***

Before presenting descriptive statistics of our sample, we would like to elaborate on the missing values imputation process. Preliminary, we had 608 observations for 152 countries. First, we excluded from the sample those countries for which the data for at least half of the explanatory variables was missed. This led to the loss of 4.6% of the data, and our sample decreased to 580 observations for 145 countries. Here it is relevant to mention the potential sample bias that arises, particularly, in case the data is missed not randomly.

Second, we checked the amount of missing data by column. We found that it does not exceed 13.1% for most of the variables. Only for the budget transparency data, the amount of missing values³ is more than 37.5%. We imputed⁴ missing data for each variable with its yearly-regionally median values. We took the median values as it is famously less responsive to outliers than mean value. We also assumed that aggregated by year and region median values can serve as better substitutes for the missing values than ungrouped one.

Table 2 represents some of the descriptive statistics. We collected two samples. One for 2008, 2011, 2014, and 2017 years is going to be used to explore the impact of the present effects on the efficiency of government spending. But we will also estimate our main specification model on the one-year lagged (i.e. 2007, 2010, 2013, and 2016) predictors. Table 2 represents descriptive statistics for the present effects data. The descriptive statistics for one-year lagged factors one may find in Appendix B.

³ For one-year lagged budget transparency variable more than 44.3% of the observations are missed.

⁴ The results of the replication of De Simone et al. (2019) on the sample before and after missing values imputation procedure are similar and could be accessed by request.

Table 2. Descriptive statistics of the sample

Variable	Mean	SD	Min	Max	Source
Government spending efficiency	3.332	0.924	1.140	6.243	Government competitiveness index, World Economic Forum
Number of days for registering property	50.250	56.329	1.000	391.000	Doing Business Index, World Bank
Number procedures for registering property	5.926	2.134	1.000	14.000	Doing Business Index, World Bank
Absence of corruption	0.024	1.008	-1.593	2.404	World Governance Indicators, World Bank
Democracy	4.966	5.843	-10.000	10.000	Polity5 Project, Center for Systemic Peace
Budget transparency	45.250	20.919	0.000	93.160	Open Budget Index, World Bank
Government effectiveness	0.560	0.261	0.000	1.000	International Country Risk Guide, Political Risk Services
GDP per capita, PPP (constant 2017 international \$)	21703.400	20971.690	773.600	118154.700	World Bank
GDP growth, %	3.709	3.396	-17.669	17.664	World Bank
Unemployment, %	7.519	5.733	0.140	33.760	International Labor Organization
Government budget balance % of GDP	-2.395	5.503	-32.204	43.800	Government competitiveness index, World Economic Forum
Government debt % of GDP	49.150	32.544	0.000	243.220	Government competitiveness index, World Economic Forum

From the figure 3 we see that some variables are highly correlated. This may complicate the interpretation of their individual impact on the dependent variable. In particular, the standard errors of the estimated coefficients could be inflated due to the issue of multicollinearity.

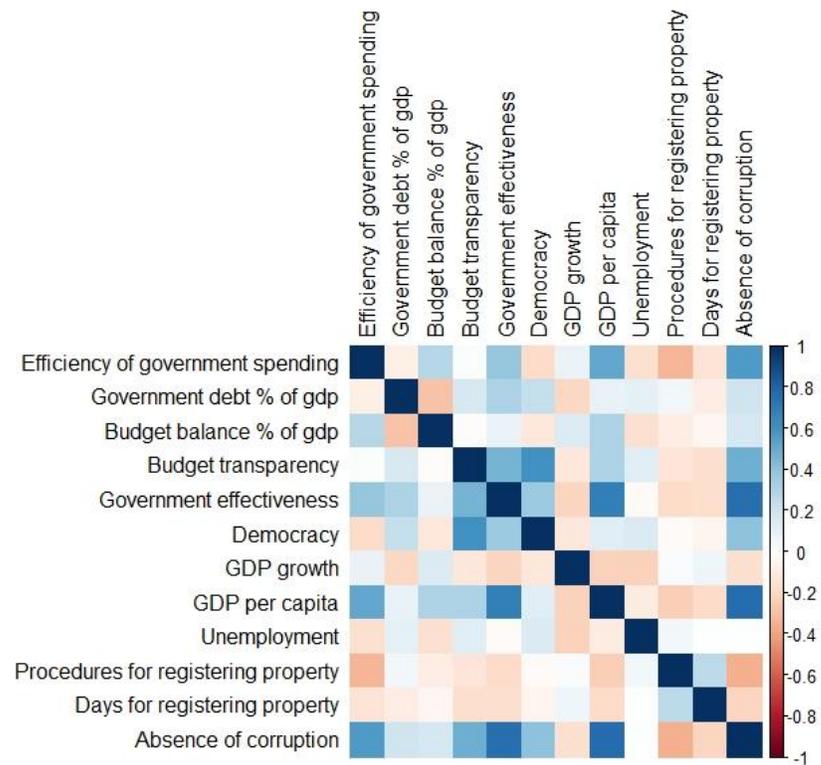


Figure 3. Correlations

The absence of corruption is highly positively correlated with the level of income and government effectiveness. While government debt % of DGP, democracy, level of unemployment, number of procedures and days for registering property negatively relate to the efficiency of government spending.

