DISCUSSION PAPER SERIES

No. 6755

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Sergei Guriev, Anton Kolotilin and Konstantin Sonin

DEVELOPMENT ECONOMICS and PUBLIC POLICY

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Sergei Guriev, New Economic School, Moscow and CEPR
Anton Kolotilin, Massachusetts Institute of Technology (MIT)
Konstantin Sonin, New Economic School, Moscow and CEPR

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ABSTRACT

Determinants of Expropriation in the Oil Sector: A Theory and Evidence from Panel Data*

In this paper we study nationalizations in the oil industry around the world in 1960-2002. We show, both theoretically and empirically, that governments are more likely to nationalize when oil prices are high and when political institutions are weak. We consider a simple dynamic model of the interaction between a government and a foreign oil company. The government cannot commit to abstain from expropriation and the company cannot commit to pay high taxes. Even though nationalization is inefficient it does occur in equilibrium when oil prices are high. The model's predictions are consistent with the panel analysis of a comprehensive dataset on nationalizations in the oil industry since 1960. Nationalization is more likely to happen when oil prices are high and the quality of institutions is low even when controlling for country fixed effects.

Sergei Guriev
New Economic School (NES)
Nakhimovsky pr. 47
Moscow 117418
RUSSIA
Email: sguriev@nes.ru

Anton Kolotilin
Massachusetts Institute of
Technology
70 Pacific Street
Cambridge
MA 02139
USA
Email: akolotilin@gmail.com

Konstantin Sonin
New Economic School (NES)
Nakhimovsky pr. 47
Moscow 117418
RUSSIA
Email: ksonin@nes.ru

1   Introduction

In recent years we have witnessed a phenomenon that has not been observed since 1970s: the forced nationalization of major, foreign-owned oil assets in Venezuela, Bolivia, Ecuador and Russia. Kazakhstan, too, is discussing the expropriation of a large oil field (*New York Times*, 2007).[1] The issue of forced nationalizations goes back to the most important question in economics: if property rights are so vital for economic efficiency, why are they so hard to uphold? The celebrated Coase theorem implies that if a government is less efficient in production, it would sell the property rights to the most efficient producer. The privatization literature (see a survey in Megginson, 2005) implies that switching to private ownership does increase productive efficiency. In the oil sector, the extensive anecdotal evidence (e.g. Yergin, 1991) shows that this argument is probably even more relevant than in other industries. Due to their economies of scale and better human capital, multinational oil companies have been more efficient; expropriations gave rise to losses of output and national income. In Mexico in 1938 and in Iran in 1951 expropriations not only resulted in a decline in growth rates, but were also followed by a decline in output and wages in the industry. In a striking example, Saudi Arabia, one of the leading oil-exporters in the world, per capita GDP have been falling or stagnating for 25 years, 1978-2003, and is now only a half of what it used to be in 1970s.

In this paper, we analyze the determinants of oil nationalizations around the world. One immediate observation is that the nationalization of oil companies takes place when oil prices were high (Figure 1). Specifically, most expropriations took place in 1970s, when oil prices were at historically high levels. Once the oil price came down in the 1980s and 1990s, the expropriations virtually disappeared and reemerged only in the last decade when oil prices climbed back to 1970s' levels.

On the one hand, it seems natural that the higher the oil price, the more valuable the oil assets

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[1]Last year, the U.S. Congressional Research Service report for Congress on the role of national oil companies opened with the following statement: "In June 2007, ExxonMobil Corporation and ConocoPhillips, two of the largest U.S. oil companies, abandoned their multi-billion dollar investments in the heavy oil deposits of the Orinoco basin in Venezuela. This action followed the breakdown of negotiations between the companies and the government of President Hugo Chavez and Petroleos de Venezuela (PDV), the Venezuelan national oil company. Four other international oil companies, including Total SA from France, Statoil from Norway, BP from Great Britain, and Chevron from the United States, accepted agreements that raised the PDV share in their Orinoco projects from approximately 40% to a controlling interest of about 78%." In the same summer 2007, TNK-BP, a Russian subsidiary of BP had to sell a major stake in its oil business to the national gas monopoly Gazprom. Before that, in December 2006, Gazprom acquired a 50%-plus-one-share stake in Sakhalin-2 oil field from Royal Dutch Shell after the international major faced prosecution from the state environmental agency.
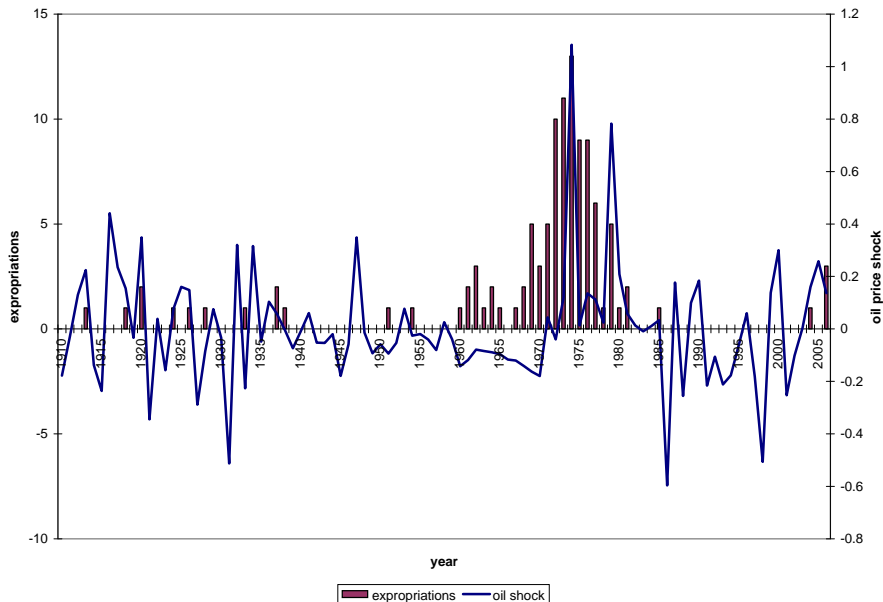
Figure 1: Number of expropriations in the oil industry and the oil price shock (deviation from the long-term price trend (11)) in 1910-2006.

