

# Opportunistic privatization

Vladan Ivanovic<sup>1</sup>, Luca J. Uberti<sup>2\*</sup>, Drini Imami<sup>3</sup>

<sup>2\*</sup> Collegio Carlo Alberto, P.za Arbarello, 8, Torino, Italy.

<sup>1</sup>University of Kragujevac, Jovana Cvijica, 66, Kragujevac, Serbia.

<sup>3</sup>Agricultural University of Tirana, Rr. Paisi Vodica, Tirana, Albania.

\*Corresponding author(s). E-mail(s): [luca.jacopo.uberti@gmail.com](mailto:luca.jacopo.uberti@gmail.com);

## 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 analysis<sup>4</sup>

**JEL codes:** C71, C78, D72, D73, L33<sup>1</sup>

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## 1 Introduction

While state ownership was once regarded as a cure for market failure (e.g. Atkinson and Stiglitz, 1980; Wilner, 2001), it is now seen primarily 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 to 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 stimulating the restructuring and profitability of the state sector. In former socialist countries, ownership transformation was perhaps the most emblematic feature of the transition from a planned to a market economy since 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)

Privatization also has 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 nomen-

klatura, usually at a fraction of their market value (Braguinsky 2009). Guriev and Rachinsky (2005: 138), for instance, describe the “loans-for-shares” auctions held [by 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 relatively underexplored. Furthermore, little is known about the impact of elections on privatization – how the preferences and behavior of campaigning politicians may affect, distort, and corrupt the privatization process. In this paper, we describe and document a type of privatization – which we refer to as ‘opportunistic privatization’ – that is associated with the persistence of the inefficiencies and poor performance that typically go along with state ownership. We argue that, in the run-up to elections, self-interested politicians use privatization opportunistically to pursue political objectives – specifically, to buy votes and interest group support, thereby increasing their chance of re-election.

The election-related effects documented in this paper emerge naturally in a simple extension of Boycko et al.’s (1996) seminal model of privatization. When public companies are privatized, politicians can use subsidies to buy back control, and 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 private managers at relatively low cost. We show that, during elections, vote-seeking politicians may 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. In pre-election periods, the political costs of bargaining with managers are lower than the political costs of inefficiencies in public companies, which are typically under heightened public scrutiny. This mechanism implies that the relative preference of politicians for state ownership decreases (or is reversed) during election periods. It also implies that the public companies privatized before elections are more likely to receive subsidies and exhibit higher costs than public companies privatized outside of election periods.

We test these predictions using unique data on privatization sales in Serbia (2001-2019). In particular, 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 2001. An middle-income Balkan country and successor state of 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 more than 10 years, as policy reforms did not begin in earnest until the downfall of former president Slobodan Milošević in the ‘bulldozer revolution’ of 2000. Thus, Serbia provides an excellent context 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. Both privati-

zation 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 heavily discounted price 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 these findings 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 these strategies to cater to 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 – they display significantly lower profits than implied by their profit function.

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 micro-data. Our findings relate to at least three strands of previous research. First, we contribute to the large literature on the economic effects of privatization (see Megginson and Netter [2001] and Estrin et al. [2009] for systematic reviews). Generally, the evidence points to beneficial effects of privatization on firm efficiency, revenues and profitability, particularly in advanced economies and in the relatively more developed ex-communist countries of Central Europe. In countries with less prudent fiscal policies, lower-quality institutions and elite entrenchment (e.g. the Soviet and Yugoslav successor states), the effects of privatization are more mixed, or even negative. None of the studies in this literature, however, links the heterogeneous performance of privatized firms to either the timing of privatization or the incentives arising from the election cycle. 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 incidence of corruption. Our findings partly address this gap, suggesting that privatization sales are likely to feature more corruption when they take place during election periods.

Finally, our findings relate to the literature on political business cycles. Previous studies have highlighted the manipulation of fiscal and monetary policy by politicians seeking re-election (Alesina et al.,

1997). In the classic ‘opportunistic’ model, politicians provide economic stimulus during election years in order to please voters (Nordhaus 1975; Rogoff and Sibert 1988). While the evidence for advanced democracies is mixed (Brender and Drazen, 2005), there is strong evidence of opportunistic behavior in transition and developing economies, where checks on executive behavior are weaker and voters are often short-sighted (Block, 2002; Akhmedov and Zhuravskaya, 2004). Our 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. While traditional models suggest that campaigning politicians try to maximize votes by providing economic stimulus, we emphasize a different and complementary mechanism – collusion between politicians and managers. By persuading managers to maintain or introduce inefficiencies, politicians generate political benefits without necessarily stimulating the economy at large. Thus, 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 derives testable predictions. In section 3, we introduce our data and present the context of post-socialist Serbia. Sections 4-6 discuss the empirical results. Section 7 concludes.

## 2 Theoretical framework

To derive testable hypotheses, 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 implications for the behavior of politicians in the run-up to elections.

### 2.1 Model setup

There are three players – a spending politician, the manager of the firm, and passive taxpayers. Under private ownership, the manager serves the interests of the firm’s shareholders; under state ownership, he serves the interests of politicians. Whoever owns the firm has a right to control the firm’s level of expenditure. Let  $\alpha \in \{0, 1\}$  denote the ownership status of the firm, with  $\alpha = 1$  indicating private ownership with managerial control, and  $\alpha = 0$  state ownership with politician control. 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  $\gamma$  dollars in excess of minimal costs.

Politicians derive political benefits  $q$  from every dollar of excess expenditure. The benefits may be the votes of additional workers hired by the firm, for example, or the bribes extracted from an inefficient (but politically connected) supplier of raw materials. 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 costs.<sup>1</sup>

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  $\gamma$ , the politician can subsidize the firm, making a transfer  $T$  from taxpayers (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 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  $\pi$ .

We first assume that  $\alpha$  is exogenous. The choice of ownership structure may be driven by programmatic or ideological considerations outside of politicians’ control. It may also be influenced by external actors such as international organizations. Under these assumptions, the politician’s and manager’s utility functions, respectively, 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, with the politician controlling both  $C$  and  $T$ . When  $\alpha = 0$ , the net transfer  $T$  from taxpayers to a state-owned enterprise is 0 by definition.<sup>2</sup> The politician then chooses the level of  $C$  that maximizes  $qC - mC$ . Specifically, he strictly prefers  $C = \gamma$  over  $C = 0$  as long as the political benefits ( $q$ ) of excess spending are larger than the political costs ( $m$ ).  $q > m$  holds when political competition is relatively high, and taxpayer’s voice relatively weak. This situation

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<sup>1</sup>We assume that  $m < 1$  since the politician cares less about the firm’s cash flows, which are owned by taxpayers, than he does about his own money.