Chapter 5

ESTIMATION RESULTS

5.1. Estimation results on the whole sample

Table 3 contains regression results for the whole sample. The coefficients of unit-specific averages one may find in Appendix C.

Table 3. Estimation results for present independent variables, CRE

Factor	Coefficient	Significance	Factor	Coefficient	Significance
Intercept	4.3813	***			
Procedures for registering property	0.0443	**	Government debt % of GDP	0.0002	
Days for registering property	-0.0019	*	2011	-0.1708	***
Absence of corruption	0.9106	***	2014	-0.2192	***
Budget transparency	-0.0044	*	2017	-0.1989	**
Government effectiveness	1.3644		Eurasia	0.1317	
Democracy	-0.0390	*	Europe and North America	-0.3416	**
ln(GDP per cap)	0.0991		Latin America and the Caribbean	-0.4589	**
GDP growth, %	0.0182	**	Middle East and North Africa	0.1154	
Unemployment, %	-0.0568	***	South Asia	0.0454	
Government budget balance % of GDP	-0.0012		Sub Saharan Africa	-0.0196	

From now on the level of significance of the estimated coefficients corresponds to heteroscedasticity robust standard errors. The coefficient in front of the number of procedures needed for registering a property contradicts the theory we hypothesized. It is positive and means that as the number of bureaucratic checks rises, so does the efficiency of government spending. At the same time, the number of days for registering property negatively affects our dependent variable. This confirms the hypothesis we made, namely, that the delays produced by slow bureaucracy harm the efficiency of government spending. Besides, a strong and positive impact on the efficiency of public revenue allocation has the absence of corruption. Keeping everything else constant, in countries with more democratic regimes the efficiency of government spending tends to be lower. This goes in line with De Simone et al. (2019). Oppositely, we obtained a negative and significant coefficient in front of the budget transparency variable. Accounting for a downward trend in the average efficiency of public spending (see figure 2), we can assume that the experts from the countries with better access to the budget information could give lower estimates of the efficiency of public spending. Higher rates of GDP growth are associated with higher efficiency of public spending. While higher rates of unemployment seem to hurt how efficiently the government allocates public revenue. While level of income, % of budget balance to GDP, and % of government debt to GDP do not affect how efficiently the government spends taxpayers' money. Coefficients in front of the time dummies confirm the picture in figure 2. In comparison to the 2008 year, the average efficiency of government spending was lower in all other periods. It reached its minimum in 2014 year and then started to rise. From the coefficients in front of the region dummies, one may learn that the average efficiency of government spending in Europe, North America, Latin America and the Caribbean is lower than in East Asia and Pacific, our base region.

Table 4 represents the coefficients for one-year lagged independent variables.

Table 4. Estimation results for one-year lagged independent variables, CRE

Factor	Coefficient	Significance	Factor	Coefficient	Significance
Intercept	4.6338	***			
Procedures for registering property	0.0219		Government debt % of GDP	0.0015	
Days for registering property	-0.0004		2011	-0.1886	***
Absence of corruption	0.8983	***	2014	-0.2365	***
Budget transparency	-0.0009		2017	-0.1791	*
Government effectiveness	1.5338		Eurasia	0.0931	
Democracy	-0.0275		Europe and North America	-0.2957	*
ln(GDP per cap)	-0.0133		Latin America and the Caribbean	-0.4536	**
GDP growth, %	0.0066		Middle East and North Africa	0.1082	
Unemployment, %	-0.0425	***	South Asia	-0.0145	
Government budget balance % of GDP	-0.0001		Sub Saharan Africa	-0.0915	

The absence of corruption in the previous year has a strong and positive impact on the efficiency of public spending in the current year. While a higher level of unemployment in the previous year is associated with lower efficiency of public revenue allocation in the current year. The one-year lagged values of all other controls seem to have no impact on the current efficiency of

government spending.

5.2. Estimation results on the subsets

The model for the subsets of data (only for present independent variables) was estimated by using the fixed effects technique. From now on the level of significance of the estimated coefficients corresponds to the heteroscedasticity and autocorrelation robust standard errors.

Table 5 represents the results for the subset of observations where the number of days for registering property is equal to or less than the sum of the sample median and one standard deviation. We assume, that in this subset of data there is no excessive bureaucracy in terms of time the latter requires.

