Opportunistic privatization

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Abstract

We argue that, in the run-up to elections, self-interested politicians use privatization opportunistically to buy votes and increase their probability of re-election. When state-owned firms are privatized, politicians can use (implicit) subsidies to persuade the new managers to pursue inefficient strategies that bring political benefits to them. Under plausible assumptions, politicians have a strict preference for privatization over state ownership in the run-up to elections. We test these predictions using a unique dataset covering the full population of former socially owned enterprises in post-Milošević Serbia (2002-2019). We report robust conditional correlations consistent with our theory. Privatization sales and revenues increase significantly in pre-election periods. The firms privatized before elections are sold at a lower price, and exhibit higher total costs after privatization, than otherwise similar firms. They also have a higher probability of bankruptcy and, conditional on surviving, display lower profitability than otherwise similar firms. These findings highlight the link between privatization, elections and corruption, and point to the need for monitoring, or even suspending, privatization sales during election periods.

Keywords: privatization, elections, corruption, collusion, cooperative games, stochastic frontier analysis

JEL codes: C71, C78, D72, D73, L33

1 Introduction

Once regarded as a cure for market failure (e.g. Atkinson and Stiglitz, 1980; Wilner, 2001), state ownership is now mainly seen as a recipe for inefficiency and mismanagement (e.g. Shleifer and Vishny, 1994). Managers of public companies are more likely to serve the interest and objectives of politicians than maximize efficiency and profits. They often pursue strategies, such as excess employment, that are politically beneficial but economically ruinous. Since the 1980s, both advanced and emerging economies have launched far-reaching privatization programs aimed at increasing the productivity and profitability of state firms. In the former socialist countries, ownership transformation was perhaps the most emblematic feature of the transition from a planned to a market economy that began in 1989.

While potentially beneficial, privatization is also frequently associated with corruption risks. Concerns are often raised about the prices paid for the assets, or the impact of asset sale on the local economy (Bjorvatn and Soreide, 2005). Joseph Stiglitz noted that, in some cases,

> 'a rigged privatization process was designed [solely] to maximize the amount government ministers could appropriate for themselves, and not the amount that would accrue to the government's treasury, let alone the overall efficiency of the economy' (2002: 58)

In some transition economies, privatization has also been linked to the rise of corrupt oligarchs. In post-Soviet Russia, many lucrative state-owned assets were acquired by managers and bureaucrats belonging to Soviet-era nomenklatura, usually at a fraction of their market value (Braguinsky, 2009).

Guriev and Rachinsky (2005: 138) describe the '"loans-for-shares" auctions held [in Russia] in the mid-1990s [as] the most scandalous episode of Russian privatization'. They argue that 'the scheme was designed to consolidate the bankers' support for Yeltzin's re-election campaign in 1996' (2005: 138).

Beyond anecdotal evidence, however, the relationship between privatization and corruption remains underexplored. Furthermore, little is known about the impact of elections on privatization − how the preferences and behavior of campaigning politicians may affect, distort or corrupt the privatization process. In this paper, we describe and document a type of privatization − which we refer to as 'opportunistic' − that is associated with mismanagement and inefficient outcomes. We argue that, in the run-up to elections, self-interested politicians use privatization opportunistically to pursue political objectives − namely, buy votes or interest group support, and increase their chance of being re-elected. Political opportunism, in turn, reduces the performance of the firms privatised before elections compared to other privatised firms.

The election-related effects documented in this paper emerge naturally in simple extensions of Boycko et al.'s (1996) seminal model of privatization. When public companies are privatized, politicians can use subsidies to buy back control, and re-impose their preference for politically beneficial, but economically costly, firm strategies. In countries with weak formal institutions and a culture of corruption, politicians can strike credible and mutually beneficial bargains with managers at a relatively low cost. We show that, during election periods (though not in general), politicians can earn a higher pay-off by privatizing public firms than keeping them under state ownership, provided bargaining is feasible. This finding is underpinned by a simple intuition. During election campaigns, the political costs of bargaining with managers are lower than the political costs of creating or maintaining inefficiencies in state firms, which are typically under heightened public scrutiny. This mechanism implies that politicians have an incentive to increase privatization efforts during election periods. It also implies that the public companies privatized before elections are more likely to receive subsides and exhibit higher costs than the public companies privatized outside of election periods.

We test these predictions using data on privatization sales in Serbia (2002-2019). We combined various primary and archival sources to construct a unique, micro-level dataset that records the privatization history and post-privatization performance of (nearly) all the socially owned enterprises (SOEs) sold in Serbia since January 2002. A middle-income economy that emerged from the collapse of the former Yugoslavia, Serbia is characterized by a weak rule of law, endemic corruption and a semi-presidential form of government. The transition process in Serbia lagged behind other post-socialist economies by over a decade, as policy reforms did not begin in earnest until the downfall of former 'strongman' president Slobodan Milošević in 2000. For this reason, Serbia provides an excellent setting to test the relationship between privatization, corruption and elections using recent data.

Based on time-series regressions, we first document an election cycle in privatization activity. Both

privatization revenues and the number of sales increase significantly in the last quarter prior to presidential elections. Exploiting variation at the firm level, we show that the SOEs privatized during election periods are both offered and sold at a discount relative to comparable firms. They also exhibit systematically higher costs after privatization than other former SOEs with a similar cost function. Although several interpretations are possible, we argue that the estimated price discounts are likely to reflect an implicit subsidy that politicians pay to persuade managers to maintain or introduce excess costs. Excess costs may arise from a number of inefficient strategies valued by politicians − for instance, excess employment (as in Boycko et al. [1996]), excess wages, the choice of high-cost (but politically beneficial) locations, or the choice of low-quality (but politically connected) input suppliers. We cannot distinguish between these channels using our data. In practice, however, 'opportunistically privatized' firms may use a combination of costly strategies to mobilize political support and promote the interests of subsidy-paying politicians.

Finally, we examine the implications of electoral bargains between politicians and managers for the performance of privatized firms. We find that the firms privatized before elections are more likely to go bankrupt than otherwise similar firms. Conditional on surviving, these firms are also less profit-efficient than otherwise similar firms − that is, they display significantly lower profits than implied by their profit function. Although our data do not allow us to document the impact of opportunistic privatisation on the incumbent's likelihood of being re-elected, we believe that in the context of Serbia the manipulation of the privatization process may be part of a larger toolbox of opportunistic strategies pursued by campaigning politicians.

Our findings highlight the link between privatization, corruption, and elections. To our best knowledge, this is the first paper that investigates this link in detail using comprehensive micro-data. As such, it contributes to at least three strands of previous research.

First, our findings relate to the large literature on the effects of privatization on corporate performance (see Megginson and Netter [2001] and Estrin et al. [2009] for systematic reviews). The existing evidence documents post-privatization improvements in sales revenues, operating efficiency and profitability, particularly for firms in advanced economies (Megginson et al., 1994) and in the ex-communist countries of Central Europe (Frydman et al,. 1999). In countries with less prudent fiscal policies, lower-quality institutions and elite entrenchment (e.g. the Soviet and Yugoslav successor states), privatization has been found to have mixed (Djankov, 1999; Parker and Kirkpatrick, 2005) or even negative effects (Perevalov et al., 2000; Brown et al., 2006). Frydman et al. (1999) report heterogeneous effects at the firm level depending on the type of owners to whom privatization gives control (e.g. insiders vs. outsiders), while Boubakri et al. (2005) highlight the quality of corporate governance as a factor shaping privatization outcomes. To our best knowledge, previous studies have not linked the heterogeneous performance of privatized firms to either the timing of privatization or

the incentives arising from electoral competition. Our research fills this gap.

Second, a small number of studies have examined the link between privatization and corruption (Kaufmann and Sigelbaum, 1996; Clarke and Xu, 2004; Koyuncu et al., 2010). In cross-country regressions, the private sector share in GDP is found to correlate negatively with the level of perceived corruption. Much less is known, however, about the impact of the privatization *process* itself − as opposed to the *outcome* of privatization − on the prevalence of corruption. Our findings partly address this gap, suggesting that privatization sales are more likely to feature corruption when they take place during election periods. This finding implies that privatization may contribute to an overall increase in perceived corruption during election years, as found in previous research (Potrafke, 2019).

Finally, our findings relate to the literature on political business cycles. Previous studies have documented extensively the manipulation of fiscal and monetary policy by politicians seeking re-election (Alesina et al., 1997). In the classic 'opportunistic' model, incumbent politicians provide economic stimulus during election years in order to please voters (Nordhaus, 1975; Rogoff and Sibert, 1988; Oriola, 2023). While the evidence from advanced democracies is mixed (Brender and Drazen, 2005), there is strong evidence of opportunistic behavior by politicians in developing (Block, 2002) and transition economies (Akhmedov and Zhuravskaya, 2004), where checks on executive behavior are weak and voters discount their memories about past macroeconomic outcomes at a faster rate (Findley, 2015). For Serbia, for instance, Ivanović et al. (2023) document a significant increase in fiscal deficit in the months preceding scheduled elections. This paper contributes to this literature by highlighting the privatization process as an additional policy tool that vote-seeking politicians may choose to manipulate in order to increase their chance of re-election.[1]

While traditional models suggest that campaigning politicians maximize votes by providing economic stimulus, we emphasize a different and complementary mechanism − namely, collusion between politicians and managers. By persuading managers to maintain or introduce inefficiencies, politicians generate political benefits without necessarily stimulating the economy at large. In this sense, our mechanism is similar to that documented by Khemani (2004), who analyzed Indian state-level data and found evidence of 'election-year targeting of special interest groups possibly in return for campaign support, as opposed to populist spending sprees to sway the mass of voters' (2004: 125).

The rest of the paper is organized as follows. Section 2 presents the model and uses it to derive testable predictions. In section 3, we present the context of post-socialist Serbia, and introduce our data. Sections 4-6 discuss the empirical results. Section 7 concludes.

[1] Using macro-level data for the periods 1990-2007 and 1977-1999, respectively, Bjørnskov and Potrafke (2011) and Bortolotti et al. (2003) find no significant change in privatization activity during election *years*. Yet, studies using low-frequency (e.g. annual) data may fail to identify a pre-election effect if the increase in privatization activity is concentrated in the last few *months* before elections (Akhmedov and Zhuravskay, 2004), as is the case in our setting. Indeed, using monthly data from Albania for the period 1995-2015, Lami et al. (2016) report evidence of a significant increase in privatization revenues during pre-election months. Their study, however, is limited to a time-series analysis and does not use micro-data to investigate the effects of elections on firm-level outcomes.

2 Theoretical framework

We use a version of the model of privatization presented by Boycko et al. (1996) and generalized by Shleifer and Vishny (1994). In this model, politicians and managers bargain over the decisions of a firm. We focus specifically on the level of expenditure chosen by the firm to hire inputs. This framework is useful to examine the decision of politicians to pay subsidies to firms, and the firms' decision to undertake costly strategies. In simple extensions (sections 2.3-2.4), we augment this model by introducing elections into the setting, and derive testable hypotheses about the behavior of politicians and firms before and after elections.

2.1 Model setup

There are three players − a spending politician, the manager of the firm, and taxpayers, who are also voters. Under private ownership, the manager serves the interests of the firm's shareholders; under state ownership, he serves the interests of politicians. Let $\alpha \in \{0, 1\}$ denote the ownership status of the firm, with $\alpha = 1$ indicting private ownership with managerial control, and $\alpha = 0$ state ownership with politician control. Whoever owns the firm has a right to control the firm's level of expenditure. Denote by C the excess costs of the firm − that is, any expenditure in excess of the efficient level implied by the firm's cost function. For simplicity, we restrict C to two possible levels of spending, 0 and $\gamma > 0$. When $C = 0$, the firm is spending efficiently on the cost frontier; when $C = \gamma$, the firm spends γ dollars in excess of minimal costs.

Politicians derive political benefits q from every dollar of excess expenditure. The reason is that hiring inputs brings votes (if the firm hires political supporters) and bribes (if the firm awards a contract to a politically connected supplier). Excess expenditure reduces the firm's profits. When the firm is owned by the state, the politician also cares about the profits forgone by the firm, as taxpayers can impose sanctions if the firm incurs losses − for instance, by holding the politician accountable at the ballot box. Denote by m the political cost of a dollar of profits forgone due to excess expenditure.

Notice that this framework assumes (realistically) that taxpayers are heterogeneous. Some taxpayers are 'short-sighted' and reward politicians for choosing an inefficient level of expenditure, generating a non-zero political benefit q. Other taxpayers are 'public-spirited' and punish politicians for choosing inefficient strategies, generating a non-zero political cost m. In Boycko et al.'s (1996) model, q and m are not micro-founded. We can speculate that q depends on the nature and level of political competition: 'if politicians compete for votes by promising jobs [...], then competition for votes raises' the marginal

political benefits of inefficiency (Shleifer and Vishny, 1994: 1013).[2] We also suggest that m depends on the relative balance of public-spirited and short-sighted taxpayers, as well as the intensity with which public-spirited taxpayers monitor the state sector.

