Governance in the Wild:
A Theory of State vs. Private Firms under Weak Institutions

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Abstract

We study how weak constraints on the government affect private contracts and the ownership of firms. To discourage expropriation, a social contract must give the government a stake in firm output. However, this reduces the firm owners' incentives to honor business contracts with suppliers, undermining their credibility. This tension disappears if suppliers contract directly with the government, which we interpret as a state-owned firm. Our model therefore predicts that under weak political institutions, contracting with the government may be second-best efficient if private business contracts are not verifiable, and hence require self-enforcement. We discuss evidence on privatizations in developing countries, and on the emergence of private firms in East Asia, which is consistent with our model's predictions. Our model has broader implications for contracting in the shadow of power, including the effect of corporate governance on the design of intra-firm hierarchies.

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1. Introduction

A large literature in political economy and development has studied the relationships of private agents with predatory governments, showing that weak checks and balances lead to "extractive" institutions, underinvestment, and low growth (e.g., North, Wallis and Weingast, 2009; Acemoglu and Robinson, 2012). An equally vast literature in organizational economics has studied the relationships of private agents *with each other*, showing how contracts, property rights, and other governance structures enable exchanges that benevolent but poorly informed governments cannot enforce (e.g., Williamson, 1985; Grossman and Hart, 1986). Given their opposite assumptions on government motives, these two literatures have mostly proceeded in parallel. Hence, we know remarkably little about whether and how the existence of a predatory government affects private contracting and the organization and ownership of firms.

Our paper addresses this question by developing a model of private contracting "in the wild," that is, in the shadow of an opportunistic ruler who may expropriate the gains from trade. We show that absent political checks and balances, this threat of expropriation reduces the credibility of contracts between private firms and their suppliers. We further show that in that case, suppliers may be better off contracting directly with the government – an arrangement that we interpret as a state-owned firm, or SOE.[1] Our model therefore provides an efficiency rationale for SOEs under weak political institutions. As discussed later, the result that SOEs may outperform private firms under weak institutions is consistent with the mixed success of privatizations, and the resilience of

[1] We define SOEs as entities recognized by national law as enterprises in which the state is the ultimate beneficiary owner of the majority of voting shares or where the state exercises effective control over an enterprise (other than through *bona fide* regulation).

SOEs, in transition economies (e.g., Karas et al., 2010; Knyazeva et al., 2013; Megginson, 2005; OECD, 2016; Kowalski et al., 2013). It is also consistent with the correlation between emergence of private firms and institutional reforms in East Asia.

In our model, there is a seller who may supply, in each period, an essential input to a firm owned by a private buyer (that is, a private firm) or, alternatively, to a firm owned by the ruler (that is, a state firm). Following an extensive literature (see Shleifer, 1998, and Roland, 2008, for a review), we assume the private firm uses a more efficient technology than the state one. This productivity advantage implies that if the seller expects the buyer to pay for the input (credible contractual enforcement), and if both of them expect the ruler not to expropriate their gains (strong political institutions), the private firm is the efficient governance form.

Our key finding is that when the ruler's power to expropriate is unconstrained (weak political institutions), the private buyer has lower credibility when contracting with the seller. As a result, efficient and individually rational private contracts may not be enforceable, and a tradeoff between the private and state firm may arise. Notice that to induce the buyer and the seller to trade, the ruler must enter a self-enforcing social contract with them, in which she promises not to expropriate their gains from trade. The ruler will honor this contract only if she can retain a share of the firm's output through taxes, such that her long-term gains from cooperation offset the present gains from defection. Unfortunately, sharing output with the ruler reduces the buyer's own gains from honoring his business contract with the seller (i.e., paying for the input). If the business contract is not court-enforceable (because of transaction complexity or inefficient courts), this reduction in the buyer's gains from cooperation undermines the private firm's credibility, thereby forcing it to procure lower quality inputs. In other words, a weak social contract caused by the lack of checks

and balances does not only deter market participation by private agents, as in the political economy literature (Greif et al., 1994; Acemoglu, 2003); it also distorts contracting *between those agents*.

This tension between social and business contracts disappears when the seller contracts directly with the ruler – that is, when the firm buying inputs is state-owned. In that case, the business and social contract coincide, and since the ruler retains the firm's output, her incentive to honor them is maximized. Thus, under weak political institutions, the state firm is more credible than the private one if business contracts between the firm and the seller are not court-enforceable: by making the ruler a common party to both the business and social contract, the state firm efficiently concentrates relational capital that would be otherwise be dispersed.

Our formal analysis of the tradeoff between private and state firms has important advantages over existing informal arguments, according to which private firms are less likely to succeed in the absence of secure property rights and contractual enforcement (e.g., Nellis 2007; Hanousek et al. 2008). First, although these arguments imply that weak institutions may reduce the advantages of private firms over SOEs, they cannot explain why SOEs would ever *outperform* private firms in weakly institutionalized environments. Second, by highlighting precise mechanisms through which political institutions and transaction costs jointly affect the costs of private ownership, our model generates nuanced predictions that can be tested in future empirical work.

Our model has also important implications beyond the political realm, as it applies to all settings in which agents contract in the shadow of a potentially predatory third party. In particular, our model can be used to understand how weak corporate governance institutions, under which a company's CEO is poorly constrained by the board, may distort relational contracts between middle managers and subordinates, and may thus prevent the CEO from efficiently delegating its supervision authority. We elaborate on this alternative interpretation of the model below.

The rest of this paper is organized as follows. Section 2 discusses our contributions to the literature. Section 3 presents the model. Section 4 analyzes the two cases of contracting in the shadow of the ruler (private firm) and contracting with the ruler (state firm), the tradeoff between these two governance forms, and alternative interpretations of the model. Section 5 studies extensions of the model, and shows robustness of the main results. Section 6 discusses applications of the model to SOEs, privatization programs, and state-led economic development. Section 7 discusses potential implications for future research and concludes.

2. Relation to the literature

Our paper relates to the literature on economic governance under weak institutions. A common theme in this literature is the commitment problem faced by a powerful ruler. We discuss the contributions most relevant to our paper below, while referring readers to Dixit (2004), and North, Wallis and Weingast (2009), for a more comprehensive and in-depth discussion of this literature.

Olson (1993) is one of the earliest studies to argue that even an autocrat with unconstrained power may be able to promote trade and economic growth. The mechanism informally suggested by Olson is a self-enforcing agreement, sustained by repeated interactions with productive agents, which commits the ruler not to entirely appropriate the gains from trade and therefore turns her from a "roving bandit" into a "stationary bandit". A series of subsequent papers formally analyze how institutions that coordinate multilateral retaliation against the ruler in case of defection may strengthen the self-enforcing agreements described by Olson (1993). Examples of coordination institutions studied in this literature are merchant guilds (Greif *et al*., 1994), federalism (Weingast, 1995), democratic elections (Fearon, 2011), and uniform legal codes (Hadfield and Weingast, 2012). Aldashev and Zanarone (2017) study the separate problem of how a ruler may use self-

enforcing agreements to commit to enforce contracts between traders. Acemoglu and Wolitzky (2020) analyze a similar problem focusing on the case in which multiple individuals, rather than a unitary ruler, may act as enforcers.

There are three key differences between this literature and our paper. First, as mentioned above, this literature solely focuses on the relationship between governments and economic agents and, therefore, does not study how weak constraints on the government affect contracting between agents. Second, all of the existing studies assume a fixed organization of production. In contrast, our paper studies how the allocation of firm ownership among productive agents and the ruler affects the ruler's commitment problem. Third, most of the existing papers (with the exception of Aldashev and Zanarone, 2017) assume the ruler is an autocrat – that is, she can only make commitments by entering self-enforcing agreements with productive agents. In contrast, our paper allows the ruler to be also constrained by formal institutions of varying strength. This innovation allows us to explore how the degree of the weakness of institutions modify optimal firm ownership.

Our paper also contributes to a (small) theoretical literature in organizational economics, which uses an incomplete contracting approach to study the choice between state and private firm ownership (Roland, 2008, provides a concise review).

Early works in this literature are Sappington and Stiglitz (1987) and Laffont and Tirole (1993, ch. 17). Sappington and Stiglitz (1987) argue (without a formal model) that if contracts between the government and firms are incomplete, it is easier for the government to intervene in a state-owned firm than in a private firm, both when the intervention is socially optimal and when it is opportunistic. This creates a potential tradeoff between the two ownership structures. Laffont and Tirole (1993) provide the first formal analysis of private versus state firm ownership from the incomplete contracting perspective. In their model, the state has stronger incentives, relative to a

private firm's shareholders, to hold up managerial investments ex post by redeploying the firm's assets to serve social goals. The downside of private firms is that their managers face two principals – regulators and shareholders – and this potentially dilutes the managers' incentives.

More recent studies are Schmidt (1996), Hart et al. (1997), and Williamson (1999). Schmidt (1996) argues that under private ownership the government does not observe production costs and can therefore credibly commit not to subsidize the firm. This lack of subsidy may cause inefficient bankruptcies ex post but has the benefit of incentivizing the firm's manager to invest in cost reduction ex ante. Hart et al. (1997) and Williamson (1999) study a make-or-buy problem in which government may produce a public service in-house or outsource it to a private contractor. They argue that in-house production mutes the profit-oriented incentives typical of private contractors, and is therefore preferable when profit maximization induces overinvestment in cost cutting at the expense of service quality. Unlike our paper, none of the studies discussed so far models how institutions affect the choice between private and state firm ownership.

Che and Qian (1998) are closer to us in that they model firm ownership under an autocratic government. Focusing on the case of China, they show that since the owner of a private firm appropriates revenues hidden from the government, she exerts more productive effort than the manager of state firm; however, she also chooses a less inefficient production technology in order to facilitate revenue hiding. Aside from the modeling approach and specific predictions, the main difference between Che and Qian (1998) and our paper is that they do not allow for variation in institutions and hence do not study how institutional differences affect optimal firm ownership. Another important difference is that since the cost of private ownership in Che and Qian (1998) is a distortion in the production technology, their model cannot explain the short-run negative effects of privatizations in weakly institutionalized environments.

