Firm Profits and Government Activity: An Empirical Investigation

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Abstract

Firm profits play a pivotal role in government activity. In times of crises, when profits are low, governments increase their size. Also, if firm profits rise to a level far above what would have been earned in a competitive economy, firms might gain market power, which in turn might influence the activity of the government.

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But are these changes in the activity of the government also efficient? In this paper, we perform a detailed empirical study on the potential effects of firm profits and markups on government size and effectiveness. Using data on 22 European countries for a period of 17 years and an instrumental variables approach, we find that there exists a robust relationship between firm gains and the activity of the state, in the sense that higher firm profits reduce government size and effectiveness. Even in a group of developed countries, such as the European countries, firm power may affect state activity.

Keywords: firm profits, government size, government effectiveness

JEL classification: C23, H11, H50

1 Introduction

As the world is facing a severe crisis caused by the COVID-19 pandemic, government fiscal stimuli to keep economies afloat will undoubtedly reshape and redefine the role of the state in the future. Parallel to the measures taken by the public authorities aimed at reducing the potential impact of the health crisis, fiscal stimulus packages were rolled out by governments to help the private sector, where profits were plummeting, in order to save jobs and businesses. Public spending as a share of GDP is projected to rise to levels unseen in recent history, changing the global economic landscape, perhaps for a prolonged time, as movements in government spending have been shown to be very rigid. But is this increase in government size also efficient, if it happened so fast and the only reason was decreased firm profits?

In this paper, we use country level data for European countries to study whether decreasing firm profits lead to a bigger and more efficient government and discuss possible explanations for these relationships. We show that, even in our dataset of relatively homogenous and developed countries, most of which are required to pass

through the same legislation harmonization process and have a common market, there exists a robust and stable negative relationship between the magnitude of firms' profits, measured through profit markups and profit shares, and the size and effectiveness of countries' governments.

Indeed, government size and effectiveness have been at the focus of the public economics research community for a long period of time as the subject of many, still ongoing debates. Many factors have been used to explain cross-country differences in government size, as for example: national income (Wagner, 1911), trade openness (Rodrik, 1998), country size (Alesina & Wacziarg, 1998), and ethnic diversity (Easterly & Levine, 1997). Also, the effects of different economic, political, and cultural factors on government effectiveness have been examined in the literature (for example, La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999; Lee & Whitford, 2009; Ahlerup & Hansson, 2011).

To the best of our knowledge, no research so far has empirically investigated the role of firm profits as a determinant of government size and efficiency. Our study aims to close this gap by including profits as an additional explanatory variable alongside those that have already been suggested in the literature to explain the variation in government activity, both across countries and across time.

What could be a potential explanation for the negative association between firm profits and government size and effectiveness? On the one hand, in times of crises when firm profits are significantly reduced, governments increase their size to support the economy. Also, government subsidies need to be efficiently distributed in order to achieve maximal effect. On the other hand, it is known that firms that dominate markets (and have profits that are by far larger than expected), may have a role in shaping political decisions related to economic issues. In general, firms aim to maximize profits and pay the lowest possible amount of tax to the state. To achieve this purpose, they may use different channels and try to influence political processes within a country. The lighter forms of influence include proposals to chambers of commerce regarding taxes, customs duties, or

other economic policy issues. More sophisticated forms include media campaigns (with open or hidden participation) about the design of economic policies and lobbying of government officials and parliamentary members for their support. The hardest forms of influence include – but are not limited to – financing (mostly unofficial) of political leaders, politicians, and media, which leads to various types of favors in return.

In this regard, Zingales (2017) highlighted that 69 of the largest 100 firm and government entities ranked by revenues in the world were firms, arguing that in some cases these large firms had private security forces that rivalled the best secret services, public relations offices that dwarfed a US presidential campaign headquarters, more lawyers than the US Justice Department, and enough money to capture a majority of the elected representatives. Also, the argument that firms have a role in shaping political decisions has already been discussed in the literature (Krueger, 1974; Olson, 1982; Appelbaum & Katz, 1987; Buckley, 1998; Zingales, 2012). Moreover, how a firm's market power is translated into political power has received increased interest in the past decade. For example, Stiglitz (2020) argues that "the huge profits generated by market power allow corporations—in our money-driven politics—to buy influence that further enhances their power and profits".

The rest of the paper is organized as follows. In Section 2, first we present the literature on the possible determinants of state size and effectiveness, and then we give a comprehensive overview of the literature that motivated our research. In Section 3, we describe the econometric model, technique, and the data used for the testing of our hypotheses. In Section 4, we present our main findings. Section 5 sets out our conclusions.

2 Literature Review

2.1 The Diversity of Possible Determinants of State Size and Effectiveness

One of the earliest theories of public finance is Wagner's law, which states that there is a long-run tendency of the relative share of the public sector to increase with the growth of per-capita real national income. Wagner (1911) listed three main reasons for this upward trend of government involvement in the economy. First, increasing societal complexity requires greater protective and regulatory activity by the public sector. Second, growth in real income facilitates the relative expansion of income-elastic expenditures on "culture and welfare". And finally, he asserted that economic development and changes in technology require that the government take over the management of natural monopolies in order to enhance economic efficiency (Henrekson, 1993).

In terms of government size, most of the theories are focused either on the determinants of demand for public services or on the determinants of supply for public services (Shelton, 2007). Factors that are most often cited within demand-oriented theories are: national income, trade openness, demographic trends, ethnic fragmentation, and wars. Their common denominator is a necessity for the state to provide insurance against various types of risks.

Cameron (1978) was the first to use trade openness as an explanatory variable for government size. In a sample of 18 OECD countries, he demonstrated that trade openness is a strong predictor of the increase in government tax revenues as a share of GDP. The author suggested that more open countries have higher rates of industrial concentration, which tend to foster higher rates of unionization, better collective bargaining process, and stronger labor confederations that eventually lead to greater demand for government transfers in the form of social security, pensions, unemployment insurance, and job training. In an extended sample of countries, Rodrik (1998) found a positive correlation between trade openness and government expenditure as a share of GDP. He denied that labor organization

was a significant factor here, owing to the existence of weak collective bargaining in most developing countries, and provided an argument that government expenditures are used to provide social insurance against external risks. Similarly, Alesina and Wacziarg (1998) introduced the argument for country size as a mediating factor in the "openness hypothesis". The authors showed that smaller countries have a larger state size and are more open to trade, while large countries can afford to have smaller governments (and therefore lower taxes) because they already benefit from a sizeable market that reduces their need to be open to trade.

On the other hand, Easterly and Levine (1997) present another theory, in which demographic trends are the main determinant of government size. They reported that high ethnic diversity is closely associated with small state size and conjecture that, at least in their sample of African countries, interest-group polarization leads to rent-seeking behavior and reduces the consensus for public goods. In a similar fashion, Alesina, Baqir, and Easterly (1999) showed that ethnic fragmentation is negatively related to local financing of productive public goods (education, roads, libraries, sewers, and refuse collection) in US cities and areas, even after controlling for other socioeconomic and demographic determinants (including black vs. non-black heterogeneity). In a follow-up study, Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003) provided new measures of ethnic, linguistic, and religious fractionalization for about 190 countries and confirmed the previously documented relationship between ethnic fragmentation and spending on welfare within a much broader dataset. Interestingly, they found similar but less significant results for linguistic fragmentation and showed that religious fragmentation is not correlated with welfare redistribution. Their explanation of this finding is that religious affiliation is the most endogenous of these three variables. Ethnicity and language are mostly fixed, but religions can be banned, and individuals can be motivated to "hide" their religion in order to avoid repression.

A detailed examination of the role of war, especially global, in the expansion of state size and building institutional capacity can be found in Rasler and Thompson (1985). Besley and Persson (2008) show that civil wars decrease the state's ability

to raise revenues, while external wars generally lead to an increase in state capacity. However, Thies (2005, 2007) argued that interstate wars in Latin America, as well as in Africa, are not a catalyst for state-building activities.

When it comes to theories focused on the determinants of the supply of public services, the evolution of government expenditure is often seen through the prism of the political organization of a society: political participation, government type, electoral rules, etc. (Shelton, 2007). For example, Meltzer and Richard (1981, 1983) develop and test a general equilibrium model where the size of the government (measured by the share of income that is redistributed) depends on the relation of mean income to the income of the decisive voter as well as the electoral rules. They find that the amount of government spending in the form of redistribution to aggregate income increases with the ratio of mean to median income and with the level of income. Persson and Tabellini (1999) connect the size of the state with the model of electoral system (majoritarian or proportional) and government type (presidential or parliamentary) within a country and find that the size of the government is smaller in countries with presidential regimes. Similarly, Milesi-Ferretti, Perotti, and Rostagno (2002) distinguish between types of government spending (purchases of goods and transfers) and find that governments in countries with majoritarian systems are more focused on spending on public goods, whereas governments in countries with proportional systems are keener to spend on transfers.