<sup>2</sup>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.

describes well the early stages of post-communist transition, when public enterprises are also typically highly inefficient (Ahrend and Martins, 2003).<sup>3</sup>

When the firm is privatized ( $\alpha = 1$ ),  $T$  is still controlled by the politician, but the level of  $C$  is now chosen by the manager. As a default, the players behave non-cooperatively. The politician will choose the level of  $T$  that maximizes  $qC - kT$  (subject to the constraint that  $T$  should be non-negative), while the manager will choose 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,  $C = T = 0$ . Whatever the choice of the manager (politician), the politician (manager) is always better off by cutting subsidies to zero (choosing an efficient cost strategy). Thus, under private ownership, the utility  $U_p^D$  of the politician is 0, and the utility of the manager  $U_m^D$  is equal to  $\pi$ . The politician extracts zero benefits from the firm, while the manager realizes the maximal profit implied by the firm's profit function.

$U_p^D$  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 subsidies  $T > 0$  to buy politically attractive inefficiencies ( $C = \gamma$ ) from the firm manager. While this bargain is not enforceable in courts, the players may rely on informal mechanisms of enforcement, such as reputation. These mechanisms are often available in contexts with a historically rooted culture of corruption, where the moral value attached to law-abidance is relatively low, and trust depends largely on reputation.

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):

$$\max_T (q\gamma - kT)(\pi - \gamma + T - \pi) \quad (3)$$

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

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

Note that the bargain is struck if and only if both the politician and manager are better off with subsidies and inefficiencies than without them. In other words, the benefits of excess costs to the politician ( $q$ ) should be larger than the political costs of subsidies ( $k$ ). 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.

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<sup>3</sup>Shleifer and Vishny (1994: 1013) argue that 'in a perfectly secure dictatorship, [q] is arbitrarily close to zero. But if politicians compete for votes by promising jobs [...], then competition for votes raises' the marginal political benefits of inefficiency.

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

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

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

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 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 ( $\alpha$  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 those with a politicized public administration (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:

$$U_p^S = (q - m)\gamma \quad (7)$$

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  $m$ . As argued in the previous sub-section,  $q > m$  holds when political competition is relatively high, and taxpayer's voice relatively weak. 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).

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. When taxpayers are called to evaluate politicians, they increase the level of monitoring of the state sector, which raises the political cost  $m$  of excess expenditure in public firms.<sup>4</sup> While 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. 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. This is the case when:

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

A sufficient condition for (8) to hold is that both  $q$  and  $k$  are smaller than  $m$ .  $q < m$  means that the political costs of excess expenditure by public enterprises outweigh the political benefits. This condition holds if, during election periods, the increase in taxpayers’ scrutiny pushes  $m$  above  $q$ .

$k < m$  holds if the political cost of subsidies is relatively low (relative to the cost of excess expenditure in public enterprises). One way in which the politician can lower  $k$  is by transferring the subsidy to the firm *implicitly* – for instance, by means of a one-off price discount at the point of sale. Since most members of the government (let alone taxpayers) do not know the true value of public enterprises, a discount on the sale price is less costly for politicians to justify than an explicit subsidy.<sup>5</sup> Since the true market value of a firm is more difficult to observe than its cost structure, moreover, a hidden price discount is also less politically costly than the squandering of public firms’ profits on inefficiencies, which are often easy to detect ( $k < m$ ). 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:

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<sup>4</sup>How monitoring is performed is irrelevant at this point, but we recognize that monitoring may take different forms in full democracies and hybrid regimes with elections.

<sup>5</sup>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).

**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  $C$  in public enterprises. At least, their relative preference for increasing  $C$  in public enterprises is smaller than outside of election periods.*

In turn, Proposition 2 implies:

**Proposition 3 (Election cycle in privatization activity)** *If 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, politicians maintain political support by inflating expenditure in public enterprises. Of course, conditional on privatization, they still prefer collusion (provided it is feasible) to no collusion. Yet, in practice, there may be enough public enterprises around to plunder, and thus no need to bargain with the managers of privatized firms. Thus, outside of election periods, privatization may well improve cost-efficiency, as documented in previous studies (Megginson and Netter, 2001; Estrin et al., 2009).

During election periods, by contrast, politicians turn to privatization and bargaining as a means to maximize political benefits. Here, privatization is more likely than outside of election periods to be purely ‘opportunistic’, with little to no gains in cost-efficiency.<sup>6</sup> In particular, Propositions 1 and 3 together 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.

## 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. Thus, a firm sold before elections is likely to exhibit both higher costs *and* higher profitability after privatization than an otherwise similar firm sold outside of election periods (when collusion is less likely).

Yet, in practice, the transfer  $T^*$  is likely to be pocketed privately by the manager or the shareholders (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, as in the classic model of corruption

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<sup>6</sup>In principle, opportunistic privatization may even be efficiency-reducing relative to state ownership. Whether this is the case, however, is a question that is beyond the scope of this paper. Because of data limitations, we can only perform a cross-sectional comparison of privatised firms sold at different points in time (before elections vs. outside of election periods).

(Rose-Ackerman, 1997), honesty may be correlated with ability. The firms that select (or are selected by politicians) into collusive agreements may be systematically less efficient 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 Privatization and elections in Serbia

Following the break-up of the Socialist Federal Republic of Yugoslavia in 1992, the Republic of Serbia (the largest of Yugoslavia's six constituent republics) remained federated with the Republic of Montenegro within a reconstituted state entity known as the Federal Republic of Yugoslavia (1992-2003) and State Union of Serbia and Montenegro (2003-2006).<sup>7</sup> During 1990-1994, a number of Serbian public enterprises were transformed into joint-stock companies and sold to workers and managers 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 Serbian President Slobodan Milošević.<sup>8</sup> After 1994, many privatized firms were forcibly taken over by their creditors – typically, state-owned banks – or directly re-nationalized. In addition, Milošević brought the appointment of enterprise directors firmly under his control (Palairt, 2001). Privatization did not resume in earnest until the overthrow of Milošević in the ‘bulldozer revolution’ of September-October 2000.