When the firm is sold to private shareholders, the level of C is chosen by the manager. To persuade the manager to raise C from 0 to γ, the politician can offer a subsidy, making a transfer T from taxpayers to the firm (Boycko et al., 1996). Similar to excess spending under state ownership, subsidies to private firms are not costless to politicians, who need to justify them to (or hide them from) public-spirited taxpayers. Denote by k the marginal political cost to the politician of subsidizing a private firm. Further, assume that when the firm is fully efficient ($C = 0$), it earns profits π.

We first treat α as an exogenous parameter. The choice of ownership structure may be driven by programmatic or ideological considerations outside of politicians' control. In a post-socialist country such as Serbia, this choice may also be influenced to a significant extent by external actors such as the World Bank.

Under these assumptions, the politician's (U_p) and manager's utility functions (U_m) are given by:

$$U_p(C,T) = qC - m(1-\alpha)C - kT \tag{1}$$

$$U_m(C,T) = \alpha(\pi - C + T) \tag{2}$$

2.2 Analysis

The firm starts out under state ownership, so the politician chooses both C and T. When $\alpha = 0$, the net transfer T from taxpayers to state-owned enterprises is 0 by definition.[3] Thus, the politician chooses the level of C that maximizes $qC - mC$. Specifically, he strictly prefers cost-inefficient strategies ($C = \gamma$) over cost-efficient ones ($C = 0$) as long as the political benefits (q) of excess spending are larger than the political costs (m). $q > m$ holds when political competition is high, and 'public-spirited' taxpayers are either few or they exert a low level of monitoring effort. In section 3.1, we argue that this condition is likely satisfied in the context of a young democracy such as Serbia.

When the firm is privatized ($\alpha = 1$), T is chosen by the politician (and can be greater than 0), but the level of C is now chosen by the manager. At baseline, the players behave non-cooperatively. The politician chooses the level of T that maximizes $qC - kT$ (subject to the constraint that T should be non-negative), while the manager chooses the level of C that maximizes $\pi - C + T$ (subject to the constraint that C should be non-negative). Trivially, at the Nash equilibrium of this game, $C = T = 0$.

[2] In a perfectly secure dictatorship, $q = 0$ (Shleifer and Vishny, 1994: 1013).

[3] It is common for public enterprises to receive subsidies from the state in the early stages of post-socialist transition (e.g. Ahrend and Martins, 2003). Since this is not our main interest, however, we focus on net subsidies (from the state to the private sector) rather than *gross* subsidies, which are reallocations across state agencies.

Whatever the choice of the manager (politician), the politician (manager) is always better off by keeping subsidies at zero (choosing an efficient cost strategy). Under private ownership, the utility U_p^D of the politician is 0, and the utility of the manager U_m^D equals π. The politician extracts no political benefits from the firm, while the manager realizes the maximal profit implied by the firm's efficiency frontier.

U_p^D and U_m^D characterize the (disagreement) outcome that prevails when collusion is infeasible, and privatization is efficiency-enhancing relative to state-ownership. Under reasonable assumptions, however, the politician and the manager may collude to improve their utilities. In particular, the politician can offer a subsidy $T > 0$ to buy politically attractive inefficiencies ($C = \gamma$) from the firm manager. While this bargain is not enforceable in courts, the players may rely on reputation or other informal mechanisms for enforcement. These mechanisms are often available in contexts with a historically rooted culture of corruption, where the moral value attached to law-abidance is low, and trust depends largely on reputation. In Serbia, the prevalence of corruption and clientelism suggests that politicians and managers may feasibly collude (Bieber, 2020).

The outcome of this cooperative game is given by the Nash bargaining solution: the politician and manager maximize the product of their utility gains over what each would realize if they failed to reach a bargain (i.e. under the disagreement outcome):

$$\max_T (q\gamma - kT)(\pi - \gamma + T - \pi) \tag{3}$$

In equilibrium, the politician will thus transfer subsidies in the amount of:

$$T^* = \frac{1}{2}\left(\frac{q}{k} + 1\right)\gamma \tag{4}$$

Note that the bargain is struck if and only if both the politician and manager are better off with inefficiencies and subsidies than without them ($q\gamma - kT^* > 0$ and $\pi - \gamma + T^* > \pi$). This is the case if the benefits of excess costs to the politician are larger than the political costs of subsidies ($q > k$). This condition, again, holds when political competition is high (high q), and taxpayers are predominantly 'short-sighted' (low k). If $q > k$, it also follows from (4) that $T^* > \gamma$. The firm manager uses a fraction $2k/(q + k)$ of the subsidy to pay for the inefficiencies valued by politicians, and adds the remaining portion $(q - k)/(q + k)$ to the firm's bottom line.

By substituting expression (4) for T, and γ for C, in (1) and (2), we confirm that collusion improves the utilities of the politician and manager relative to the disagreement outcome:

$$U_p^* = \frac{1}{2}(q - k)\gamma > U_p^D \tag{5}$$

$$U_m^* = \pi + \frac{1}{2}\left(\frac{q}{k} - 1\right)\gamma > U_m^D \tag{6}$$

Although collusion reduces the efficiency of the firm, it produces an outcome that is jointly efficient from the point of view of managers and politicians. These calculations can be summarized in the following result:

Proposition 1 (Exchange of subsidies for inefficiencies) *When informal mechanisms exist to enforce collusive agreements, politicians transfer state subsidies to privatized firms in exchange for managers choosing economically costly, but politically beneficial, firm strategies.*

Note that the subsidy T^* is akin to a bribe paid by the politician to the manager, while the manager's spending on inefficiencies may be thought of as a kickback from the manager to the politician. For this reason, incorporating bribes explicitly in the model, as in Shleifer and Vishny (1994), does not substantively alter this result.

2.3 Privatization and elections

Since politicians can use subsidies to extract political benefits from privatized firms, it is natural to ask whether they prefer state or private ownership. This question is relevant because it may be possible for the politician to influence the choice of ownership structure - in other words, α may be endogenous. The politician, for instance, may be able to exert pressure on the agency in charge of the privatization process. This kind of influence has been documented extensively in transition economies, especially where the public administration is highly politicised (Meyer-Sahling et al., 2016).

The politician's preferences can be derived from the model. Under state ownership, the politician's utility is given by:

$$U_p^S = (q - m)\gamma \tag{7}$$

while under private ownership it is given by equation (5), provided bargaining is feasible. It is easy to see that the politician prefers state-ownership ($U_p^S > U_p^*$) if and only if $(q + k) > 2m$.

A sufficient condition for this inequality to hold is that both q and k are larger than m. We already argued that $q > m$ holds if taxpayers are predominantly short-sighted and political competition is high, as is plausibly the case in the context of Serbia. Boycko et al. (1996) also argue that, in general, $k > m$. It is less costly for politicians to squander SOEs' profits on inefficiencies than to get additional subsidies for private firms:

> 'when [a public enterprise] squanders its profits, most members of the government do not know that it is potentially profitable [...]. In contrast, when a [private] firm receives a subsidy, the minister must compete for the resources of the Treasury with all the other politicians' (1996, 314).

In sum, even if collusion raises the politician's utility after privatization (relative to the disagreement outcome), the politician is still better off under state ownership. Thus, in general, politicians should

be expected to resist privatization.

Provided bargaining is feasible, however, it can be shown that the politician's relative preference for state ownership ($U_p^S - U_p^*$) is reduced or even reversed during election periods. To obtain this result, we add structure to the model by characterizing elections. While 'short-sighted' taxpayers select incumbent politicians if doing so brings them a private benefit (e.g. a job in a state-owned or privatised firm), 'public-spirited' taxpayers select the incumbent only if they can rule out a certain level of inefficiency in the state sector. To do so, they increase their monitoring effort during election periods. This, in turn, increases the political cost m of excess expenditure in public firms.[4] Thus, holding q and k constant, the politician's relative preference for state ownership, which is given by $(\frac{1}{2}q + \frac{1}{2}k - m)\gamma$, goes down during election campaigns, weakening politicians' resistance to privatization.

Campaigning politicians may even prefer privatization to state ownership ($U_p^S - U_p^* < 0$), provided bargaining is feasible. This is the case when:

$$(q + k) < 2m \tag{8}$$

A sufficient condition for (8) is that both q and k are smaller than m. $q < m$ holds if a large increase in pre-electoral monitoring effort causes the political costs of excess expenditure in state firms to outweigh the political benefits, given the level of political competition.

$k < m$, in turn, holds if the political cost of subsidies is low relative to the political cost of excess expenditure in public enterprises. Consider first the cost of subsides. Politicians can lower k by making the subsidy transfer *implicit* − as in a one-off price discount at the point of sale. Taxpayers do not know the true value of public enterprises. Thus, a discount on the sale price is more difficult to detect (is less politically costly to politicians) than an explicit (out-of-pocket) expenditure.[5] Now, compare the political cost of an implicit subsidy of this kind to the political cost of excess expenditure in public enterprises. Generally, the true market value of a firm is more difficult to observe or determine than the firm's cost structure. It follows that a discount on the sale price of a public firm is less easily detectable (and hence easier to justify to public-spirited taxpayers) than the squandering of public firms' profits on inefficiencies ($k < m$). This argument assumes that politicians can manipulate sale prices − for instance, by influencing the agency in charge of privatization.

These findings can be summarized with the following proposition:

Proposition 2 (Preference for privatization before elections) *During election periods, politicians prefer privatizing public enterprises and buying an inefficient level of C by colluding with managers, to increasing*

[4] While 'public-spirited' taxpayers demand accountability for the performance of the state sector, which is controlled by politicians, they do not typically hold politicians accountable for the decisions of private firms, which are controlled by managers.

[5] Several studies have documented the extensive use of implicit subsidies, e.g. for food and fuel, in developing and transition countries (Besley and Kanbur, 1988; Arze del Granado et al., 2012).

C in public enterprises. At least, politicians' relative preference for increasing C in public enterprises (over privatizing and colluding) is smaller than outside of election periods.

In turn, Proposition 2 implies:

Proposition 3 (Election cycle in privatization activity) *Provided politicians can influence the privatization agency, they will exert effort to increase privatization activity in the run-up to elections. At least, they will exert less effort to resist the privatization of public enterprises than outside of election periods.*

Based on Proposition 3, it is reasonable to expect privatization activity to intensify in the run-up to elections (hypothesis H1).

Outside of election periods, the payoffs of politicians are higher under state-ownership than under privatization (with or without collusion); politicians therefore resist privatisation. Conditional on privatization happening, politicians are still better off plundering existing public enterprises than colluding with the managers of privatised firms. Thus, to the extent that it happens, privatization outside of election periods produces the cost-efficient, non-collusive outcome ($C = T = 0$) that improves the corporate performance of privatised firms (Megginson and Netter, 2001; Estrin et al., 2009).

During election periods, by contrast, politicians respond to an increase in monitoring effort from public-spirited taxpayers by turning to privatization with bargaining. They intensify privatization efforts (Proposition 3) and strike collusive bargains with the managers of privatised firms (Proposition 2). These results imply that the firms privatized before elections are more likely to receive implicit subsidies (hypothesis H2), and less likely to be cost-efficient (H3), than other privatized firms.[6]

2.4 Privatization, elections and firm profitability

As shown in section 2.2, the manager uses the transfer T^* to increase the firm's bottom line, after paying for the inefficiencies demanded by politicians. Collusive bargaining *increases* the profitability of a privatized firm relative to the disagreement outcome. This results implies that a public firm privatized before elections should exhibit both higher costs *and* higher profitability after privatization than an otherwise similar firm sold outside of election periods.

Yet, in practice, the transfer T^* is likely to be pocketed privately by the manager (just like a bribe), especially if it is channeled in the form of a discount at the point of sale. As such, it is unlikely to accrue to the firm's bottom line. Furthermore, honesty may be correlated with ability, as in the classic model of corruption (Rose-Ackerman, 1997). The buyers that choose to collude with politicians

[6]The model *assumes* that politicians buy the same level γ of inefficiency from the buyers of 'opportunistically' privatized firms as the level that prevailed under state ownership. As such, it is agnostic as to whether 'opportunistically' privatized firms may be at least more cost-efficient than they were under state ownership. In any case, because of data limitations, our empirical analysis focuses on a cross-sectional comparison of privatizations taking place in pre-election vs. non-election periods, rather than a comparison of corporate performance outcomes before and after privatization.

may be systematically less efficient also along other dimensions than costs. Thus, the firms privatized before elections may actually exhibit lower profitability than other privatized firms even if the cost-inefficiencies valued by politicians are fully paid for by the subsidy (hypothesis H4). We let the data speak on this issue.