and the stronger the incentives to expropriate. On the other hand, given the costs of expropriation, it is not immediately clear why a government would respond to a positive oil price shock with expropriation rather than just with imposing higher taxes. Contract theory implies that the government is better off keeping property rights intact and taxing the oil companies' rents. Using taxes contingent on (observable and verifiable) oil prices, the government can preserve oil companies' incentives for investment in new fields and cost-reducing technologies. This straightforward solution, however, relies on the external enforcement of contracts which is not the case: the government is both an enforcer and a contracting party. Therefore, this contract should be treated as a relational contract (see Baker et al., 1994, 2002). The contract is self-enforced. The only protection for the private company is the government's desire to benefit from the more efficient production in the future and checks and balances within the government.

Analysis of this relational contract results in a simple prediction: when current oil price is high, (inefficient) expropriations may take place in equilibrium. In this case the immediate prize is too valuable relative to future revenues. Each party's self-enforcement constraint is harder to meet, and the logic of relational contracting falls apart. Therefore, we should expect more expropriations in periods of higher oil prices. Another prediction is that expropriation is more likely whenever there are fewer checks on the government so that the latter finds it hard to commit. It also follows

that an increase in the managerial and technical capabilities of oil-producing countries increases the government's outside option in the case of expropriation and thus increases the risk of expropriation.

We test these predictions using the data on all the expropriations of foreign-owned oil companies around the world in 1960-2002. We focus on oil as the expropriations of oil companies are high-profile events and relatively easy to to observe and quantify. Also, oil is a globally traded commodity with a long time series of prices. We show that expropriations are indeed more likely to take place when oil price (controlling for its long-term trend) is high and in country-years where and when political institutions are weak. The results hold for both measures of institutions that we use (constraints on the executive and the level of democracy from the Polity IV dataset). Most importantly, the results hold even if we control for country fixed effects; in other words, in a given country, expropriation is the likelier the weaker this country's institutions.

Our econometric results are consistent with the rich anecdotal evidence available in the existing literature. Yergin (1991) provides a detailed narrative of major events in the oil industry, paying particular attention to the fate of international oil majors. Kobrin (1980, 1984a,b) argues that one of the driving forces of the waves of expropriations from 1960-70 was the rising desire of governments to take more control over the economy; however, it is unclear why direct control over the resource-extracting industry necessarily strengthens the state. When state capacity to control the economy increased in late 1970s, the number of expropriations fell dramatically. Kobrin (1985) emphasizes that once one government expropriates, there is a visible "domino effect". Other oil-exporting governments learn from the experience. Note that this argument is endogenous to the effect of world-wide oil prices on incentives to expropriate. Moran (1973) describes how international treaties may increase costs of expropriation. Williams (1975) estimates the amount of expropriations of foreign owners, both with and without compensation, in developing countries from 1956 to 1972.

There are also a few papers on the theory of expropriation risk. Bohn and Deacon (2000) study how property rights protection affects investment and production in the oil industry. If there is a risk of expropriation, which is modelled as an exogenous probability in a dynamic model, firms underinvest in long-term production capacity, while trying to extract and sell resources inefficiently early. Bohn and Deacon use cross-sectional evidence to show that the first effect dominates, and insecure ownership rights result in under- rather than overinvestment. In Thomas and Worrall (1994), a firm and a state are involved in multi-period interaction in the environment with poorly protected property rights. The state, which cannot produce on its own, can expropriate the firm's one-period proceeds but gets nothing in subsequent periods. The firm has all the bargaining power but has no access to the revenue generated by oil sale. Initially, the firm underinvests, but in the long

run invests at the socially optimal level for certain parameter values. In our model, the government can produce on its own, albeit less efficiently than the private firm, and the government, rather than the firm, has full bargaining power. Most crucially, both the government and the private firm are both able to produce and obtain revenue on their own. As a result, when oil prices are high, expropriation does occur in equilibrium, unlike in Thomas and Worrall's model.

Another relevant literature is the dynamic theory of political transition. Acemoglu and Robinson (2001) argue that democratic revolutions are more likely when the economy is in a downturn. In our model, expropriations happen when oil prices are high, which corresponds to the positive terms-of-trade shock for an oil-producing country. The difference comes from the relative short- and long-term benefits in the two models. In our model, the state compares the immediate proceeds of expropriation against long-term losses in efficiency. In Acemoglu and Robinson (2001), the median voter trades off immediate deadweight losses due to a revolution and future gains of a greater control over political decision-making.

The rest of the paper is organized as follows. Section 2 contains a model which links stochastic movement of oil prices to government's incentives to expropriate. Section 3 describes the data used in the empirical exercise and reports the empirical results. Section 4 concludes.

2 Theory

2.1 Setup

We consider an infinite period game between two risk-neutral agents: the private (foreign) firm F and the government G. Each agent maximizes the net present value of the expected future cash flows.[2] Both have a discount factor of $\delta \in (0, 1)$ per period.

There is a natural resource, e.g. oil, which is extracted by either F or G, and then sold in the global market.

Production technology. For either F or G extracting Q_t barrels of oil in period t requires investing $K_{t-1} = Q_t^{1/\alpha}$ units of capital in the previous period; here $\alpha \in (0, 1)$. The cost of capital for F is normalized to 1. The government is less efficient. To install K units of capital, it needs to spend γK, where $\gamma > 1$. For simplicity, we assume that capital stock depreciates fully in one period.