Table 5. Estimation results for countries, where the number of days for registering property is not greater than the sum of its sample median and standard deviation (n=512), FE

Factor	Coefficient	Significance	Factor	Coefficient	Significance
Procedures	0.0726	***	GDP growth, %	0.0215	**
Days	-0.0036	**	Unemployment, %	-0.0548	***
Absence of corruption	0.8174	***	Government budget balance % of GDP	0.0009	
Budget transparency	-0.0040		Government debt % of GDP	-0.0002	
Government effectiveness	1.2404		2011	-0.1083	*
Democracy	-0.0459	*	2014	-0.1626	**
ln(GDP per cap)	-0.2451		2017	-0.1286	

As we see, for 512 of 580 observations, according to the assumption we made, there is no red tape in terms of the number of days for registering property. Almost all of the results obtained for the whole sample hold for this subset of data. Thus, the increase in the number of days for registering property is associated with the decrease in the efficiency of government spending. While the number of bureaucratic procedures still has a positive impact on how efficiently the government allocates taxpayers' money. Only the coefficients in front of the budget transparency and dummy for the 2017 year lost their significance comparing with the estimates for the whole sample.

Table 6 represents the results for the countries where we assume the presence of redundant bureaucracy in terms of the number of days the latter takes.

Table 6. Estimation results for countries where the number of days for registering property is greater than the sum of its sample median and standard deviation (n=68), FE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures	0.1985		GDP growth, %	-0.0120	
Days	0.0005		Unemployment, %	-0.0620	
Absence of corruption	1.3348	***	Government budget balance % of GDP	-0.0193	**
Budget transparency	-0.0113	**	Government debt % of GDP	0.0022	
Government effectiveness	-1.8345		2011	-0.2906	**
Democracy	0.0526		2014	-0.3242	**
ln(GDP per cap)	2.4927	***	2017	-0.2941	

Only 68 among 580 observations have the number of days for registering property exceeding the sum of sample median and standard deviation. For countries where the bureaucracy already takes lots of time, the effect of an additional day or procedure on the efficiency of government spending is not different from zero. However, for this subset, the impact of the absence of corruption is even greater than for the whole sample. In addition, within this subset in richer countries, the efficiency of government spending is higher. At the same time, a bigger % of budget balance to GDP has a negative effect on the efficiency of government spending.

Table 7 and Table 8 show the estimation results for the subsets where the number of procedures for registering property is either no more or greater than the sum of sample median and standard deviation.

Table 7. Estimation results for countries where the number of procedures for registering property is not greater than the sum of its sample median and standard deviation (n=511), FE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures	0.0197		GDP growth, %	0.0217	**
Days	-0.0019	*	Unemployment, %	-0.0621	***
Absence of corruption	0.9325	***	Government budget balance % of GDP	-0.0012	
Budget transparency	-0.0064	**	Government debt % of GDP	0.00001	
Government effectiveness	1.6262	*	2011	-0.1443	**
Democracy	-0.0423		2014	-0.1970	**
ln(GDP per cap)	0.1165		2017	-0.1906	*

In countries where, according to our assumption, there is no redundancy in the number of bureaucratic procedures, each additional day that bureaucracy takes is associated with decreasing government spending efficiency. However, practically the coefficient is not much different from zero. Also, for this subset, the coefficient in front of the government effectiveness turned out to be positive and significant.

Table 8. Estimation results for countries where the number of procedures for registering property is greater than the sum of its sample median and standard deviation (n=69), FE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures	0.1884	***	GDP growth, %	-0.0033	
Days	-0.0011		Unemployment, %	-0.0474	**
Absence of corruption	0.8765	*	Government budget balance % of GDP	-0.0116	
Budget transparency	0.0099	**	Government debt % of GDP	-0.0004	
Government effectiveness	-11.7465	***	2011	-0.3247	*
Democracy	-0.0373		2014	-0.1953	
ln(GDP per cap)	-0.4302		2017	-0.1788	

For the subset of countries where we spotted the redundancy in terms of the number of procedures for registering property, still, each additional procedure positively affects the efficiency of government spending. While each additional day spent on bureaucracy does not have any impact on the efficiency of government spending. The coefficient in front of the government

effectiveness variable took quite a large negative and significant value. This is counterintuitive. We have to be cautious while interpreting the individual effect of government effectiveness as it is highly correlated with the absence of corruption, and level of income. Additionally, this subset of data is quite small, and the coefficients' significance can be affected by the issue of multicollinearity.

In Table 9 and Table 10 we present results for the subsets of countries with higher and lower than average levels of the absence of corruption.

Table 9. Estimation results for countries where the level of the absence of corruption is greater than its sample mean (n=229), FE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures	0.0798		GDP growth, %	0.0066	
Days	-0.0018		Unemployment, %	-0.0905	***
Absence of corruption	1.0464	***	Government budget balance % of GDP	0.0043	
Budget transparency	-0.0030		Government debt % of GDP	0.0039	
Government effectiveness	2.4220		2011	-0.0038	
Democracy	-0.1397		2014	-0.0463	
ln(GDP per cap)	-0.6343		2017	0.0165	

In countries with a higher than average level of the absence of corruption (hence with a lower than average level of corruption), the time the bureaucratic procedures take does not influence the efficiency of government spending. The

same holds for the number of procedures. While the strong and positive impact of the absence of corruption is preserved. Higher unemployment is still associated with the lower efficiency of the public revenue allocation. All other factors seem not to have any impact.