A new Law on Privatization was passed in 2001, paving the way for the establishment of the Privatization Agency (PA), 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 Đinđić, 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, emphasis added).

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 to be 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 and were planned to be restructured and privatized at a later stage (Uvalić, 2010: 184). POEs are

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<sup>7</sup>Privatisation in Montenegro, which declared independence in 2006, is not covered in our analysis.

<sup>8</sup>During 1997-2000, Milošević was the federal president of Yugoslavia.

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 recommendation of the World Bank to rely exclusively on cash sales to outsiders (see Roland [2000] for a classification of privatization methods). In particular, two methods were used – auctions for smaller firms, and tenders for larger and more strategically important concerns. The auctions were based on an open-bid, first-price (English) method, and were usually held in the offices of the Privatization Agency. 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. Typically, they also specified a minimum sale price and mandatory social programs for laid-off workers. In all tenders, a mandatory capital investment requirement was also attached to the sale contract.

While the sale of SOEs was initially expected to be completed by 2005, the process lasted much longer than expected. During 2001-2019, a total of 2203 SOEs were sold by auction, and 126 by tender.<sup>9</sup> Taken together, these firms 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 approximately 40 percent in 2001 to 60 percent in 2011 (Uvalić, 2013). At the time of writing, the PA had been dissolved, and the authority to privatise the only 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, but was generally distrusted by the public. Notably, the SOEs' workers were usually fiercely opposed to privatization. They feared justifiably that the new owners might at best restructure and downsize the companies, many of which were seriously overstaffed, and at worst cease production altogether to strip the firm's fixed assets. Either way, the outcome of privatization would be unfavourable to the workers, who had enjoyed considerable benefits under social ownership. Uvalić (2010: 181) reports that layoffs and delays in wage payment were common in many privatized enterprises, contributing to an increase in strikes. In general, Serbian politicians were keenly aware of the potentially negative electoral consequences of workers' dissatisfaction.

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).

Anecdotal evidence suggests that the privatization process was often captured by special interests. Consider the case of *Vatrosprem*, a Belgrade-based former SOE active in the production and servicing

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<sup>9</sup>Based on our data.

of special-purpose vehicles (e.g. firefighter and garbage-collection trucks). In October 2003, one and a half months before a presidential election, the SOE was sold to a consortium of four buyers. The largest stake (43 percent) in the consortium was held by a company controlled by an MP (Dragiša Marinković), who was also president of the parliamentary committee for privatization. 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 thus able to secure the sale at the lowest possible price, which likely underestimated the true value of the firm. At the time of privatization, *Vatrosprem* had 296 employees on its payroll. In April 2014, it filed for bankruptcy. The outfit that emerged from the restructuring process, which was bought again by Marinković (now a sole owner) in August 2018, had as few as 65 employees in 2019, pointing to potential overstaffing problems in the post-privatization, pre-bankruptcy phase.

Serbia’s political system is characterised by power concentration and weak checks on executive behaviour. Perhaps a legacy of ‘strongman rule’ under Milošević, the informal ‘presidentialisation’ of politics is a defining feature of post-socialist Serbia (Spasojević, 2021). Although Serbia is a parliamentary republic, and executive power rests with the prime minister under the constitution, the president of the republic is directly elected by the people and plays an outsized role in decision-making. Since 2000, the incumbent president has also always been the leader of the party controlling the parliamentary majority. For this reason, in the analysis, we focus on presidential, rather than parliamentary, elections.<sup>10</sup> During 2001-2019, seven presidential elections took place, all of which were characterised by tight competition between opposing candidates.<sup>11</sup>

## 3.2 Data

We compiled a unique firm-level dataset covering (almost) all SOEs privatized in Serbia since 2001. 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 Register 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

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<sup>10</sup>We also performed the analysis with parliamentary elections, finding no significant results (see Appendix 3).

<sup>11</sup>Presidential elections were held in September 2002, December 2002, November 2003, June 2004, January 2008, May 2012, and April 2017.

which information is publicly available (2018). Lastly, we used Octoparse software to scrape and obtain information from the webpages of individual privatized enterprises.

[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 prior to 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 a relatively narrow time window before elections in order to identify effects that are less likely to be confounded by the influence of other events. In the Appendix, we test the robustness of our results 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<sup>12</sup>, its geographical location, and industry sector (4-digit NACE).<sup>13</sup> 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 out by a consortium of buyers, we also observe the number of companies or individuals comprising the consortium. Lastly, we have information about the privatization sale itself, including the method used (auction vs. tender) and the investment requirement imposed by the PA, if any.

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 total

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<sup>12</sup>This was computed by subtracting the year of establishment from the year of privatisation.

<sup>13</sup>We use the Statistical Agency’s division of Serbia into 4 macro-regions (Vojvodina, Belgrade region, Eastern and Southern Serbia, and Western Serbia Šumadija).

costs and net income in the year 2018.<sup>14</sup> All the monetary variables that refer to year 2018 (the firm performance variables) are expressed in current 2018 Serbian dinars. Investment requirements and privatization prices, by contrast, were deflated using a Consumer Price Index, and are expressed in constant 2006 dinars.<sup>15</sup>

A potential concern with our analysis is that politicians may select particular types of firms to privatize before elections.<sup>16</sup> 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 before elections to be identical on other dimensions to the SOEs sold outside of 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 potential 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 sales (*pre – election* = 1) and other sales separately, together with t-tests of the null that the mean difference is zero. For all 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 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  $\chi^2$  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 other sales. Here, the  $\chi^2$  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.<sup>17</sup> 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 as other firms, they display notable differences on the outcome variables listed in Table 1, Panel B. For

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<sup>14</sup>The firm’s total costs, which equals 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.

<sup>15</sup>The Consumer Price Index is from the National Bank of Serbia.

<sup>16</sup>Alternatively, but less plausibly, firms may self-select for ‘opportunistic privatization’.

<sup>17</sup>This observation, which can be confirmed visually (Figure 2), is based on tests of the difference between the two population percentages.

one thing, they were put on the market 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 other firms (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 pick 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 the terms of sale and the SOEs’ performance after privatization. To the extent that our controls variables (e.g. firm age, method of privatization) are at least partly reflective of the firm’s performance before privatisation, however, we can take comfort in noting that all our findings are robust to including our full set of controls in the regressions.