3 Data and country background

3.1 Serbia and its political system

Following the break-up of the Socialist Federal Republic of Yugoslavia in 1992, the Republic of Serbia (the largest and most powerful of Yugoslavia's six constituent republics) remained federated with the Republic of Montenegro as part of a state entity known as the Federal Republic of Yugoslavia (1992-2003). The overthrow of Slobodan Milošević (federal president since 1997) in the 'bulldozer revolution' of September-October 2000 paved the way for a progressive weakening of the Federation. In 2003, Yugoslavia was reconstituted as a confederacy (the State Union of Serbia and Montenegro), which was eventually abolished altogether as Montenegro declared independence in 2006.[7]

Classified by Freedom House as 'partly free', the Republic of Serbia is a young democracy with a political system characterised by power concentration and a weak system of checks and balances. Bieber (2020) describes Serbia (and other Balkan states) as 'competitive authoritarian regimes' in which authoritarian tendencies co-exist with the formal institutions of democracy. There are generally 'high levels of [political] polarization' (high q), which 'often disguise the absence of substantial ideological differences' between political parties (Bieber, 2020: 140). Bieber (2020, 113), in addition, highlights the clientelist link between party membership and employment, which is 'very clear' to many citizens: 'a 2018 survey of young people in Serbia, for instance, showed that 92 percent believe[d] that it is easier to get a job through membership in the ruling party' than without it (ibid.). We interpret this finding as evidence that a large majority of voters are 'short-sighted', and provide political support to the incumbent as part of a tacit exchange involving jobs, contracts, or other benefits (m is low).

Serbia has a parliamentary system of government, with executive power resting with the prime minister under the constitution. Yet, the president of the republic is directly elected by popular vote, and plays an outsize role in political decision-making. Perhaps a legacy of 'strongman rule' under Milošević, the effective 'presidentialisation' of politics is a defining feature of post-socialist Serbia (Spasojević, 2021). The incumbent president (whether elected or acting) has always been either the leader of the political coalition controlling the parliamentary majority (e.g. Boris Tadić) or a junior (easily

[7]Privatisation in Montenegro is not covered in our analysis. Also, the dataset does not include the firms located in the so-called Autonomous Province of Kosovo and Metohija, which had de facto broken away from the Republic of Serbia in 1999 (following the Kosovo war) and unilaterally declared independence in 2008.

controllable) partner in the governing coalition (e.g. Nataša Mićić). After parliamentary elections, the leader of the dominant coalition has traditionally sought to consolidate his/her personal power by winning a popular 'plebiscite' and becoming president. As such, the incumbent president serves de facto under a semi-presidential system, and is able to exert much more influence over political decisions than prescribed by the formal rules of his/her office. Spasojević and Stojiljković (2019: 68) explain that:

> 'the actual increase of presidential power came from the extension of initial authority through centralisation of power and informal mechanisms - oligarchic tendencies and party discipline. [The internal statutes of political parties have] enabled presidents to rule in an unchallenged manner and to control the most important party bodies, including [party] congress[es] and the main [party] board[s]. This, in turn, leads to control over competition for leading positions within the party and control over candidacy procedures [for prospective members of parliament].'

Because of these informal channels of influence, the political payoffs of becoming president are higher than those of becoming prime minister; consequently, presidential elections are generally higher-stakes contests than parliamentary elections. In the empirical analysis, we focus on the former.[8] Between January 2002 and December 2019, *seven* presidential elections took place.[9]

Electoral rules are simple. The candidate who receives 50 percent of the votes cast plus one is elected president of the republic.[10] Regularly scheduled elections are held every five years, and must be called by the chairperson of the Serbian parliament *three months* before the end of the incumbent's term of office. Four out of seven contests in our sample period were early elections, however.[11] In this case, again, the parliamentary chairperson must set a date for a snap election within *three months* of the end of the incumbent's mandate. Also, the chairperson takes over as interim president. Although the law provides a procedure to impeach the president, again triggering early elections, this never happened in post-Milošević Serbia.

While public-spirited voters may be a minority, election campaigns and voting/counting procedures are closely monitored by international organisations such as the OSCE (Organization for Security and Cooperation in Europe), and by external actors such as the US and the European Union, of which Serbia has been an official candidate member since 2012. For this reason, it is plausible that the political

[8] In the appendix, we also perform the analysis using parliamentary elections, finding no significant results.

[9] Presidential elections were held in September 2002, December 2002, November 2003, June 2004, January 2008, May 2012, and April 2017. During 2001-2003, no federal (Yugoslavian) presidential election took place. The power of the President of the Federal Republic of Yugoslavia was already on the wane, as demonstrated by the incumbent (Vojislav Koštunica, Milošević's successor) running for President of Serbia in the 2002 elections. With the establishment of the State Union of Serbia and Montenegro (2003), the offices of president and prime minister were merged, with the incumbent elected by the federal parliament. In 2006, the office was abolished as the State Union was dissolved.

[10] In case no candidate gains an absolute majority, the two candidates with the largest share of votes compete in a second-round run-off held no later than 15 days after the first round of voting. Until 2004, there was a minimum turnout rule of 50 percent plus one vote. Since this rule led to the invalidation of three elections, it was eventually dropped.

[11] During 2002-2019, early elections were triggered by the invalidation of the previous election under the minimum turnout rule, or (in one case) by the incumbent's resignation.

costs of inefficiencies in the state sector (m) may be substantially higher in pre-election periods.

3.2 Privatization in Serbia

During 1990-1994, a number of Serbian public enterprises were transformed into joint-stock companies and privatized (mainly to insiders) under laws passed by former Yugoslav prime minister Ante Marković in 1989-1990 (Uvalić, 2010: 66). This process was progressively stalled and eventually reversed by Slobodan Milošević, who was president of Serbia during 1991-1997.[12] Starting in 1994, many privatized firms were forcibly taken over by their creditors − typically, state-owned banks − or re-nationalized. In addition, Milošević brought the appointment of enterprise directors firmly under his control (Palairet, 2001). Privatization did not resume in earnest until his overthrow in 2000.

A new Law on Privatization was passed in 2001, paving the way for the establishment of the Privatization Agency (PA, from now on), which received technical and financial support from the World Bank (Cvetković et al., 2007). In a speech to the Serbian parliament following the passing of the Law on Privatization, former Serbian prime minister Zoran Djindjić, who was assassinated in 2003, expressed his hope that:

> 'this [would] be the last law on privatization [in Serbia] and that we will definitively end the traces of the ideological society in which we lived for a long time and where the principle of efficiency was not a priority' (21 June 2001).

While technically an independent organisation, the PA was known to be highly politicized. For instance, a former PA director during 2003-4 (Mirko Cvetković) had previously been deputy Minister of Economy and Privatization. He later went on to become Minister of Finance (2007-8), and even Prime Minister (2008-12). Because of revolving doors, clientelism, and other informal mechanisms, party leaders could easily influence, manipulate or control the decisions of the PA.

In the empirical analysis, we focus specifically on the privatization of socially-owned enterprises (SOEs), or *društveno preduzeće*. In the corporate law of socialist Yugoslavia, SOEs were defined as the property of society, as opposed to the state, and featured a high degree of workers' self-management. Publicly owned enterprises (or POEs), such as utility and telecom companies, had a different legal status (Uvalić, 2010: 184) and are not covered in our analysis.

Because of the shortcomings of voucher privatization and insider sales in other transition economies (and in 1990s' Serbia), the Serbian government followed the World Bank's recommendation to rely exclusively on cash sales to outsiders.[13] In particular, two methods were used − auctions for smaller

[12] In 1997, Milošević became the federal president of Yugoslavia.
[13] Roland (2000) presents a classification of privatization methods.

enterprises, and tenders for larger and more strategically important concerns. Both auctions and tenders specified a minimum sale (opening) price at which the SOE may be sold in the absence of higher bids. The auctions were based on an open-bid, first-price (English) method, and were usually held in the offices of the PA. To participate, bidders were required to pay 10 percent of the opening price upfront as a deposit. The tenders were public calls for buyers disseminated via local media. All the sales involved 100 percent of an SOE's equity, with no mixed ownership. In most cases, buyers were required by the PA to make a specified capital investment in the firm. Ostensibly, both auctions and tenders could be planned and carried out fairly quickly (certainly within three months).

For both privatization methods, the opening price was set by the PA based on an initial valuation of the SOE conducted by external consultants. While the bidding process was probably fair, anecdotal evidence indicates that the initial valuations were subject to political interference, potentially leading to some of the SOEs' assets being undervalued. The PA awarded the largest share of valuation contracts to *CES Mecon* − a consulting firm owned by an influential businessman who hired Mirko Cvetković, later head of the PA, as the firm's executive director. Serbia's Anti-Corruption Council (2003) flagged these conflicts of interest and raised questions as to whether some SOEs had been sold for less than their market value. For instance, in February 2009 Nikola Djivanović, who was later arrested on charges of embezzlement, bought *Beogradfilma*'s film theatres for 9 million Euros and quickly sold them on for *twice* that amount. *Beogradfilma*'s initial valuation had been made by *CES Mecon*.

During 2002-2019, a total of 2,203 SOEs were sold by auction, and 126 by tender.[14] Taken together, Serbia's SOEs accounted approximately for 20 percent of Serbia's national income in 2001 (Uvalić, 2010: 209). As a result of privatization, the private sector share in GDP increased from around 40 percent in 2001 to 60 percent in 2011 (Uvalić, 2013). The state generated total revenues of 276 billion dinars, corresponding approximately to the value of government consumption expenditure in 2002. Almost 90 percent of total revenues from privatization were realized between 2002 and 2010, indicating that the relationships reported in this paper are identified primarily (albeit not entirely) from the five presidential elections that took place in that time period. At the time of writing, the PA had been dissolved, and the authority to privatise the 76 remaining SOEs (which are mostly unviable concerns) had been transferred from the PA to the Ministry of Economy.

The privatization process enjoyed considerable elite support, with all main political parties nominally in favour of ownership transformation. Yet, privatization was generally distrusted by the public, and fiercely opposed by the SOEs' workers, who feared justifiably that private owners might at best restructure and downsize the newly privatized firms (many of which were seriously overstaffed), and at worst cease production altogether to strip the firm's assets. Either way, the outcome of privatization

[14] Based on our data.

would be unfavourable to the workers, who had enjoyed considerable benefits under social ownership. Uvalić (2010: 181) shows that layoffs and delays in wage payment were common in many privatized firms, contributing to an increase in strikes. In general, Serbian politicians were keenly aware of the potentially negative electoral consequences of workers' dissatisfaction.

The history of *Vatrosprem*, a Belgrade-based former SOE active in the production and servicing of special-purpose vehicles (e.g. firefighter and garbage-collection trucks), provides anecdotal evidence of a potential case of collusion between politicians and managers. In October 2003, less than two months before a presidential election, *Vatrosprem* was sold to a consortium of four buyers. The largest stake (43 percent) in the consortium was held by a company controlled by the president of the parliamentary committee for privatization (Dragiša Marinković). The second largest stake was co-owned by a businessman who was later sentenced for fraud in a separate privatization case. The auction that led to the sale of *Vatrosprem* had only one bidder, and the consortium was able to secure the sale at the lowest possible price, which may have underestimated the firm's market value. At the time of privatization, *Vatrosprem* had 296 employees on its payroll. In April 2014, the company filed for bankruptcy. The outfit that emerged from the restructuring process was bought again by Marinković in August 2018. At this point, the restructured firm had a much smaller workforce of 65 full-time employees, suggesting that before going into administration the privatized company controlled by Marinković might have been severely overstaffed.

3.3 Data

We compiled a unique firm-level dataset covering (almost) all SOEs privatized in Serbia since January 2002.[15] The data was mainly collected from primary sources. We relied to a large extent on the information contained in privatization contracts (and their annexes), the majority of which are publicly available on the PA's website. Since a considerable minority of contracts were missing, we requested (and were granted) authorization to review the privatization files contained in the PA's archives. We also used the PA's auction reports to cross-check and augment this information. To supplement this data, we also used information from other sources, including the Business Registers Agency (BRA) and the Bankruptcy Supervision Agency (BSA). Importantly, we use BRA data to track the post-privatization performance of many former SOEs, focusing specifically on the most recent (pre-pandemic) year for which information is publicly available (2018). Lastly, we used Octoparse software to scrape and obtain information from the webpages of individual privatized enterprises.

[15] Part of this dataset was compiled by Ivanović et al. (2019).

[Table 1]

The variables that we observe are summarised in Table 1. First, combining information on each firm's privatization date with the dates of presidential elections, we constructed an indicator for pre-election privatizations − our main independent variable of interest. This variable takes the value 1 if the firm was sold during the last three months before a presidential election, and 0 otherwise. 378 firms, or 16.2 percent of all privatized SOEs, were sold in pre-election periods. We focus on this specific time window before elections in order to identify effects that are less likely to be confounded by the influence of other events. In the analysis, however, we test the robustness of our findings to alternative definitions of 'pre-election period'.

We observe a number of firm characteristics, including the number of workers employed by the firm at the time of privatization, the firm's age[16],its geographical location, and industry sector (4-digit NACE).[17] A plurality of former SOEs (32 percent) is located in Vojvodina, historically the most industrialised region of Serbia (see Figure 1). The three most frequent industry sectors are manufacturing (33 percent of all former SOEs), wholesale and retail trade (14 percent), and construction (13 percent) (see Figure 2). We also construct a dummy that takes the value 1 if the firm is located in a large city (with more than 100,000 inhabitants) outside of Belgrade, Serbia's capital city and most populous urban centre. Unfortunately, information on the SOEs' performance prior to privatization was not recorded systematically by the PA.