However, when it comes to the countries with the lower than average level of the absence of corruption (hence with a higher than average level of corruption), the impact of each additional day spent on bureaucratic procedures becomes negative and significant (see Table 10). While positive and significant effects of the absence of corruption, and GDP growth, a negative and significant effect of the level of unemployment are preserved for this subset of data. Also, negative and significant coefficients in front of time dummies are relatively bigger in magnitude, than the same coefficients estimated for the whole sample.

Table 10. Estimation results for countries where the level of the absence of corruption is less than its sample mean (n=351), FE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures	0.0326		GDP growth, %	0.0185	*
Days	-0.0019	***	Unemployment, %	-0.0357	*
Absence of corruption	1.0328	***	Government budget balance % of GDP	-0.0021	
Budget transparency	-0.0029		Government debt % of GDP	-0.0015	
Government effectiveness	0.3438		2011	-0.2495	***
Democracy	-0.0270		2014	-0.3608	***
ln(GDP per cap)	0.5108		2017	-0.3588	***

We also want to know if there any difference in the estimates for the countries from different income groups⁵. For instance, in high-income countries (see Table 11) each additional bureaucratic check is associated with an increase in the efficiency of government spending. However, among rich countries, those with a higher level of income tend to have lower efficiency in government spending. The absence of corruption still has a significant and positive impact, while the level of unemployment negatively affects the efficiency of public spending. All other coefficients are not different from zero for this subset.

Table 11. Estimation results for high-income countries (n=192), FE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures	0.1080	*	GDP growth, %	0.0184	
Days	0.0013		Unemployment, %	-0.0906	***
Absence of corruption	0.7283	***	Government budget balance % of GDP	0.0043	
Budget transparency	-0.0042		Government debt % of GDP	0.00003	
Government effectiveness	1.1306		2011	0.0536	
Democracy	-0.2461		2014	0.0956	
ln(GDP per cap)	-1.3333	**	2017	0.1666	

Table 12 and Table 13 present the estimation results for the upper-middle and

⁵ The available number of observations allowed us to estimate the models for high, upper-middle and lower-middle income countries.

lower-middle income countries accordingly.

Table 12. Estimation results for upper middle-income countries (n=160), FE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures	0.0727	**	GDP growth, %	0.0202	
Days	-0.0025	***	Unemployment, %	-0.0301	
Absence of corruption	0.6937	**	Government budget balance % of GDP	-0.0084	
Budget transparency	0.0012		Government debt % of GDP	-0.0022	
Government effectiveness	1.2264		2011	-0.2680	***
Democracy	-0.0212		2014	-0.4547	***
ln(GDP per cap)	0.5894		2017	-0.4095	***

For the upper-middle income countries, the magnitude of the coefficients of the number of days and procedures for registering property is slightly higher than for the whole sample. The direction and the significance of the coefficients hold. Again, the absence of corruption has a positive and significant impact on the efficiency of government spending. Time dummies are still negative and significant.

For lower middle-income countries (see Table 13), the quantity of procedures the bureaucracy requires does not influence how efficiently the government allocates public revenue. However, each additional day spent on fulfilling procedures negatively affects the efficiency of government spending. A positive significant effect of the absence of corruption and a negative

significant effect of unemployment are preserved for this subset. Also, government effectiveness has a positive significant impact on the efficiency of public resources allocation in a group of lower-middle income countries.

Table 13. Estimation results for lower middle-income countries (n=144), FE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures	0.0345		GDP growth, %	0.0038	
Days	-0.0026	**	Unemployment, %	-0.0801	*
Absence of corruption	1.1827	***	Government budget balance % of GDP	0.0174	
Budget transparency	-0.0037		Government debt % of GDP	0.0042	
Government effectiveness	3.2288	*	2011	-0.2275	*
Democracy	-0.0389		2014	-0.3127	*
ln(GDP per cap)	0.8354		2017	-0.3655	

5.3. Robustness check

As it is suggested in De Simone et al. (2019), we also estimated the model with normalized from 0 to 1 dependent variable. For this purpose, we used correlated random effects estimation technique within panel limited dependent variable (PLDV) regression framework.

Table 14 contains the results⁶ from PLDV regression for present independent variables for the whole sample.

⁶ The coefficients of the unit-specific time-averages could be accessed by request.