3. The model

3.1. Environment

In any given period $t = 1, \dots, \infty$, a seller S (he) and a private buyer B (he) have the opportunity to trade in a state governed by a ruler R (she). All players are risk-neutral, live forever, and discount next-period payoffs by a common factor $\delta \in [0,1]$. Through most of the paper, we assume for simplicity that the three players are cash-constrained (i.e., do not have initial wealth and hence cannot make upfront payments). We relax this assumption in section 5.1, and show that all of our results continue to hold.

S supplies an input of quality $a_t \in \mathbb{R}^+$ to a firm, incurring an effort cost of $c(a_t)$, which is assumed to be increasing and convex. S can be interpreted both as an employee of the firm and as an independent supplier, whose input embeds effort and human capital. S's input can be combined with a machine to produce output (to be defined momentarily) under one of two possible governance forms. In a *private firm*, B owns the machine and S sells the input to B, who transforms it into output. In a *state firm*, R owns the machine and S sells the input to R, who transforms it into output (B plays no role in the state firm). We assume for simplicity that once the input is received, producing output is costless for the firm' owner (allowing for costly output production would complicate the model without adding important insights). At the same time, we assume S has a comparative advantage in producing the input, and the firm's owner has a comparative advantage in producing output – that is, we rule out autarchic production of both input and output by the same player.

Regardless whether she owns the firm or not, in every period R has the opportunity to expropriate S and B – that is, R may use her coercive power to grab the total wealth S and B have in the state.[2] This expropriable wealth consists of the firm's output and all monetary transfers S and B receive from trading with each other or with R (as defined below more precisely).

3.2. Key assumptions

There are two differences between state and private firm ownership in our model. First, we assume that for a given input quality, the state firm produces less output than the private firm.

Assumption 1*: Let $v(a)$ be the private firm's output given input a, with $v(\cdot)$ increasing and concave. Then, the state firm's output is $(1-\theta)v(a)$, with $\theta \in (0,1)$.*

This assumption captures in a reduced form various potential deficiencies of the state firm, from R's low specialization (due to her involvement in both production and government activities) to private benefits that may lead R to impose soft budget constraints or use an inefficiently labor-intensive technology (e.g., Laffont and Tirole, 1993; Shleifer and Vishny, 1994; Shleifer, 1998).

The second difference between the private and state firm is informational (e.g., Schmidt, 1996). Under state ownership, R buys the input and receives the output so she observes a_t. In contrast, under private ownership, it is B who buys the input and receives the output: since R is now an outsider with respect to the firm, she does not observe a_t. However, we assume R has access to an imperfect verification device, the court, which observes a_t (and reports it to R) with probability

[2] The threat of coercion induces B and S to deliver any income generated in the state that the ruler demands. We implicitly assume that the cost of exerting coercion is low enough relative to the gains from expropriation, such that the ruler is willing to coerce.

$q \in (0,1)$, and observes nothing with probability $1-q$. We shall interpret q, alternatively, as efficiency and independence of the court (e.g., Djankov e al., 2003), or as verifiability/measurability of the input by a court of given quality.

> ***Assumption 2****: In any given period t, R perfectly observes a_t and $v(a_t)$ under state firm ownership. Under private ownership, the private buyer B perfectly observes a_t and $v(a_t)$ whereas R observes them with probability q, and fails to observe them with probability $1-q$.*

In the language of contract theory, Assumption 2 implies that the input a_t is observable to the buyer and seller who exchange it but only imperfectly verifiable by third parties. Note that the switch from state to private ownership affects R's information because it changes R's role vis-à-vis the productive exchange (from buyer to third party). In this sense, our model sharply differs from classic theories of the firm (e.g., Grossman and Hart, 1986; Hart, Shleifer & Vishny, 1997), which study the allocation of ownership between a buyer and a seller who have fixed roles in production, and hence fixed information.

3.3. Political institutions

The goal of our model is to determine which governance form – the private or state firm – maximizes total surplus (in the sense of output minus input cost) under different constraints on the ruler, or "political institutions" (Acemoglu et al., 2001; Acemoglu and Johnson, 2005). We consider two institutional regimes, depending on what actions the ruler, R, can commit to (or not to) take.

Under *strong political institutions*, R is bound by the rule of law. In the context of our simple model, this means that R is committed not to expropriate B and S (unless the purpose of

expropriation is to punish breach of contract detected by the court), and to be judged by the court (and obey the court's orders) if she fails to make a promised payment to B or S. Examples of strong political institutions are England after the Glorious Revolution, and advanced liberal democracies in modern times. In these regimes, the parliament can veto taxes proposed by the executive (commitment not to expropriate). Moreover, there are constitutional mechanisms to remove the executive for disobeying court orders, which can be used to force the executive to honor its contracts with private citizens and firms.[3] In contrast, under *weak political institutions*, R cannot make any commitments and is therefore free to expropriate B and S and breach contracts with them. Examples would be absolute monarchies in the Ancien Régime, and modern autocratic regimes.

Two remarks are at order here. First, weak political institutions do not imply a weak state. In our model, R's power (in the sense of expropriation technology) is fixed whereas R's *ability* to use this power to expropriate depends on political institutions. Second, we conduct a partial equilibrium analysis that treats institutions as exogenous. This is a useful exercise because while the governance of firms (private vs. state ownership) can be modified in the sort run (Williamson, 2000), political and legal institutions are more "sticky" and persistent (e.g., Glaeser and Shleifer, 2002; Acemoglu et al., 2001). We leave the exploration of long-run equilibria with endogenous institutions for future work.

[3] In some "intermediate" political systems, such as England between the Civil War and the Glorious Revolution (North and Weingast, 1989), 19th-century constitutional monarchies, or contemporary semi-democratic regimes, R may be committed not to expropriate private citizens while at the same time enjoying some discretion to breach contracts with them. As will become clear in a moment, this case does not affect our analysis of the private firm, and it is analytically identical to our analysis of the state firm with $q = 0$.

4. Optimal governance

In this section, we characterize equilibrium production and surplus in the state and private firm, and establish which of the two governance forms is efficient (i.e., surplus-maximizing) in different institutional settings.

Given the presence of a ruler endowed with coercive power, production requires two distinct but potentially overlapping agreements: a standard "business contract," under which S sells inputs to the buyer (that is, to R in the state firm, and to B in the private firm) in exchange for compensation; and a (less standard) "social contract" under which R promises not to expropriate S and B. We say that a given business contract and social contract are *enforceable* if they jointly describe a subgame perfect equilibrium of the infinitely repeated game. We focus on equilibria that punish deviations optimally (Abreu, 1988) and are stationary (i.e., prescribe the same equilibrium behavior in each period). Accordingly, hereafter we drop all time subscripts from the model.

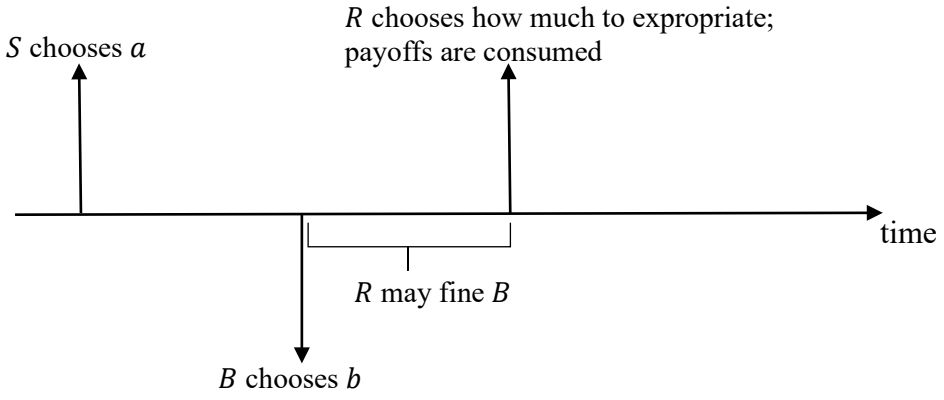
4.1. Private firm: contracting in the shadow of the ruler

In the private firm, the business contract specifies, for each period: (1) the input quality $a \in \mathbb{R}^+$ that S should supply, and (2) the bonus $b \in \mathbb{R}^+$ that B should pay to S. Additionally, the social contract (3) prescribes that R should not expropriate S and B, and (4) establishes a tax $x \in \mathbb{R}^+$ that R should collect from B, which determines the division of the firm's output between its owner, B,

and the ruler.[4] If R deviates (by expropriating B or S), both B and S stop trading in R's territory. If S deviates (by not supplying the promised input), B stops buying from and making payments to S; moreover, R refuses to buy from S in future periods if S tries to replace B as a buyer.[5] Lastly, if B deviates (by not paying the promised bonus to S), S stops selling to B, and R fines B if the court verifies his deviation.

Figure 1 below summarizes the sequence of moves and deviation opportunities within a period.

Figure 1. Timeline in the private firm



At the outset, S chooses whether to supply the promised input quality a at cost $c(a)$. Then, B receives the output $v(a)$ and chooses whether to pay the promised bonus, b. Finally, R chooses whether to expropriate S and B – that is, whether to take S's bonus and B's output net of the bonus and prescribed tax, $v(a) - b - x$.

In the optimal equilibrium, a, b, x are chosen to maximize total surplus:

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[4] In theory, S may also be taxed. Note, however, that the sole purpose of taxes in this model is to reallocate surplus to R. Any feasible level of R's profit can be obtained by fixing the upfront salary w to leave S with zero surplus and taxing B accordingly. Thus, assuming no taxes on S is without loss.

[5] That is, R would interpret S's attempt to sell to R instead of B as a deviation.