Oil price. The global price of oil, p_t, follows an i.i.d. process with a density function $f(p_t)$ and the distribution function $F(p_t)$. The expected price is $\mathbb{E}[p_t] = \int p f(p) dp = P$. The support of the

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[2]The government's objective function would be the same if it maximized the welfare of the rest of society, excluding foreign firms, and the tax revenues were distributed to the society.

distribution is $[\underline{p}, \overline{p}]$. We allow for both bounded and unbounded supports $\overline{p} \leq \infty$. We make the i.i.d. assumption for the sake of tractability. More sophisticated stochastic process would produce similar results but would make the analysis more complex.

Taxation and expropriation. Initially, the oil extraction is carried out by the private firm F. As long as the production is private, F appropriates output Q, sells it in the global market and pays taxes, T , to the government. The government sets the tax level. The government also can expropriate the oil production at any moment. Expropriation incurs a cost $C > 0$ for the government. This cost reflects the strength of property rights protection in the country, sensitivity to international sanctions, etc. After an expropriation, the private firm would never be interested in returning to this country.[3] Formally, we focus on perfect public equilibria in the repeated game with the following restrictions on beliefs. The private firm believes that if the once-expropriated firm is privatized back, then the government will expropriate it regardless of the strategy the private owner pursues. (This is tantamount to assuming that the cost of second expropriation is lower than the cost of the first one.) The government believes that once the private sector fails to pay the tax, it will not pay taxes in the future. These assumptions allow focusing on equilibria that maximize social welfare.

Before the beginning of the game the government sets the tax schedule $T_t = T(p_t, K_t)$. Violation of the tax schedule in the future is perceived by the firm as expropriation. The initial level of capital is $K_1 = 0$.

Timing. In each period t, the timing is as follows:

- The oil price, p_t, is realized.

- If the oil industry is public, the government sells $Q_t = K_t^\alpha$ at price p_t and invests $I_t = \gamma K_{t+1}$.

- If the industry is private, the government decides whether to expropriate.

- If the industry remains private, the private sector sells $Q_t = K_t^\alpha$ at price p_t, decides whether to pay the tax, and invests. If the private sector does not pay taxes, the government expropriates the company without any cost and makes the investment decision.

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[3]Historically, there have been examples of a privatization following a nationalization. Yergin (1991) tells the story of the Nigerian government, which seized the British Petroleum's assets in 1973, only to auction it off soon afterwards.

2.2 Benchmark: the first best

The first best outcome is as follows: the oil business is private, and the level of investment is as follows

$$K^* = \arg\max_K \left\{ \delta K^\alpha \mathbb{E}[p_t] - K \right\} = (\alpha \delta P)^{\frac{1}{1-\alpha}}. \tag{1}$$

2.3 Equilibrium without expropriation

For some parameter values, the first best investment level (1) can be supported along the equilibrium path. In this section, we will solve for the equilibrium in which (i) the government has no incentives to expropriate; and (ii) the firm is better-off paying taxes.

This equilibrium is similar to the one in the relational contracts literature (Baker et al., 1994, 2002). G does not expropriate as the one-period returns to expropriation are below the future payoffs related to higher production efficiency. The government benefits from F's more efficient investment as it can charge higher taxes. Still, the taxes have to be sufficiently low, so that F's quasi-rent provides F with incentives to pay them rather than sell one-period worth of output and quit the country. These self-enforcement constraints impose the conditions on parameters under which the first best is supported in equilibrium.

The government maximizes its expected revenue. Since there is no risk of expropriation it is optimal to implement the first best level of investment $K_t = K^*$.

Let us now check the self-enforcement constraints. At any moment, the firm should prefer the equilibrium payoff (net of investment costs and taxes) to the deviation (do not pay taxes once, do not invest and get zero thereafter):

$$p_t K^{*\alpha} + \frac{1}{1-\delta} \frac{1-\alpha}{\alpha} K^* - \sum_{\tau=t}^{\infty} \delta^{\tau-t} \mathbb{E}_t[T_\tau] \geq p_t K^{*\alpha}.$$

The government should also prefer the equilibrium payoff to expropriation. If the government expropriates, it grabs $p_t K^{*\alpha}$, pays the cost C and then produces with suboptimal technology. The latter strategy brings about the net present value of

$$U_{\exp} = \frac{1}{1-\delta} \left[\max_K \delta P K^\alpha - \gamma K \right] = \frac{1}{1-\delta} \frac{1-\alpha}{\alpha} \gamma^{-\frac{\alpha}{1-\alpha}} K^*. \tag{2}$$

Therefore, the government's self-enforcement constraint is

$$\sum_{\tau=t}^{\infty} \delta^{\tau-t} \mathbb{E}_t[T_\tau] \geq p_t K^{*\alpha} - C + U_{\exp}.$$

Summing the self-enforcement constraints for F and G, we obtain a necessary condition for this equilibrium to exist:

$$\frac{p}{P} \leq \frac{C}{PK^{*\alpha}} + \frac{\delta(1-\alpha)}{1-\delta}\left(1 - \gamma^{-\frac{\alpha}{1-\alpha}}\right) \text{ for any } p \in [\underline{p}, \bar{p}].$$

Let us show that it is also a sufficient condition. Whenever $T_t = T^* = \frac{1-\alpha}{\alpha}K^*$, F chooses K^*, both self-enforcement constraints are satisfied, and the firm gets zero continuation payoff which means that the government revenue is maximized. If $T_t < T^*$ for some t, then the firm's self-enforcement constraint is not binding, and thus, the government can increase its payoff by raising taxes.