Table 14. Estimation results for the present independent variables, PLDV

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Intercept	0.6356	***			
Procedures for registering property	0.0087	*	Government debt % of GDP	0.00004	
Days for registering property	-0.0004	***	2011	-0.0335	***
Absence of corruption	0.1784	***	2014	-0.0431	***
Budget transparency	-0.0008	*	2017	-0.0393	**
Government effectiveness	0.2682		Eurasia	0.0259	
Democracy	-0.0075	**	Europe and North America	-0.0672	**
ln(GDP per cap)	0.0186		Latin America and the Caribbean	-0.0903	***
GDP growth, %	0.0036	**	Middle East and North Africa	0.0233	
Unemployment, %	-0.0112	***	South Asia	0.0088	
Government budget balance % of GDP	-0.0002		Sub Saharan Africa	-0.0036	

The direction and significance of all the coefficients is the same as before the normalization of the dependent variable.

Table 15 shows the results from PLDV regression for one-year lagged independent variables for the whole sample.

Table 15. Estimation results for the one-year lagged independent variables, PLDV

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Intercept	0.6866	***			
Procedures for registering property	0.0042		Government debt % of GDP	0.0003	
Days for registering property	-0.00007		2011	-0.0366	***
Absence of corruption	0.1768	***	2014	-0.046	***
Budget transparency	-0.0001		2017	-0.0351	**
Government effectiveness	0.3019		Eurasia	0.0186	
Democracy	-0.0055	*	Europe and North America	-0.058	**
ln(GDP per cap)	-0.0045		Latin America and the Caribbean	-0.0893	***
GDP growth, %	0.0013		Middle East and North Africa	0.0221	
Unemployment, %	-0.0083	***	South Asia	-0.003	
Government budget balance % of GDP	0.00003		Sub Saharan Africa	-0.0179	

A robustness check confirmed the direction and significance of all of the coefficients of one-year lagged independent variables but democracy. Namely, a higher level of political regime democracy in the previous year may lead to the lower efficiency of government benefits allocation in the current year.

Chapter 6

CONCLUSIONS

By looking just at the direction and significance of the estimated for the whole sample coefficients, one may say that the time of the bureaucratic procedures negatively affects the efficiency of government spending. However, the value of the coefficient of the number of days for registering property is quite small to make a real impact. While the number of bureaucratic procedures has a significant and positive impact on the efficiency of government spending. The coefficient of the number of procedures for registering property still is not very big, however, it is twenty times as much as the value of the coefficient of the number of days. The general conclusion that may be drawn from this result is that on average the additional bureaucratic check rather helps the government to allocate resources more efficiently. While the bureaucratic hold-ups, holding everything else constant, seem not to have any impact on the efficiency of public spending. What matters, regardless of the subset we use to estimate our model, is the level of the absence of corruption. The higher it is, the higher the efficiency of government resources allocation. For comparison, the magnitude of the coefficient of the absence of corruption is twenty times as much as the magnitude of the coefficient of the number of procedures and four hundred times as much as the magnitude of the coefficient of the number of days for registering property. This means that the first government priority should be the fight against corruption if it wants to increase the efficiency of public spending. Decreasing unemployment can be the second task on the government agenda. For many subsets as well as for the whole sample significant negative effect of the level of unemployment on the efficiency of public revenue allocation was observed. The reasons behind

significant negative coefficients in front of the budget transparency and democracy scores could be further investigated.

We also checked how the values of our predictors in the previous year affect the efficiency of government spending in the current year. We found that one-year lagged values only of the absence of corruption and level of unemployment make an impact on the current level of the efficiency of taxpayers' money spending.

In the next few paragraphs, we would like to highlight the results we obtained while estimating the model on different subsets using the present values of the independent variables. For a group of observations, for which the number of days for registering property exceeds the sum of its sample median and one standard deviation neither an additional government check nor the day spent on bureaucracy has an impact on public spending efficiency. While the magnitude of the absence of corruption variable is higher for this subset than for the whole sample. Oppositely, in a subset, for which the number of days for registering property is either less or equal to the sum of its sample median and standard deviation, the coefficients of the number of procedures and number of days for registering property are almost twice as large as they are for the whole sample. To sum up, this means that when the bureaucracy is slow, then an additional day or procedure spent on it does not matter for the efficiency. The latter mostly depends on the level of corruption. In case the bureaucratic machine works without serious delays, then each additional government check increases the efficiency of public spending, while each additional day spent on bureaucracy decreases it.

For a group of observations, for which the number of procedures for registering property is greater than the sum of its sample median and one standard deviation, the marginal effect of the number of procedures for

registering property is positive and significant. This means that for a subset, where according to our assumption there is undesired proceduralism, still, an additional bureaucratic check may improve the efficiency of government spending. However, for a subset with the number of procedures for registering property equal to or less than its sum of sample median and standard deviation, a marginal effect of a number of procedures is equal to zero. While the negative significant effect of the number of days on the efficiency of government spending is preserved.