[Figures 1 and 2]

We also observe several characteristics of the firms' buyers − e.g. whether it is a domestic or foreign buyer, and a legal or physical person. When the enterprise was bought by a consortium of buyers, we also know the number of companies or individuals comprising the consortium. Lastly, we have information on the privatization sale itself, including the method used (auction vs. tender) and the value of the mandatory capital investment required by the PA, if any. To obtain a proxy for the ease with which state-owned enterprises were privatised, we also construct an indicator variable that takes the value 1 if an SOE had been put up for auction *unsuccessfully* (one or more times) prior to being eventually sold, and 0 otherwise.

As outcome variables of interest, we consider the opening and sale price of each privatization sale; whether the firm was still active or had gone bankrupt by 2021; and, conditional on surviving, its

[16]This was computed using information on the year of establishment.

[17]We use the Statistical Agency's division of Serbia into 4 macro-regions (Vojvodina, Belgrade region, Eastern and Southern Serbia, and Western Serbia & Šumadija).

total costs and net income in 2018.[18] All the monetary variables that refer to the year 2018 (the firm performance variables) are expressed in current local currency units (Serbian dinars). Investment requirements and privatization prices, by contrast, were deflated using a Consumer Price Index, and are expressed in constant 2006 dinars.[19]

A potential concern with our analysis is that politicians may select particular types of firms to privatize before elections.[20] Although our model only implies that politicians select the *timing* of privatization strategically, we cannot rule out that, conditional on timing, some firms are more likely to be put up for sale than others. Thus, in general, we cannot expect the SOEs that are sold in pre-election periods to be identical on other dimensions to the SOEs sold in non-election periods. The rich set of firm characteristics recorded in our dataset, however, allows us to control for at least some of these potential differences, correcting for any bias arising from selection on observables. For this reason, in the empirical analysis, we compare outcomes across firms privatized during vs. outside of election periods *conditional on* other firm characteristics.

To assess the potential influence of selection mechanisms, we examine the extent to which firms privatized before elections differ systematically from other firms along observable dimensions. Table 1 reports group means for pre-election and non-election sales separately, together with t-tests of the null that the mean difference is zero. For all (but one of) our independent variables (Panel A, Table 1), the tests cannot reject the null of equality of the means at conventional levels of significance. On these observable dimensions at least, the two groups of firms sold in pre-election and non-election periods appear to be well-balanced.

Figure 1 displays the distribution of privatized firms across geographical regions, distinguishing between privatization sales taking place before elections (right-hand side panel) and sales taking place outside of election periods (left-hand side panel). A Pearson's χ^2 test cannot reject the null that the geographical distribution of firms is identical across the two groups (p-value = 0.231), indicating that the probability of being privatized before elections is independent of the firm's location. Figure 2 depicts the sectoral distribution of former SOEs, again distinguishing between pre-election and non-election sales. Here, the χ^2 test rejects the null that the firms' distribution across sectors is independent of the timing of privatization (p-value = 0.001). In particular, pre-election sales appear to feature significantly less transportation and more ICT companies.[21] Except for this small difference, however, there is little evidence that politicians select firms based on the firm characteristics that we observe.

Although the firms privatized 'opportunistically' appear to be drawn from the same population

[18] The firm's total costs, which equal the sum of the cost of goods sold (COGS) plus sales, general and administrative (SG&A) costs, were calculated by subtracting the firm's 2018 EBITDA (earnings before interest, taxes, depreciation and amortization) from the firm's sale revenues in 2018.

[19] The Consumer Price Index is from the National Bank of Serbia.

[20] Alternatively, but less plausibly, firms may self-select for 'opportunistic privatization'.

[21] This observation, which can be confirmed visually (Figure 2), is based on tests of the difference between the two population percentages.

as other firms, they display notable differences on the outcome variables listed in Table 1, Panel B. For one thing, they were put up for sale at a significantly lower asking price, although the final sale price is not statistically different across the two groups. For another, their total costs in 2018 were twice as large as those of firms privatized outside of election periods, the difference being statistically significant at the 5 percent level. The firms sold in pre-election sales also had a significantly higher probability of going bankrupt (35 percent) than the firms sold in non-election periods (31 percent). Conditional on surviving, their profits in 2018 were half of that of other firms (although this difference is not statistically significant). While the distribution of the raw data appears to be consistent with our hypotheses (H2-H4), in the next sections we use regression analysis to carry out formal tests.

We emphasise that our findings should be interpreted as robust conditional correlations in line with the model's observable predictions. It is possible that politicians may select the firms to privatize before elections based on criteria that we cannot observe. For instance, the selection mechanism may be influenced by the firm's pre-privatization performance, which in turn may affect both the terms of sale and the SOEs' performance after privatization.[22] Yet, to the extent that our control variables (e.g. ease of sale, choice of privatization method, firm age, etc.) are at least partly reflective of the firm's performance before privatisation, we can take comfort in noting that all our findings are robust to including the full set of controls in the regressions.

[Table 2]

Next, we used the firm-level information to construct a macro-level dataset. To measure the overall intensity of privatization activity, we counted the total number of privatization sales and computed the total revenues (in constant dinars) realised from these sales in each month during 2002-2019, leading to time series with monthly frequency. This information is summarised in Table 2. The number of sales per month is positively correlated (0.59) with the log of revenues. Our main independent variable of interest is a pre-election quarter dummy − an indicator that takes the value 1 in the last three months prior to a presidential election, and 0 in all other months. About 10 percent of the months during which the privatization process was ongoing are 'pre-election months' on this definition. From the National Bank of Serbia (NBS), we also obtained monthly data on the main policy interest rate, which averaged 7.8 percent in the sample period; and quarterly data on GDP in constant dinars, which we used to compute the year-on-year growth rate of quarterly GDP as $100 \times (\ln GDP_t - \ln GDP_{t-12})$.

As indicated by the group means and t-tests reported in Table 2, both the number of privatization

[22] Since data on the SOEs' pre-privatization performance is not available, we cannot compare pre- with post-privatization performance, as in Megginson et al. (1994). Nor do we compare the performance of privatized firms with that of state-owned firms operating under similar conditions.

sales and the revenues from privatization were around three times as large in pre-election periods as in non-election periods, in line with hypothesis H1. We also find that, on average, GDP growth was about 1.2 percentage points higher before elections than outside of election periods. This finding is consistent with politicians stimulating the economy in the run-up to elections (Alesina et al., 1997; Ivanović et al., 2023), and points to the need for controlling for GDP growth in the time-series regressions.

4 Election cycles in privatization

Model specification. We begin by using the time-series dataset to test the hypothesis that privatization activity intensifies in the run-up to elections (H1). We consider the following two specifications:

$$\ln p_rev_t = \beta_0 + \beta Q1_t + u_t \tag{9}$$

$$n_sales_t = \exp\left(\beta_0 + \beta Q1_t\right) \times u_t \tag{10}$$

where $\ln p_rev_t$ is the natural log of total revenues from the sale of n_sales_t public enterprises in month t. $Q1_t$ is the pre-election quarter dummy (see Table 2), β_0 is a constant term, and u_t is a random disturbance. β, our parameter of interest, measures any systematic change in privatization outcomes in the last quarter running up to a presidential election.

[Table 3]

Equation (9) is estimated by simple OLS.[23] The outcome of equation (10) is a non-negative, integer-valued count variable, which we assume to be distributed as negative binomial (NB2) with population mean μ and variance $\sigma = (\mu + \lambda\mu^2)$, with $\lambda > 0$.[24] Equation (10) is thus estimated by maximum-likelihood (ML).[25]

Empirical results. The parameter estimates of β in equations (9) and (10) are presented in Panel A and B of Table 3 (column 1), respectively. The results indicate that both the total revenues from privatization and the number of SOEs sold *increase* in the last three months before a presidential election. The estimates of β are statistically significant at the 5 and 1 percent level, respectively (column

[23] Since the error process u_t may be subject to serial correlation, causing the OLS variance estimator to be biased downwards, we correct the standard errors using the traditional Newey-West procedure.

[24] The sample distribution of *n_sales* is right-skewed and highly over-dispersed, with the sample variance (345.8) substantially larger than the sample mean (10.8). This indicates that the population variance σ is likely to be larger than the population mean μ. For this reason, we favor an NB2 over a Poisson ($\lambda = 0$) model specification.

[25] While the consistency of the ML estimator of β in (10) only depends on a correct specification of the conditional mean of *n_sales*, the associated ML standard errors are generally inconsistent in the presence of distributional mis-specification. Thus, we follow Cameron and Trivedi's (2013: 85) recommendation of basing inference on robust standard errors.

1). Despite our unbalanced design, with less than 10 percent of observations falling within pre-election quarters, we note that 216 monthly observations allow us to conduct statistical tests with sufficient power.[26]

It is possible that these estimated effects may arise primarily or even entirely from unmodelled influences that coincide temporally with elections. Thus, in alternative specifications, we condition the estimate of β on a number of potential observable and unobservable confounders. Although the elections in our sample period did not take place at regular intervals, we first account for any potential seasonal effects by adding a full set of monthly dummies (column 2).[27] The models in column 3 use year fixed effects (FE) to control flexibly for broad trends in privatization outcomes over time - for instance, trends arising from the composition and ability of the PA, or from macro-economic shocks affecting investment demand. In this specification, the identification of election-related effects comes entirely from a comparison of pre-election with non-election quarters *within* election years.

Column (4) reports dynamic specifications that remove the serial correlation in u_t by explicitly modelling the dependence of current sales and revenues on their past realizations. Both the linear (Panel A) and NB2 models (Panel B) condition the estimates of β on four lags of the dependent variable.[28] An advantage of the dynamic specification is that it controls flexibly for all omitted historical determinants of current privatization decisions. Pre-election and other months are treated as if privatization outcomes had been the same in preceding months, eliminating the potentially confounding influence of pre-trends. For simplicity, column (4) reports the sum of the coefficients on the four lags of the dependent variable, which measures the overall degree of persistence in privatization outcomes over time. Column (5) includes two observed proxies for investment demand − the log of the NBS interest rate, and the year-on-year quarterly growth rate of GDP. Lastly, column (6) presents kitchen-sink specifications with all controls included simultaneously in the regressions.[29]

With the exception of model (6) in Panel B, the finding of a significant pre-election increase in privatization revenues and sales remains qualitatively unaltered (although the estimates of β are generally smaller in magnitude than in the unconditional models reported in column 1). Based on adjusted R-squared (Panel A) and two information criteria (Panel B), the best fit to the data is achieved by

[26] Ioannidis et al. (2017) find that, in many areas of economics, a large majority of published results are based on under-powered statistical tests. For this reason, we performed a simple power analysis using Stata software. To simplify the calculations, we focus on regression model (1) in Panel A (Table 3), which is formally identical to a t-test for the equality of two population means. At the 5 percent significance level, we need a sample of 186 observations (18 for pre-election periods, and 168 for non-election periods) to detect a difference of 6.374 log-points between the pre-election period mean of 16.726 and the non-election period mean of 10.356 (given the respective sample standard deviations of 8.5 and 10.2) with 80 percent power (a standard threshold of acceptability). With 216 observations (21 for pre-election periods, and 195 for non-election periods), we can actually perform the same t-test with 87.2 percent power. This finding implies that, if the null hypothesis of no difference between pre-election and non-election periods is false, our test will only fail to reject this hypothesis in 12.8 percent of repeated samples - an acceptable Type-II error rate.

[27] The coefficients on the monthly dummies are always jointly insignificant, ruling out any seasonal effect.

[28] To determine the lag structure, we inspected the partial autocorrelation structure of $\ln p_rev_t$. In the NB2 model, we log-transformed the lags of the dependent variable to avoid an explosive functional form (Zeger and Qaqish, 1988; Cameron and Trivedi, 2013: 281)

[29] With 36 parameters to estimate and 212 observations, however, these specifications may imply a substantial loss of statistical power. For this reason, the results reported in column (6) should be interpreted with caution.

model (6) in Panel A, and model (4) in Panel B. These estimates indicate that total revenues from privatization sales more than treble in the last three months before presidential elections[30], while the number of privatization sales nearly doubles (to 20.5 sales per month) relative to a long term average of 11 sales per month.[31] These estimates imply that, on average, the PA concluded a total of 29 ($= 11 \times 0.898 \times 3$) additional SOE sales in each pre-election quarter, generating an additional 10 bln Serbian dinars ($= 1.3 \times 2.64 \times 3$), or approximately 94 mln US$ at today's exchange rate.

Robustness and discussion. These findings point consistently to an economically large increase in privatization activity in the last quarter before presidential elections. In a further alternative specification, we also include additional dummies for the 2nd and 3rd quarter before elections, as well as the 1st, 2nd and 3rd quarter *after* elections. The estimated coefficients on these dummies, conditional on four lags of the dependent variables, are plotted in Figure 3. While the coefficient on $Q1$ implies, again, a statistically significant increase in sales and revenues in the last three months before elections, all the other coefficients are statistically insignificant at conventional levels, corroborating our choice to focus on the last quarter before elections only.