Along with government size, economists have also been concerned about the effectiveness of government services. In particular, using a sample of 154 countries, La Porta et al. (1999) look at economic, political, and cultural factors that determine government performance, such as property rights indices, bureaucratic delays, school attainment, infrastructure quality, ethnolinguistic fragmentation, religion, latitude, and many other variables for a large sample of countries. They find that countries with higher income, ethnolinguistic homogeneity, a common law system, or a location further from the equator have better-performing governments. Importantly, the authors also find that governments that are more

effective are also larger in size and collect higher taxes. Furthermore, Ahlerup and Hansson (2011) study the association between nationalism and government effectiveness for a cross-section of countries and find that nationalism has an inverted U-shaped relationship with government effectiveness. Lee and Whitford (2009) make use of the World Bank's Worldwide Governance Indicators (WGI) to analyze variation in government effectiveness across countries and across time to find that a significant part of it is explained by a country's relative position in the worldwide income distribution.

2.2 Firms' Role in Shaping Political Decisions

The idea that firms becoming strong enough to influence political decisions is not new. Berle and Means (1932) wrote: "The rise of the modern corporation has brought a concentration of economic power which can compete on equal terms with the modern state – economic power versus political power, each strong in its own field. The state seeks in some aspects to regulate the corporation, while the corporation, steadily becoming more powerful, makes every effort to avoid such regulation... The future may see the economic organism, now typified by the corporation, not only on an equal plane with the state, but possibly even superseding it as the dominant form of social organization."

Krueger (1974) started with the investigation of the "rent seeking" behavior of firms. Firms are said to seek rents when they try to obtain benefits for themselves through the political arena. They typically do so by getting a subsidy for a good or service that they produce, by special tax treatment, by getting a tariff on a good they produce, or by getting a special regulation that hampers their competitors (see also Appelbaum & Katz, 1987, and Buckley, 1998). Moving these ideas further, Olson (1982) stated that different interest groups, such as cotton farmers and steel producers, have an incentive to form lobby groups and influence policies in their favor, arguing that these policies tend to be protectionist for these groups, which will hurt economic growth. More recently, new strands of literature focus on the excess market power of firms and its relationship with political power.

Zingales (2012, 2017) argues that the interaction of concentrated corporate power and politics is a threat to the functioning of the free-market economy and a threat to democracy as well. Stiglitz (2020) states that market power translated into political power leads to an increase in profits that is above what can be earned in a competitive economy. The conclusions of important studies that analyze firms' role in the government are presented in Table 1.

Table 1: *Overview of Key Studies Analyzing Firms' Role in Government*

Study	Conclusions	Dataset
Krueger (1974)	The value of firms' rents associated with import licenses can be relatively large.	Two country data: India and Turkey.
Olson (1982)	Special interest groups will accumulate over time in stable societies and eventually will reduce the economic efficiency of the economy in which they operate.	Data on 48 American states since World War II.
Appelbaum and Katz (1987)	The outcome depends on the relative bargaining powers of the regulator and the firms, while consumers benefit when firms have less bargaining power in comparison with the regulators.	Formal game-theoretic analysis.
Buckley (1998)	Government policy responses depend on the strategic rent seeking of the transnational corporations.	Formal game-theoretic analysis.
Zingales (2012)	Firms may send lobbyists to politicians who can financially support their campaigns, or promise them the votes of the employees, in exchange for certain legislation to be passed or blocked. Or, former employees of firms can start working in the regulatory body of their sector. Moreover, instead of defensive lobbying, i.e., lobbying to prevent certain legislation that may hurt a firm or sector, there is increasingly more offensive lobbying – lobbying for legislation which actively helps a firm or sector at the expense of other companies, consumers, or other sectors.	Analysis in a book.
Zingales (2017)	The interaction of concentrated corporate power and politics is a threat to the functioning of the free-market economy, and a threat to democracy as well.	Theoretical analysis. Lobbying database (https://www.opensecrets.org/lobby).
Shapira and Zingales (2017)	DuPont was able to delay by more than 30 years any liability for contaminating the water supply near its factory, by hiding information and protecting itself behind the trade secret law.	Internal company documents disclosed in trials.
Stiglitz (2020)	The huge profits generated by market power allow corporations – in existing money-driven politics – to buy influence that further enhances their power and profits.	Analysis in a book.
Ram (2009)	Positive association between openness and government size does not arise due to the mediating role of country size.	41-year panel data for over 150 countries.

Source: Authors' compilation.

While the link between firm profits and state size and effectiveness is not yet established in the literature, certain studies have already theoretically elaborated the relationship between firm power and government size and effectiveness. Acemoglu, Ticchi, and Vindigni (2011) developed a theoretical case to explain the emergence and persistence of inefficient states in which elites capture democratic processes and keep taxation low, at the costs of aggregate inefficiencies. In addition, Epstein and Gang (2019) use game theory to model interactions between rich and poor constituencies on the one hand and a tax administrator on the other hand in order to study the change in the tax enforcement level that subsequently influences the capacity of the state to raise revenues and fund public policy. They find that in states with weak institutions, tax evasion constrains the ability of the state to maximize social welfare.

3 Methodology

3.1 Model

We specify our econometric model as:

$$Government_{it} = \alpha_0 + \alpha_1 Profit_{it} + \alpha_2 Controls_{it} + \alpha_t + \beta_i + u_{it} \ , \quad (1)$$

where the dependent variable $Government_{it}$ is either the government size or government effectiveness of country i in period t. We measure the first variable as the log of the share of government total expenditure as a percentage of GDP in the country, whereas the effectiveness is quantified in raw values using the index from the World Bank's WGI.

For firm profits, we use two different quantities: profit shares and profit markups. As will be elaborated in more detail in the following subsection, both are calculated as aggregate measures for the total financial gains generated by all firms within an economy.

Profits, however, are not enough to explain government activity, and, therefore, in every regression we also include a set of control variables. The first of these is the rule of law in the country, which is expected to have a positive effect on government performance (La Porta et al., 1999). The second is a measure of the level of economic development of a country and is quantified as the log of GDP per capita in purchasing power terms, which is included as a proxy of the Wagner hypothesis – i.e., is expected to have a positive effect on government activity. The third variable is the size of the economy, approximated through the population of the country. According to the previously mentioned empirical investigations, there is an inverse relationship between the economy and state performance – i.e., as the size of an economy increases, the government size and effectiveness significantly decrease (Alesina & Wacziarg, 1998). The last control variable is the openness of the country, which we measure as the log of the share of international trade as a percentage of GDP. More open economies are expected to have larger and more effective governments because of the increased income risk that greater openness usually entails (Ram, 2009).

Finally, in the regression specification we include time (α_t) and country (β_i) fixed effects, in order to account for possible omitted factors that are not controlled by the explanatory variables and may affect the dependent variables.

3.2 Econometric Technique

There might be endogeneity in this model because government activity can also affect firm profitability. Concretely, bigger governments require more revenues, which means higher taxes, and in turn implies lower firm profits. Government effectiveness, similarly, may affect firm profitability through several channels. On the one hand, more effective governments are more likely to prevent tax evasion, which is likely to reduce firm profitability. On the other hand, more effective governments may also improve profitability, through better enforcement of laws and regulations and more effective institutions.

To address this potential endogeneity, one needs to find a way to isolate the changes in firm profitability that are unrelated to government activity. One standard way to do this is through a two-stage least squares (2SLS) estimation procedure. 2SLS is able to overcome the endogeneity problem by instrumenting firm profits in the first stage of the procedure with variables that are unrelated to government activity:

$$Government_{it} = b_0 + b_1 Profit_{it} + b_2 Controls_{it} + \gamma_t + \delta_i + u_{it} \quad (2)$$

$$Profit_{it} = c_0 + c_1 Instrument_{it} + c_2 Controls_{it} + \mu_t + \eta_i + e_{it} \, . \quad (3)$$

The task of finding good instruments is never easy. Good instruments have to be correlated with the explanatory variable, but at the same time uncorrelated with the dependent variable, through channels other than the explanatory variables. Here we propose three instruments: oil prices, exchange rates, and minimum wages. All of them are likely to be related to firm profits. Oil prices constitute an important part of firm expenses, and thus higher oil prices are likely to reduce firm profits; minimum wages are likely to affect wages in general, and through this firm profits as well; exchange rates determine the price of products on foreign markets, and through this affect firm demand as well as firm profits. At the same time, we do not see a direct way in which they are related to government size or effectiveness, other than through the included explanatory variables, at least in this sample of countries. Oil prices might affect government size in oil-producing countries, where governments have revenues from oil. But in our sample, only Norway has significant oil revenues, and this will be captured by the country fixed effects. In extreme situations, when oil prices increase rapidly, they may also result in recessions, which may affect government size, either through lower revenues or the need for higher spending. But oil shocks are clearly outside of the time period that we are analyzing here. Minimum wages might affect government revenues through their effect on consumption and GDP. But this will be captured by the GDP variable, which is included as a control. If minimum wages had sizeable unemployment effects, they could affect government size through the

need for higher social spending induced by the higher unemployment. But the literature on the relationship between minimum wages and unemployment is inconclusive, to say the least. Exchange rates may affect government revenues through their effect on trade (exports and imports). This will be controlled by the trade openness variable (which is the sum of exports and imports). If there are some other one-time effects of the proposed instruments on government activity, they will be accounted for by the time fixed effects. Thus, we consider that our proposed instruments are not related to government activity through channels other than the explanatory variables, and therefore satisfy the two conditions for appropriate instruments.