$s^{PF} \equiv v(a) - c(a)$,

subject to the business contract and the social contract being enforceable. First, all players must benefit from these contracts (participation constraints):

$\pi^{PF} \equiv x \geq 0$ for R, (PCR)

$u_S \equiv b - c(a) \geq 0$ for S, and (PCS)

$u_B \equiv v(a) - x - b \geq 0$ for B. (PCB)

Second, S must be willing to supply the prescribed input quality, and B must be willing to pay the bonus (incentive constraints). Because B can withdraw the bonus if S deviates, S's incentive constraint is identical to (PCS).[6] B's incentive constraint is given by:

$v(a) - x - b + \frac{\delta}{1-\delta} u_B \geq (1-q)(v(a) - x)$. (ICB)

Lastly, under weak political institutions, R must retain enough of the firm's output to be willing not to expropriate S and B:

$\frac{\delta}{1-\delta} \pi^{PF} \geq v(a) - x$.[7] (ICR-w)

Clearly, it is optimal to pay the minimum bonus consistent with (PCS), $b = c(a)$, such that (ICB) is relaxed. Under strong political institutions, R can commit not to expropriate B, so (ICR-w) can be ignored and (ICB) can be further relaxed by not taxing the buyer: $x = 0$. Substituting the optimal bonus and tax into (ICB), we obtain a necessary and sufficient enforceability condition:

$\frac{\delta}{1-\delta} s^{PF} \geq c(a) - qv(a)$. (PEC-s)

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[6] To see this, notice that the incentive constraint is $-c(a) + b + \frac{\delta}{1-\delta} u_S \geq 0$, which simplifies to (PCS).

[7] Constraint (ICR) is obtained by rearranging the condition that R's payoff be higher in the absence of expropriation: $x + \frac{\delta}{1-\delta} \pi^{PF} \geq b + [v(a) - b]$.

The left-hand side of (PEC-s) is B's present discounted payoff from continuing to contract with S. The right-hand side is B's reneging temptation, given by the bonus he owes S, minus the expected fine.

The analysis changes substantially under weak political institutions. In that case, R cannot make any commitments so unless the parties are patient (δ close enough to one) the non-expropriation constraint, (ICR), matters. Now the social contract must allow R to collect a tax or else she will have an incentive to expropriate. Thus, the best that can be done to relax (ICB) and enforce the business contract is to set a tax that satisfies (ICR) with equality: $x = (1-\delta)v(a)$. After substituting the tax and the bonus into (ICB), we obtain a new and more stringent enforceability condition:

$$\frac{\delta}{1-\delta}[\delta v(a) - c(a)] \geq c(a) - q\delta v(a). \qquad \text{(PEC-w)}$$

This analysis of enforceability conditions under strong vs. weak political institutions proves our first result.

> ***Proposition 1****: (i) Under strong political institutions, an efficient private firm maximizes surplus, s^{PF}, subject to enforceability condition (PEC-s). (ii) Under weak political institutions, an efficient private firm maximizes surplus subject to enforceability condition (PEC-w).*

Part (i) of Proposition 1 nests the two economic literatures on formal and relational contracting, both of which study environments where political institutions are strong and the state is non-predatory. When the business contract between the firm's owner (B) and its supplier (S) is court-enforceable ($q \approx 1$), the threat of immediate punishment (the fine) is sufficient to deter breach,

and as a result, the enforceability constraint is non-binding.[8] In contrast, when the business contract is not court-enforceable ($q \approx 0$), the fine is irrelevant, and breach can only be deterred if the discounted surplus produced by B and S offsets B's temptation not to pay the bonus. When the parties are impatient (low enough δ), the enforceability constraint is now binding (Levin, 2003).

Part (ii) of Proposition 1 is novel to our paper. The economic literature on weak institutions has examined social contracts between rulers and producers, and the rulers' non-expropriation constraint (e.g., Olson, 1993; Greif *et al*., 1994; Acemoglu, 2003). However, these models have focused on *sole producers* and as such, they have ignored how rulers' limited commitment affects private contracting – that is, the ability of private firms to contract with input suppliers. Our result sheds light on this issue.

As discussed before, weak institutions limit R's commitment and thus call for the social contract to allocate a share of the firm's output to R via taxes. Unfortunately, by reducing B's output share, these taxes reduces both B's long-term gains from contracting with S, on the LHS of (PEC-w), and the present penalty B faces for breaching the business contract, on the right hand side. Because of these mutually reinforcing effects, credibility of the business contract under weak institutions is constrained *even if such contract is court-verifiable* (that is, even if $q = 1$). To put it more colorfully, private contracts are always relational "in the wild".

Our result that *weak institutions distort private contracting* differs in a subtle but important way from the standard finding that the threat of governmental expropriation reduces firms' willingness to enter markets and produce. Proposition 2 implies that even if a firm enters the

[8] To see this formally, notice that for $q = 1$, the RHS of (PEC-s) is negative for all potentially optimal levels of a (i.e., for all a below the surplus-maximizing level).

market and transforms inputs efficiently (recall that B undertakes no costly effort in our model), weak constraints on the government may prevent that firm from efficiently contracting with suppliers, and hence from selling the desired output. That is, weak institutions do not only undermine trust between government and economic agents (their decision to enter and produce), they also undermine trust between the agents themselves (their decision to contract with each other).

Let $\overline{a}^{PF}$ and $\underline{a}^{PF}$ be the solutions to the private firm's problem under strong and weak political institutions, respectively. Then, Proposition 1 has the following, natural comparative statics.

Proposition 2*: (i) In a private firm, if the players are patient (high enough δ), S supplies surplus-maximizing input quality under both strong and weak political institutions:* $\overline{a}^{PF} = \underline{a}^{PF}$*. (ii) If players are impatient (low δ), S supplies higher input quality under strong political institutions than under weak institutions:* $\overline{a}^{PF} > \underline{a}^{PF}$*. (iii) Under both strong and weak political institutions, the input quality is weakly increasing in q, the extent to which the business contract is court-enforceable.*

Proof: in appendix.

A potential implication of Proposition 2 is that because weak political institutions reduce the credibility of relational business contracts ($\overline{a}^{PF} > \underline{a}^{PF}$ for all q), they may incentivize the use of inefficient but court-enforceable contracts. In other words, under weak institutions private contracts may be more formalistic and may rely more on objective evaluation criteria and metrics. To illustrate this point, suppose S's input, a, and the output, $v(a)$, are not verifiable by a court ($q = 0$ for input and output), but there is an imperfect performance measure, p, which is affected by a and is verifiable ($q = 1$ for this measure). Thus, instead of offering S a bonus contingent on input quality, B may offer S an incentive contract contingent on p. Such an incentive contract may

be costly for B for a variety of reasons. For instance, it may invite gaming (Holmstrom and Milgrom, 1991) or force B to leave S a rent if S is cash-constrained (e.g., Sappington, 1983).

Our model suggests that these costs may limit the use of contractual incentives by B, and may even induce B not to use them at all, under strong political institutions, when relational incentives have higher credibility. Under weak institutions, however, an optimally designed incentive contract may elicit greater input quality and generate higher surplus than a pure relational contract, due to the latter's reduced credibility. Fully developing this implication formally is beyond the scope of this paper; however, extending the model in this direction could be an important topic for future research.

Having developed a simple theory of how weak political institutions distort private contracting, we now turn to analyze how contracting problems are different, and sometimes easier to solve, when input suppliers contract directly with the ruler – that is, when production is carried by a state-owned firm.

4.2. State firm: contracting with the ruler

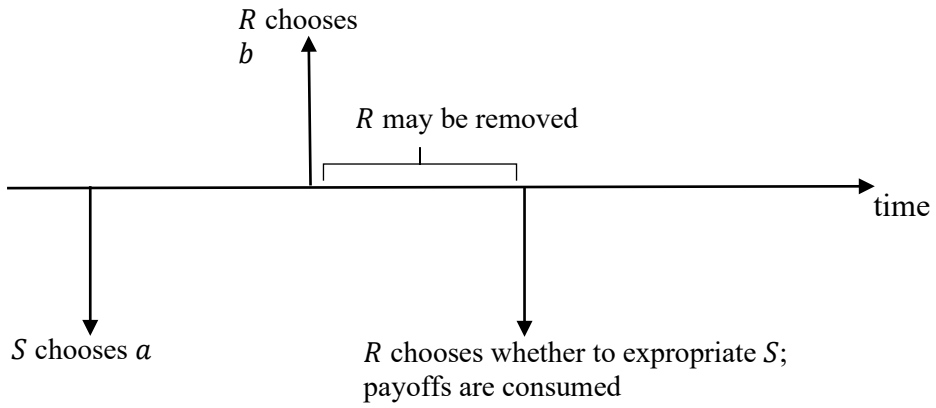
The state firm differs from the private firm under several respects. First, in each period it is R, not B, who buys the input and pays S – that is, S enters a business contract with R. Second, per our assumption 1, the state firm suffers from a productivity gap: output is now given by $(1-\theta)v(a)$, rather than $v(a)$. Third, R is now residual claimant of the firm' output so no taxes are needed in equilibrium.

In the state firm, the business contract specifies (1) an input $a \in \mathbb{R}^+$ that S should supply to R, and (2) a bonus $b \in \mathbb{R}^+$ that R should pay if and only if S supplies the required input.

If R deviates by expropriating S (which can only happen under weak political institutions) or by missing a payment, S stops selling to R forever after. Additionally, under strong political institutions, if the court detects that R has missed a due payment (which happens with probability q) and R nevertheless refuses to pay, R loses the firm's output. This punishment inflicted on R should be interpreted as the result of R being removed (e.g., Acemoglu, 2003; Fearon, 2011). If S deviates (by not supplying the promised input), R stops buying from and making payments to S forever after.

Figure 2 below summarizes the sequence of moves, and the deviation opportunities, within a period.

Figure 2. Timeline in the state firm



At the beginning of each period, S chooses whether to supply the promised input quality a at cost $c(a)$. Then, R receives the state firm's output, $(1-\theta)v(a)$, and chooses whether to pay the

promised bonus b. Finally, if political institutions are weak, R chooses whether to expropriate S's bonus or not, and all payoffs are consumed.