[Figure 3]

To further allay concerns that our estimates of β may reflect the influence of other factors beyond elections, we perform a simple falsification test. In Appendix 1 (columns 1-2), we spuriously shifted the timing of presidential elections forward by one (Panel A) or two years (Panel B). The results show that the estimated pre-election effects become much smaller, losing statistical significance, when a 'placebo election' is administered in lieu of an actually occurring election. In Appendix 2 (columns 1-2), we also show that our results do not depend critically on our definition of 'pre-election period' as the last quarter before elections. Indeed, the estimates of β remain qualitatively consistent (although are now smaller in magnitude) when we use indicators for the last 4 (Panel A) or 5 months (Panel B) before elections, instead of an indicator for the last 3 months.

Overall, this evidence is consistent with the prediction that before elections politicians prefer to privatize than to increase inefficiencies in state-owned firms (Proposition 2); and consequently, that they exert effort to influence the decisions of the privatization agency (Proposition 3), leading to an increase in privatization activity before elections (H1). Yet, politicians would only fuel a pre-election increase in sales if they can buy inefficiencies from the managers of privatized firms (that is, if bargaining is feasible). Thus, our interpretation of pre-election effects as driven by 'opportunism' implies

[30] 264 percent increase
[31] $= \exp(0.641) - 1 = 0.898$, or an 89.8 percent increase

that we should observe at least some of the consequences of politicians colluding with managers. In the next section, we look for evidence of collusive bargaining by investigating the sale price and cost structure of privatized SOEs. Any evidence of price discounts and excess costs in the SOEs sold before elections would support our interpretation of the pre-election increase in privatization activity as driven by opportunistic bargaining.

5 Privatization prices and firm costs

During election periods, politicians prefer privatization to state-ownership if the subsidy paid to managers under bargaining is less costly politically than excess spending in state-owned firms ($k < m$). As discussed in section 2, one way for politicians to keep the political costs of subsidies low is to make the transfer implicit − for instance, by persuading the privatization agency to grant a discount on the SOE's sale price.

5.1 Privatization prices

Model specification. To explore whether the SOEs that were privatized before elections were sold at a discount (H2), we estimate the following linear specification using the firm-level dataset:

$$\ln price_i = \beta Q1_i + \theta X_i + \epsilon_i \tag{11}$$

where $price_i$ refers to either the asking price or the final sale price of firm i. $Q1_i$ is a pre-election privatization dummy that takes the value 1 if firm i was privatized in the last quarter before a presidential election, and 0 otherwise (see Table 1). X_i is a vector of price determinants, and ϵ_i is a random disturbance capturing all unmodelled factors shaping the firm's market value.[32] Following previous studies on the determinants of privatization prices (Lopez-de-Silanes, 1997; Arin and Okten, 2003; Gashi et al., 2020), we allow the firm's market value to depend on firm and industry characteristics, buyer characteristics, and the features of the sale process (e.g. the privatization method). To capture these drivers as exhaustively as possible with our data, we include in the regression *all* the independent variables listed in Panel A of Table 1 (except for the firm's revenues in 2018), in addition to a full set of industry sector and region fixed effects. We also consider an alternative specification with year-of-privatization FE.

[32] For brevity, we do not write explicitly the constant term in the equation, nor do we report the estimate in the regression tables.

[Table 4]

Empirical results. The OLS estimates of β in equation (11), together with standard errors corrected for arbitrary patterns of residual correlation within industry sectors, are presented in Table 4. The dependent variable is the PA's initial asking price in Panel A, and the final sale price in Panel B. In column (1) we present simple bivariate regressions showing the unconditional relationship between $\ln price_i$ and $Q1_i$, omitting X_i. The estimates imply that the SOEs that were sold during the last three months before presidential elections were valued 70 percent lower than other firms, on average, when they were first put up for auction or offered by tender. Their final sale price was 35 percent lower, on average, than the sale price of other firms, suggesting that the auction mechanism might have contributed to narrowing the initial gap in asking prices.

These correlations remain unaltered if we only compare firms that were privatized in the same year (that is, in the same market environment) by including year-of-privatization FE (column 2). The models reported in column (3) control for other potential determinants of privatization prices by including the full set of control variables described in Table 1, Panel A, together with a full set of sector and region FE. The models in column (4) include both year-of-privatization FE and the full set of controls. In both cases our findings remain qualitatively unaltered. Although the magnitude of β in column (4), Panel B, drops by about half, the coefficient remains statistically significant at conventional levels, implying a 17 percent discount on the final sale price.

How was this discount applied in practice? In an alternative specification (not reported in full to save space), we include the opening price as an additional control in a regression for the final sale price (with the full set fo controls, as in column 4, Panel B). The estimate of β $(-0.052, s.e. = 0.082)$ is now much smaller and statistically insignificant at conventional levels. *Conditional on their initial asking price*, the SOEs that went on auction in pre-election periods were *not* priced differently by bidders relative to otherwise similar SOEs auctioned off in non-election periods. We interpret this finding as evidence that the final sale prices were probably discounted by manipulating the initial valuation of SOEs, and not by corrupting the bidding process. The anecdotal evidence on the external consultants hired by the PA to carry out the valuations (e.g. *CES Mecon*) presented in section 3.2 is supportive of this interpretation.[33]

In this regression, the coefficient on the opening price $(0.296, s.e. = 0.035)$ is positive and statistically significant. Other things equal, doubling the initial asking price results in a 30 percent increase in the final sale price, on average, suggesting that the bidding process (however fair) is not independent

[33] To further confirm this interpretation, we constructed an indicator variable that takes the value 1 if the firm was sold at the initial asking price - that is, if the price was not bid up in the auction. 41 percent of SOEs were sold at the opening price. We then run a logit regression of this variable on $Q1$, conditional on the full set of controls (as in Table 4, models 4). The coefficient on $Q1$ (-0.012, $s.e.$=0.151) is small and statistically insignificant, suggesting that buyers were *no* more likely to be kept from bidding (if they were at all) in pre-election than in non-election sales (we thank Vladimir Ponczek for suggesting this additional test)

of the SOE's initial valuation. Based on this estimate, applying a 60 percent discount on the initial valuation (as suggested by the estimates of model (4) in Panel A) leads to an $60 \times 0.296 = 18$ percent discount on the final sale price, which is consistent with the findings of model (4), Panel B.

Robustness and discussion. In additional robustness checks, we find that the estimated price 'discount' disappears completely, as it should, when the timing of elections is spuriously shifted forwarded by one (Appendix 1, columns 3-4, Panel A) or two years (Panel B). It remains statistically significant, however, when we consider pre-election periods as covering the last 4 (Panel A) or 5 months (Panel B) before presidential elections (Appendix 2, columns 3-4). In these specifications, the estimated magnitude of the price 'discount' is somewhat smaller than in the estimates obtained from the corresponding models in Table 4 (column 2), suggesting that the estimated pre-election effects are driven primarily by firms privatized in the last three months before elections.

The estimates in Table 4 (column 4) could be interpreted causally under the assumption that (conditional on the covariates) the firms sold before elections do not differ systematically from other firms in ways that could affect their market value. As we noted in section 3, politicians do not appear to select firms for 'opportunistic privatizations' based on any of the characteristics controlled for in column (3) and (4), except perhaps location (see Table 1, and Figures 2-3). Yet, we cannot rule out that the selection process may be related to other, unobserved, firm characteristics - for instance, the SOEs' performance before privatization. To the extent that these characteristics are not captured by our covariates (e.g. ease of sale and method of privatization being two plausible proxies), they will affect the firm's market value through the error term, potentially biasing the OLS estimator. For this reason, we emphasize that our findings are correlational. Even so, they do provide evidence that is at least *consistent* with campaigning politicians channeling an implicit subsidy to firm managers through a discount on market value. Furthermore, we find it plausible to believe that, if anything, politicians would rationally select the best-, rather than the worst-, performing SOEs to allocate to political supporters. If so, the OLS estimators in Table 4 would be biased upwards, and our estimates would represent lower bounds to the discount on market value offered to managers by politicians.[34]

5.2 Firm costs

Politicians would only pay a subsidy to firms if they can get politically valuable benefits in return. To test whether the managers of 'opportunistically privatized' firms live up to their end of the bargain,

[34]These findings contrast with those of Gashi et al. (2020), who investigate privatization prices using firm-level data from post-conflict Kosovo. As part of a broader analysis, they find that the firms privatized during the last six months before an election were not sold at a significantly different price than other similar firms. They conclude that their results 'provide no evidence that the [...] sale of former SOE assets was used as a means of achieving political goals at election times', arguably because 'the transformation process in Kosovo was under tight control by the international community' (2020: 22). In Serbia, the role of international actors in policy implementation was important, but much less so than in neighbouring Kosovo.

we look for evidence of excess costs (H3). To do so, we estimate a stochastic cost frontier (SF) model.

Model specification. SF analysis can be used to examine the factors that cause a firm to deviate from the minimum-cost frontier implied by its cost function. The cost function 'characterizes the minimum expenditure required to produce a bundle of outputs given the prices of the inputs used' and the technology in use (Belotti et al., 2013: 720). Costs in excess of the minimum-cost frontier may be attributed to individual firm inefficiencies. The cost function has the following Cobb-Douglass form:

$$\ln C_i = \eta \ln Q_i + \sigma_i + \lambda_i + (v_i + u_i) \tag{12}$$

where C_i refers to total costs in 2018 and Q_i denotes the level of output, proxied by the firm's sales revenues in 2018. σ_i and λ_i are industry sector and location (region and large city) fixed effects, respectively, which control for input prices and technology. As an SF model, equation (12) features a composite error term: $(v_i + u_i)$. v_i, which is symmetrically (normally) distributed, contains measurement and specification errors. u_i is a one-sided disturbance representing the cost-inefficiency component. Following Stevenson (1980), we assume that u_i has a truncated-normal distribution ($\mathcal{N}^+$) with mean μ and standard deviation σ_u. To incorporate exogenous factors affecting individual firm inefficiency, we follow the approach of Kumbhakar et al. (1991), who proposed to parametrize the mean of the pre-truncated inefficiency distribution. In Kumbhakar et al.'s (1991) model, u_i is distributed as $\mathcal{N}^+(\mu_i, \sigma_u^2)$, and a set of exogenous co-variates is allowed to shift $\mu_i = E(u_i)$. We assume that the conditional mean of the inefficiency term has the following form:

$$E(u_i) = \beta Q1_i + \theta X_i + \beta_0 \tag{13}$$

where the symbols have the same interpretation as in equation (11) and β_0 is a constant term. Equations (12) and (13) are estimated simultaneously by maximum likelihood (ML). As in previous exercises, we are interested in the estimates of β.

[Table 5]

Empirical results. The results are reported in Table 5. Panel B reports the parameters of the estimated cost frontier (eq. 12),[35] while Panel A reports the estimated parameters of the inefficiency equation (eq. 13). Column 1 reports a simple model that omits X_i from the inefficiency equation. The estimate of β is positive, indicating that the firms privatized before elections (prior to 2018) were on

[35] The cost function is found to be a convex function of output, implying decreasing returns to scale for privatised SOEs in Serbia. Both the sector and location FE enter as jointly significant, indicating that the cost frontier shifts across sectors and locations, conceivably because of differences in technology and/or input prices.

average more cost-inefficient in 2018 than the firms that were sold outside of election periods, although the difference is not statistically significant. The variance of u_i (σ_u) is also statistically indistinguishable from zero, however, pointing to potential mis-specification problems.

In column 2 (our preferred specification), we add our full set of control variables to the inefficiency equation. σ_u is now significantly greater than 0, and the estimate of β is positive and significant at the 1 percent level. The average marginal effects of Q_1 on the mean $E(u_i)$ of inefficiency, and hence on $\ln C_i$, are shown in curly brackets.[36] The estimate in column (2), that is 0.036, implies that, in 2018, the firms that had been privatized before elections reported total costs that were, on average, almost 4 percent higher than the total costs of other former SOEs with similar technology, input prices and output levels.

In column 3, we test the robustness of this finding by moving three control variables (domestic/foreign buyer, physical/legal person buyer, and firm age) from the inefficiency to the cost-frontier equation. The rationale is that it is unclear whether, say, foreign firms have lower costs than domestic firms because they are more efficient cost-minimizers, or because they use more advanced, cost-saving technologies. The results of running this specification are qualitatively consistent with previous findings (σ_u is now statistically insignificant, however). Lastly, in column 4, we experiment with a different specification of the cost function that omits the location fixed effects. The assumption, realistic in a small country such as Serbia, is that labour and other input markets are not local, and input prices are constant across locations in equilibrium. The results are, again, qualitatively consistent (indeed, the marginal effect of Q_1, reported in curly brackets, is slightly larger).

Robustness and discussion. In similar falsification tests to the ones reported so far, we find that the former SOEs privatized before 'placebo elections' that never took place are (as they should) no more cost-inefficient than other similar firms (Appendix 1, column 5). The results based on alternative definitions of 'pre-election periods' are also qualitatively consistent (Appendix 2, column 5), although the estimated marginal effects (0.016 and 0.031) are smaller in magnitude than the estimates implied by the frontier analyses reported in columns 2, 3 (0.036) and 4 (0.045) of Table 5. This finding suggests, again, that the estimated effects of electoral opportunism are likely to be driven primarily by the firms privatized in the last *quarter* before elections.