3.3 Data

The main sources for the data used in our analysis are the WEO database from the IMF, WDI and WGI from the World Bank, ILOSTAT, and Eurostat. The data found in these databases are easily comparable across countries because they broadly follow the same methodology for compilation and are expressed in the same units. For instance, government statistics presented in these databases follow the Government Finance Statistics Manual (GFSM 2014) that is aligned with macroeconomic data from the 2008 version of the System of National Accounts (SNA). The limitation of using the WEO data is their aggregation, as macro-level data cannot offer as much of a detailed insight into sectoral impact as micro-level data. However, in the absence of such a dataset, the WEO database offers a reliable macroeconomic aggregation for the microeconomic outcomes.

Going into detail, as a proxy for government size we use data on general government total expenditure (percent of GDP) from IMF's WEO, while to get data for the second dependent variable, government effectiveness, we take the corresponding indicator from the World Bank's WGI.

Firm profits can be obtained from macro-data (national accounts) and micro-data (corporate accounts). We follow Katsimi and Sarantides (2012) and use data

from national accounts. The choice of national accounts data stems from their consistency across time and across countries, given that comparable and detailed financial statements based on the same financial accounting practices for all of the firms in the countries of our sample were not available to us. Thus, with the use of national accounts data, the magnitude of profits generated within an economy can be obtained by decomposing the domestic output into types of factor income that arise from the final production of goods and services. The profit share is then calculated as a ratio between the gross operating surplus and mixed income and the market value of total output. Recent literature use of this ratio has revealed that the profit share in output has increased in the past couple of decades, in particular in the US and the EU (Smith & Ellis, 2007; Eggertsson, Robbins, & Wold, 2021; Akcigit & Ates, 2019).

Profit markups are more difficult to measure because, by definition, they rely on data for marginal costs that are not directly observed. To overcome this difficulty, several approaches have been suggested in the literature. Some of these approaches include the use of micro-data or firm-level data (De Loecker & Warzynski, 2012; Karabarbounis & Neiman, 2019) or aggregate macro-data (Macallan, Millard, & Parker, 2008; Balakrishnan & López-Salido, 2002). Following Macallan et al. (2008), we obtain an approximation of profit markups as a ratio between the labor share in output and the elasticity of output with respect to labor. The theory behind this ratio is the production function approach that is widely used in the current literature (De Loecker & Warzynski, 2012; Asker, Collard-Wexler, & De Loecker, 2019; Koppenberg & Hirsch, 2022; De Loecker, Eeckhout & Unger, 2021). Given the relative homogeneity of the countries in our sample, an average value of 0.63 elasticity of output with respect to labor was used, as suggested by the literature (Proietti, Musso, & Westermann, 2007; Arratibel et al., 2007; Iradian, 2007). Data needed to calculate both profit indicators were obtained from Eurostat.

The instruments used in our analysis are the minimum wage in 2017 PPP USD collected from the ILOSTAT database, the nominal exchange rate, expressed as

local currency units per USD from the World Bank, and oil shock calculated as a product of oil prices and oil share in a country's imports. Oil prices are averages for Brent, WTI, and Dubai Fateh, taken from the IMF, while oil imports are from UN Comtrade. The data for the remaining control variables – such as GDP per capita (PPP), trade (percent of GDP), population – are from the World Bank database. Annual data, for the period from 2002 to 2018, are used for 22 EU member countries, as of 2018, which had a legislation for a minimum wage.

Data sources, variable descriptions, and their abbreviations are presented in more detail in Table 2. Table 3 shows the descriptive statistics for the variables. Table 4 lists the countries and the mean values of the included variables for each country. As we can see from Table 4, given the range and standard deviation, the cross-country differences are approximately the same in terms of the dependent variable and the independent variables of interest, profit shares, and markups. France is the country with the highest ratio of government expenditure to GDP, followed by Belgium, Greece, and Hungary, whereas Romania and Bulgaria have the lowest ratio. Mean profit share is highest in Greece, Romania, and Ireland, and lowest in France, Croatia, and Slovenia. The mean markups, on the other hand, are largest in Slovakia, followed by Ireland and the Czech Republic. Slovenia is the country with the lowest mean value for the markups.

Table 2: *Data Sources and Description of Variables*

Variable	Code	Definition	Data source	Observations	Note
General government total expenditure (% of GDP)	gov_size	Total expense and net acquisition of non-financial assets.	WEO, IMF	*355*	Measured in logs
GDP per capita, constant prices PPP; 2011 international dollars	gdp_ppp_pc	GDP is expressed in constant international dollars per person.	WEO, IMF	*355*	Measured in logs
Population (persons)	pop	The total population of a country consists of all persons falling within the scope of census.	WEO, IMF	355	Measured in logs
Population ages 65 and above (% of total population)	pop65	Population ages 65 and above as a % of the total population.	WDI, World Bank	355	Measured in logs

Trade (% of GDP)	trade	The sum of exports and imports of goods and services as a share of GDP.	WDI, World Bank	*355*	Measured in logs
Government effectiveness	gov_eff	Captures perceptions of the quality of public services, civil service and the degree of its independence from political pressures, quality of policy formulation and implementation, and credibility of the government.	WGI, World Bank	355	
Rule of law	rule_of_law	Captures perceptions of the extent to which agents have confidence in and abide by the rules of society.	WGI, World Bank	355	
Control of corruption	corruption_ control	Captures perceptions of the extent to which public power is exercised for private gain.	WGI, World Bank	*355*	
DEC alternative conversion factor (LCU per USD)	e_rate	The annual exchange rate used for the World Bank Atlas method, expressed in local currency units per USD.	WDI, World Bank	355	Measured in logs
Statutory nominal gross monthly minimum wage, 2017 USD PPP	min. wage	The minimum monthly earnings of all employees at the end of each year.	International Labour Organization, ILOSTAT	355	Measured in logs
Profit share	profits	The ratio between the gross operating surplus and mixed income and the market value of total output.	Annual macroeconomic database of the European Commission (AMECO)/ Eurostat	355	Measured in logs
Profit markups	markups	The ratio between the elasticity of output w.r.t. labor and the labor share in output.	Annual macroeconomic database of the European Commission (AMECO)/ Eurostat	*355*	Measured in logs
Oil shock	oil_shock	Product between oil prices and oil share in each country's imports.	Oil prices – IMF; Imports – UN Comtrade	355	Measured in logs

Source: Authors' compilation.

Table 3: *Sample Summary Statistics*

Statistic	Observations	Mean	Std. dev.	Minimum	1st quartile	Median	3rd quartile	Maximum
e_rate	355	13.07	48.7	0.5	0.75	0.85	1.50	281.52
gov_size	355	0.43	0.07	0.25	0.38	0.42	0.47	0.65
profits	355	0.45	0.06	0.34	0.40	0.43	0.51	0.64
markups	355	1.22	0.14	0.99	1.10	1.22	1.31	1.85
gdp_pp_c	355	32342.56	16599.26	10738.43	22543.55	28055.02	38384.63	98537.42
pop	355	16.65	20.30	0.40	2.92	10.10	18.35	82.90
trade	355	1.29	0.72	0.47	0.72	1.22	1.55	4.08
gov_eff	355	1.01	0.54	-0.36	0.69	0.99	1.45	2.09
rule_of_law	355	1.01	0.56	-0.26	0.61	1.01	1.44	1.98
oil_shock	355	8.62	7.17	0.33	3.81	6.43	11.52	47.37
minw	355	911.87	481.87	150.92	516.3	825.21	1278.10	2084.71
corruption_control	355	0.85	0.7	-0.44	0.29	0.77	1.41	2.17
pop65	355	0.17	0.02	0.10	0.15	0.17	0.18	0.22

Source: Authors' calculations.