In an efficient state firm, a, b maximize total surplus

$s^{SF} \equiv (1-\theta)v(a) - c(a)$,

subject to the business and social contract being enforceable. First of all, R and S must gain from participating in these contracts. This leads to the participation constraints:

$\pi^{SF} \equiv (1-\theta)v(a) - b \geq 0$ for R, and (PCR)

$u_S \equiv b - c(a) \geq 0$ for S. (PCS)

Second, S must be willing to supply the prescribed input quality, which coincides with (PCS), as before. Third, R must be willing to pay the bonus to S, and not to expropriate S after the bonus is paid. Under strong political institutions, R cannot expropriate so only the payment constraint matters. Since R is removed with probability q if she fails to pay S, the payment constraint is:

$(1-\theta)v(a) - b + \frac{\delta}{1-\delta}\pi^{SF} \geq (1-q)(1-\theta)v(a)$. (ICR-strong)

Under weak political institutions, R cannot be removed, and since she gains the same from not paying the bonus or expropriating it after it is paid, there is a unique payment and non-expropriation constraint:

$\frac{\delta}{1-\delta}\pi^{SF} \geq b$. (ICR-weak)

As before, it is optimal to pay S the minimum bonus that satisfies (PCS), $b = c(a)$, such that R's incentive constraints are relaxed. Substituting $b = c(a)$ into these constraints sheds light on how the input quality S provides to the state firm varies with the institutional regime. Under strong political institutions, the necessary and sufficient enforceability condition is:

$\frac{\delta}{1-\delta}s^{SF} \geq c(a) - q(1-\theta)v(a)$. (SEC-s)

The left-hand side of (SEC-s) is R's present discounted payoff from continuing to contract with S. The right-hand side is R's reneging temptation, given by the bonus she owes S, minus the expected loss from being removed.

As in the case of the private firm, under weak political institutions, R is free to expropriate and cannot be punished for failing to pay the bonus so the enforceability condition becomes more stringent:

$$\frac{\delta}{1-\delta} s^{SF} \geq c(a). \qquad \text{(SEC-w)}$$

Our analysis of the state firm's enforceability conditions proves our next result.

Proposition 3*: (i) Under strong political institutions, an efficient state firm maximizes surplus, s^{SF}, subject to enforceability condition (SEC-s). (ii) Under weak political institutions, an efficient state firm maximizes surplus, s^{SF}, subject to enforceability condition (SEC-w).*

Part (i) parallels Proposition 1. When political institutions are strong, contracting with the ruler is similar to private contracting: it is unconstrained if the business contract is court-enforceable ($q \approx 1$), and it is constrained by the surplus produced by the firm-supplier relationship if the business contract is relational ($q \approx 0$). The only difference is that because the state firm suffers from an efficiency gap θ (Assumption 1), its output is lower than the private firm's output for a given input quality. As we shall see, this difference affects the relative efficiency of the two governance forms.

Part (ii) of Proposition 3 highlights important differences between the state firm and the private firm under weak political institutions. First, because in the state firm R buys directly from S, the social contract and the business coincide. As a result, both contracts can be sustained by the firm's full surplus, of which R is residual claimant. Second, this potential advantage of the state firm over

the private firm is mitigated by the fact that under weak institutions the ruler cannot be punished, so breach of the business contract is not subject to court enforcement – that is, q is absent from the RHS of (SEC-w), whereas it features in the RHS of (PEC-w). Notice that condition (SEC-w) is analytically similar to the conditions analyzed by the economic literature on weak institutions (Greif et al., 1994; Acemoglu, 2003), where economic agents enter a social contract with the ruler, who promises not to expropriate them. This is not surprising: like those papers, our model of the state firm is one of "contracting with the ruler".

Let $\overline{a}^{SF}$ and $\underline{a}^{SF}$ be the solutions to the state firm's problem under strong and weak political institutions, respectively. Then, Proposition 3 has the following comparative statics.

Proposition 4*: (i) In a state firm, if the players are patient (high enough δ), S supplies surplus-maximizing input quality under both strong and weak political institutions: $\overline{a}^{SF} = \underline{a}^{SF}$. (ii) If players are impatient (low δ), S supplies higher input quality under strong political institutions than under weak institutions: $\overline{a}^{SF} > \underline{a}^{SF}$. (iii) Under strong political institutions, the input quality is decreasing in the productivity gap θ, and weakly increasing in the business contract verifiability q. (iv) Under weak political institutions, the input quality decreases in θ but does not depend on q.*

Proof: in appendix.

Having characterized what the private firm (contracting in the shadow of the ruler) and the state firm (contracting with the ruler) can accomplish, we are now ready to conduct a "horserace" between the two governance forms under different institutional regimes.

4.3. State vs. private firm

Having characterized optimal equilibria for both the private and the state firm, we can now compare these two governance forms on efficiency grounds. Under strong political institutions, the private firm is efficient (i.e., generates higher surplus than the state firm) because it has access to a superior technology. This advantage makes the private firm's surplus higher than the state firm's one for a given input quality, and it also makes its enforceability condition, (PEC-s), less stringent than the state firm's condition, (SEC-s).

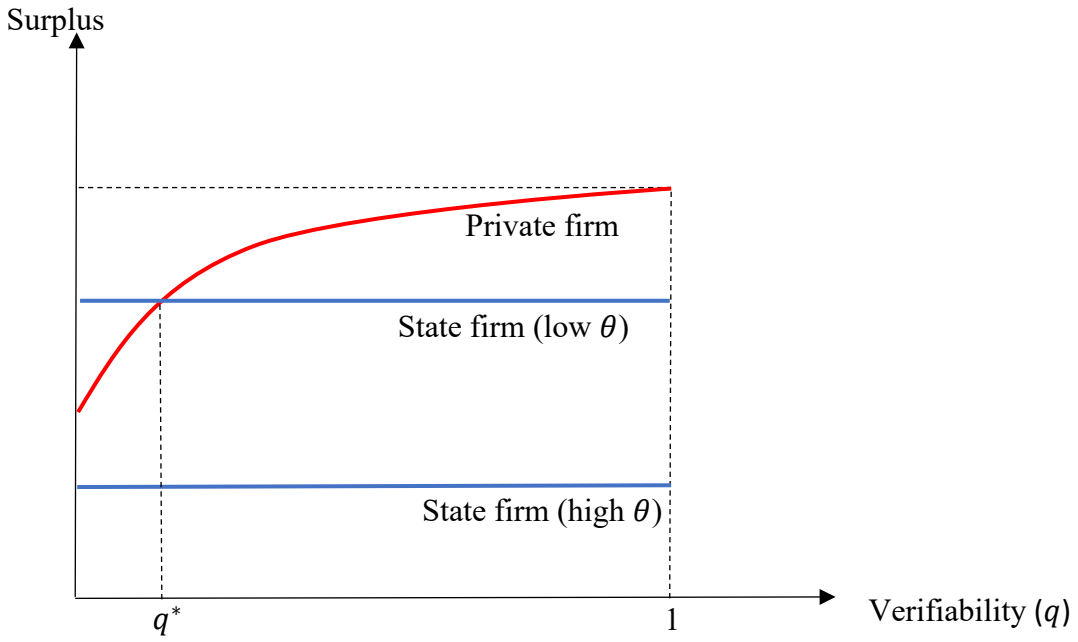
Under weak political institutions, however, which governance is efficient is a priori ambiguous and depends on θ, the private firm's productivity advantage, and q, the extent to which the business contract is verifiable.

Proposition 5*: (i) Under strong political institutions, the private firm is efficient. Under weak political institutions, the private firm continues to be efficient (ii) when the parties are patient (high enough δ) or (iii) when its productivity advantage is large (high enough θ). (iv) If none of these conditions holds, the private firm is efficient when the business contract is verifiable (high enough q), whereas the state firm is efficient when the business contract is unverifiable (low q).*

Proof: in appendix.

Proposition 5 highlights the novel tradeoff between private and state firm ownership captured by our model. As shown by Figure 3 below, the benefit of the private firm is its higher productivity, measured by θ. The potential downside of the private firm is its lower credibility, which comes from a tension between business contract and social contract that arises "in the wild," that is, when political institutions are weak.

Figure 3. State vs. private firm under weak political institutions



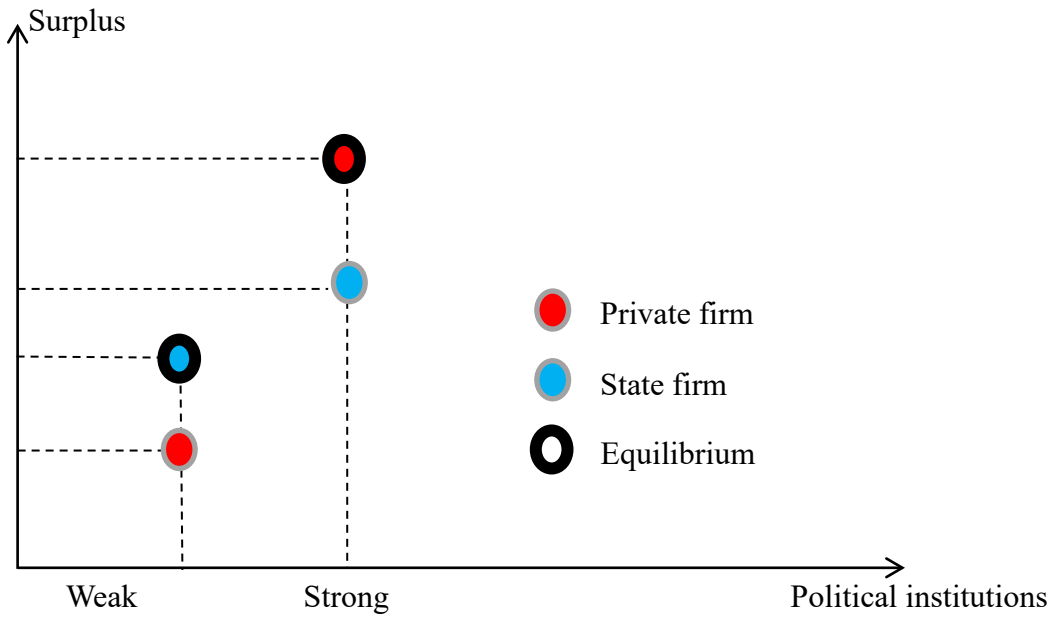
To understand this tradeoff, recall that in the private firm, the owner (B) is taxed to provide the ruler with an incentive not to expropriate. As a result, the owner gains less than the firm's surplus from honoring the business contract. This tension disappears in the state firm because there, the owner is also the ruler (that is, the social and business contracts coincide), and hence the full firm's output can be used to incentivize her. This potential credibility advantage of the state firm, however, tends to disappear if its output is much lower than that of the private firm (large θ). Moreover, the state firm's credibility advantage tends to disappear if the business contract is verifiable (large q) because in that case, the threat of a fine (imposed by the ruler) provides B with an immediate incentive to honor the business contract, which compensates the reduction in long-term incentives induced by the tax. This threat does not exist in the state firm because under weak political institutions, the ruler has unconstrained power and thus cannot be punished.