In sum, the firms that were privatized before presidential elections were both sold at a lower price, and display higher excess costs after privatization, than otherwise similar firms privatized outside of election periods. Excess costs may arise either because of input (e.g. labor) overuse, or because the firm uses the 'wrong' combination of inputs (e.g. sub-standard machinery bought from politically connected suppliers). Although the magnitude of the estimated effect is relatively small (a 4 percent

[36] See Kumbhakar and Sun (2013) for a derivation of the formulas used in post-estimation to compute the average marginal effects.

reduction in cost-efficiency), our results are only based on a single cross-section of privatised firms in 2018. It is plausible that the politician's one-off transfer to the manager (the price discount) may be reciprocated by politically beneficial cost inefficiencies that are spread out over the politician's term in office. For instance, *Vatrosprem* appears to have maintained an inflated workforce for at least nine years after privatization (see section 3.2).

Although other interpretations may be possible, these findings are consistent with what we should observe if the mechanisms described in our extension of Boycko et al.'s (1996) model were operative, and politicians colluded with firm managers in the run-up to elections, trading an implicit subsidy against politically beneficial inefficiencies. While the firms privatized before elections are less cost-efficient than otherwise similar firms, we cannot rule out that they may be more cost-efficient than they were under state ownership. This possibility, however, is not inconsistent with the predictions of our model.

6 Firm performance outcomes

Lastly, we examine the impact of 'opportunistic privatization' on firm performance. As shown in section 2, the subsidy provided by politicians under bargaining is larger than the costs of inefficiencies ($T^* > \gamma$), making the firms that are privatized opportunistically more profitable. Yet, T^* may accrue privately to the managers, rather than to the firm's bottom line. In addition, bargaining may induce a negative selection effect on the ability of managers, leading to lower performance (Rose-Ackerman 1997), as implied by hypothesis H4. Which of these two effects dominates is an empirical question.

6.1 Firm survival

First, we investigate the impact of electoral opportunism on firm survival. To so do, we estimate the following logit model:

$$Bankruptcy_i = \Lambda\left(\beta Q1_i + \theta X_i + \beta_0\right) + \epsilon_i \tag{14}$$

where $Bankruptcy_i$ is a dummy variable that takes the value 1 if by 2021 firm i had either filed for bankruptcy or ceased to exist, and 0 otherwise. The other symbols have the same interpretation as in (11), and Λ refers to the logistic function. The parameters in (14) are estimated by ML, and the marginal effects of $Q1_i$ are reported in Table 6. Model (1) omits X_i, while model (2) conditions the estimated effect of being sold before elections on our full set of controls (See Table 1). For firms privatized before elections, the probability of bankruptcy (35.8 percent) is 4.4 percentage points higher

(column 2) than the probability of bankruptcy for otherwise similar firms privatized outside of election periods (31.4 percent). The difference corresponds to a 14 percent increase, and is statistically significant at the 1 percent level. This estimated effect, however, disappears (as it should) when we run a falsification test, comparing a group of firms that were privatized before a set of 'placebo elections' with all other firms (Appendix 1, column 6). The results are also robust (and quantitatively similar) to using alternative definitions of 'pre-election' periods (Appendix 2, column 6).

[Table 6]

In columns (1) and (2), the control group of survivor firms includes firms that merged with other entities or went into voluntary liquidation, in addition to active firms. To compare bankrupt firms with a more coherent reference group of active firms only, we replicate the analysis on a restricted sample that excludes merged and liquidated firms. The results, which are reported in columns (3) and (4) of Table 6, remain qualitatively unaltered.

These findings indicate that the firms that were privatised before elections were more likely to run into severe problems, and eventually go bankrupt. As such, they suggest tentatively that the managers who were willing to collude with politicians may have been less capable than other managers, in addition to being less honest.

6.2 Firm profitability

Second, we ask whether, conditional on surviving, 'opportunistically privatized' firms were more or less profitable than other firms. To do so, we estimate a stochastic *profit* frontier (SF) model.

Model specification. Similar to the SF model for costs, the SF model for profits estimates a firm's deviation from the profit frontier. This is the maximal profit that the firm could realize, given its technology and the market prices it faces, if it was a fully efficient profit-maximiser. The profit frontier has the following form:

$$\ln \pi_i = \sigma_i + \lambda_i + (v_i - u_i) \tag{15}$$

where π_i refers to the firm's net income in 2018; and σ_i and λ_i are industry-sector and location (region and large city) fixed effects, respectively, which proxy for market prices and technology. Similar to the SF model for costs, the profit model features a composite error term: $(v_i - u_i)$. v_i is a normally distributed error term, while u_i is a one-sided inefficiency term measuring deviations from maximal profits (note that the inefficiency term enters the profit function with a minus sign). Again, we assume that u_i is distributed as truncated-normal with mean μ_i and variance σ_u^2, and that $\mu_i = E(u_i)$ has the

same form as equation (13).

[Table 7]

Empirical results. The results of the SF analysis are presented in Table 7. Column (1) reports a simple specification in which only Q_i is allowed to shift $E(u_i)$. Column (2), which reports our preferred specification, includes our full set of covariates in the inefficiency equation. Column (3) moves three control variables (domestic/foreign buyer, physical/legal person buyer, and firm age) from the inefficiency to the profit frontier equation. Lastly, column (4) experiments with an alternative specification of the profit function that omits the location fixed effects.

Across these four specifications, the results indicate that the firms privatized before elections are significantly less efficient in maximising profits than other firms using a similar technology and facing a similar price environment. Based on model (2), the average marginal effect of Q_1 on the mean of inefficiency, $E(u_i)$, and hence on $\ln \pi_i$, is 0.352. This estimate implies that, in 2018, the firms that had been privatized in the run-up to elections posted profits that were, on average, 35 percent lower than the profits of otherwise similar firms − a very large effect. The average marginal effects of Q_1 implied by the alternative specifications reported in Table 7 are very similar.

Robustness and discussion. We cannot rule out the possibility that the firms sold before elections are less profitable (and more likely to go bankrupt) because they were selected by politicians based on unobserved characteristics that affect corporate performance negatively. For this reason, we emphasize again that our results are correlational. Still, we believe that the estimated pre-election effect is unlikely to reflect the influence of confounding events. The profit shortfall of 'opportunistically privatized' firms disappears in falsification tests that shift the timing of elections spuriously forward by one or two years (Appendix 1, column 7). (The estimate of β reported in column (7), Panel B of Appendix 1 is statistically significant at 10 percent but has the 'wrong' sign, implying that the firms privatized two years *after* the actual presidential elections are systematically *closer* to their profit frontier).

In additional results, we also find that the estimated detrimental effect of elections on profitability is smaller (and statistically insignificant) when we focus on firms privatized during the last four or five months before presidential elections (Appendix 2, column 7). This finding suggests that the firms that are negatively affected by election-related opportunism are specifically those that are sold during the last quarter before elections.

Not only were opportunistically privatized firms less likely to survive. Conditional on survival, they were also less profitable. These findings highlight the adverse impact of pre-election collusion between politicians and managers on corporate performance. They also point to the potential social costs of electoral opportunism.

Parliamentary elections. Lastly, in Appendix 3, we re-run (a short version of) the entire analysis presented here but focusing on the last quarter before *parliamentary* rather than presidential elections. We find no evidence of an increase in privatization activity before this type of elections, nor do we find evidence of price discounts, excess costs, and poorer performance in the group of firms privatised in the last quarter before parliamentary elections. These findings corroborate our choice to focus on presidential contests, in line with the greater informal power of the Serbian president compared to the prime minister.

7 Discussion and conclusion

This paper has examined the preferences and behavior of politicians vis-à-vis state-owned enterprises in pre-election periods. In environments with a high tolerance for corruption, politicians can strike collusive bargains with firm managers, trading an implicit subsidy (e.g. a discount on the privatization sale price) against economically costly but politically beneficial inefficiencies. We argued that during election periods public scrutiny over state firms increases, while price discounts on asset sales can easily evade monitoring. Thus, provided bargaining is feasible, vote-seeking politicians may extract more political benefits from privatizing state firms and colluding with managers than from introducing inefficiencies in state firms.

To test these mechanisms, we constructed a unique dataset covering the population of former state-owned enterprises in Serbia (2001-2019). We document a significant increase in privatization revenues and sales in the last quarter before presidential elections. We also find that the firms that were privatized before elections were offered and sold at a substantial discount (17 percent) relative to the market price of similar firms; they also exhibited (4 percent) higher total annual costs following privatization. Moreover, we show that the firms privatized before elections perform worse than those sold in non-election periods.

These findings are consistent with the collusion mechanism described by our augmented version of Boycko et al.'s (1996) model of privatization. This interpretation is also supported by anecdotal evidence, such as the case of *Vatrosprem* discussed in section 3.2. Although other mechanisms may generate the correlations documented in the analysis, we consider bargaining the 'best explanation' for the empirical patterns observed. For instance, while politicians may in principle increase privatization efforts to finance a fiscal expansion (as in Lami et al.'s [2016] findings for Albania), the budgeting and spending process typically takes longer than three months. Thus, if the provision of economic stimulus was the main motivation, we would arguably observe an effect starting earlier than the last pre-election

quarter. This is not the case, however (see Figure 3).[37] Furthermore, while the relationships reported in Tables 4-7 may arise from politicians' selecting poorly performing SOEs for pre-election sales, we find this explanation implausible theoretically (we are not aware of any theoretical model that could generate this prediction). In any case, our rich set of control variables is likely capturing at least partly the performance of SOEs before privatization, making this explanation implausible also empirically.

To our best knowledge, our analysis provides the first detailed documentation of the link between privatization and elections using micro-data. Our findings highlight the risk that campaigning politicians might capture the privatization process, especially in countries with weak institutions, and at least partially undermine its effectiveness. The political manipulation of privatization programmes could have negative and especially long-lasting consequences on employment and productivity, in contrast to the manipulation of traditional policy instruments, such as fiscal and monetary policy, which may only trigger short-run fluctuations.

Although our findings are context-specific, we believe they may be relevant for other transition and developing economies featuring high levels of political competition, weak democratic institutions, and widespread corruption. In these economies, policy-makers and international actors should find ways to insulate the agency in charge of privatization from political interference − for instance, by strengthening its legal independence; facilitating a political settlement amongst competing politicians; or negotiating a mandatory suspension of privatization sales during election periods.[38]. Strengthening the professionalism and independence of the media and raising voter awareness (especially before elections) may also increase the marginal costs to politicians of colluding with managers.

The main limitation of our analysis is the lack of data on the performance of state firms before privatization, which is not systematically available in the case of Serbia. Future work should thus turn to difference-in-difference approaches. It should also examine systematically the electoral effectiveness of policy manipulation. After all, in equilibrium we should only observe the relationships presented in this paper if the incumbent's manipulation of the privatization process increases their marginal probability of being re-elected. In addition, both our theory and empirics model politicians as a single agent. This is plausible in the case of Serbia, given the president's vast informal power. Yet, future work should also consider competition between politicians, as well as competition between different levels of government.

[37] Of course, we cannot rule out that a collusive mechanism may also have macro-economic consequences, which remain an important topic of future research.