[Table 2]

Next, we used our firm-level information to construct a macro-level dataset. In particular, we counted the total number of sales and computed the total revenues from privatization (in constant dinars) realised in each month during 2001-2019, thereby generating a time-series dataset with monthly frequency. This information is summarised in Table 2. Here, 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’. From the National Bank of Serbia (NBS), we also obtained monthly data on the main policy interest rate, which averaged 7.8 percent during our 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  $100 \times (\ln GDP_t - \ln GDP_{t-12})$ .<sup>18</sup>

As indicated by the group means and t-tests reported in Table 2, both the number of privatization sales and the revenues from privatization were around three times as large in the last pre-election quarter as at other points in time, 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

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<sup>18</sup>This transformation has the effect of de-trending and de-seasonalizing the GDP data.



finding is consistent with politicians stimulating the economy in the run-up to elections (Alesina et al., 1997). It also points to the need for controlling for GDP growth in the time-series regressions.

## 4 Election cycles in privatization

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

$$\ln p\_rev_t = \beta_0 + \beta Q1_t + u_t \quad (9)$$

$$n\_sales_t = \exp(\beta_0 + \beta Q1_t) \times u_t \quad (10)$$

where  $\ln p\_rev_t$  is the natural log of total revenues realized by the Serbian state from the sale of  $n\_sales_t$  public enterprises in month  $t$ .  $Q1_t$  is the pre-election quarter dummy (see Table 2),  $\beta_0$  is a constant term, and  $u_t$  is a random disturbance.  $\beta$ , 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. 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. 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  $\mu$  and population variance  $\sigma = (\mu + \lambda\mu^2)$ .<sup>19</sup> While the consistency of the maximum-likelihood (ML) estimator of  $\beta$  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 misspecification. Thus, we follow Cameron and Trivedi's (2013: 85) recommendation of basing inference on robust standard errors.

The parameter estimates of  $\beta$  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 substantially in the last three months before a presidential election. The estimates of  $\beta$  in (9) and (10) are statistically significant at the 5 and 1 percent level, respectively.

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<sup>19</sup>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  $\sigma$  is likely to be larger than the population mean  $\mu$ . For this reason, we favor an NB2 ( $\lambda > 0$ ) over a Poisson ( $\lambda = 0$ ) model specification.

It is possible that the 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  $\beta$  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).<sup>20</sup> The models in column 3 use year fixed effects (FE) to control flexibly for broad trends in privatization outcomes over time. The year FE absorb any unobserved influences related to the ability and composition of the PA, as well as macro-economic and institutional shocks affecting investment demand. In this specification, the identification of election-related effects comes entirely from a comparison of pre-election with other quarters within election years.

Column (4) reports a dynamic specification that removes 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  $\beta$  on four lags of the dependent variable.<sup>21</sup> An advantage of the dynamic specification is that it controls flexibly for all omitted historical influences on 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 of privatization outcomes over time. Lastly, 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.

Throughout columns (2)-(6), the finding of a significant pre-election increase in privatization revenues and sales remains qualitatively unaltered. Based on adjusted R-squared (Panel A) and two information criteria (Panel B), the best fit to the data is achieved by model (4) in Panel A, and model (5) in Panel B. The estimate of  $\beta$  in model (5), Panel A, implies that total revenues from privatization sales quadruple in the last three months prior to presidential elections.<sup>22</sup> The corresponding estimate in Panel B implies that the number of privatization sales almost doubles (to 20.5 sales per month) relative to a long term average of 11 sales per month.<sup>23</sup> These estimates point consistently to an economically large increase in privatization activity in the last quarter running up to 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

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<sup>20</sup>The coefficients on the monthly dummies are always jointly insignificant, ruling out any seasonal effect.

<sup>21</sup>In the NB2 model, we log-transform the lags of the dependent variable, following the specification proposed by Zeger and Qaqish (1988) and recommended by Cameron and Trivedi (2013: 281) to avoid an explosive functional form.

<sup>22</sup>319 percent increase

<sup>23</sup> $= 100 \times [\exp(0.641) - 1] = 89.8$  percent increase

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  $\beta$  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 effect becomes 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  $\beta$  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 just 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. Thus, our interpretation of pre-election effects as driven by ‘opportunism’ implies 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 prices and cost structure of SOEs privatized before elections.

## 5 Privatization prices and firm costs

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. 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

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:

$$\ln price_i = \beta Q1_i + \theta X_i + \epsilon_i \quad (11)$$

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 (see Table 1);  $X_i$  is a vector of price determinants; and  $\epsilon_i$  is a random disturbance capturing all unmodelled factors shaping the firm’s market value.<sup>24</sup> 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 given 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 and region fixed effects.

[Table 4]

The OLS estimates of  $\beta$  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 asking price for the company 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  $Q1_i$ . 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 by including year of privatization FE (column 2). Column (3) reports our preferred specification, which controls for other potential determinants of privatization prices, substantially increasing the regressions’ R-squared in both Panel A and Panel B. We find that firms privatized before elections were first offered by the PA at a price that was, on average, 78 percent lower than the price of otherwise comparable firms. They were then sold at a final price that suggests a discount on market value of almost 30 percent.

The estimated price ‘discount’ disappears completely, as it should, when the timing of elections is

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<sup>24</sup>For brevity, we do not write explicitly the constant term in the equation, nor do we report the estimate in the regression tables.

spuriously shifted forward 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, 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 3) 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), 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 (e.g. the SOEs’ pre-privatization performance). To the extent that these characteristics affect the firm’s market value through the error term, the OLS estimators of the parameters reported in Table 4, column 3, would be biased and inconsistent. 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 note that, if anything, it appears more plausible that politicians may 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 by politicians.

## 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, we look for evidence of excess costs (H3). To do so, we estimate a stochastic cost frontier (SF) model. SF analysis provides an approach to modelling the factors that lead 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). Any deviation from this cost frontier may be attributed to individual firm inefficiencies. The cost function has the following form:

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

where  $C_i$  refers to the firm’s total costs in 2018 and  $Q_i$  is the firm’s level of output, proxied by its sale revenues in 2018.  $\sigma_i$  and  $\lambda_i$  are industry and location 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  $\mu$  and standard deviation  $\sigma_u$ . 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 their 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 the conditional mean of the inefficiency term to have the following form:

$$E(u_i) = \beta Q_1 + \theta X_i + \beta_0 \tag{13}$$

where the symbols have the same interpretation as in (11) and  $\beta_0$  is a constant term.