Proposition 1. *There exists an equilibrium without expropriation with the first best level of investment if and only if the oil price volatility is not too high ($\bar{p}$ is sufficiently low given the expected price P), institutions are strong (C is high), both agents are sufficiently patient (δ is high), and the government is sufficiently inefficient (γ is high) so that:*

$$\frac{\bar{p}}{P} \leq \frac{C}{PK^{*\alpha}} + \frac{\delta(1-\alpha)}{1-\delta}\left(1 - \gamma^{-\frac{\alpha}{1-\alpha}}\right). \tag{3}$$

The tax level in this equilibrium is $T^* = \frac{1-\alpha}{\alpha}K^*$.

2.4 Equilibrium with expropriation

If the oil price is very volatile, (3) does not hold. In this case, the investment is suboptimal and expropriation may take place along the equilibrium path. Let us introduce F's and G's payoffs V_F and V_G, respectively. Since the tax schedule $T_t = T(p_t, K_t)$ depends only on current oil price and capital, the investment along the equilibrium path prior to expropriation is also constant over time $K_t = \widetilde{K}$. The government's payoff is as follows:

$$V_G(K_t; p_t) = \max\left\{-C + p_t K_t^\alpha + \frac{1}{1-\delta}\frac{1-\alpha}{\alpha}\gamma^{-\frac{\alpha}{1-\alpha}}K^*, \ T_t + \delta\int V_G(\widetilde{K}; p_{t+1})f(p_{t+1})dp_{t+1}\right\} \tag{4}$$

The government does not expropriate whenever:

$$p_t\widetilde{K}^\alpha \leq C - \frac{1}{1-\delta}\frac{1-\alpha}{\alpha}\gamma^{-\frac{\alpha}{1-\alpha}}K^* + T(p_t, \widetilde{K}) + \delta\int V_G(\widetilde{K}; p)f(p)dp. \tag{5}$$

Let $\mathcal{P}$ denote the set of oil prices when the condition (5) is satisfied.

The firm's self-enforcement constraint is as follows: $V_F(\widetilde{K}; p_t) \geq p_t\widetilde{K}^\alpha$, where its payoff V_F solves the Bellman equation:

$$V_F(\widetilde{K}; p_t) = p_t\widetilde{K}^\alpha - T(p_t, \widetilde{K}) - \widetilde{K} + \delta\int_{\mathcal{P}} V_F(\widetilde{K}; p_{t+1})f(p_{t+1})dp_{t+1}\}. \tag{6}$$

7

In equilibrium, the firm's self-enforcement constraint should be binding, otherwise G could increase the tax level without violating F's self-enforcement constraint, and hence increase G's payoff. Therefore, the tax is:

$$T(p_t, \widetilde{K}) = T(\widetilde{K}) = \widetilde{T} \equiv -\widetilde{K} + \delta \widetilde{K}^\alpha \int_{\mathcal{P}} p f(p) dp \tag{7}$$

Since the optimal tax schedule does not depend on the current price p_t, the government's constraint (5) implies that the government does not expropriate whenever $p_t \leq \widetilde{p}$ where:

$$\widetilde{p} = \widetilde{K}^{-\alpha} \left[C - \frac{1}{1-\delta} \frac{1-\alpha}{\alpha} \gamma^{-\frac{\alpha}{1-\alpha}} K^* + \widetilde{T} + \delta \int V_G(\widetilde{K};p) f(p) dp \right].$$

Let us now solve (4). As shown in the Lemma 1 in the Appendix, the equations above imply that (5) is equivalent to:

$$p_t \widetilde{K}^\alpha \leq \frac{-\widetilde{K} + \delta P \widetilde{K}^\alpha + [C - U_{\exp}](1-\delta)}{1 - \delta F(\widetilde{p})} \tag{8}$$

The government's problem is to choose the investment level it wants to implement and to choose the tax level that implements the investment level. To implement a given $\widetilde{K}$, the government should set $T(K_t) = \widetilde{T}$ if $K_t = \widetilde{K}$ and a very high tax otherwise. Thus the government's optimization problem is:

$$\begin{aligned}
\text{maximize } \widetilde{T} + \delta \mathbb{E}_t[V_G(\widetilde{K}; p_{t+1})] &= \frac{-\widetilde{K} + \delta P \widetilde{K}^\alpha - \delta[C - U_{\exp}](1 - F(\widetilde{p}))}{1 - \delta F(\widetilde{p})} \tag{9} \\
\text{subject to } \widetilde{p} \widetilde{K}^\alpha &= \frac{-\widetilde{K} + \delta P \widetilde{K}^\alpha + [C - U_{\exp}](1-\delta)}{1 - \delta F(\widetilde{p})} \\
\widetilde{p} &\in [\underline{p}, \overline{p}]
\end{aligned}$$

Proposition 2. *If (3) does not hold, the equilibrium is as follows. Consider $\widetilde{p}$ and $\widetilde{K}$ that solve the optimization problem (9). Whenever the oil price, p, exceeds $\widetilde{p}$, the government expropriates. As long as the oil price is below $\widetilde{p}$, there is no expropriation, F invests $\widetilde{K}$ which is lower than the first best , and the tax level is:*

$$\widetilde{T} = -\widetilde{K} + \delta \widetilde{K}^\alpha \int_{\underline{p}}^{\widetilde{p}} p f(p) dp.$$

As institutions become very strong $C \to \infty$, the investment level approaches the first best $\widetilde{K} \to K^*$.

Assume further that the distribution $f(\cdot)$ is such that $p^2 f(p)$ is decreasing in p at $\widetilde{p}$ and $p(1 - \delta F(p))$ is increasing in p at $\widetilde{p}$. Then the probability of expropriation $\int_{\widetilde{p}}^{\overline{p}} f(p) dp$ decreases with both the strength of institutions, C, and the government's inefficiency γ, and the equilibrium level of investments $\widetilde{K}$ increases in both C and γ.

8

Proof: See Appendix A.