Proposition 5 has interesting testable implications. According to a first interpretation, verifiability of the business contract, q, can be thought of as the quality of judicial institutions. Then, Proposition 5 implies that political and judicial institutions are complementary determinants of firm governance: in states where political institutions are weak, we expect SOEs to outperform private firms *if judicial institutions are also weak*, and vice versa if judicial institutions are strong.

According to a second interpretation, q can be thought of as (an inverse measure of) complexity of the firm's procurement and production process, such that if q is low, even an efficient court cannot verify input quality. Then, Proposition 5 implies that within a given state characterized by weak political institutions, SOEs are more likely to outperform private firms in markets for complex and sophisticated goods or services than in markets for standardized ones. Thus, our model delivers predictions both on the relative incidence of SOEs and private firms across countries with different political and judicial institutions, and on the existence and structure of "mixed economies" in weakly institutionalized countries.

Proposition 5 also implies that empirical studies that compare SOEs to private firms without taking institutions into account are likely to suffer from selection bias. This point is illustrated by Figure 4 below, which depicts the total surplus generated by a private firm (red) and a state firm (blue) under different political institutions, assuming the private firm's productivity advantage is not too large ($\theta < \theta^*$) and the business contract is hard to verify ($q < q^*$).

Figure 4. Coase meets Heckman in the wild



Observed private firms (bold red) are more efficient than observed state firms (bold blue) because private firms are optimal under strong political institutions and can therefore fully exploit their specialization advantage. However, observed state firms are more efficient than the counterfactual private firms over which they were chosen (light red) because weak institutions more severely constrain the productivity of private firms compared to state firms. Thus, privatizing a state firm in a weakly institutionalized setting would reduce, rather than increase, total surplus. (Our figure echoes the "Coase meets Heckman" one in Gibbons (2005), which frames Coase's observation that observed firms must be more efficient than counterfactual markets under high transaction costs. That is why we named our figure "Coase meets Heckman in the Wild").

4.4. An alternative interpretation: Contracting inside companies

While we have used private and state firms as our leading example, our model applies to any setting in which productive agents contract in the shadow of a powerful party with limited commitment. One such setting is the modern corporation. Like our "ruler" has the power to take the income of citizens and to deny promised payments, a company's CEO has the power to reallocate resources among divisions and projects, and to deny discretionary rewards to its subordinates (such as bonuses or promotions). Moreover, like political institutions can constrain a ruler's power, so corporate governance institutions can constrain a CEO's power – for instance, by ensuring that the board of directors is independent on the CEO, and hence is willing to control her. Thus, our model offers a potential theory of how corporate governance affects intra-firm governance and contracting.

To illustrate how our model may apply to corporations, consider a company whose CEO is R, and the director of a company division, B, who manages a subordinate, S. Interpret a as the subordinate's non-contractible effort, and $v(a)$ as the output such effort contributes to the division. Moreover, interpret q as the extent to which R can monitor B and S, which may be determined by the size of R's staff, or how busy R is (Aghion and Tirole, 1997). To make our discussion as stark as possible, assume $q = 0$. To motivate S, B may promise him a bonus, b, contingent on effort. Because this bonus is not contractually specified, B may choose not to pay it even if S exerts the promised effort. Nevertheless, B may enter a relational contract with S (the "business contract"), which provides him with an incentive to pay the bonus if B's division retains enough of S's contribution (and if such contribution is valuable enough). R, the CEO, may further sanction B

for cheating on his subordinate – for instance, by reallocating the division's profits to other firm units or projects (the equivalent of a "fine" in our baseline case).

At the same time, R may also use her discretion opportunistically, that is, she may reallocate divisional profits even if B does not deviate in order to promote preferred projects (the equivalent of output expropriation in our baseline case). R may also opportunistically block payment of the bonus, for instance, by cutting the division's bonus pool (the equivalent of bonus expropriation). R may prefer not to behave opportunistically, however, if her corporate relational contract with B and S (equivalent of the social contract described above) is strong. Moreover, R may not be tempted to behave opportunistically if the company has strong corporate governance institutions that will sanction her opportunism ex post, such as an independent and strong board of directors, or a pool of competent activist shareholders.

Applied to this corporate example, our model predicts that weak corporate governance undermines intra-division relationships, and therefore limits a division's ability to motivate its employees. When that is the case, our model further predicts that reorganizing the firm as a flatter hierarchy in which R manages S, and B's middle manager position disappears, might be efficient. In particular, this flat hierarchy (equivalent of the state-owned firm in our baseline case) will be efficient if R's specialization losses and congestion costs of managing S directly (θ) are not too large. An additional implication of our model is that promoting strong corporate governance and limiting CEO entrenchment (i.e., moving from weak to strong institutions) may improve the functioning of a firm's internal units and enables the adoption of a more decentralized and efficient organizational hierarchy.

These implications of our model offer a potentially important contribution to the existing literature on delegation and the optimal depth of intra-firm hierarchies, which holds corporate

governance constant.[9] This gap has also been noticed by empiricists. In their review of the evidence on hierarchies, Rajan and Wulf (2006) examine the intuitive conjecture that better corporate governance should leads to flatter hierarchies, and conclude: "When we regress the depth of a firm's organizational structure on […] the extent of governance pressure on the firm […] we find little systematic relationship. […] We can only conclude that more work is needed to establish that better corporate governance has led to flatter hierarchies". Our theoretical model suggests parameters – particularly, the extent to which corporate headquarters can monitor divisions, q – that may moderate the relationship between corporate governance and hierarchy and should therefore be included in the empirical analysis.

5. Extensions

5.1. Deep pockets

Our baseline model assumes the players are cash-constrained, implying that they cannot make upfront payments or post bonds to guarantee their contractual promises. In practice, there might be settings in which R or B has deep pockets – for instance, R may be the ruler of a state that enjoys rents from natural resources, and B may own other firms (or subsidiaries of the same firm) abroad. One may then wonder whether deep pockets would improve the private firm's and the state firm's outcomes in a way that eliminates differences between the two governance forms. In this section, we relax the assumption of cash-constrained players, and show that all qualitative results from section 4 continue to hold.

[9] See Mookherjee (2006, 2013) for an excellent review of the theoretical literature on hierarchies.

Suppose both R and B have deep pockets. In particular, assume R has a large wealth ω_R, and B a large wealth ω_B, at the onset of play. To make deep pockets as consequential as possible, assume further that B's wealth is located outside the state, such that B can bond his obligations towards S (the business contract) by bringing β units of his wealth inside the state and making it potentially subject to R's fines.[10] Then, keeping in mind that $b = c(a)$, constraint (ICR-s) in the state firm becomes:

$$\frac{\delta}{1-\delta}\pi^{SF} \geq c(a) - q[\omega_R + (1-\theta)v(a)]. \quad (5)$$

Moreover, constraints (ICB) and (ICR-w) in the private firm become, respectively:

$$\frac{\delta}{1-\delta}u_B \geq c(a) - q(\beta + v(a) - x), \text{ and} \quad (6)$$

$$\frac{\delta}{1-\delta}\pi^{PF} \geq \beta + v(a) - x. \quad (7)$$

Under strong political institutions, both the private firm and the state firm are now able to achieve the surplus-maximizing input quality, regardless verifiability of the business contracts and the extent to which parties are patient. To see this, notice that because ω_R is large, (5) is satisfied at $a = a^{**}$ for all $\delta > 0$ and $q > 0$. Similarly, notice that because ω_B is large, (6) can be satisfied at $a = a^{*}$, for all $\delta > 0$ and $q > 0$, by selecting $x = 0$ and a large enough bond (for instance, $\beta = [(1-q)c(a^{*})]/q$). While both the private and state firm (not surprisingly!) accomplish more under deep pockets than in the presence of cash constraints, however, their relative efficiency does not change: under strong political institutions, the private firm is efficient because it has higher

[10] In theory, we could also allow R (in the state firm) or B (in the private firm) to pay an upfront salary to S (in addition to the bonus), and S to post a bond. It is almost immediate to check that using these additional payments and bonds would transfer slack from the incentive constraints of R and B to the incentive constraint of S, without modifying the set of enforceable contracts. We therefore omit the salary and supplier's bond for simplicity.

productivity, and therefore its surplus-maximizing quality and the corresponding surplus are higher than those of the state firm: $a^* > a^{**}$.

Under weak political institutions, it turns out that deep pockets are irrelevant, and hence all the results from section 4 continue to apply.

Lemma 1*: Under weak political institutions,* $\beta = 0$ *is optimal in the private firm.*

Proof: Suppose that $\beta > 0$ at the optimum (in which case x must also be positive). Reduce β by a small amount $\varepsilon > 0$, and x by $(1-\delta)\varepsilon$. This perturbation leaves R's incentive constraint, (7), unaffected, and it relaxes B's incentive constraint, (6), by $(1-q)\delta > 0$. Thus, $\beta > 0$ cannot be optimal. ■

Intuitively, a given reduction in the tax and the bond reduces R's future gains from cooperation by the same amount as it increases those of B. At the same time, the reduction in x and β reduces R's present gains from defection more than it increases B's because the latter are uncertain (with probability $1-q$, B escapes the fine regardless the bond's size). Thus, a tax and bond reduction that has zero net effect on R's incentives (i.e., reduces her continuation value and temptation by the same amounts) must strengthen B's incentives.