[Table 5]

Equations (12) and (13) are estimated simultaneously by maximum likelihood (ML). The parameter estimates are reported in Table 5. Column 1 reports a simple model that omits  $X_i$  from the inefficiency equation. The estimate of  $\beta$  is positive, indicating that the firms privatized before elections (prior to 2018) were on 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  $u_i$  ( $\sigma_u$ ) is also statistically indistinguishable from zero, however, pointing to potential mis-specification problems. In column 2, we add our full set of control variables to the inefficiency equation.  $\sigma_u$  is now significantly larger than 0, and the estimate of  $\beta$  is positive and significant at the 1 percent level. The average marginal effect of  $Q_1$  on the mean of inefficiency  $E(u_i)$ , and hence on  $\ln C_i$ , is 0.052.<sup>25</sup> This estimate implies that, in 2018, the firms that were privatized before elections reported total costs that were, on average, 5 percent higher than the total costs of other firms with similar technology, input prices and output levels. 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 from politically connected suppliers). Although the magnitude of this effect is relatively small, it is plausible that the politician’s one-off transfer to the manager may be reciprocated by politically beneficial cost inefficiencies that are spread out over the politician’s term in office, and possibly even longer.

Lastly, in column 3, we test the robustness of this finding by moving three control variables (domes-

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<sup>25</sup>See Kumbhakar and Sun (2013) for a derivation of the formulas used in post-estimation to compute the average marginal effects.

tic/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, although  $\sigma_u$  is now statistically insignificant. Furthermore, 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 estimate of  $\beta$  is not statistically significant when *four* (instead of three) pre-election months are considered.

In sum, the firms that were privatized before presidential elections were both sold at a lower price, and display higher excess costs, than otherwise similar firms. Although other interpretations may be possible, these findings are consistent with what we should observe if the mechanisms described in our model were operative, and politicians colluded with firm managers in the run-up to elections to strike mutually beneficial bargains. Our findings are also consistent with an increase in corruption during election years, as documented in previous cross-country studies (Potrafke, 2019).

## 6 Firm performance outcomes

Lastly, we examine the impact of ‘opportunistic privatization’ on firm performance. The subsidy earned by the manager under bargaining is larger than the costs of inefficiencies (see section 2), making firms that are privatized opportunistically more profitable. Yet, bargaining may also 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 non-linear probability model:

$$Bankruptcy_i = \Lambda(\beta Q1_i + \theta X_i + \beta_0) + \epsilon_i \quad (14)$$

where  $Bankruptcy_i$  is a dummy variable that takes the value 1 if by 2021 firm  $i$  had filed for bankruptcy (or had ceased to exist), and 0 otherwise. The other symbols have the same interpretation as in (11), and  $\Lambda$  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. Column (1) omits  $X_i$ , while column (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 (36 percent) is almost 5 percentage points higher (column 2) than for otherwise similar firms (31 percent). The difference corresponds to a 17 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.

## 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. 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  $\pi_i$  refers to the firm’s net income in 2018; and  $\sigma_i$  and  $\lambda_i$  are industry-sector and location effects (region FE and a dummy for large urban centers), 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. Again, we assume that  $u_i$  is truncated-normally distributed with mean  $\mu_i$  and variance  $\sigma_u^2$ , and that  $\mu_i = E(u_i)$  has the same form as equation (13).

[Table 7]



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) includes our full set of covariates in the inefficiency equation, while column (3) moves three control variables (domestic/foreign buyer, physical/legal person buyer, and firm age) from the inefficiency to the cost frontier equation. Across these three specifications, the results indicate that the firms privatized before elections are significantly less efficient in generating profits than other firms with a similar technology and price environment. The average marginal effect of  $Q_1$  on the mean of inefficiency,  $E(u_i)$ , and hence on  $\ln \pi_i$ , is 0.330. This estimate implies that, in 2018, the firms that had been privatized in the run-up to elections posted profits that were, on average, 33 percent lower than the profits of otherwise similar firms – a very large effect.

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 other, unobserved characteristics that affect firm performance negatively. For this reason, we emphasize again that our results are correlational. Still, we argue 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). 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. This finding highlights the adverse impact of collusive bargaining between politicians and managers. It also points to the potential social costs of electoral opportunism.

## 7 Conclusion

This paper has examined the preferences and behavior of politicians vis-à-vis state-owned enterprises in pre-election periods. During election campaigns, public scrutiny over the state sector is high, and politicians have an interest in having privatized firms pursue strategies that bring political benefits to them in the form of votes.

Based on a simple extension of Boycko et al.’s (1997) model of privatization, we find that under plausible assumptions vote-seeking politicians fuel an increase in privatization activity in the run up to elections. Politicians can strike a collusive bargain with firm managers, and trade an implicit subsidy (e.g. a discount on the privatization price) against economically costly but politically beneficial inefficiencies. We show that, during elections, politicians are better off with privatization than with

state ownership, provided bargaining is feasible.

To test these predictions, 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 relative to the market price of similar firms; they also exhibited higher total costs following privatization. Moreover, we show that the firms privatized opportunistically before elections perform worse than other privatized firms.

To our best knowledge, this is the first 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 a culture of corruption, at least partially undermining its effectiveness. The electoral manipulation of the privatization process 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. Thus, our results are relevant for all transition and developing economies that retain a relatively large state sector.

Policy-makers and international actors should find ways to screen the privatization body from political interference – for instance, by strengthening its legal independence; by facilitating a political settlement amongst competing politicians; or by negotiating a mandatory suspension of privatization sales during election campaigns. Indeed, the latter measure was introduced in 2020 in neighboring Albania. Strengthening the professionalism and independence of the media and raising voter awareness 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 turn to difference-in-difference approaches to further elucidate the impact of election-related incentives on the performance of privatized firms. Furthermore, 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.