The technical assumption that $p^2 f(p)$ is decreasing in p is natural. If $p^2 f(p)$ were weakly increasing in p, then there would not exist a finite $\mathbb{E}[p]$. The assumption that $p(1 - \delta F(p))$ is increasing in p also natural, since $\lim_{p \to \infty} 1 - \delta F(p) = 1 - \delta$.

Remark 1. *In a non-generic case, the equilibrium may involve underinvestment but not expropriation. This happens when the distribution is bounded and the firm invests so that the government is indifferent between expropriating and keeping the company private exactly when the oil price reaches its upper bound, $\bar{p}$. This case is characterized by the same optimization problem (9). Empirically, however, this case is hard to distinguish from the equilibrium without expropriation.*

We assumed that the government sets the tax schedule as a function of the current state $T_t = T(p_t, K_t)$. In general, the government could condition the tax on the whole history of oil price and investment: $T = \{T_t : H_p^t \times H_K^t \to \mathbb{R}, t = 1, .., \infty\}$, where H_p^t and H_K^t are all possible histories of oil price and capital of duration t. Yet, the results would not change. Levin (2003) showed that stationary contracts are optimal among all possible contracts that could depend on histories when the game is stationary and both agents are risk neutral and lack commitment. The argument is as follows. First, since both agents are risk neutral, we can restrict contracts to those that depend on current states of the world and time. Indeed, there are two ways of manipulating self-enforcement constraints: (i) current transfers and (ii) continuation values. Since agents are risk neutral, i.e. the objective function linearly depends on current payoffs, for any contract in which continuation value depends on history, we can find a contract in which the continuation value does not depend on history, all constraints are satisfied and this contract gives the same expected value for the government. Second, since the game is stationary, the optimal contract does not depend on time, and hence, it is stationary.

The non-trivial risk of expropriation in equilibrium may produce a counter-intuitive result: private ownership does not have to be optimal ex ante. Indeed, if oil price is sufficiently volatile ($\frac{\bar{p}}{P}$ is high) and government production is quite efficient (γ is close to 1), then expropriation is a relatively frequent event. As expropriations incur deadweight losses, C, those losses outweigh the inefficiency of public ownership. Thus when property rights are not secure it might be in the social interest to have government ownership. However, if the government inefficiency is sufficiently high (γ is high), private production is superior to government production.

9

3 Empirical analysis

The model has a number of empirical implications. First, a positive oil price shock increases the risk of expropriation. Second, weak political institutions (e.g., insufficient checks on the executive or weak democratic institutions) increase the risk of expropriation. The constraints on the executive capture the immediate cost of expropriation, while the strength of democracy reflects the alignment of the current government's objectives with the long-term national interest. Finally, the level of human capital development may also affect the risk of expropriation. On the one hand, the government's ability to invest efficiently increases the risk of expropriation. On the other hand, a higher level of human capital allows the government to collect more taxes, thus eliminating incentives to expropriate, rendering the effect of human capital on expropriation ambiguous. Given that human capital is highly correlated with institutions both across countries and over time, we will control for human capital in all specifications.

3.1 Data

Expropriations. The data on expropriations are based on four major sources complemented by our own search in Google, ProQuest and Factiva. The four main sources use a similar methodology (described in Kobrin, 1980) and cover three different time periods. The first dataset was built by Stephen Kobrin (Kobrin, 1980, 1984a) and covers 1960-1979. The second dataset (Minor, 1994) covers 1980-1992; the third one comes from Coyle (2003) and covers 1993-2002; the fourth one comes from Kobrin (1984b) and covers 1918-1980.[4] Our own search was also based on Kobrin's approach and covered 1913-2006.

Below we describe Kobrin's methodology and dataset in a greater detail (see Kobrin, 1980, for a comprehensive description). These data were mostly collected by the United Nations Economic and Social Council. The data only include forced divestments of foreign property which were classified into the four categories: (i) *formal expropriation,* (ii) *intervention,* (iii) *forced sale* and (iv) *contract renegotiation.* Unlike formal expropriation (which took place in accordance with the local law), intervention is an extra-legal forced transfer of ownership (by either public or private actors). Contract renegotiation is a revision of contractual agreements involving coercive power of the government, which resulted in an effective transfer of ownership.

We only consider the acts of expropriation in oil extraction (SIC codes 130 and 131). Our

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[4]The last dataset includes nationalizations in oil production only.

dependent variable is as follows:

$$E_{it} = \begin{cases} 1, & \text{if there was at least 1 expropriation in country } i \text{ in year } t \text{ in the oil sector;} \\ 0, & \text{otherwise.} \end{cases} \qquad (10)$$

We study the period of 1960-2002; according to the data sources above, during this period there have been 94 expropriations in 40 countries (see the Appendix B for the complete list). Most nationalizations were concentrated in 1970s (see Figure 1).

Oil price. We use crude oil price data from BP Statistical Review of World Energy June 2006 (www.bp.com). Figure 2 presents the list of all the major events that affected oil prices in 1970-2000 according to US Department of Energy's Energy Information Administration.[5]

Theory predicts that both the expected oil price and the oil price shock (deviation from the trend) affect the probability of expropriation. As the oil price is not stationary, including the the oil price per se in regressions could generate spurious results. Thus, we need to single out the unexpected component in the oil price dynamics. We use a model from Pindyck (1999) who estimates the following equation for the long-term oil prices (we extend his dataset to 1882-2006):

$$ln(p_t) = 0.844^{***}ln(p_{t-1}) + 3.40^{***} + 0.0280^{**}t + 0.000259^{***}t^2 + \varepsilon_t, \qquad (11)$$

where p_t is the oil price in 2005 US dollars, $t = year - 1982$; ***, **, * denote 1%, 5% and 10% statistical significance, respectively.

This equation allows us to obtain the unexpected oil price component ε_t which we use as an independent variable throughout the paper. We refer to this residual as the "oil price shock".