Let us conclude by briefly discussing the case of asymmetric cash constraints. If only R is constrained ($\omega_R = 0$, ω_B is large), Lemma 1 above implies that the results from section 4 apply under both strong and weak political institutions. Suppose now that only B is cash-constrained ($\omega_B = 0$, ω_R is large). The analysis of weak political institutions is identical to section 4 because in that case, R has unrestrained power and thus cannot use her wealth to bond promises. Under strong political institution, however, the asymmetric cash constraint allows R to bond promises, and thus it creates a region in which the state firm is efficient. While the state firm always

implements the surplus-maximizing input quality, the private firm now only does so if δ is high enough, implying that the state firm is efficient at low enough levels of θ and q.

5.3. Asymmetric time horizons

So far, we have followed the convention in models of repeated games and assumed all players live forever and share the same discount factor. While this is the natural place to start, there may be settings in which the time horizons of state and private actors are different. For instance, Greif, Milgrom & Weingast (1994) analyze a model in which sequences of merchants engage in anonymous trade in the territory of a powerful ruler.

In this section, we show that our results on the tradeoff between state and private firms survive (in fact, are reinforced) in this scenario. To do so, we follow Greif *et al*. (1994) and modify our baseline model by assuming that while R lives forever, the buyer and the seller die at the end of each period and are replaced by an identical pair in the following period. Accordingly, we denote the seller and buyer in period t as S_t and B_t, respectively. We also follow Greif *et al*. (1994) in assuming that future buyers and sellers observe how their predecessors behaved and were treated by the ruler. This assumption is consistent with the circulation of information within traders' communities (e.g., Greif *et al*., 1994; Hadfield and Weingast, 2012; Masten and Prufer, 2014) and allows for the provision of relational incentives to the ruler via social contracts, as in our baseline model.

> ***Assumption 3****: for any period t, S_t and B_t die at the end of the period and are replaced by identical players, S_{t+1} and B_{t+1}, at the beginning of period t+1, whereas R lives forever and discounts next-period payoffs by $\delta \in [0,1]$.*

Assumption 4*: all actions taken up to period* t *are perfectly observed by the future buyers and sellers (*S_{t+1}, B_{t+1}, S_{t+2}, B_{t+2}, *...).*

Enforceable contracts are defined as in the baseline model, except that now: (1) if R deviates, she is punished by the buyers and sellers in future periods, who will refuse to trade in her state; and (2) if a buyer or seller deviates, his only punishment consists of the fine imposed by the ruler (buyers and sellers cannot be punished through termination as they are short-lived). To maximize the effectiveness of fines, we assume both the ruler and the buyers have deep pockets and can use their wealth to bond promises, as in section 5.2.

The analysis of the state firm is identical to section 5.2. The analysis of the private firm is identical to section 4, except that now the buyer's incentive constraint does not feature future payoffs:

$$c(a) \leq q(\beta + v(a) - x). \tag{8}$$

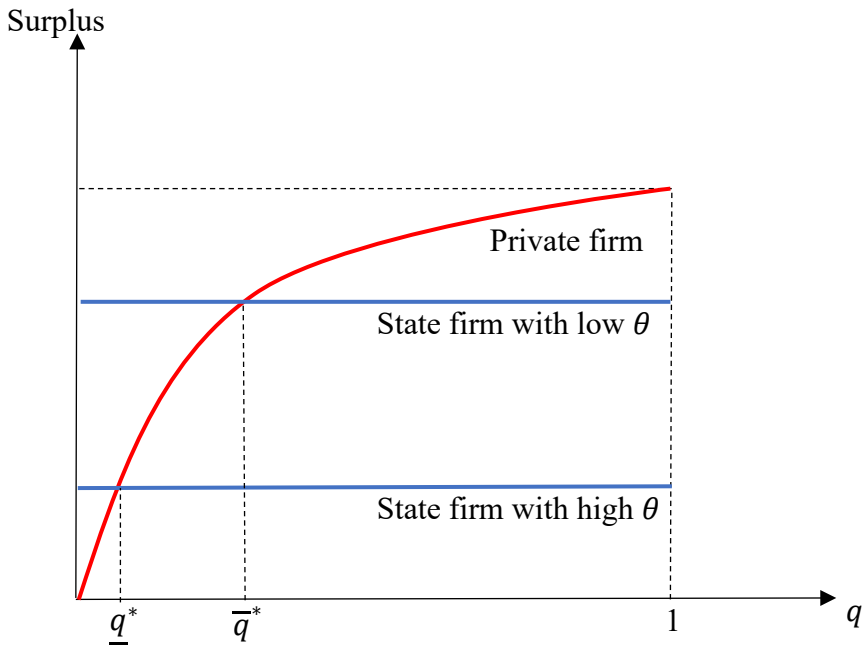
Suppose B posts bond $\beta = [(1-q)c(a)]/q$, and R gets all the surplus ($x = v(a) - c(a)$). These payments are optimal because they satisfy (PCB), (PCS), and the buyer's new incentive constraint, (8), while relaxing the ruler's non-expropriation constraint, (7). Substituting these payments into (7), we obtain the enforceability condition:

$$\frac{\delta}{1-\delta} S^{PF} \geq \frac{c(a)}{q}. \tag{9}$$

Under strong political institutions, constraint (9) can be ignored and the private firm is efficient due to its productivity advantage. Similarly, the private firm is efficient under weak political institutions if δ is high enough. If political institutions are weak and δ is low, condition (9) is binding, and the private firm's input quality and surplus are increasing in q. Clearly, Proposition 5 is qualitatively still valid, although the region where the private firm is efficient is now smaller

than in the baseline model with long time horizons. In particular, notice that in the baseline model, the private firm produces some surplus even if the business contract is completely unverifiable ($q \approx 0$) because the buyer retains some of the output and hence gains from repeated contracting with the seller. In the model with short time horizons, this possibility disappears and therefore the private firm produces zero surplus for $q \approx 0$.

Figure 5. State vs. private firm under asymmetric time horizons



This point is illustrated by figure 5 above: because the private firm now produces zero surplus under low verifiability, there is a region in which the state firm dominates even if it suffers from a strong productivity gap ($\theta > \theta^*$).

6. Applications

6.1. Privatization

Our model provides a useful theoretical framework to understand the performance and timing of privatizations in transition and developing countries. An extensive empirical literature, reviewed by Megginson and Netter (2001), finds that privatization in the OECD countries has been generally successful in increasing the productivity and profitability of firms. Some developing and transition economies, most notably Chile and the Czech Republic, also undertook successful privatizations (Biais and Perotti, 1999). Contrarily, in several developing countries, particularly in the former Soviet area, privatizations have been shown to reduce the productivity of former state firms (e.g., studies in Roland, 2008; Knyazeva et al., 2003; Brown et al., 2006; Guriev and Megginson, 2007). In Russia, Karas et al. (2010) find that private banks perform worse than state-owned banks, even in the late 2000s, and that this difference cannot be explained by the choice of production process, the bank's environment, management's risk preferences, the bank's activity mix, or bank size. Anderson et al. (2000) study the early-1990s privatization in Mongolia and find that after privatization, firms with residual state ownership appear to be more efficient than fully private firms. Djankov and Nenova (2000) analyze the privatization in Kazakhstan relying on a dataset of about 6 600 firms and find that whereas the newly created private firms established after 1992 perform better than privatized firms or those that remain state-owned, the privatized firms perform as badly as, or worse than, the state-owned enterprises. They explain that privatization failed to improve performance because divested firms were used as short-term vehicles for extracting

private benefits. More generally, Nellis (1999) argues that "the farther east one travels, the less likely is one to see rapid or dramatic returns to privatization" (p. 6).

Our model can explain these seemingly conflicting facts. The OECD countries had relatively developed political institutions as they started to privatize state firms in the 1990s (mostly to ease their government budgetary constraints). In all of those countries, the government's taxation power was constrained by an independent elected parliament, though there were differences across them in the strength of broader checks and balances on the government's discretion. Thus, in the language of our model, all of the OECD countries fall into either the "strong" or the "intermediate" political institutions categories. Consistent with the empirical evidence, our model predicts that in such a context, privatized firms should perform better than the state firms they replaced.

In contrast, many developing countries on which privatizations were imposed (often as a precondition for international loans) had weak political and judicial institutions. In particular, despite their formal transition to democracy the ex-Soviet countries in the 1990s had weak protection of property rights, obsolete legal codes, and corrupted judicial systems. For instance, Black et al. (2000) write in their conclusion of the study of Russian privatization: "The profit incentives to restructure privatized enterprises (instead of looting them), and to create new businesses that could draw workers from shrinking enterprises, can be swamped by a hostile business environment. In Russia, that environment includes a punitive tax system, official corruption, organized crime, an unfriendly bureaucracy, and a business culture in which skirting the law is seen as normal, even necessary behavior" (Black et al. 2000).

Our model predicts that privatizing state-owned enterprises in such a context reduces firm performance. This is not the case, however, for the privatizations implemented by Chile and the Czech Republic during their transition to democracy (1986-91 and 1991-94, respectively). In both

of these countries property rights protection and judicial institutions in the pre-democratization period already were significantly stronger than in the ex-Soviet republics – that is, Chile and the Czech Republic appear to have "intermediate" rather than "weak" political institutions at the respective moments of privatization. Consistent with the evidence, our model predicts that privatization should increase firm performance in these contexts.[11]

When watched through the lens of our model, the different cross-country success rates of privatizations suggest that their timing is important and should be closely adapted to the institutional environment. Economists have informally advanced this idea in the past. For instance, Smith and Trebilcock (2001) argue that: "a successful privatization requires many elements that are often not available in developing countries, e.g., a stable political environment, an absence of corruption and effective competition in the private sector […] Each less developed country (LDC) should tailor its reform strategy to its current political and economic climate, and should modify this strategy as these circumstances change" (p. 218). Milton Friedman used a similar argument to correct his formerly unconditional support for privatizations: "Privatization is meaningless if you don't have the rule of law. What does it mean to privatize if you do not have security of property, if you can't use your property as you want to?" (Friedman 2002: xvii-xvii). Similarly, Guriev and Megginson (2007) write: "The benefits of privatizations depend on market institutions being in place. The countries that manage to ensure property rights protection and the rule of law, impose hard budget constraints, increase competition, and improve corporate governance reap the largest

[11] Interestingly, Brown et al. (2013) find that after 2002 (and before 2006, where their data stops), there was a qualitative change in the performance of privatized firms in Russia, reverting the negative trend of the 1992-2002 period. Whether this change can be attributed to institutional change remains an open question for future exploration.

benefits. If appropriate institutions are not in place, privatization often fails to improve performance at the firm level and for the economy as a whole." (p. 286).[12]

Our model provides a clear illustration and a theoretical micro-foundation for these arguments. At the same time, our model goes beyond the existing informal arguments by elucidating how the *interaction* between different types of institutions (political and judicial) determines the success or failure of privatizations.