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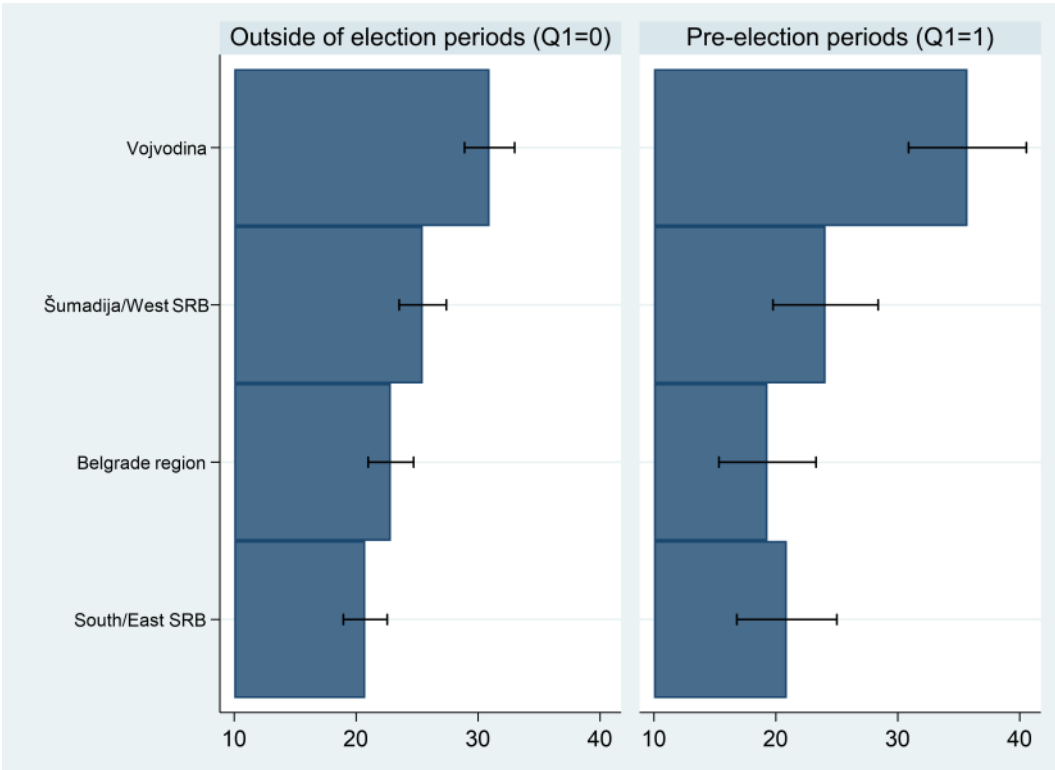
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**TABLE 1: Descriptive Statistics: Firm-level dataset**

Variable description	Source	N	Mean	(s.d.)	Pre-election = 0	Pre-election = 1	[t-test]
					Mean( <i>a</i> )	Mean( <i>b</i> )	( <i>a</i> - <i>b</i> )
<i>PANEL A: Independent variables:</i>							
Pre-election privatization ( $Q1_i$ )	Contract	2,330	0.16	(0.37)	0	1	
Number of workers at privatization	Firm website	2,330	173	(328)	176	154	[0.171]
Age of firm at privatization	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 requirement (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]
Revenues, 2018 (current mln dinars)	BRA	1,482	0.37	(1.91)	0.316	0.651	[0.158]
<i>PANEL B: Outcome variables:</i>							
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]

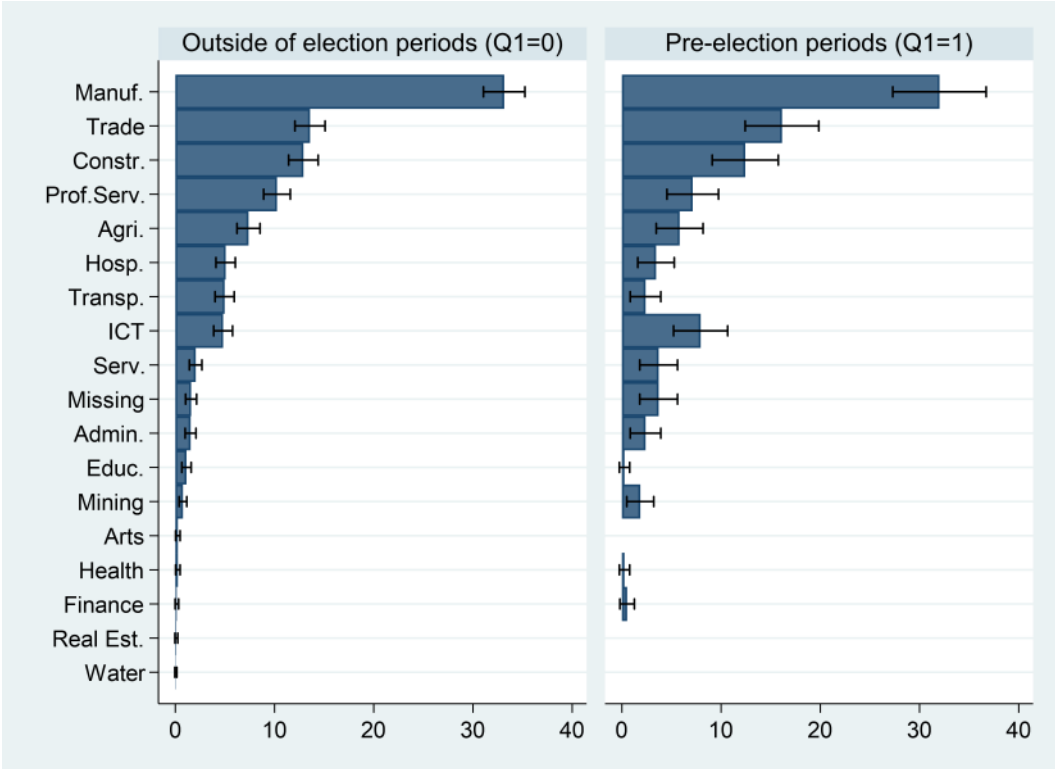
Notes: the last column reports two-sample t-tests of the null hypothesis that the difference of the means is equal to zero. The population variances (pre-election=0 and pre-election=1) are assumed to be different. PA stands for Privatization Agency; BRA stands for Business Registration Agency; BSA stands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

**FIGURE 1 – Geographical distribution of former SOEs according to 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 former SOEs according to 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: Time-series data**