Resource abundance. We also control for oil abundance. The more oil in the country, the lower the cost of expropriation C per unit of expropriated assets; hence we should observe more expropriations in oil-richer countries.

Oil abundance is usually proxied by oil reserves, oil production, or oil exports. We will use the data on oil production from the U.S. Energy Information Administration rather than data on oil reserves. Systematic data on oil reserves (from BP) only start in 1980, while the bulk of expropriations occurred in 1970s. The other problem with using data on reserves is that this data usually include "economically relevant" reserves, which are endogenous to the current oil price.

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[5]See http://www.eia.doe.gov/pub/oil_gas/petroleum/analysis_publications/chronology/petroleumchronology2000.htm) for a detailed description of events.
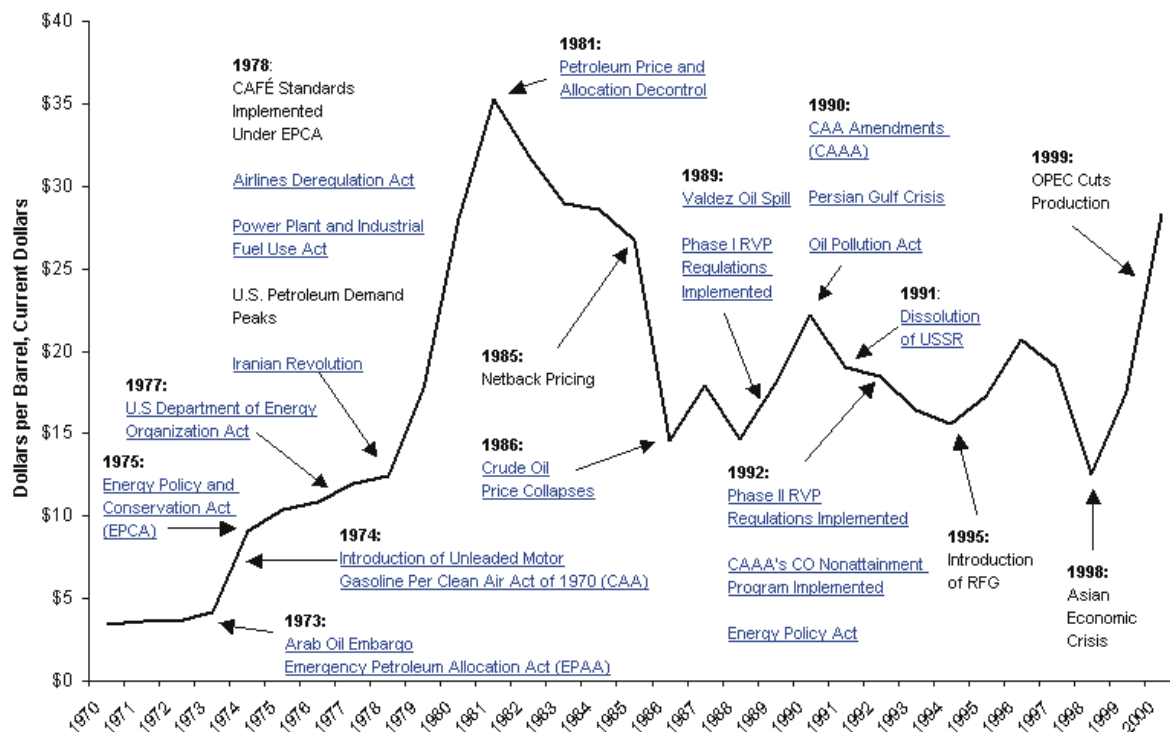
Figure 2: Major events affecting the international oil price changes. Source: "Petroleum Chronology of Events 1970-2000." US Department of Energy, Energy Information Administration.

We also prefer oil production to oil exports as the latter are endogenous to the level of development. Most developed economies are diversified. Even if they have substantial oil reserves and oil output, they still need to import to cover the needs of manufacturing and service sectors. For example, the U.S. is one of the largest oil producers, but it imports rather than exports oil.

We proxy oil wealth by the logarithm of average annual crude oil production in 1980-2002 plus one thousand barrels. To account for per capita oil wealth, we simply control for the logarithm of country's population in all specifications.

Institutions and the cost of expropriation. We proxy the costs of expropriation by the quality of political institutions using two variables from the Polity IV dataset (Marshall and Jaggers, 2006): constraints on the executive (XCONST) and institutionalized democracy (DEMOC). XCONST ranges from 1 to 7 and captures the existence of decision rules in the economy (the checks

and balances on the executive). DEMOC ranges from 0 to 10 and includes both the constraints on the executive, the presence of institutions and procedures through which citizens can express effective preferences about policies and leaders, and guaranties of civil liberties.

The two variables are related but do measure somewhat different aspects of institutions. The XCONST variable captures the strength of institutions understood as rules of the game. It is often used as the main proxy for institutions (see Henisz, 2000, and a discussion in Glaeser et al., 2004). The DEMOC variable also includes the implicit incentives for the executive to care for social welfare through providing citizens with procedures for removing non-performing executives.

While there exist many other data sources on the quality of institutions, only Polity IV provides annual data for the whole period we study. All other indices (including those from the Freedom House) do not cover 1970s when most of the oil expropriations have taken place.

Human capital. We proxy human capital by adult literacy (percentage of literate citizens among those of 15 years or older). The adult literacy data come from the Cross-National Time-Series Data Archive (*Databanks International at www.databanks.sitehosting.net*) that provides annual estimates until 1980. From 1980 on there is only one observation every five years. As such, we interpolate the missing data for this variable.

We have also used alternative measures of human capital (such as years of schooling, share of population with primary, secondary, tertiary education) and results were similar. We focus on literacy as it captures the level of human capital rather than the human capital investments.