For a subset of data where the level of the absence of corruption is greater than its sample mean (i.e. for lower than average corrupt states), neither the number of days nor the number of procedures for registering property affects the efficiency of government spending. While among these less than on average corrupt states those countries that have even higher level of the absence of corruption still demonstrate more efficient public spending. A negative impact of the level of unemployment in this subset is almost twice as large as for the whole sample. In the meantime, for a group of observations with a lower than its sample mean level of the absence of corruption (i.e. for higher than average corrupt states), a negative significant impact of the number of days for registering property on the efficiency of public revenue allocation is observed. However, the magnitude of the coefficient is quite small to change the game.

We also found that for high-income countries the greater number of bureaucratic procedures is associated with the better efficiency of government spending. However, among these rich countries, the richer ones tend to spend taxpayers' money less efficiently. In a subset for upper middle-income countries, as well as in the whole sample, the higher the number of days for registering property the lower the estimate of the efficiency of government spending. The opposite effect demonstrates the number of bureaucratic

procedures. For lower middle-income countries, we also detected a negative significant effect of the number of days for registering property on the efficiency of government spending. While the number of bureaucratic procedures does not show any impact.

One more time we stress the fact that the duration of bureaucratic procedures and the number of the latter may depend on the objective reasons. This is why a blindly cut of the time the bureaucracy takes does not solve the problem, or even may lead to worse efficiency of public spending due to the allocation of government benefits to those who do not need or do not deserve them. Still, the largest impact on the efficiency of public spending has the absence of corruption. However, in more than average corrupt states, the decrease in the duration of bureaucratic procedures may slightly increase the efficiency of public revenue allocation. For example, this can be done by the digitalization of bureaucratic procedures and simultaneous decrease of the human factor involved in the process of evaluation of the applications for government benefits. Similarly, in the states where it takes long to deal with bureaucracy, the first thing the government has to care about is decreasing the level of corruption.

WORKS CITED

- Andrushko, S. 2019. "Help the billionaire: who receives the largest agricultural subsidies from the budget?" Radio Svoboda, February 8, 2019. https://www.radiosvoboda.org/a/schemes/29757789.html?fbclid=IwAR3pkpSydhz_PufzcUnvs_tC66YIUa2Hz6-2LAogzye0jORaz9mVcvAPpdc.
- Caldas Montes, G., J. Albuquerque Bastos, and A. de Oliveira. 2019. "Fiscal transparency, government effectiveness and government spending efficiency: Some international evidence based on panel data approach." *Economic Modelling* 79, no. 6 (June): 211-225. <https://doi.org/10.1016/j.econmod.2018.10.013>.
- Christensen, J., Aarøe, L., Baekgaard, M., Herd, P. and Moynihan, D.P. 2020. "Human Capital and Administrative Burden: The Role of Cognitive Resources in Citizen-State Interactions." *Public Administration Review* 80, no. 1 (January/February): 127-136. <https://doi.org/10.1111/puar.13134>.
- Delavallade, C. 2006. "Corruption and distribution of public spending in developing countries." *Journal of Economics and Finance* 30, no. 6 (June): 222–239. <https://doi.org/10.1007/BF02761488>.
- Fredriksson, A. 2014. "Bureaucracy intermediaries, corruption and red tape." *Journal of Development Economics* 108, no. 5 (May): 256-273. <https://doi.org/10.1016/j.jdeveco.2014.02.005>.
- Hauer, D., and A. Kyobe. 2010. "Determinants of Government Efficiency." *World Development* 38, no. 11 (November): 1527-1542. <https://doi.org/10.1016/j.worlddev.2010.04.004>.
- Jain, A. K. 2001. "Corruption: A review." *Journal of Economic Surveys* 15, no. 1 (February): 71–121. <https://doi.org/10.1111/1467-6419.00133>.

- Liu, C., and J. L. Mikesell. 2014. "The Impact of Public Officials' Corruption on the Size and Allocation of U.S. State Spending." *Public Administration Review* 74, no. 3 (May/June): 346-359. <https://doi.org/10.1111/puar.12212>.
- Lui, F. 1985. "An equilibrium queuing model of bribery." *Journal of Political Economy* 93, no. 4 (August). <https://doi.org/10.1086/261329>.
- Méon, PG., and K. Sekkat. 2005. "Does corruption grease or sand the wheels of growth?" *Public Choice* 122, no. 1 (January): 69-97. <https://doi.org/10.1007/s11127-005-3988-0>.
- Mohammad, A., and Y. Chong Soh. 2020. "Does greater regulatory burden lead to more corruption? Evidence using firm-level survey data for developing countries." World Bank Group. <https://www.enterprisesurveys.org/content/dam/enterprisesurveys/documents/research-1/Does-Greater-Regulatory-Burden-Lead-to-More-Corruption-Evidence-Using-Firm-Level-Survey-Data-for-Developing-Countries.pdf>.
- Mouna, A., B. Nedra, and M. Khaireddine. 2020. "International comparative evidence of e-government success and economic growth: technology adoption as an anti-corruption tool." *Transforming Government: People, Process and Policy* 14, no. 5 (May): 713-736. <https://doi.org/10.1108/TG-03-2020-0040>.
- Moynihan, D., P. Herd, and H. Harvey. 2015. "Administrative Burden: Learning, Psychological, and Compliance Costs in Citizen-State Interactions." *Journal of Public Administration Research and Theory* 25, no. 1 (January): 43-69. <https://doi.org/10.1093/jopart/muu009>.