[38] A measure along these lines was introduced in 2020 in neighboring Albania

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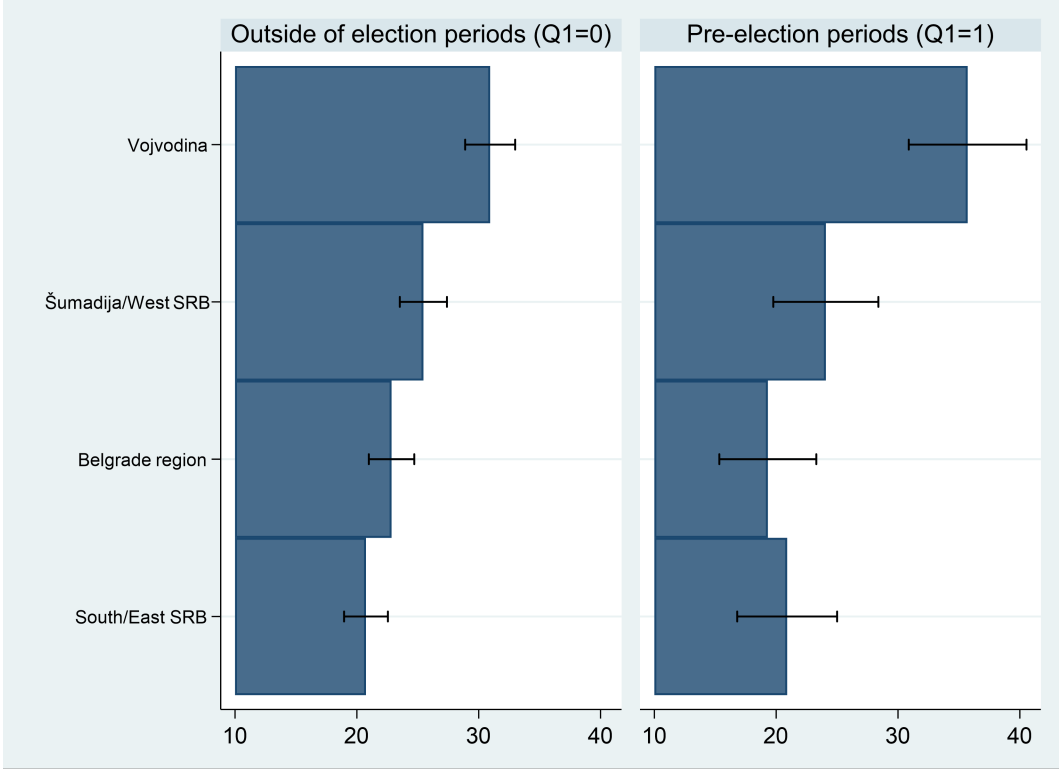
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TABLE 1: Descriptive Statistics: Firm-level dataset

					Pre-election = 0	Pre-election = 1	[t-test]
Variable description	Source	N	Mean	(s.d.)	Mean(a)	Mean(b)	($a-b$)
PANEL A: Independent variables:							
Pre-election privatization ($Q1_i$)	Contract	2,330	0.16	(0.37)	0	1	
Number of employees at privatization (#)	Firm website	2,330	173	(328)	176	154	[0.171]
Firm age at privatization (years)	Firm website; BRA	2,326	29	(14)	29	29	[0.338]
Located in large city (dummy)	Firm website; BRA	2,330	0.13	(0.33)	0.13	0.15	[0.297]
Domestic (vs. foreign) buyer (dummy)	Contract; BRA	2,330	0.89	(0.31)	0.89	0.90	[0.614]
Buyer is physical (vs. legal) person (dummy)	Contract; BRA	2,330	0.24	(0.43)	0.24	0.23	[0.522]
Number of buyers (#)	Contract (appendix)	2,330	4.7	(31.9)	4.7	4.0	[0.689]
Investment requirements (constant mln dinars)	Contract	2,330	56.4	(361)	48.8	95.5	[0.162]
Privatized by auction (vs. tender) (dummy)	Contract	2,330	0.95	(0.23)	0.94	0.96	[0.120]
Auctioned unsuccessfully before sale (dummy)	PA auction reports	2,283	0.14	(0.35)	0.15	0.11	[0.022]
Sales revenues, 2018 (current mln dinars)	BRA	1,482	0.37	(1.91)	0.316	0.651	[0.158]
PANEL B: Outcome variables:							
Opening price (constant mln dinars)	PA auction reports	2,330	18.7	(40.2)	19.8	12.7	[0.000]
Sale price (constant mln dinars)	Contract; PA reports	2,330	121	(997)	108	186	[0.444]
Total costs, 2018 (current mln dinars)	BRA	1,482	0.32	(1.73)	0.28	0.58	[0.016]
Bankruptcy, 2021 (dummy)	BRA; BSA	2,330	0.32	(0.47)	0.31	0.35	[0.097]
Net income, 2018 (current mln dinars)	BRA	1,482	0.12	(2.42)	0.13	0.05	[0.331]

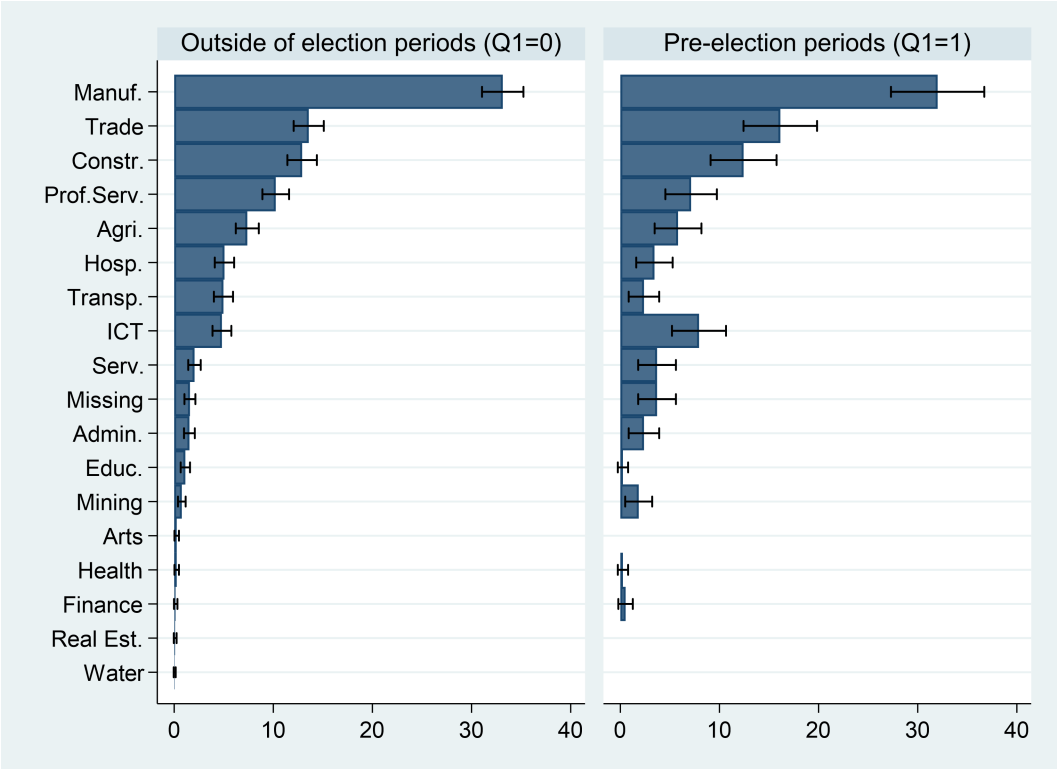
Notes: the last column reports two-sample t-tests of the null hypothesis that the difference of the means is equal to zero. The population variances (pre-election=0 and pre-election=1) are assumed to be different. PA stands for Privatization Agency; BRA stands for Business Registration Agency; BSA stands for Bankruptcy Supervision Agency.

FIGURE 1 – Geographical distribution of SOEs by timing of privatisation



Notes: the diagrams report the percentage of privatised firms located in each of the four geo-statistical regions of Serbia, by time of privatisation. They also show the 95 percent confidence intervals for the population percentages, based on the normal approximation of the binomial distribution. 1,952 firms were privatised outside of election periods, versus 378 in pre-election periods.

FIGURE 2 – Sectoral distribution of SOEs by timing of privatisation



Notes: the diagrams report the percentage of privatised firms belonging to each NACE industry sector, by time of privatisation. They also show the 95 percent confidence intervals for the population percentages, based on the normal approximation of the binomial distribution. 1,952 firms were privatised outside of election periods, versus 378 in pre-election periods.

TABLE 2: Descriptive Statistics: Monthly data (2002-2019)

					Pre-election = 0	Pre-election = 1	[t-test]
Variable description	Source	N	Mean	(s.d.)	Mean(a)	Mean(b)	($a-b$)
PANEL A: Independent variables:							
Pre-election quarter ($Q1_t$)	Rep. of Serbia	216	0.10	(0.30)	0	1	
Y-o-y rate of quarterly GDP growth (%)	NBS	216	3.2	(3.1)	3.1	4.3	[0.055]
NBS policy interest rate (%)	NBS	216	7.8	(2.7)	7.8	8.3	[0.214]
PANEL B: Outcome variables:							
Privatization revenues (constant bln dinars)	Contracts; PA reports	216	1.3	(4.4)	1.1	3.6	[0.325]
Privatization sales (#)	Contracts; PA reports	216	11	(19)	9	24	[0.035]

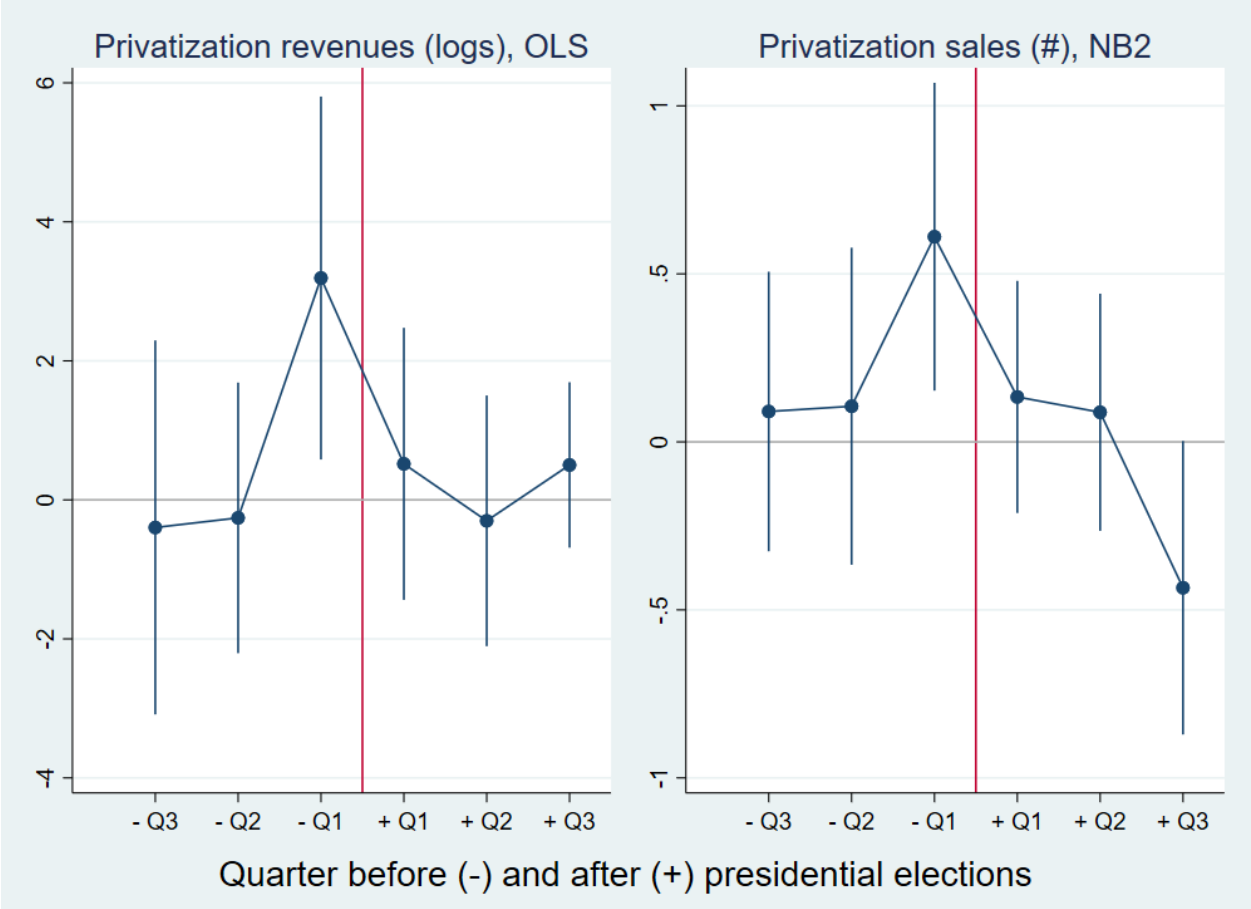
Notes: the last column reports two-sample t-tests of the null hypothesis that the difference of the means is equal to zero. The population variances (pre-election=0 and pre-election=1) are assumed to be different. NBS stands for National Bank of Serbia

TABLE 3: Election cycles in privatization (times series regressions, 2002-2019)

	Baseline	Season.	Year FE	Dynamics	Controls	All
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A - Dependent variable: ln(privatization revenues), OLS						
ln(privatization revenues), 4 lags				0.886***		0.070
				[0.038]		[0.173]
Pre-election quarter ($Q1_t$)	6.374**	6.045**	3.715**	3.189**	3.789**	2.642*
	(2.607)	(2.616)	(1.563)	(1.306)	(1.735)	(1.606)
Adjusted R-squared	0.03	0.01	0.67	0.64	0.27	0.71
PANEL B - Dependent variable: privatization sales (#), NB2						
ln(privatization sales), 4 lags				0.840***		0.415***
				[0.047]		[0.139]
Pre-election quarter ($Q1_t$)	0.931***	0.817***	0.943**	0.641***	0.532*	0.116
	(0.288)	(0.265)	(0.455)	(0.236)	(0.275)	(0.218)
λ	4.6	4.4	0.7	0.7	3.2	0.3
(s.e. of λ)	(0.5)	(0.5)	(0.1)	(0.1)	(0.4)	(0.1)
AIC	1229	1245	992	983	1175	987
BIC	1239	1292	1060	1006	1191	1041
Seasonality dummies	No	YES	No	No	No	YES
Year FE	No	No	YES	No	No	YES
4 lags of the dependent variable	No	No	No	YES	No	YES
Control variables	No	No	No	No	YES	YES
Observations (months)	216	216	216	212	216	212

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Time-series (monthly) OLS regressions with Newey-West standard errors in parenthesis (3 lags) in Panel A. Negative-binomial (NB2) regressions with robust standard errors in parenthesis in Panel B. Columns 4 and 6 (Panels A and B) report a linear combination of the coefficients on the four lags of the dependent variable included in the regression [delta-method standard errors in brackets]. The control variables (columns 5 and 6) include: the NBS policy interest rate (in logs), and the year-on-year rate of GDP growth.