GDP per capita. The real GDP per capita data come from the World Development Indicators 2004. Unfortunately, there are many gaps in these data prior to 1980 in less developed countries, where and when most expropriations took place. This is why we will estimate specifications both with and without per capita GDP (the latter to increase the sample size).

Country coverage. We have excluded the countries of the former Soviet Union, Yugoslavia, Czechoslovakia, Germany, Namibia, and Eritrea. First, it is hard to reconcile national and subnational statistics for these countries that have undergone breakup and unification events during our sample period. Second, as there was no private property in the centrally planned economies, by definition expropriation was not possible . We have also removed 17 countries for which there are no data on oil production or population. We ended up with 149 countries.

3.2 Empirical methodology

We use the data above to study the determinants of the risk of expropriation. Our theory implies that expropriation is more likely when oil prices are high and when the quality of institutions is low. Our model has ambiguous implications for the effect of human capital.

We estimate logit regressions where the binary dependent variable, E_{it}, is zero when there is no expropriation and one when there is expropriation, for each in country i in year t. We use three specifications. First, we estimate a between-effects specification to compare the countries with frequent and rare occurrences of expropriation. This specification aims at understanding country-specific factors that drive expropriation risks. It is, however, vulnerable to omitted variable bias, misspecification, and other methodological problems. Also, by treating each country as one observation we cannot take advantage of the across-time variation in our independent variables. In particular, we cannot estimate the effect of oil prices.

This is why we also run pooled regressions (controlling for clustering at the country level) and conditional fixed-effects regressions. Pooled regressions treat each country-year as a separate observation; in particular, we use data on institutions and economic development in a given country for a given year:

$$P(E_{it} = 1) = F(\alpha \; \text{OilPriceShock}_t + \beta \; \text{Inst}_{it} + \gamma \; X_{it}),$$

where Inst_{it} is a proxy for institutions (democracy or constraints on the executive), X_{it} is a vector of controls (human capital, oil abundance, region dummies, logarithm of GDP, logarithm of population), and $F(.)$ is the cumulative distribution function of logistic distribution.

The fixed effect specification includes country dummies and therefore takes into account all country-specific factors that do not vary with time such as legal origin, colonial legacies, religion, culture, etc. The fixed effect specification is:

$$P(E_{it} = 1) = F(\tilde{\alpha} \; \text{OilPriceShock}_t + \tilde{\beta} \; \text{Inst}_{it} + \tilde{\gamma} \; \tilde{X}_{it} + \mu_i)$$

where μ_i denotes country fixed effects, and $\tilde{X}_{it}$ is a vector of controls that varies in time (such as logarithm of GDP per capita).

The fixed effect model is a strong test of the effect of institutions. By definition, institutions evolve slowly. The coefficient $\tilde{\beta}$ captures the effect of the change in institutions on the change in the risk of expropriation controlling for all country-specific variables. This specification can only be estimated on the countries with at least one expropriation, which further reduces the sample and makes the test even more challenging.

3.3 Results

Summary statistics and between-effects specifications

Table 1 presents the summary statistics. We show the average oil price shock for the years with and without expropriations. We also compare the average quality of institutions, and average level of human capital for countries with and without expropriations and for country-years with and without expropriations. All the summary statistics are consistent with our model: expropriations are more likely to happen when oil price shock is high, and in countries and country-years with weaker institutions. The latter effect holds for the whole dataset and for the subsample of countries with at least one expropriation. Table 1 also shows that expropriations are more likely in countries and country-years with lower human capital.

Table 1. Summary statistics for expropriations and non-expropriations.

	Expropriation	No expropriation	t-statistic	Observations	Expropriations, out of total
Oil price shock	0.062	-0.086	-1.817*	Years	22/43
Executive constraints	2.495	3.962	5.83***	Country-years	91/5064
Executive constraints	2.495	3.183	2.952***	Country-years*	91/1491
Executive constraints	3.083	4.247	3.177***	Countries	39/131
Democracy	1.341	3.953	5.838***	Country-years	91/5064
Democracy	1.341	2.489	3.097***	Country-years*	91/1491
Democracy	2.306	4.462	3.223**	Countries	39/131
Literacy	42.288	64.506	7.142***	Country-years	92/5121
Literacy	42.288	56.008	5.121***	Country-years*	92/1431
Literacy	54.291	67.638	2.679***	Countries	39/139

* countries with at least one expropriation

* significant at 10%; ** significant at 5%; *** significant at 1%

The correlation between institutions and the risk of expropriation disappears in between-effects regressions once we control for other country-level variables (see Table B2 in the Appendix). In order to study the within-country dynamics and to control for the oil price shock, we estimate pooled and fixed-effects regressions below.

Pooled regressions

Table 2 presents the results of pooled regressions (controlling for clustering at the country level). Expropriation is more likely in years when oil price shock is high and in country-years with poorer institutions and lower human capital. These results hold when we control for appointments of new rulers, oil abundance, regional dummies, GDP per capita and GDP growth.

Table 2: Logit pooled regressions.

	Dependent variable is a dummy for expropriation					
Oil price shock	1.79	1.80	1.79	1.79	1.81	1.82
	[0.27]***	[0.27]***	[0.27]***	[0.28]***	[0.34]***	[0.34]***
Executive constraints	-0.17		-0.07		-0.18	
	[0.07]**		[0.09]		[0.09]**	
Democracy		-0.15		-0.08		-0.12
		[0.04]***		[0.04]*		[0.05]**
Literacy			-0.04	-0.04	-0.03	-0.03
			[0.01]***	[0.01]***	[0.01]**	[0.01]**
Change of ruler	0.74	0.78	0.62	0.65	0.53	0.55
	[0.28]***	[0.28]***	[0.30]**	[0.30]**	[0.31]*	[0.31]*
Average log oil production	0.49	0.5	0.51	0.52	0.70	0.70
	[0.07]***	[0.07]***	[0.08]***	[0.08]***	[0.14]***	[0.14]***
Log GDP per capita in 1965					0.7	0.63
					[0.29]**	[0.29]**
Log GDP per capita					-1.04	-0.95
					[0.42]**	[0.40]**
Log of population	-0.37	-0.36	-0.43	-0.43	-0.54	-0.53
	[0.10]***	[0.10]***	[0.11]***	[0.11]***	[0.20]***	[0.20]***
Observations	5060	5060	4669	4669	3536	3536

All specifications include regional dummies. Robust standard errors are in brackets.