- Rayp, G., and N. Van De Sijpe. 2007. "Measuring and explaining government efficiency in developing countries." *The Journal of Development Studies* 48, no. 2 (February): 360-381. <https://doi.org/10.1080/00220380601125230>.
- Rose-Ackerman, S. 1997. "The political economy of corruption." in *Corruption and the global economy*, edited by Kimberly Ann Elliott, 31-60. United States: Institute for International Economics.
- Shleifer, A., and R. Vishny. 1993. "Corruption.", *The Quarterly Journal of Economics* 108, no. 3 (August): 599-617. <https://doi.org/10.2307/2118402>.
- De Simone, E., M. Bonasia, M. Gaeta, and L. Cicatiello. 2019. "The effect of fiscal transparency on government spending efficiency." *Journal of Economic Studies* 46, no. 7 (July): 1365-1379. <https://doi.org/10.1108/JES-03-2019-0123>.
- Wooldridge, J. M. 2018. *Introductory Econometrics: A Modern Approach. 7th ed.* USA: Cengage.

APPENDIX A
TRENDS BY REGION

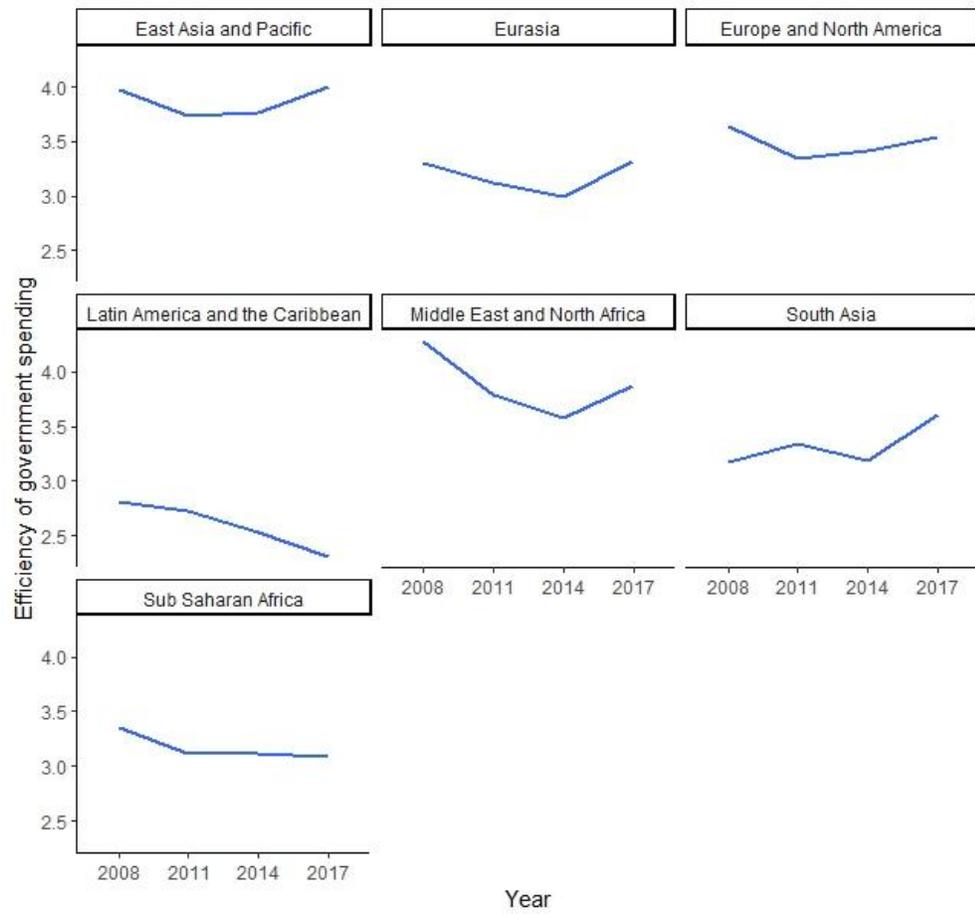


Figure 4. Trends in the Efficiency of government spending by region

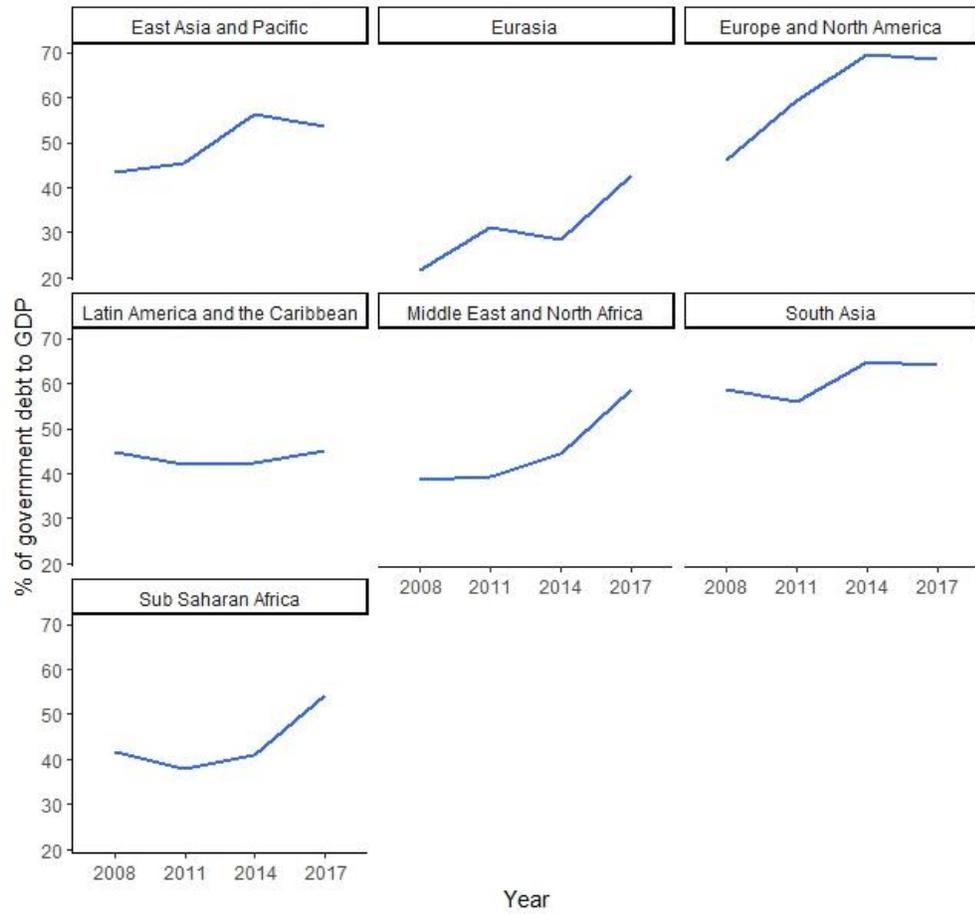


Figure 5. Trends in the Share of government debt to GDP by region

APPENDIX B

SUMMARY STATISTICS OF ONE-YEAR LAGGED PREDICTORS

Table 16. Summary statistics for one-year lagged independent variables

Variable	Mean	SD	Min	Max	Source
Number of days for registering a property	53.450	64.734	1.000	690.000	Doing Business Index, World Bank
Number procedures for registering a property	5.924	2.062	1.000	14.000	Doing Business Index, World Bank
Absence of corruption	0.029	1.012	-1.664	2.446	World Governance Indicators, World Bank
Democracy	4.946	5.843	-10.000	10.000	Polity5 Project, Center for Systemic Peace