6.2. Development trajectories in East Asia

A second important case to which our model applies is the development trajectory of East Asian growth "miracles", such as South Korea, Taiwan, and China. More specifically, our model can explain why these countries initially relied on state-led economic development but switched to private-sector-led development after political (and judicial) institutions became stronger. Below we briefly illustrate the co-evolution of political and legal institutions on one hand, and firm ownership structure on the other, in these countries. We then discuss the common patterns in these three cases in the light of our theoretical model.

6.2.1. South Korea

Prior to 1987 (the Sixth Republic), South Korea was essentially governed by military rule (although in 1963-1987 the political regime was nominally democratic). In 1987, anti-government protests induced a regime change and led to the first direct presidential election in 16 years. Although the first president in this new regime (Roh Tae-woo) came from the military, his

[12] See a similar argument in Guriev (2020), with much more details about the political-economic trajectory of Russia from pre-1991 to 2018.

government promoted democratization (by increasing freedom of the press, liberalizing international travelling, and giving autonomy to the universities). As a result of these reforms, in 1992 South Koreans elected the first civilian president in 30 years (Kim Young-sam). Since then, South Korea has been effectively a democratic regime.

Amsden (1989) argues that the sustained economic growth of South Korea in a period characterized by weak political institutions (1960-1980) was enabled by the state's involvement in productive activities and by its tight links to business conglomerates (*chaebols*). Consistent with that, Lane (2019) shows that firms in sectors declared as militarily strategic by the state in 1973 (e.g., the heavy chemicals industry) grew 80 per cent more than comparable manufacturing firms not targeted by the state. Milhaupt and Pistor (2008) investigate in greater depth the role of the *chaebols*. They note that in the absence of investor protections and a legal framework for financial contracts, the *chaebols* engaged in a symbiotic relationship with the government, which could influence their business decisions but provided in exchange capital protection from competition, licenses, and favorable regulations. In other words, the *chaebols* could be seen as quasi-state actors.

The Korean *chaebol* system was fairly productive when Korean industry primarily relied on the diffusion of foreign know-how and best practices (Amsden, 2001). However, once the country reached the technological frontier, those legal imperfections started to bind and the Korean model of economic development began showing weaknesses. In additional to the lack of modern legal institutions, the corrupt interlinkage between government and the *chaebols* was financially harmful for the state (Pirie 2007: 76). Moreover, the *chaebols* wanted to relax (at least partially) their alliance with the government to gain access to international credit markets (Hundt 2009: 94).

As a result of these deficiencies, economic reformers gradually took control of the government's agenda and engaged in a vast liberalization program in 1997, following the financial crisis. Reforms between 1997 and 2000 deregulated economic activity and established an independent financial regulator, an autonomous central bank, and other market-supporting institutions (Pirie 2007: 107-122). At the same time, the government strengthened South Korea's legal institutions by codifying the fiduciary duty of corporate directors, imposing liability on controlling "activist" shareholders, enforcing rules that limited improper intragroup transactions against *chaebol* insiders, and promoting shareholder derivative litigation against corporate directors (Milhaupt and Pistor 2008, p. 119). Altogether, these reforms sparked a new and different growth model, based on private economic initiative, which led to a rapid increase in South Korea' R&D intensity (Santacreu and Zhu 2018) and innovation (Jamrisko et al. 2019).

6.2.2. Taiwan

After World War II, and the retreat of the *Kuomintang* (KMT) party from mainland China in 1949, Taiwan was an autocracy ruled under martial law until the late 1980s. Pressure for democratization built up from 1979 until 1986, when the first opposition political party (the Democratic Progressive Party, or DPP) was allowed to register. Under President Lee Teng-hui, democratization continued throughout the 1990s, culminating in the end of KMT rule in 2000. Democratization was followed by important reforms in legal institutions and the legal environment for business, which were relatively under-developed during the dictatorship period (Wade, 1990; Shao and Tseng, 2014; World Bank, 2018).

The impressive economic development of Taiwan after the 1960s was initially driven by SOEs. For instance, Evans (1995) writes: "the KMT retained control, generating one of the largest state-

owned sectors in the non-Communist world […] Taiwan's state-owned enterprises accounted for over half of all fixed industrial production in the 1950s, and, after falling off a bit in the 1960s, their share expanded again in the 1970s" (pp. 55, 256). As noted by Wade (1990), Taiwanese SOEs were overall profitable: "Public enterprise prices have more than covered costs of production. Over the 1970s their surpluses contributed an average of 10 percent of the government's net revenue, which makes Taiwan an exception to the familiar thesis that government-owned corporations tend to deplete rather than add to government revenues" (p. 180).

Nevertheless, during the 1980s and 1990s, the government started to reduce the role of SOEs. Their share of domestic capital formation declined from 20.4% in 1971 to 10.2% in 2005 (Pao et al. 2008: 326), and a privatization program was launched in 1989. It is important to note that this process was gradual, rather than stark. As Evans (1995) notes: "the KMT regime progressively exposed its "greenhouse capitalists" to the rigors of the market, making export quotas dependent on the quality and price of goods and diminishing protection over time" (p. 58). Over time, this transition from state-led to private-sector-led development has been highly successful, leading *The Economist* to define Taiwan as "one of the world's most robust frameworks to encourage lending to small- and medium-sized enterprises (SMEs), the kinds of firms that have ideas but few resources." (*The Economist* 2019).

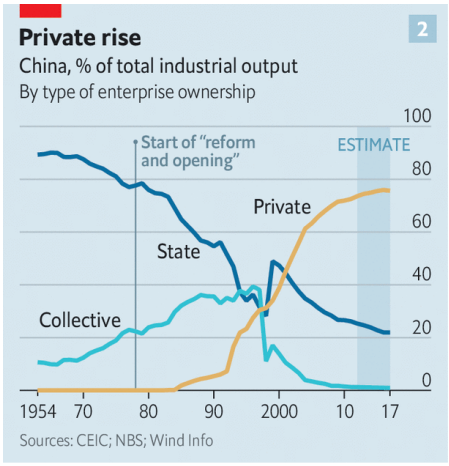
6.2.3. China

Unlike South Korea and Taiwan, China has not undergone a democratization process. However, when Chinese leaders targeted economic growth as a key objective in 1978, they sought to protect economic agents from governmental expropriation by incentivizing regional leaders to pursue growth, mostly through a promotion-based incentive scheme (Xu, 2011). While these

incentive programs made some progress towards improving Chinese political institutions (at last from the perspective of investors), legal institutions remained underdeveloped in China until recently (e.g., Allen, 2005). Indeed, several scholars (e.g., Peerenboom, 2002; Clarke *et al*., 2008; Xu, 2011) argue that to maintain a high growth in the future, it is now urgent for China to shift the focus of reforms on modernizing its legal institutions. In particular, Xu (2011) argues that "without a properly developed legal system, many problems cannot be resolved by regional competition, regional experimentation, personnel control, and other methods deployed by the RDA [regionally-decentralized authoritarian] regime. […] As the private sector and markets become fundamentally important to the economy, the negative impacts of bad laws and the absence of the rule of law will become even more manifest" (pp. 1132-33, 1140).

In terms of firm ownership structure, it is noteworthy that despite the pro-growth agenda initiated by its leaders in 1978, China only started to privatize (some of) its SOEs after 1997. The change in the relative importance of private firms along the path of Chinese development is illustrated by Figure 6 below, which shows the evolution of total industrial output between 1954 and 2017 by firm ownership type. In the early stages of economic reform (1978-1992), there was no rise of private firms and most dynamics corresponds to the conversion of SOEs into collectively-owned enterprises. From the mid-1990s a proper private sector started to emerge, growing most rapidly in the early 2000s.

Figure 6. Chinese industrial output by firm type[13]



The Economist

6.2.4. Discussion

Our model can explain the joint evolution of institutions and firm ownership in South Korea, Taiwan, and China. In all of these countries, the emergence of private firms, the privatization of SOEs and (in the case of South Korea) the emancipation of private firms from governmental protection and patronage, proceeded in parallel with improvements in legal and judicial institutions and the imposition of stronger constraints on the government's expropriation power. In Korea and Taiwan these political constraints were imposed by democratization, whereas in China they arose indirectly, through the pro-growth incentives that the central government gave to regional leaders. Consistent with these facts, our model predicts that when both legal and political institutions are weak, a social contract in which production is carried by private firms is less viable than one in

[13] The figure can be accessed at: https://www.economist.com/china/2018/12/08/forty-years-after-deng-opened-china-reformists-are-cowed. Similarly, Song et al. (2011) document that the ratio of employment in domestic private firms to total domestic employment in manufacturing in China increased from a mere 4% in 1998 to 56% in 2007.

which production is carried by SOEs (or quasi-SOEs, as in South Korea). As a result, SOEs are constrained-optimal in such an environment despite their lower productivity.

Our model also predicts that given the slow co-evolution of judicial and political institutions in China, the late timing of privatizations there was then probably efficient. When there are both weak property rights and dysfunctional judicial institutions (as was the case in China in the 1978-1998 period), state firms are more viable than private ones. Given the minimal property-rights protection (through the tournament-scheme incentives that the regional leaders faced), as judicial institutions improve (which was the case in China from the late 1990s onwards), private firms gradually become the efficient organizational form; consequently, privatization programs start to become more attractive. This argument is also consistent with the fact that observed privatizations in China have been on average successful (in increasing firm productivity). In fact, Song et al. (2011, Figure 3) document that in the 1998-2007 period, the *observed* private firms (both domestic and foreign-owned) are consistently more profitable than the *observed* state-owned firms in China.