FIGURE 3 – Election cycles in privatization activity (2002-2019)



Notes: the coefficient plots report the estimated coefficients on a set of dummies capturing the first three quarters before and after presidential elections, conditional on four lags of the dependent variables (as in model 4, Table 3). The red vertical line denotes the timing of elections. The adjusted R-squared of the OLS model is 0.63; the AIC and BIC of the NB2 model are, respectively, 989 and 1029. The number of observations is 212 for both models.

TABLE 4: Privatization prices (OLS regressions)

	Unconditional	Privatization year FE	Controls	All
	(1)	(2)	(3)	(4)
PANEL A - Dependent variable: ln(opening price)				
Pre-election privatization ($Q1_i$)	-0.703^{***}	-0.731^{***}	-0.987^{***}	-0.604^{***}
	(0.206)	(0.197)	(0.118)	(0.113)
Adjusted R-squared	0.01	0.14	0.51	0.55
PANEL B - Dependent variable: ln(sale price)				
Pre-election privatization ($Q1_i$)	-0.348^{**}	-0.301^{*}	-0.351^{***}	-0.167^{*}
	(0.165)	(0.172)	(0.082)	(0.097)
Adjusted R-squared	0.00	0.06	0.40	0.44
Year of privatization FE	No	YES	No	YES
Control variables	No	No	YES	YES
Observations (firms)	2,330	2,330	2,279	2,279

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The unit of analysis is the firm (former SOE). OLS regressions with robust standard errors clustered at the sector level in parenthesis. The control variables included in the models reported in columns (3) and (4) include: firm-level characteristics (sector, location, log of number of employees at privatization and its square, firm age in years), buyer characteristics (foreign vs. domestic, physical vs. legal person, number of buyers in logs), the log of investment requirements at privatization, the method of privatization (auction vs. tender), and an indicator for firms that had been put up for auction unsuccessfully prior to being sold.

TABLE 5: Costs of production (stochastic frontier analysis)

Dependent variable: ln(total costs), 2018	(1)	(2)	(3)	(4)
PANEL A - Inefficiency equation (distance to frontier):				
Pre-election privatization ($Q1_i$)	0.054	0.627***	0.215**	1.949***
	(0.036)	(0.226)	(0.096)	(0.298)
{Average marginal effects}	{0.009}	{0.036}	{0.036}	{0.045}
PANEL B - Cost frontier:				
ln(revenues), 2018	1.053***	1.057***	1.067***	1.059***
	(0.006)	(0.006)	(0.008)	(0.007)
Sector FE	YES	YES	YES	YES
Joint test [p-value]	[0.000]	[0.000]	[0.000]	[0.000]
Region FE	YES	YES	YES	No
Joint test [p-value]	[0.001]	[0.002]	[0.000]	
Located in large city (dummy)	−0.096***	−0.101***	−0.098***	
	(0.032)	(0.031)	(0.029)	
Additional controls in inefficiency eq.	No	YES	YES	YES
Additional controls in cost frontier	No	No	YES	No
σ_u	0.01	0.20***	0.05	0.55***
σ_v	0.43***	0.43***	0.42***	0.43***
Observations (firms)	954	922	922	922

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; The unit of analysis is the firm (former SOE). ML regressions with robust standard errors clustered at the sector level in parenthesis. [Delta-method standard errors in brackets] The dependent variable is total costs (in logs), which includes cost of goods sold (COGS), and sales, general & administrative (SG&A) expenses. {The average marginal effects of Q_1 on the mean of inefficiency $E(u_i)$, and hence on the dependent variable, are shown in curly brackets}. The additional controls included in the inefficiency equation (models 2 and 4) are: the number of employees at privatization (in logs) and its square, firm age in years, buyer characteristics (foreign vs. domestic, physical vs. legal person, number of buyers in logs), the log of investment requirements at privatization, the method of privatization (auction vs. tender), and an indicator for firms that had been put up for auctions unsuccessfully prior to being sold. Model (3) moves three variables (firm age, domestic vs. foreign buyer and physical vs. legal person buyer) from the inefficiency equation to the cost function

TABLE 6: Firm performance: Probability of bankruptcy (logit regressions)

Dependent variable:	Control group: all firms		Control group: active firms	
Bankruptcy (dummy), 2021	(1)	(2)	(3)	(4)
Pre-election privatization ($Q1_i$)	0.045**	0.044**	0.056**	0.049**
	(0.022)	(0.018)	(0.023)	(0.021)
Pseudo R-squared	0.00	0.09	0.00	0.11
Control variables	No	YES	No	YES
Observations (firms)	2,330	2,278	1,960	1,908

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; The unit of analysis is the firm (former SOE). Logit regressions with robust standard errors clustered at the sector level in parenthesis. The table reports average marginal effects. Control variables include: firm-level characteristics (sector, location, number of employees at privatization in logs, and its square, firm age in years), buyer characteristics (foreign vs. domestic, physical vs. legal person, number of buyers in logs), the log of the investment requirements at privatization, the method of privatization (auction or tender), and an indicator for SOEs that had been put up for auction unsuccessfully prior to being sold.

TABLE 7: Firm performance: Profitability (stochastic frontier analysis)

Dependent variable: ln(net income), 2018	(1)	(2)	(3)	(4)
PANEL A - Inefficiency equation (distance to frontier):				
Pre-election privatization ($Q1_i$)	0.773**	0.357**	0.366**	0.363*
	(0.391)	(0.181)	(0.184)	(0.201)
{Average marginal effects}	{0.382}	{0.352}	{0.358}	{0.357}
PANEL B - Profit frontier:				
Sector FE	YES	YES	YES	YES
Joint test [p-value]	[0.000]	[0.000]	[0.000]	[0.000]
Region FE	YES	YES	YES	NO
Joint test [p-value]	[0.033]	[0.029]	[0.088]	
Located in large city (dummy)	0.390**	0.342*	0.291	
	(0.184)	(0.200)	(0.286)	
Additional controls in inefficiency eq.	No	YES	YES	YES
Additional controls in profit frontier	No	No	YES	No
σ_u	2.40***	2.08***	2.06***	2.10***
σ_v	1.69***	1.10***	0.38	0.00***
Observations (firms)	1,108	1,074	1,074	1,074

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; The unit of analysis is the firm (former SOE). ML regressions with robust standard errors clustered at the sector level in parenthesis. [Delta-method standard errors in brackets]. {The average marginal effects of Q_1 on the mean of inefficiency $E(u_i)$, and hence on the dependent variable, are shown in curly brackets}.The additional controls included in the inefficiency equation (models 2 and 4) are: number of employees at privatization (in logs) and its square, firm age in years, buyer characteristics (foreign vs. domestic, physical vs. legal person, number of buyers in logs), the log of investment requirements at privatization, the method of privatization (auction vs. tender), and a dummy for firms that were offered by auction unsuccessfully prior to beind sold. Model (3) moves three variables (firm age, domestic vs. foreign buyer and physical vs. legal person buyer) from the inefficiency equation to the profit function.

APPENDIX 1: Falsification tests

	Time-series regressions		Privatization prices & firm costs			Firm performance	
Dependent variable:	ln(revenues)	N. of sales	ln(opening price)	ln(sale price)	ln(costs)	Bankruptcy	ln(net income)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A - Election dates spuriously shifted forward by 1 year							
Pre-election quarter ($Q1_t$)	0.681	0.049					
	(0.588)	(0.160)					
Pre-election privatization ($Q1_i$)			−0.074	-0.119	-0.109	-0.009	0.196
			(0.201)	(0.141)	(0.226)	(0.019)	(0.208)
{Average marginal effects}					{-0.014}		{0.193}
Observations	212	212	2,330	2,330	922	2,278	1,074
PANEL B - Election dates spuriously shifted forward by 2 years							
Pre-election quarter ($Q1_t$)	-0.820	-0.056					
	(1.044)	(0.168)					
Pre-election privatization ($Q1_i$)			-0.272	0.115	-0.070	-0.043	-0.298*
			(0.261)	(0.173)	(0.332)	(0.028)	(0.169)
{Average marginal effects}					{-0.008}		{-0.293}
Observations	212	212	2,330	2,330	922	2,278	1,074

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Models (1) and (2) are estimated using the time-series dataset (see Table 2), and include 4 lags of the dependent variable. All the other models are estimated using the firm-level dataset (Table 1). Models (3) and (4) control for year fixed effects. Model (5) is stochastic cost frontier model that includes the full set of controls in the inefficiency equation (see Table 1, Panel A). Model (6) is a logit model (marginal effects reported) that includes the full set of control variables. Model (7) is a stochastic profit frontier model that includes the full set of controls in the inefficiency equation.

APPENDIX 2: Robustness to alternative definitions of 'pre-election period'

	Time-series regressions		Privatization prices & firm costs			Firm performance	
Dependent variable:	ln(revenues)	N. of sales	ln(opening price)	ln(sale price)	ln(costs)	Bankruptcy	ln(net income)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PANEL A - Pre-election period: 4 months before presidential elections							
Pre-election period ($Q1_t$)	1.938*	0.521**					
	(1.008)	(0.212)					
Pre-election privatization ($Q1_i$)			−0.533***	−0.318**	0.257**	0.059***	0.187
			(0.154)	(0.135)	(0.110)	(0.019)	(0.151)
{Average marginal effects}					{0.016}		{0.184}
Observations	212	212	2,330	2,330	922	2,278	1,074
PANEL B - Pre-election period: 5 months before presidential elections							
Pre-election period ($Q1_t$)	1.822**	0.502***					
	(0.916)	(0.188)					
Pre-election privatization ($Q1_i$)			−0.599***	−0.250*	1.227*	0.049***	0.180
			(0.155)	(0.139)	(0.627)	(0.016)	(0.124)
{Average marginal effects}					{0.031}		{0.177}
Observations	212	212	2,330	2,330	922	2,278	1,074

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Models (1) and (2) are estimated using the time-series dataset (see Table 2), and include 4 lags of the dependent variable. All the other models are estimated using the firm-level dataset (Table 1). Models (3) and (4) control for year fixed effects. Model (5) is stochastic cost frontier model that includes the full set of controls in the inefficiency equation (see Table 1, Panel A). Model (6) is a logit model (marginal effects reported) that includes the full set of control variables. Model (7) is a stochastic profit frontier model that includes the full set of controls in the inefficiency equation.

APPENDIX 3: Parliamentary (instead of presidential) elections

	Time-series regressions		Privatization prices & firm costs			Firm performance	
Dependent variable:	ln(revenues)	N. of sales	ln(opening price)	ln(sale price)	ln(costs)	Bankruptcy	ln(net income)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Pre-election quarter ($Q1_t$)	−0.814	−0.174					
	(1.560)	(0.216)					
Pre-election privatization ($Q1_i$)			0.118	0.080	0.059	0.007	0.173
			(0.166)	(0.134)	(0.118)	(0.024)	(0.199)
{Average marginal effects}					{0.006}		{0.170}
Observations	212	212	2,330	2,330	922	2,278	1,074

Notes: ***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$. In these regressions, $Q1_t$ takes the value 1 in the last three months before a *parliamentary* election (time-series regressions in columns 1-2), while $Q1_i$ takes the value 1 if firm i was privatized in the last three months before a *parliamentary* election. Parliamentary elections took place on 28 December 2003, 21 January 2007, 11 May 2008, 6 May 2012, 16 March 2014, and 24 April 2016. Models (1) and (2) include 4 lags of the dependent variable, and are based on the time-series dataset. All the other models are based on the firm-level dataset. Models (3) and (4) control for year fixed effects. Model (5) is a stochastic cost frontier model that includes the full set of controls in the inefficiency equation. Model (6) is a logit model (marginal effects reported) that includes our full set of controls. Model (7) is a stochastic profit frontier model that includes the full set of controls in the inefficiency equation.

Opportunistic privatization

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Abstract

We argue that, in the run-up to elections, self-interested politicians use privatization opportunistically to buy votes and increase their probability of re-election. When state-owned firms are privatized, politicians can use subsidies to persuade the new managers to pursue inefficient strategies that bring political benefits to them. Under plausible assumptions, politicians have a strict preference for privatization over state ownership in the run-up to elections. We test these predictions using a unique dataset covering the full population of former socially owned enterprises in post-Milošević Serbia (2001-2019). We report robust conditional correlations consistent with our theory. Privatization sales and revenues increase significantly in pre-election periods. The firms privatized before elections are sold at a lower price, and exhibit higher total costs after privatization, than otherwise similar firms. They also have a higher probability of bankruptcy and, conditional on surviving, display lower profitability than otherwise similar firms. These findings highlight the link between privatization, elections and corruption, and point to the need for monitoring, or even suspending, privatization sales during election periods

Keywords: privatization, elections, corruption, collusion, cooperative games, stochastic frontier analysis4

JEL codes: C71, C78, D72, D73, L33[1]

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