Budget transparency	46.560	19.076	0.000	93.160	Open Budget Index, World Bank
Government quality	0.558	0.263	0.000	1.000	International Country Risk Guide, Political Risk Services
GDP per capita, PPP (2017) in thousands	21384.500	20916.900	794.600	120647.800	World Bank
GDP growth, %	4.332	3.898	-26.300	25.000	World Bank
Unemployment, %	7.744	5.932	0.150	34.930	International Labor Organization
Government budget balance % of GDP	-2.496	5.225	-20.392	30.620	Government competitiveness index, World Economic Forum
Government debt % of GDP	48.822	32.514	0.062	248.060	Government competitiveness index, World Economic Forum

APPENDIX C

THE ESTIMATES FOR THE UNIT-SPECIFIC TIME AVERAGES

Table 17. Coefficients of country-specific time averages for present independent variables, CRE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures for registering property	-0.0763				
Days for registering property	0.0022	**	ln(GDP per cap)	-0.1690	
Absence of corruption	-0.2775		GDP growth, %	0.0316	
Budget transparency	0.0027		Unemployment, %	0.0596	***
Government quality	-0.7345		Government budget balance % of GDP	0.0316	
Democracy	-0.0064		Government debt % of GDP	-0.0028	

Table 18. Coefficients of country-specific averages for one-year lagged independent variables, CRE

Factors	Coefficient	Significance	Factors	Coefficient	Significance
Procedures for registering property	-0.0580	*			
Days for registering property	0.0007		ln(GDP per cap)	-0.0791	
Absence of corruption	-0.2607		GDP growth, %	0.0431	**
Budget transparency	-0.0008		Unemployment, %	0.0429	***
Government quality	-0.8980		Government budget balance % of GDP	0.0145	
Democracy	-0.0211		Government debt % of GDP	-0.0049	**