7. Conclusion

This paper has shown theoretically that the lack of checks and balances on governmental expropriation makes private contracts less credible and more difficult to enforce. We have also shown that under weak political institutions, it may be more efficient for workers and suppliers to contract with state-owned firms than with private firms – that is, weak institutions may prevent the gains from private ownership from being reached. Our model has implications for the design of private contracts under weak institutions, and can explain privatization failures and the continued prominence of state-owned firms in weakly institutionalized environments, while generating novel testable predictions on the optimal timing of privatization in developing countries. The model also

has broader implications for governance choice in the presence of potentially predatory agents, including the effect of weak corporate governance institutions on intra-firm contracting and the design of company hierarchies.

Future research may extend and test our model in several direction. On the theoretical side, it would be interesting to study how the link between political institutions, contracting and firm ownership changes in the presence of multiple firms that compete and interact strategically. It would also be interesting to develop a full analysis of how weak institutions may affect the design of private contracts, building on the discussion that we initiated in section 4.1. On the empirical side, we hope our research will stimulate analyses of how political institutions, judicial institutions, and transaction characteristics jointly affect the incidence of private and state firm ownership, and the scope and design of private contracts.[14] More generally, we hope our paper will prompt more researchers to investigate the interplay between political institutions and the organization of economic exchanges.

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[14] See Paltseva, Toews, and Troya-Martinez (2021) for a recent study that moves in this direction.

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Appendix. Proofs

Proof of Proposition 2

Proposition 2*: (i) In a private firm, if the players are patient (high enough δ), S supplies surplus-maximizing input quality under both strong and weak political institutions:* $\overline{a}^{PF} = \underline{a}^{PF}$*. (ii) If players are impatient (low δ), S supplies higher input quality under strong political institutions than under weak institutions:* $\overline{a}^{PF} > \underline{a}^{PF}$*. (iii) Under both strong and weak political institutions, the input quality is weakly increasing in q, the extent to which the business contract is court-enforceable.*

Proof: When $\delta \approx 1$, both enforceability conditions, (PEC-s) and (PEC-w), are slack, so S supplies the surplus-maximizing input quality:

$$\underline{a}^{PF} = \overline{a}^{PF} = a^* \equiv argmax\{s^{PF}\}.$$

If $\delta \approx 0$, both conditions are binding and S supplies an input of lower quality. Since (PEC-s) and (PEC-w) become less stringent as δ increases, there must be cutoffs $\delta_s^{PF} \in (0,1)$ and $\delta_w^{PF} \in (0,1)$ such that under strong (weak) political institutions, S supplies surplus-maximizing quality if $\delta \geq \delta_s^{PF}$ ($\delta \geq \delta_w^{PF}$), and a lower quality otherwise. Notice that $\delta_s^{PF} < \delta_w^{PF}$ because condition (PEC-w) is more stringent than (PEC-w). Thus, our analysis implies that $\overline{a}^{PF} > \underline{a}^{PF}$ for all $\delta < \delta_w^{PF}$.

It remains to be shown that $\overline{a}^{PF}$ and $\underline{a}^{PF}$ are weakly decreasing in q. We do so for $\underline{a}^{PF}$ as the proof for $\overline{a}^{PF}$ follows from an identical argument. If $\delta \geq \delta_w^{PF}$, $\underline{a}^{PF} = a^*$ and hence does not depend on q. If instead $\delta < \delta_w^{PF}$, $\underline{a}^{PF}$ is given by:

$$\Phi^{PF}(a,q) \equiv \frac{\delta}{1-\delta}\{[\delta + q(1-\delta)]v(\underline{a}^{PF}) - c(\underline{a}^{PF})\} - c(\underline{a}^{PF}) = 0. \qquad \text{(A1)}$$

By taking the total differential, we obtain

$\frac{d\underline{a}^{PF}}{dq} = -\frac{\delta v(\underline{a}^{PF})}{\Phi_a^{PF}(\underline{a}^{PF},q)}$.

Let $\tilde{a}^{PF} \equiv argmax\{\Phi^{PF}(a,q)\}$, and notice that since $\Phi^{PF}(a,q)$ is concave, $\underline{a}^{PF}$ exists and is larger than $\tilde{a}^{PF}$. This implies that $\Phi_a^{PF}(\underline{a}^{PF},q) < 0$, and therefore $\frac{d\underline{a}^{PF}}{dq} > 0$. This completes the proof. ■

Proof of Proposition 4

Proposition 4*: (i) In a state firm, if the players are patient (high enough δ), S supplies surplus-maximizing input quality under both strong and weak political institutions: $\overline{a}^{SF} = \underline{a}^{SF}$. (ii) If players are impatient (low δ), S supplies higher input quality under strong political institutions than under weak institutions: $\overline{a}^{SF} > \underline{a}^{SF}$. (iii) Under strong political institutions, the input quality is decreasing in the productivity gap θ, and weakly increasing in the business contract verifiability q. (iv) Under weak political institutions, the input quality decreases in θ but does not depend on q.*

Proof: The proof is identical to that of Proposition 2, except for the statement that input quality decreases in θ. We prove this statement for the case of weak political institutions as the proof for strong institutions is analogous. Let $\delta_w^{SF} \in (0,1)$ the cutoff such that S supplies surplus-maximizing quality for $\delta \geq \delta_w^{SF}$, and lower quality otherwise. If $\delta \geq \delta_w^{SF}$, we have:

$\underline{a}^{SF} = a^{**} \equiv argmax\{s^{PF}\}$.

This input quality satisfies:

$(1-\theta)v'(a^{**}) - c'(a^{**}) = 0$, and (A2)

$(1-\theta)v''(a^{**}) - c''(a^{**}) < 0$, (A3)

where second order condition (A3) is satisfied due to concavity of the surplus function. Differentiating the first order condition, (A2), we obtain:

$\frac{d\overline{a}^{SF}}{d\theta} = -\frac{v\prime(a^{**})}{(1-\theta)v\prime(a^{**})-c\prime\prime(a^{**})} > 0.$

If $\delta \geq \delta_w^{SF}$, $\underline{a}^{SF}$ is given by:

$$\Phi^{SF}(a,\theta) \equiv \frac{\delta}{1-\delta}\{(1-\theta)v(\underline{a}^{SF}) - c(\underline{a}^{SF})\} - c(\underline{a}^{SF}) = 0. \quad \text{(A5)}$$

By taking the total differential, we obtain

$\frac{d\underline{a}^{SF}}{d\theta} = -\frac{\frac{\delta}{1-\delta}v(\underline{a}^{SF})}{\Phi_a^{SF}(\underline{a}^{SF},\theta)}.$

Let $\tilde{a}^{PF} \equiv argmax\{\Phi^{SF}(a,\theta)\}$, and notice that since $\Phi^{SF}(a,\theta)$ is concave, $\underline{a}^{SF}$ exists and is larger than $\tilde{a}^{PF}$. This implies that $\Phi_a^{SF}(\underline{a}^{SF},\theta) < 0$, and therefore $\frac{d\underline{a}^{SF}}{d\theta} < 0$. This completes the proof. ■

Proof of Proposition 5

Proposition 5*: (i) Under strong political institutions, the private firm is efficient. Under weak political institutions, the private firm is efficient (ii) when the parties are patient (high enough δ) or (iii) when its productivity advantage is large (high enough θ). (iv) If none of these conditions holds, the private firm is efficient when the business contract is verifiable (high enough q), while the state firm is efficient when the business contract is unverifiable (low q).*

Proof: Under strong political institutions, the private firm's problem is analogous to the state firm's problem for $\theta = 0$. Thus, part (i) immediately follows from the fact that the solution to the state firm's problem is strictly decreasing in θ (Proposition 4). For the rest of the proof, define $\tilde{s}^{SF}(\theta)$ and $\tilde{s}^{PF}(q)$, respectively, as the maximized surplus in the state firm and in the private firm when political institutions are weak. Consider first high levels of δ, such (PEC-w) is slack at $q = 0$, that is:

$\frac{\delta}{1-\delta}[\delta v(a^*) - c(a^*)] \geq c(a^*).$

In that case, the state firm's productivity gap implies that $\tilde{s}^{PF}(q) > \tilde{s}^{SF}(\theta)$ for all q, θ. This proves part (ii).

Consider now lower levels of δ, such that (PEC-w) is binding at $q = 0$. Notice that $\tilde{s}^{PF}(0) > \tilde{s}^{SF}(1)$ because $\underline{a}^{PF} > 0$ at $q = 0$ whereas $\underline{a}^{SF} = 0$ at $\theta = 1$. Notice, also, that $\tilde{s}^{PF}(0) < \tilde{s}^{SF}(0)$ because at $q = \theta = 0$, the private firm generates the same surplus as the state firm for a given a but has a more stringent enforceability condition. Since $\tilde{s}^{SF}(\theta)$ decreases in θ, there exists then $\theta^* \in (0,1)$ such that $\tilde{s}^{PF}(0) > \tilde{s}^{SF}(\theta)$ if $\theta > \theta^*$, and $\tilde{s}^{PF}(0) < \tilde{s}^{SF}(\theta)$ otherwise. Since $\tilde{s}^{PF}(q)$ increases in q, this implies, in turn, that $\tilde{s}^{PF}(q) > \tilde{s}^{SF}(\theta)$ for all q if $\theta > \theta^*$. This proves part (iii).

Lastly, to prove part (iv), suppose that $\theta < \theta^*$. By definition, $\tilde{s}^{PF}(0) < \tilde{s}^{SF}(\theta)$ in this region. Moreover, it is easy to verify that at $q = 1$, (PEC-w) coincides with (SEC-w), and therefore $\tilde{s}^{PF}(1) > \tilde{s}^{SF}(\theta)$. Since $\tilde{s}^{PF}(q)$ increases in q, these facts imply that there exists q^* such that $\tilde{s}^{PF}(q) < \tilde{s}^{SF}(\theta)$ at $q < q^*$, and $\tilde{s}^{PF}(q) > \tilde{s}^{SF}(\theta)$ at $q > q^*$. ■