Table 4: *Mean Values of the Studied Variables, per Country*

Country	e_rate	gov_size	profits	Markups	gdp_ppp_pc	pop	trade	gov_eff	rule_of_law	oil_shock	minw	corruption_control	pop65
Belgium	0.81	0.52	0.39	1.04	40651.05	10.86	1.52	1.57	1.38	7.74	1553.14	1.49	0.18
Bulgaria	1.59	0.34	0.5	1.26	15865.5	7.44	1.13	0.14	-0.08	9.74	343.16	-0.15	0.19
Croatia	6.04	0.48	0.36	1.07	20338.37	4.31	0.85	0.54	0.17	9.74	721.49	0.14	0.18
The Czech Republic	22.38	0.42	0.51	1.33	28014.22	10.4	1.32	0.95	0.98	4.13	564.39	0.4	0.16
Estonia	0.81	0.38	0.42	1.25	24404.56	1.34	1.43	1.03	1.14	8.96	483.74	1.1	0.18
France	0.81	0.55	0.35	1.1	38398.77	62.59	0.57	1.51	1.44	7.78	1518.33	1.38	0.18
Germany	0.81	0.46	0.39	1.11	41940.35	81.27	0.79	1.61	1.69	6.02	1824.35	1.83	0.2
Greece	0.81	0.49	0.54	1.23	28099.3	10.96	0.58	0.52	0.56	15.96	980.84	0.09	0.19
Hungary	226.4	0.49	0.41	1.3	23489.63	9.98	1.52	0.69	0.74	4.31	576.69	0.4	0.17
Ireland	0.81	0.37	0.53	1.43	50700.5	4.49	1.81	1.49	1.66	6.42	1380.95	1.58	0.12
Latvia	0.79	0.37	0.47	1.3	20258.35	2.12	1.08	0.76	0.75	7.3	442.18	0.31	0.18
Lithuania	0.81	0.35	0.48	1.31	22662.02	3.11	1.28	0.82	0.78	15.06	486.97	0.38	0.17
Luxembourg	0.81	0.42	0.4	1.21	91974.34	0.51	3.35	1.73	1.82	6.88	1759.95	1.99	0.14
Malta	0.81	0.41	0.45	1.28	30882.25	0.42	2.73	1.06	1.36	17.18	996.27	0.85	0.16
The Netherlands	0.81	0.44	0.41	1.09	46292.09	16.6	1.36	1.84	1.82	10.86	1591.37	2.04	0.16
Poland	3.35	0.43	0.5	1.28	21343.84	38.09	0.85	0.59	0.61	6.25	689.45	0.5	0.14
Portugal	0.81	0.47	0.41	1.14	26681.16	10.46	0.72	1.1	1.12	8.74	767.51	1.03	0.19
Romania	3.3	0.34	0.54	1.22	17181.16	20.54	0.71	-0.23	0.04	5.56	394.27	-0.19	0.16
Slovakia	0.81	0.41	0.53	1.44	24545.66	5.4	1.63	0.82	0.52	5.41	494.47	0.26	0.13
Slovenia	0.81	0.43	0.37	1.03	28501.99	2.03	1.33	1.03	1	6.63	975.09	0.89	0.17
Spain	0.81	0.42	0.44	1.14	33128.23	45.35	0.59	1.18	1.1	10.15	914.14	1	0.18
The United Kingdom	0.63	0.4	0.39	1.09	38033.39	62.78	0.57	1.63	1.71	5.97	1232.95	1.8	0.17

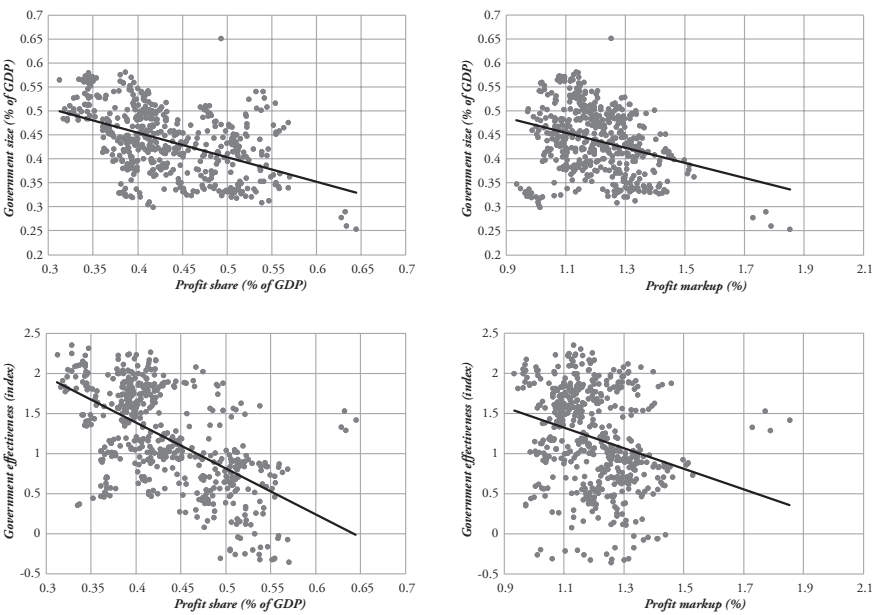
Source: Authors' calculations.

4 Empirical Results

4.1 Descriptive Analysis

We begin the analysis with a graphical representation of the correlation between government activity and firm profits. Figure 1 shows the scatter plots of these variables for all the analyzed countries. The top left panel shows the correlation between government size and the profit share, the top right panel between government size and profit markup, the bottom left between government effectiveness and the profit share and the bottom right between government effectiveness and profit markup. All the scatter plots reveal a clear negative association between government activity and firm profits: as firm profits increase, government activity tends to decline.

Figure 1: *Relationship Between Government Activity and Firm Profitability*



Note: The top panel shows the relationship with government size, whereas the bottom panel with government efficiency.

Sources: IMF's World Economic Outlook database for the general government expenditures, as percentage of GDP; World Bank's World Governance Indicators for government effectiveness; profit share and profit markup as explained in the text; authors' calculations.

4.2 OLS Results

We next present the ordinary least squares (OLS) results of the model shown in Equation (1). OLS also provides consistent, unbiased, and efficient estimation in situations when there is exogeneity among regressors and the errors are homoscedastic and serially uncorrelated. Even though the exogeneity assumption is unlikely to hold in our case, OLS has been the most frequently used method for studying the determinants of government size and effectiveness – see, for example, Shelton (2007) and Ram (2009) – and for that reason, we also report its results. To account for potential heteroscedasticity and serial correlation, the standard errors of each coefficient are corrected by implementing the clustered standard errors procedure. Table 5 reports these results, where the dependent variable in the regressions is shown in the heading row.

Table 5: *OLS Results*

Variable	(1) OLS *gov_size*	(2) OLS *gov_size*	(3) OLS *gov_eff*	(4) OLS *gov_eff*
profits (log)	-0.597***		-0.303	
	(0.201)		(0.323)	
markups (log)		-0.442**		-0.328
		(0.194)		(0.214)
gdp_ppp_pc (log)	-0.332***	-0.370***	0.422**	0.412**
	(0.091)	(0.095)	(0.176)	(0.161)
trade (log)	-0.109	-0.082	0.393	0.436
	(0.125)	(0.129)	(0.265)	(0.267)
pop (log)	-0.093	-0.289**	-0.514	-0.589
	(0.147)	(0.104)	(0.435)	(0.356)
rule_of_law	0.109**	0.103**	0.357***	0.344***
	(0.044)	(0.042)	(0.096)	(0.092)
Constant	2.177**	3.545***	-3.105	-2.540
	(0.843)	(0.940)	(2.715)	(2.090)
Observations	355	355	355	355
R-squared	0.604	0.601	0.471	0.477
Number of countries	22	22	22	22

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

Columns (1) and (2) show the results where the dependent variable is the government size, columns (3) and (4) where the dependent variable is the government effectiveness. We observe that both profit shares and markups exhibit a negative marginal effect on government size and effectiveness. In the government size regressions, the effects are highly significant statistically. A 1 percent increase in the profit share results in an average decrease in the government size of 0.6 percent and a reduction in the government effectiveness of 0.4 units, while an increase in the level of markups is associated with an average decrease in the government size of 0.5 percent and a decrease of government effectiveness of 0.2 units. As for the control variables, the rule of law is significant in all the regressions, with a positive sign implying that countries with a better rule of law have bigger and more effective governments. GDP per capita is also significant in all of the regressions, with negative coefficients in the size regressions, and positive in the effectiveness regressions. The negative sign in the size regressions is against the Wagner law, as it implies that more developed countries actually have smaller governments. The positive sign in the government effectiveness regressions is as expected, as it implies that more developed countries have more effective governments. Population is negative in all regressions, although significant in only a few, implying that bigger countries have smaller and less effective governments, as expected. Trade, finally, is insignificant in all regressions, which might be explained by the similarity of the analyzed countries.