Variable description	Source	N	Mean	(s.d.)	Pre-election = 0    Pre-election = 1		[t-test]
					Mean( <i>a</i> )	Mean( <i>b</i> )	( <i>a</i> - <i>b</i> )
<i>PANEL A: Independent variables:</i>							
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]
<i>PANEL B: Outcome variables:</i>							
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]

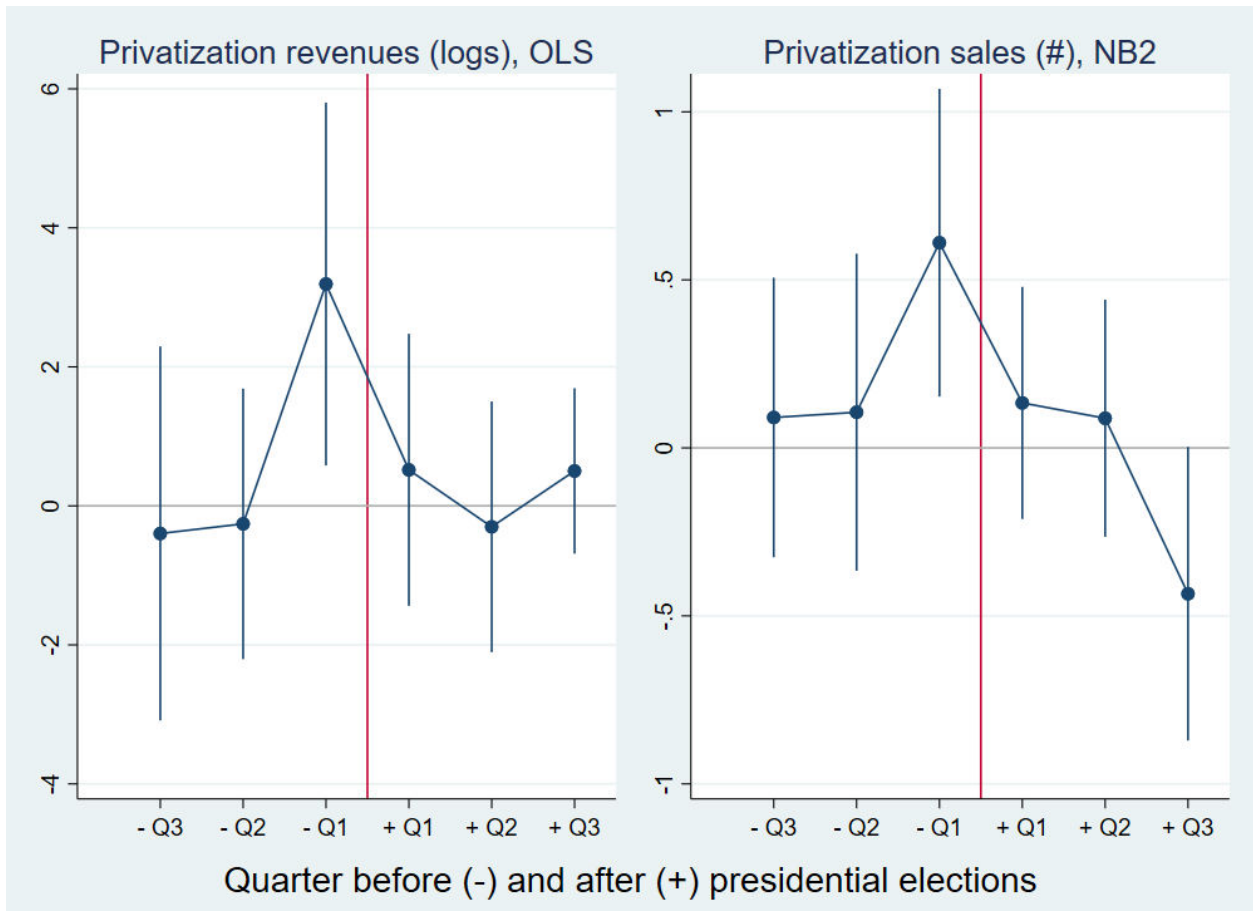
Notes: the last column reports two-sample t-tests of the null hypothesis that the difference of the means is equal to zero. The population variances (pre-election=0 and pre-election=1) are assumed to be different. NBS stands for National Bank of Serbia

**TABLE 3: Election cycles in privatization (times series regressions, 2001-2019)**

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

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. Column 5 (Panels A and B) reports 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 two additional pre-election dummies (column 2) take the value 1 in the second and third quarter before elections, respectively. The control variables (column 6) include: the NBS policy interest rate (in logs), and the year-on-year rate of GDP growth.

**FIGURE 3 – Election cycle in privatization activity**



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, and the AIC and BIC of the NB2 model are, respectively, 989 and 1029.

**TABLE 4: Privatization prices (OLS regressions)**

	Unconditional (1)	Year FE (2)	Controls (3)
<i>PANEL A - Dependent variable: opening price (logs)</i>			
Pre-election privatization ( $Q1_i$ )	-0.703*** (0.212)	-0.731*** (0.203)	-0.785*** (0.234)
Adjusted R-squared	0.01	0.14	0.48
<i>PANEL B - Dependent variable: sale price (logs)</i>			
Pre-election privatization ( $Q1_i$ )	-0.348* (0.170)	-0.301* (0.177)	-0.298*** (0.077)
Adjusted R-squared	0.00	0.05	0.38
Year of privatization FE	No	YES	No
Control variables	No	No	YES
Observations	2,330	2,330	2,326

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 in columns (1)-(3). The control variables included in the models reported in column (3) are: firm-level characteristics (sector, location, age in years, number of employees at privatization), buyer characteristics (foreign vs. domestic, physical vs. legal person, number of buyers), the method of privatization (auction vs. tender) and the log of investment requirements at privatization.