4.3 2SLS Results

As a means of addressing the problem of endogeneity, as explained above, we propose a 2SLS estimation, where firm profits are instrumented by oil prices, exchange rates, and minimum wages. Table 6 presents the 2SLS estimation of Equations (2) and (3), where the dependent variable is the government size. We assess the appropriateness of the instruments on the grounds of three statistics. The first is the F test for the significance of the instruments in the first stage regression – if the F value is greater than 10, it is considered that the instruments

are not weak. The second is the Kleibergen-Paap underidentification test, where the null hypothesis is that the model is under identified, so a *p*-value below 0.05 indicates that the model is identified. The third is the Hansen *J* test, where the null hypothesis is that the instruments are uncorrelated with the error term, so a *p*-value above 0.05 indicates that the instruments are valid. All the tests are reported in the tables. Furthermore, the reported standard errors are robust to both arbitrary heteroskedasticity and arbitrary autocorrelation.

Columns (1) and (2) of Table 6 show the results for the profit share, where column (2) shows the first stage regression and column (1) the second stage regression. From the first stage regression, it can be seen that the three instruments are all strong in explaining the dynamics of the profit share – they are all highly significant and with expected signs. The minimum wage and the oil prices are negative, implying that when they increase, firm profits decline, while the exchange rate is positive, meaning that when the exchange rate depreciates against the USD, firm profits increase, owing to the higher foreign demand. The *F* test for the significance of the three variables is 53, far higher than the rule of thumb value of 10, meaning that the instruments are not weak. From the second stage regression, it can be seen that the profit share is now even stronger than in the OLS estimation – its coefficient is around 1 and highly significant, implying that a 1 percent increase in the profit share results in an average decrease in the government size of 1 percent. This is a very strong effect. For illustration, it indicates that an increase in the profit share of 0.1 basis points, from 0.39 (the 25th percentile of the variable distribution) to 0.49 (the 75th percentile), would lead to a decline in government size of approximately 25 percent.

Columns (3) and (4) of Table 6 show the results for the profit markup. These results are very similar to the previous ones. The three instruments from the first stage regression are strong predictors of the profit markups – all of them are individually significant at 1 percent, with the expected signs, and the *F* test value for their joint significance is 76. Then, in the second stage regression, the markup is highly significant for the government size and with a bigger coefficient than

in the OLS estimation (-0.6), implying that if markups increase by 1 percent, government size declines by 0.6 percent. When the control variables are in question, their coefficients in the 2SLS estimates are very similar to the previously elaborated OLS results.

Table 6: *2SLS Results for Government Size*

Variable	(1)	(2)	(3)	(4)
	Second stage	**First stage**	**Second stage**	**First stage**
	gov_size	***profits***	***gov_size***	***markups***
profits (log)	-0.998*** (0.187)			
markups (log)			-0.581*** (0.114)	
minw (log)		-0.116*** (0.022)		-0.170*** (0.027)
e_rate (log)		0.172*** (0.044)		0.303*** (0.056)
oil_shock (log)		-0.038*** (0.008)		-0.063*** (0.010)
gdp_pp_c (log)	-0.279*** (0.048)	0.225*** (0.033)	-0.357*** (0.041)	0.229*** (0.042)
trade (log)	-0.042 (0.059)	0.139*** (0.035)	-0.043 (0.059)	0.241*** (0.045)
pop (log)	0.108 (0.124)	0.353*** (0.063)	-0.256*** (0.083)	0.021 (0.080)
rule_of_law	0.083*** (0.027)	-0.068*** (0.018)	0.089*** (0.026)	-0.108*** (0.023)
Observations	355	355	355	355
R-squared	0.567		0.593	
Number of countries	22	22	22	22
F test for instruments	53.35		76.73	
Kleibergen-Paap test	0	0		
Hansen *J* test	0.0002	0		

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

Table 7 presents the 2SLS results for government effectiveness. Columns (1) and (2) show the results for the profit share, and columns (3) and (4) for the profit markup. The first stage regressions in both cases are very similar to the government size results – the three instruments turn out to be strong predictors of the profit

shares and profit markups. The second stage regressions indicate that the effects of the profit variables on government effectiveness are again negative, significant, and stronger than in the OLS case – a 1 percent increase in the profit share leads to a decline in government effectiveness by 1 unit, while a 1 percent increase in the profit markup decreases government effectiveness by 0.7 units.

Table 7: *2SLS Results for Government Effectiveness*

Variable	(1)	(2)	(3)	(4)
	Second stage	**First stage**	**Second stage**	**First stage**
	gov_eff	***profits***	***gov_eff***	***markups***
profits (log)	-0.976**			
	(0.409)			
markups (log)			-0.672***	
			(0.252)	
minw (log)		-0.116***		-0.170***
		(0.022)		(0.027)
e_rate (log)		0.172***		0.303***
		(0.044)		(0.056)
oil_shock (log)		-0.038***		-0.063***
		(0.008)		(0.010)
gdp_pp_c (log)	0.511***	0.225***	0.445***	0.229***
	(0.105)	(0.033)	(0.091)	(0.042)
trade (log)	0.506***	0.139***	0.534***	0.241***
	(0.129)	(0.035)	(0.129)	(0.045)
pop (log)	-0.177	0.353***	-0.508***	0.021
	(0.271)	(0.063)	(0.184)	(0.080)
rule_of_law	0.313***	-0.068***	0.309***	-0.108***
	(0.059)	(0.018)	(0.057)	(0.023)
Observations	355	355	355	355
R-squared	0.443		0.464	
Number of countries	22	22	22	22
F test for instruments	53.35		76.73	
Kleibergen-Paap test	0		0	
Hansen *J* test	0.004		0.006	

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

4.4 Robustness Checks

We conduct several robustness checks. First, we reduce the sample of estimation by eliminating several first and last years from the sample. Next, we reduce the

sample by removing the observations with the lowest and highest values. Then, we reduce the instrument set to two variables instead of three. Finally, we change the specification of our model by including two additional explanatory variables: the fraction of the elderly population in the country and the control of corruption and include the lagged values of the dependent variables as instruments.

Table 8 shows the results of the regressions with reduced number of years, for government size. The first three columns show the results where the explanatory variable is the profit share, while the last three columns show the results for profit markups. The first of these columns presents the results where the first several years of the sample are excluded; the second of the columns shows the results where the last several years are excluded; and the third shows the results where both the first and last couple of years are excluded. In all the cases, around 20 percent of the observations are excluded. The exact time periods are indicated in the heading row of the table. It can be seen that the coefficients on the profit variables remain similar as before – highly significant and negative, even with a slightly higher magnitude than previously.

Table 8: *Results for Government Size with Reduced Number of Years*

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	After 2005	**Before 2016**	**After 2004 and before 2017**	**After 2005**	**Before 2016**	**After 2004 and before 2017**
	gov_size	***gov_size***	***gov_size***	***gov_size***	***gov_size***	***gov_size***
profits (log)	-1.609***	-0.960***	-1.637***			
	(0.215)	(0.312)	(0.297)			
markups (log)				-1.032***	-0.538***	-0.926***
				(0.126)	(0.177)	(0.154)
gdp_pp_c (log)	-0.214***	-0.328***	-0.226***	-0.384***	-0.379***	-0.417***
	(0.073)	(0.062)	(0.084)	(0.054)	(0.056)	(0.060)
trade (log)	0.215**	-0.032	0.289***	0.217***	-0.047	0.210**
	(0.087)	(0.073)	(0.106)	(0.078)	(0.069)	(0.085)
pop (log)	0.609***	-0.137	0.326*	0.110	-0.412***	-0.180
	(0.164)	(0.143)	(0.176)	(0.113)	(0.115)	(0.122)
rule_of_law	-0.002	0.107***	0.014	0.008	0.105***	0.038
	(0.036)	(0.034)	(0.040)	(0.032)	(0.033)	(0.033)
Observations	275	288	251	275	288	251
R-squared	0.544	0.494	0.417	0.646	0.532	0.577
Number of countries	22	21	22	22	21	22

F test for instruments	49.81	26.45	34.5	67.85	45.12	56.88
Kleibergen-Paap test	0	0	0	0	0	0
Hansen *J* test	0.610	0	0.158	0.043	0	0.004

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

Table 9 shows the results with reduced number of years, for government effectiveness. The columns are the same as before – the first three columns show the results where the explanatory variable is the profit share, and the last three columns show the results for profit markups. Again, the results remain very stable. Profit variables are negative and highly significant, and on some occasions even with a stronger magnitude than in the baseline regressions.

Table 9: *Results for Government Effectiveness with Reduced Number of Years*

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	After 2005	**Before 2016**	**After 2004 and before 2017**	**After 2005**	**Before 2016**	**After 2004 and before 2017**
	gov_eff	***gov_eff***	***gov_eff***	***gov_eff***	***gov_eff***	***gov_eff***
profits (log)	-0.617* (0.373)	-1.448** (0.673)	-1.052** (0.507)			
markups (log)				-0.516** (0.245)	-0.964** (0.381)	-0.765** (0.299)
gdp_pp_c (log)	0.335*** (0.127)	0.461*** (0.134)	0.462*** (0.144)	0.290*** (0.105)	0.388*** (0.121)	0.355*** (0.115)
trade (log)	0.204 (0.151)	0.580*** (0.158)	0.404** (0.182)	0.254* (0.151)	0.591*** (0.149)	0.417** (0.165)
pop (log)	-0.492* (0.284)	-0.421 (0.309)	-0.628** (0.301)	-0.643*** (0.219)	-0.844*** (0.246)	-0.941*** (0.237)
rule_of_law	0.346*** (0.063)	0.379*** (0.072)	0.327*** (0.069)	0.335*** (0.062)	0.367*** (0.070)	0.329*** (0.065)
Observations	275	288	251	275	288	251
R-squared	0.334	0.378	0.309	0.352	0.428	0.353
Number of countries	22	21	22	22	21	22
F test for instruments	49.81	26.45	34.5	67.85	45.12	56.88
Kleibergen-Paap test	0	0	0	0	0	0
Hansen *J* test	0.023	0.091	0.128	0.048	0.146	0.295

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

We next present the results when the observations with the lowest and highest values for the government activity and firm profits variables are excluded from the sample, in Table 10. The coefficients for the profit variables remain roughly the same as before in magnitude. Only the significance of the profit variables in the government effectiveness regressions declines.

Table 10: *Results with Low and High Values for the Excluded Variables*

Variable	(1)	(2)	(3)	(4)
	Gov. size + profit share	**Gov. size + profit markup**	**Gov. eff. + profit share**	**Gov. eff. + profit markup**
profits (log)	-1.315*** (0.273)		-0.919 (0.694)	
markups (log)		-0.743*** (0.156)		-0.740 (0.515)
gdp_ppp_pc (log)	-0.320*** (0.047)	-0.338*** (0.038)	0.515*** (0.110)	0.487*** (0.107)
trade (log)	-0.087 (0.056)	-0.090* (0.049)	0.580*** (0.136)	0.625*** (0.137)
pop (log)	0.139 (0.117)	-0.172** (0.072)	-0.233 (0.277)	-0.583*** (0.197)
rule_of_law	0.013 (0.032)	0.049** (0.024)	0.355*** (0.078)	0.310*** (0.076)
Observations	305	300	308	300
R-squared	0.416	0.581	0.433	0.483
Number of countries	22	22	21	21
F test for instruments	32.14	45.4	27.98	39.73
Kleibergen-Paap test	0	0	0	0
Hansen *J* test	0.017	0	0.066	0.045

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

We continue the robustness check by reducing the instrument set to two variables, instead of all three. Table 11 shows the results for government size, and Table 12 for government effectiveness. The first three columns of the two tables show the results for the profit share variables, the last three for the profit markup. The instrument set is indicated in the heading row of the tables. It can be seen that the results remain largely unchanged – in Table 11, the profit variables are always highly significant and with coefficients similar to the baseline ones. In Table 12,

the profit variables are insignificant in the cases where the instrument set consists of the oil prices and the minimum wage.

Table 11: *Results for Government Size with Alternative Instrument Set*

Variable	(1) Minimum wage + exchange rate	(2) Oil prices + exchange rate	(3) Oil prices + minimum wage	(4) Minimum wage + exchange rate	(5) Oil prices + exchange rate	(6) Oil prices + minimum wage
	gov_size	*gov_size*	*gov_size*	*gov_size*	*gov_size*	*gov_size*
profits (log)	-1.136*** (0.247)	-0.518* (0.273)	-1.370*** (0.241)			
markups (log)				-0.658*** (0.151)	-0.335** (0.162)	-0.868*** (0.148)
gdp_pp_c (log)	-0.261*** (0.054)	-0.313*** (0.044)	-0.230*** (0.056)	-0.350*** (0.043)	-0.346*** (0.037)	-0.330*** (0.045)
trade (log)	-0.018 (0.066)	-0.023 (0.062)	0.021 (0.069)	-0.021 (0.065)	-0.046 (0.051)	0.039 (0.067)
pop (log)	0.178 (0.150)	-0.158 (0.110)	0.295* (0.151)	-0.238*** (0.088)	-0.272*** (0.073)	-0.189** (0.092)
rule_of_law	0.074** (0.030)	0.097*** (0.026)	0.058* (0.031)	0.081*** (0.028)	0.103*** (0.023)	0.060** (0.029)
Observations	355	510	355	355	510	355
R-squared	0.537	0.517	0.466	0.582	0.521	0.527
Number of countries	22	30	22	22	30	22
F test for instruments	32.81	21.85	39.78	45.07	43.43	52.85
Kleibergen-Paap test	0	0	0	0	0	0
Hansen *J* test	0	0	0.027	0	0	0.001

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

Table 12: *Results for Government Effectiveness with Alternative Instrument Set*

Variable	(1) Minimum wage + exchange rate	(2) Oil prices + exchange rate	(3) Oil prices + minimum wage	(4) Minimum wage + exchange rate	(5) Oil prices + exchange rate	(6) Oil prices + minimum wage
	gov_eff	*gov_eff*	*gov_eff*	*gov_eff*	*gov_eff*	*gov_eff*
profits (log)	-1.256** (0.534)	-1.588** (0.700)	-0.190 (0.461)			
markups (log)				-0.919*** (0.336)	-0.910** (0.403)	-0.134 (0.301)
gdp_pp_c (log)	0.548*** (0.116)	0.470*** (0.113)	0.407*** (0.107)	0.468*** (0.095)	0.365*** (0.091)	0.394*** (0.091)

trade (log)	0.552*** (0.144)	0.444*** (0.159)	0.374*** (0.132)	0.605*** (0.146)	0.349*** (0.127)	0.381*** (0.137)
pop (log)	-0.036 (0.324)	-0.084 (0.282)	-0.571** (0.289)	-0.450** (0.195)	-0.449** (0.183)	-0.635*** (0.187)
rule_of_law	0.295*** (0.064)	0.355*** (0.066)	0.365*** (0.059)	0.284*** (0.063)	0.381*** (0.058)	0.363*** (0.059)
Observations	355	510	355	355	510	355
R-squared	0.414	0.287	0.47	0.439	0.332	0.473
Number of countries	22	30	22	22	30	22
F test for instruments	32.81	21.85	39.78	45.07	43.43	52.85
Kleibergen-Paap test	0	0	0	0	0	0
Hansen *J* test	0	0.063	0.640	0.003	0.043	0.662

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

Next, we change the model specification and investigate if our model is robust with the inclusion of certain explanatory variables from the literature. For this purpose, we include two additional variables in the model. First, we include the log of the fraction of the population aged above 65. This variable is a proxy of the demographic constitution of the country. It is known that demographics play an important role in the production of the long-run government supply and demand. Concretely, the ageing population should exert a positive influence on government spending by increasing the expenditures for social security and medical care, thus additionally affecting the effectiveness of the government (Shelton, 2007; Lee & Lin, 1994). Second, we add the control of corruption variable from WGI. The control of corruption "captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption"[1]. By definition, the control of corruption evaluates the condition of the state with respect to capture by elites and private interests. Therefore, it may serve as an alternative measure for the magnitude of crony capitalism in an economy to our profit quantities. The results are displayed in Table 13. In each specification, the markups and profit shares remain significant explanatory variables with negative marginal effect.

1 More about control for corruption can be read at https://databank.worldbank.org/metadataglossary/1181/series/CC.EST#:~:text=Control%20of%20Corruption%20captures%20perceptions,by%20elites%20and%20private%20interests

Table 13: *2SLS Results for Government Size and Effectiveness with Two Additional Control Variables*

Variable	gov_size	profits	gov_size	markups	gov_eff	profits	gov_eff	markups
profits (log)	-0.986***				-1.185***			
	(0.183)				(0.398)			
markups (log)			-0.582***				-0.778***	
			(0.112)				(0.243)	
minw (log)		-0.123***		-0.181***		-0.123***		-0.181***
		(0.023)		(0.029)		(0.023)		(0.029)
e_rate (log)		0.160***		0.290***		0.160***		0.290***
		(0.045)		(0.057)		(0.045)		(0.057)
oil_shock (log)		-0.039***		-0.062***		-0.039***		-0.062***
		(0.008)		(0.010)		(0.008)		(0.010)
gdp_pp_c (log)	-0.242***	0.252***	-0.323***	0.258***	0.362***	0.252***	0.273***	0.258***
	(0.051)	(0.038)	(0.044)	(0.048)	(0.111)	(0.038)	(0.096)	(0.048)
trade (log)	-0.037	0.142***	-0.035	0.244***	0.505***	0.142***	0.529***	0.244***
	(0.059)	(0.035)	(0.058)	(0.045)	(0.127)	(0.035)	(0.126)	(0.045)
pop (log)	0.123	0.359***	-0.253***	0.003	-0.083	0.359***	-0.517***	0.003
	(0.126)	(0.065)	(0.084)	(0.083)	(0.273)	(0.065)	(0.182)	(0.083)
rule_of_law	0.103***	-0.050**	0.091***	-0.108***	0.291***	-0.050**	0.268***	-0.108***
	(0.030)	(0.021)	(0.030)	(0.027)	(0.065)	(0.021)	(0.066)	(0.027)
pop65_log	-0.139	-0.055	-0.166*	-0.105	0.861***	-0.055	0.828***	-0.105
	(0.090)	(0.068)	(0.088)	(0.087)	(0.196)	(0.068)	(0.190)	(0.087)
corruption_control	-0.046*	-0.033*	-0.021	-0.01	0.109**	-0.033*	0.139***	-0.01
	(0.025)	(0.017)	(0.024)	(0.022)	(0.054)	(0.017)	(0.051)	(0.022)
Observations	355	355	355	355	355	355	355	355
R-squared	0.576		0.598		0.457		0.491	
Number of countries	22	22	22	22	22	22	22	22

F test for instruments	55.14		77.98		55.14		77.98	
Kleibergen-Paap test	0		0		0		0	
Hansen *J* test	0		0		0.092		0.114	

Notes: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' calculations.