**TABLE 5: Firm costs (stochastic frontier analysis)**

Dependent variable: ln(total costs), 2018	(1)	(2)	(3)
<i>PANEL A - Inefficiency equation (distance to frontier):</i>			
Pre-election privatization ( $Q1_i$ )	0.054 (0.047)	0.191*** (0.046)	0.138*** (0.043)
Constant	-0.007 (3.673)	-3.382** (1.389)	0.534*** (0.192)
<i>PANEL B - Cost frontier:</i>			
ln(revenues), 2018	1.053*** (0.006)	1.062*** (0.007)	1.066*** (0.008)
Sector FE	YES	YES	YES
Joint test [p-value]	[0.000]	[0.000]	[0.000]
Region FE	YES	YES	YES
Joint test [p-value]	[0.001]	[0.000]	[0.000]
Located in large city (dummy)	-0.096*** (0.032)	-0.095*** (0.033)	-0.087*** (0.030)
Additional controls in inefficiency e.	No	YES	YES
Additional controls in cost function	No	No	YES
$\sigma_u$	0.01	0.14***	0.01
$\sigma_v$	0.43***	0.43***	0.42***
Observations	954	954	954

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. The dependent variable is total costs (in logs), which includes cost of goods sold (COGS), and sales, general and administrative (SG&A) expenses. The additional controls included in the inefficiency equation (model 2) are: firm age in years, number of employees at privatization, buyer characteristics (foreign vs. domestic, physical vs. legal person, number of buyers in logs), the method of privatization (auction vs. tender), and the log of investment requirements at privatization. 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 survival (logit regressions)**

Dependent variable:	Control group: all firms		Control group: active firms	
	(1)	(2)	(3)	(4)
Bankruptcy (dummy), 2021				
Pre-election privatization ( $Q1_i$ )	0.045** (0.022)	0.049*** (0.019)	0.056** (0.023)	0.056*** (0.021)
Pseudo R-squared	0.00	0.08	0.00	0.10
Control variables	No	YES	No	YES
Observations	2,330	2,324	1,969	1,854

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, age in years, number of employees at privatization), buyer characteristics (foreign vs. domestic, physical vs. legal person, number of buyers), the method of privatization (auction or tender) and the log of the investment requirements at privatization.

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

Dependent variable: ln(net income), 2018	(1)	(2)	(3)
<i>PANEL A - Inefficiency equation (distance to frontier):</i>			
Pre-election privatization ( $Q1_i$ )	0.773** (0.391)	0.334** (0.169)	0.374** (0.195)
Constant	1.194 (1.865)	9.496*** (0.365)	7.242** (2.969)
<i>PANEL B - Profit frontier:</i>			
Sector FE	YES	YES	YES
Joint test [p-value]	[0.000]	[0.000]	[0.000]
Region FE	YES	YES	YES
Joint test [p-value]	[0.033]	[0.023]	[0.000]
Located in large city (dummy)	0.390** (0.184)	0.359* (0.195)	0.188 (0.155)
Additional controls in inefficiency e.	No	YES	YES
Additional controls in profit function	No	No	YES
$\sigma_u$	2.40***	2.11***	1.90***
$\sigma_v$	1.69***	1.10***	1.03***
Observations	1,108	1,108	1,108

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. The additional controls included in the inefficiency equation (model 2) are: firm age in years, number of employees at privatization, buyer characteristics (foreign vs. domestic, physical vs. legal person, number of buyers in logs), the method of privatization (auction vs. tender). and the log of investment requirements at privatization. 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**

Dependent variable:	Time-series regressions		Privatization prices & firm costs			Firm performance	
	ln(revenues) (1)	N. of sales (2)	Opening price (3)	Sale price (4)	ln(costs) (5)	Bankruptcy (6)	ln(net income) (7)
<i>PANEL A - Election dates spuriously shifted forward by 1 year</i>							
Pre-election quarter ( $Q1_t$ )	0.681 (0.538)	0.049 (0.160)					
Pre-election privatization ( $Q1_i$ )			-0.074 (0.207)	-0.119 (0.146)	-0.009 (0.049)	-0.003 (0.020)	0.200 (0.215)
Observations	212	212	2,330	2,330	954	2,324	1,108
<i>PANEL B - Election dates spuriously shifted forward by 2 years</i>							
Pre-election quarter ( $Q1_t$ )	-0.820 (1.111)	-0.056 (0.168)					
Pre-election privatization ( $Q1_i$ )			-0.272 (0.269)	0.115 (0.179)	0.038 (0.029)	-0.030 (0.028)	-0.263 (0.185)
Observations	212	212	2,330	2,330	954	2,324	1,108

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

Dependent variable:	Time-series regressions		Privatization prices & firm costs			Firm performance	
	ln(revenues)	N. of sales	Opening price	Sale price	ln(costs)	Bankruptcy	ln(net income)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>PANEL A - Pre-election period: 4 months before presidential elections</i>							
Pre-election quarter ( $Q1_t$ )	1.938*	0.521**					
	(1.008)	(0.212)					
Pre-election privatization ( $Q1_i$ )			-0.533***	-0.318**	0.100	0.064***	0.180
			(0.159)	(0.139)	(0.189)	(0.019)	(0.150)
Observations	212	212	2,330	2,330	954	2,324	1,108
<i>PANEL B - Pre-election period: 5 months before presidential elections</i>							
Pre-election quarter ( $Q1_t$ )	1.822**	0.502***					
	(0.916)	(0.188)					
Pre-election privatization ( $Q1_i$ )			-0.599***	-0.250*	0.183**	0.056***	0.182
			(0.160)	(0.143)	(0.088)	(0.017)	(0.130)
Observations	212	212	2,330	2,330	954	2,324	1,108

Notes: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Models (1) and (2) include 4 lags of the dependent variable. Models (3) and (4) control for year fixed effects. Model (5) is stochastic cost frontier model that includes our 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 our full set of controls in the inefficiency equation.



**APPENDIX 3: Parliamentary (instead of presidential) elections**

Dependent variable:	Time-series regressions		Privatization prices & firm costs			Firm performance	
	ln(revenues) (1)	N. of sales (2)	Opening price (3)	Sale price (4)	ln(costs) (5)	Bankruptcy (6)	ln(net income) (7)
Pre-election quarter ( $Q1_t$ )	-0.842 (1.606)	-0.174 (0.216)					
Pre-election privatization ( $Q1_i$ )			0.118 (0.172)	0.080 (0.139)	0.189 (0.136)	0.050 (0.136)	0.134 (0.215)
Observations	212	212	2,330	2,330	954	2,324	1,108

Notes: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .  $Q1_t$  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. Models (3) and (4) control for year fixed effects. Model (5) is stochastic cost frontier model that includes our 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 our full set of controls in the inefficiency equation.