Table 14: *2SLS Results for Government Size and Effectiveness With Lags as Additional Instruments*

Variable	(1) Second stage *gov_size*	(2) First stage *profits (log)*	(3) Second stage *gov_size*	(4) First stage *markups (log)*	(5) Second stage *gov_eff*	(6) First stage *profits (log)*	(7) Second stage *gov_eff*	(8) First stage *markups*
profits (log)	-0.808***				-0.602***			
	(0.099)				(0.211)			
markups (log)			-0.547***				-0.419***	
			(0.066)				(0.142)	
minw (log)		-0.062***		-0.083***		-0.055***		-0.076***
		(0.017)		(0.018)		(0.017)		(0.018)
e_rate (log)		0.072**		0.093**		0.062*		0.096**
		(0.035)		(0.039)		(0.036)		(0.040)
oil_shock (log)		-0.01		-0.021***		-0.01		-0.023***
		(0.006)		(0.007)		(0.006)		(0.007)
profits lagged (log)		0.756***				0.715***		
		(0.044)				(0.042)		
markups lagged (log)				0.825***				0.779***
				(0.037)				(0.035)

gov_size lagged (log)		0.062**		0.091***				
		(0.028)		(0.031)				
gov_eff lagged						-0.031**		-0.02
						(0.013)		(0.014)
gdp_pp_c (log)	-0.309***	0.100***	-0.374***	0.090***	0.454***	0.089***	0.407***	0.060**
	(0.044)	(0.028)	(0.042)	(0.030)	(0.095)	(0.027)	(0.090)	(0.029)
trade (log)	-0.05	0.088***	-0.03	0.104***	0.454***	0.101***	0.468***	0.114***
	(0.056)	(0.026)	(0.056)	(0.029)	(0.119)	(0.027)	(0.120)	(0.030)
pop (log)	0.03	0.121**	-0.247***	0.02	-0.376*	0.101**	-0.579***	-0.01
	(0.097)	(0.048)	(0.084)	(0.051)	(0.208)	(0.048)	(0.180)	(0.052)
rule_of_law	0.090***	-0.02	0.092***	-0.036**	0.315***	-0.01	0.315***	-0.03
	(0.025)	(0.014)	(0.025)	(0.015)	(0.054)	(0.014)	(0.054)	(0.015)
Observations	335	335	335	335	335	335	335	335
R-squared	0.607		0.613		0.429		0.437	
Number of countries	22	22	22	22	22	22	22	22
F test for instruments	186		229		187		227	
Kleibergen-Paap test	0		0		0		0	
Hansen *J* test	0		0		0		0	

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

Source: Authors' calculations.

Finally, we add the lagged values of the profit share, profit markups, government size, and government effectiveness to the set of instruments in our 2SLS regression analysis. Table 14 gives these results for the first and second stages of the regression analysis. In every case, firm profits and profit markups remain significant predictors, with negative marginal value of the government size and government effectiveness.

To conclude, the robustness analysis supports the previous findings that firm profits exhibit a sizeable and significant negative effect on government activity.

5 Conclusion

We investigated the potential impact of firm profits on government size and effectiveness for a panel of 22 European countries over a period of 17 years. This was done by considering country-wise aggregated indices of profit shares and margins as measures for the level of firm gains within an economy. By using a 2SLS technique, which accounts for endogeneity, we showed that profits have a significant negative effect on government size and effectiveness. A series of robustness checks was also performed, which confirmed the initial results. Hence, the discovered pattern is non-trivial and may play a major role in shaping state activity.

Various explanations can be given for the direction and the magnitude of the relationship between firm profits and government size and effectiveness.

First, it is obvious that economic cycles drive the government size. In recession periods, government size increases for the purpose of stimulating the economy, whereas in times of boom the government size decreases as the private sector can sufficiently support the economy. Interestingly, here we showed that decreased firm profits also lead to larger government efficiency, suggesting that having a fast response in times of crises does not mean that the money is not spent efficiently. In fact, the opposite might be the case. In this regard, our study offers

an approximation for the impact of the changes in firm profits on a country's government efficiency.

Second, profit accumulation by firms may play a role in shaping political decisions related to economic issues. While the role of the state is vital in resolving significant shocks that economies are faced with, such as the recent pandemic, the documented negative relationship between firms' profits and state size and effectiveness raises the question of the distorted public choice when specific interest groups gain excessive power. This effect is formally known as crony capitalism – the presence of an economic system in which businesses thrive not as a result of risk, but rather due to return on money amassed through a nexus between the business class and the political class. Crony capitalism is directly related to the presence of corruption within a state but may not necessarily represent a synonymous concept. In this case, excessive firm power that shapes political decisions can be considered as a threat to the state to fulfil its functions as well as a threat to democracy.

Lastly, apart from the secular increase in profits from a macroeconomic perspective, another trend observed in parallel is the increase in profit concentration within a relatively small number of companies. In a 2015 report by the McKinsey Global Institute, it was reported that 10 percent of the world's publicly listed companies make around 80 percent of all the profits. According to *The Economist*, this "superstar effect" – observed for large and global companies – is most visible in the United States. The effect has also been confirmed in the literature for some of the largest economies in the world, but mostly for the US (De Loecker et al., 2021; Grullon, Larkin, & Michaely, 2015; Bessen, 2016; Philippon, 2019). In fact, using an example from the telecommunications industry, Philippon (2019) explains that the relationship between competition and concentration arises from rent-seeking behavior among big firms that continuously lobby to increase their profits. Autor, Dorn, Katz, Patterson, and Van Reenen (2020) show, with the use of micro-data, that the increase in the aggregate markup arises because of an increase in the market share of big companies, or "superstar firms". Finally,

using industry-level data, Barkai (2016) studies the shares of labor, capital, and profits and their interaction with market competition and finds that increments in market concentration occur simultaneously with a decline in the labor share and an increase in the profit share. Multinational firms have access to diverse sources of finance and can accumulate sizeable savings that allow them to be less disciplined by the market, i.e., to circumvent domestic market regulation and to potentially abuse the informational and financial advantage over the state with their corporate decisions.

Investigating in detail the role of the last two possible effects on the government appears as a fruitful future topic. This, for example, could be done by deriving a measure for the excess profit margins. We also encourage studies that may extend our analysis to: differences in the impact of sectorial profit concentration across countries, studying patterns in regulation that may lead to higher accumulated profits, etc.

Declaration of interest
The authors declare no competing interests.

Literature

Acemoglu, D., Ticchi, D., & Vindigni, A. (2011). Emergence and persistence of inefficient states. *Journal of the European Economic Association, 9*(2), 177–208. doi: https://doi.org/10.1111/j.1542-4774.2010.01008.x

Ahlerup, P., & Hansson, G. (2011). Nationalism and government effectiveness. *Journal of Comparative Economics, 39*(3), 431–451. doi: https://doi.org/10.1016/j.jce.2011.05.001

Akcigit, U., & Ates, S. T. (2019). What happened to US business dynamism? *National Bureau of Economic Research Working Paper No. 25756*. doi: https://doi.org/10.3386/w25756

Alesina, A., Baqir, R., & Easterly, W. (1999). Public goods and ethnic divisions. *The Quarterly Journal of Economics, 114*(4), 1243–1284. doi: https://doi.org/10.1162/003355399556269

Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., & Wacziarg, R. (2003). Fractionalization. *Journal of Economic Growth, 8*(2), 155–194. doi: https://doi.org/10.1023/A:1024471506938

Alesina, A., & Wacziarg, R. (1998). Openness, country size and government. *Journal of Public Economics, 69*(3), 305–321. doi: https://doi.org/10.1016/S0047-2727(98)00010-3

Appelbaum, E., & Katz, E. (1987). Seeking rents by setting rents: The political economy of rent seeking. *The Economic Journal, 97*(387), 685–699. doi: https://doi.org/10.2307/2232930

Arratibel, O., Heinz, F. F., Martin, R., Przybyla, M., Serafini, R., Zumer, T., & Rawdanowicz, L. (2007). Determinants of growth in the Central and Eastern European EU member states – A production function approach. *ECB Occasional Paper No. 61*.

Asker, J., Collard-Wexler, A., & De Loecker, J. (2019). (Mis)allocation, market power, and global oil extraction. *American Economic Review, 109*(4), 1568–1615. doi: https://doi.org/10.1257/aer.20171438

Autor, D., Dorn, D., Katz, L. F., Patterson, C., & Van Reenen, J. (2020). The fall of the labor share and the rise of superstar firms. *The Quarterly Journal of Economics, 135*(2), 645–709. doi: https://doi.org/10.1093/qje/qjaa004

Balakrishnan, R., & López-Salido, J. D. (2002). Understanding UK inflation: The role of openness. *Bank of England Working Paper No. 164*. doi: https://doi.org/10.2139/ssrn.340544

Barkai, S. (2016). Declining labor and capital shares. *The Journal of Finance, 75*(5), 2421–2463. doi: https://doi.org/10.1111/jofi.12909

Berle, A., & Means, G. (1932). *The modern corporation and private property*. New York, NY: Commerce Clearing House.

Besley, T., & Persson, T. (2008). Wars and state capacity. *Journal of the European Economic Association, 6*(2–3), 522–530. doi: https://doi.org/10.1162/JEEA.2008.6.2-3.522

Bessen, J. E. (2016). How computer automation affects occupations: Technology, jobs, and skills. *Boston University School of Law, Law and Economics Research Paper No. 15-49*. doi: https://doi.org/10.2139/ssrn.2690435

Buckley, P. J. (1998). Government policy responses to strategic rent-seeking transnational firms. In P. J. Buckley, *International strategic management and government policy* (pp. 25–39). London: Palgrave Macmillan. doi: https://doi.org/10.1007/978-1-349-26646-3_3

Cameron, D. R. (1978). The expansion of the public economy: A comparative analysis. *American Political Science Review, 72*(4), 1243–1261. doi: https://doi.org/10.2307/1954537

De Loecker, J., Eeckhout, J., & Unger, G. (2021). The rise of market power and the macroeconomic implications. *The Quarterly Journal of Economics, 135*(2), 561–644. doi: https://doi.org/10.1093/qje/qjz041

De Loecker, J., & Warzynski, F. (2012). Markups and firm-level export status. *American Economic Review, 102*(6), 2437–2471. doi: https://doi.org/10.1257/aer.102.6.2437

Easterly, W., & Levine, R. (1997). Africa's growth tragedy: Policies and ethnic divisions. *The Quarterly Journal of Economics, 112*(4), 1203–1250. doi: https://doi.org/10.1162/003355300555466

Eggertsson, G. B., Robbins, J. A., & Wold, E. G. (2021). Kaldor and Piketty's facts: The rise of monopoly power in the United States. *Journal of Monetary Economics, 124*, S19–S38. doi: https://doi.org/10.1016/j.jmoneco.2021.09.007

Epstein, G. S., & Gang, I. N. (2019). Inequality, good governance, and endemic corruption. *International Tax and Public Finance, 26*(5), 999–1017. doi: https://doi.org/10.1007/s10797-019-09542-z

Grullon, G., Larkin, Y., & Michaely, R. (2015). The disappearance of public firms and the changing nature of US industries. doi: https://doi.org/10.2139/ssrn.2612047

Henrekson, M. (1993). Wagner's law – A spurious relationship? *Public Finance, 46*(3), 406–415.

Iradian, G. (2007). Rapid growth in transition economies: Growth-accounting approach. *IMF Working Paper No. 07/164*.

Karabarbounis, L., & Neiman, B. (2019). Accounting for factorless income. *NBER Macroeconomics Annual, 33*(1), 167–228. doi: https://doi.org/10.1086/700894

Katsimi, M., & Sarantides, V. (2012). The impact of fiscal policy on profits. *Economic Inquiry, 50*(4), 1050–1068. doi: https://doi.org/10.1111/j.1465-7295.2011.00408.x

Koppenberg, M., & Hirsch, S. (2022). Markup estimation: A comparison of contemporary methods at the example of European food retailers. *Agribusiness, 38*(1), 108–133. doi: https://doi.org/10.1002/agr.21711

Krueger, A. (1974). The political economy of the rent-seeking society. *The American Economic Review, 64*(3), 291–303.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government. *The Journal of Law, Economics, and Organization, 15*(1), 222–279. doi: https://doi.org/10.1093/jleo/15.1.222

Lee, B. S., & Lin, S. (1994). Government size, demographic changes, and economic growth. *International Economic Journal, 8*(1), 91–108.

Lee, S.-Y., & Whitford, A. B. (2009). Government effectiveness in comparative perspective. *Journal of Comparative Policy Analysis, 11*(2), 249–281. doi. https://doi.org/10.1080/13876980902888111

Macallan, C., Millard, S., & Parker, M. (2008). The cyclicality of mark-ups and profit margins for the United Kingdom: Some new evidence. *Bank of England Working Paper No. 351*. doi: https://doi.org/10.2139/ssrn.1280900

Meltzer, A. H., & Richard, S. F. (1981). A rational theory of the size of government. *Journal of Political Economy, 89*(5), 914–927. doi: https://doi.org/10.1086/261013

Meltzer, A. H., & Richard, S. F. (1983). Tests of a rational theory of the size of government. *Public Choice, 41*(3), 403–418. doi: https://doi.org/10.1007/BF00141072

Milesi-Ferretti, G. M., Perotti, R., & Rostagno, M. (2002). Electoral systems and public spending. *The Quarterly Journal of Economics, 117*(2), 609–657. doi: https://doi.org/10.1162/003355302753650346

Olson, M. (1982). *The rise and decline of nations: Economic growth, stagflation, and social rigidities*. New Haven, CT: Yale University Press.

Persson, T., & Tabellini, G. (1999). The size and scope of government: Comparative politics with rational politicians. *European Economic Review, 43*(4–6), 699–735. doi: https://doi.org/10.1016/S0014-2921(98)00131-7

Philippon, T. (2019). *The great reversal: How America gave up on free markets*. Cambridge, MA: Harvard University Press. doi: https://doi.org/10.4159/9780674243095

Proietti, T., Musso, A., & Westermann, T. (2007). Estimating potential output and the output gap for the euro area: A model-based production function approach. *Empirical Economics, 33*(1), 85–113. doi: https://doi.org/10.1007/s00181-006-0085-2

Ram, R. (2009). Openness, country size, and government size: Additional evidence from a large cross-country panel. *Journal of Public Economics, 93*(1–2), 213–218. doi: https://doi.org/10.1016/j.jpubeco.2008.04.009

Rasler, K. A., & Thompson, W. R. (1985). War making and state making: Governmental expenditures, tax revenues, and global wars. *American Political Science Review, 79*(2), 491–507. doi: https://doi.org/10.2307/1956662

Rodrik, D. (1998). Why do more open economies have bigger governments? *Journal of Political Economy, 106*(5), 997–1032. doi: https://doi.org/10.1086/250038

Shapira, R., & Zingales, L. (2017). Is pollution value-maximizing? The DuPont case. *NBER Working Paper No. 23866*. doi: https://doi.org/10.3386/w23866

Shelton, C. A. (2007). The size and composition of government expenditure. *Journal of Public Economics, 91*(11–12), 2230–2260. doi: https://doi.org/10.1016/j.jpubeco.2007.01.003

Smith, K., & Ellis, L. (2007). The global upward trend in the profit share. *BIS Working Paper No. 231.*

Stiglitz, J. (2020). *People, power, and profits: Progressive capitalism for an age of discontent*. W. W. Norton & Company.

Thies, C. G. (2005). War, rivalry, and state building in Latin America. *American Journal of Political Science, 49*(3), 451–465. doi: https://doi.org/10.1111/j.1540-5907.2005.00134.x

Thies, C. G. (2007). The political economy of state building in sub-Saharan Africa. *The Journal of Politics, 69*(3), 716–731. doi: https://doi.org/10.1111/j.1468-2508.2007.00570.x

Wagner, A. (1911). Staat (in nationalökonomischer Hinsicht). *Handwörterbuch der Staatswissenschaften, 7*, 727–739.

Zingales, L. (2012). *A capitalism for the people: Recapturing the lost genius of American prosperity*. Basic Books.

Zingales, L. (2017). Towards a political theory of the firm. *Journal of Economic Perspectives, 31*(3), 113–130. doi: https://doi.org/10.1257/jep.31.3.113