* significant at 10%; ** significant at 5%; *** significant at 1%

The coefficients at the covariates are also intuitive. Change of ruler and oil abundance are positively correlated with expropriation. GDP growth is negatively correlated with expropriation, while the initial level of GDP per capita is positively correlated with expropriation. As we control for institutions, the latter result is likely to reflect the level of expropriable wealth (similarly to oil

abundance, which we proxy only imperfectly).

Table 3 shows that the results are the same for the subsample of countries which had at least one expropriation. This subsample is important for a number of reasons. First, it is exactly this subset for which pooled and panel regressions can be compared. Second, for this subset we know that probability of expropriation is not trivial (and the country is in the equilibrium with expropriation). As an additional robustness check, we have also estimated the same specifications for the subsample of less developed countries. The results (available upon request) are similar.

Table 3: Logit pooled regressions for countries with at least one expropriation.

	Dependent variable is a dummy for expropriation					
Oil price shock	1.90	1.90	1.91	1.91	1.86	1.85
	[0.30]***	[0.30]***	[0.31]***	[0.31]***	[0.39]***	[0.38]***
Executive constraints	-0.16		-0.08		-0.21	
	[0.07]**		[0.08]		[0.06]***	
Democracy		-0.14		-0.08		-0.16
		[0.04]***		[0.04]*		[0.03]***
Percent literate			-0.04	-0.04	-0.06	-0.06
			[0.01]***	[0.01]***	[0.01]***	[0.02]***
Change of ruler	0.7	0.72	0.58	0.58	0.51	0.52
	[0.30]**	[0.30]**	[0.32]*	[0.32]*	[0.32]	[0.32]
Average log oil production	0.23	0.25	0.22	0.23	0.32	0.33
	[0.05]***	[0.05]***	[0.06]***	[0.06]***	[0.10]***	[0.10]***
Log GDP per capita in 1965					0.79	0.71
					[0.31]**	[0.32]**
Log GDP per capita					-0.45	-0.27
					[0.39]	[0.38]
Log population	-0.25	-0.25	-0.3	-0.29	0.08	0.14
	[0.08]***	[0.08]***	[0.10]***	[0.10]***	[0.21]	[0.23]
Observations	1491	1491	1391	1391	968	968

All specifications include regional dummies. Robust standard errors are in brackets.

* significant at 10%; ** significant at 5%; *** significant at 1%

Fixed effects

The results of fixed effect estimations are presented in Table 5. The results are consistent with the model. Expropriations are more likely to occur when the oil price shock is high. Even controlling for country fixed effects, higher quality of institutions (and of human capital) reduces the risk of expropriation. A change in a state's ruler increases the risk of expropriation in some specifications.

Table 4: Logit panel regressions with country fixed effects.

	Dependent variable is a dummy for expropriation							
Oil price shock	1.92	1.92	1.89	1.88	1.91	1.90	1.98	2.14
	[0.29]***	[0.29]***	[0.31]***	[0.31]***	[0.36]***	[0.36]***	[0.31]***	[0.32]***
Executive constraints	-0.25		-0.22		-0.17		-0.16	-0.11
	[0.09]***		[0.10]**		[0.10]		[0.07]**	[0.06]*
Democracy		-0.23		-0.16		-0.15		
		[0.08]***		[0.08]**		[0.08]**		
Percent literate			-0.10	-0.10	-0.12	-0.12	-0.13	-0.13
			[0.02]***	[0.01]***	[0.02]***	[0.02]***	[0.02]***	[0.01]***
Change of ruler	0.66	0.67	0.4	0.4	0.56	0.56	-0.15	-0.18
	[0.31]**	[0.31]**	[0.32]	[0.32]	[0.36]	[0.37]	[0.29]	[0.26]
Log GDP per capita					1.12	1.14	1.12	0.74
					[0.73]	[0.73]	[0.53]**	[0.46]
Observations	1481	1481	1383	1383	1057	1057	1102	1102
Number of Countries	38	38	38	38	28	28	30	30

Robust standard errors are in brackets.

* significant at 10%; ** significant at 5%; *** significant at 1%

In the last two specifications we check the robustness of our results by replacing the dependent variable "expropriation occurred in country i in year t" with "expropriation occurred in country i in year t, $t-1$, or $t+1$" and with "expropriation occurred in country i in years $t-2$ to $t+2$". The results are similar.

3.4 Alternative explanations

The results above imply that even controlling for time-invariant country characteristics higher oil prices and poorer institutions increase the risk of expropriation. The fact that the magnitudes of

the effects are similar in pooled and fixed effects regressions suggests that the effect of institutions is similar across all the countries that have expropriated foreign oil companies. There is, however, an issue of reverse causality. It might well be the case that expropriations concentrate so much power in the hands of the rulers that institutions are undermined. There may also be a measurement bias issue. Even if expropriations do not influence the institutions per se, they may affect the outsiders' perception of institutions and lower the Polity IV XCONST and DEMOC scores. Both issues are hard to resolve with the data we have. We cannot distinguish between direct and reverse causality by studying the sequencing of events. Indeed, if expropriations are planned or discussed a year or two in advance, the measures of institutions may go down before the actual expropriation. Still, we believe that the reverse causality is unlikely to be the case. We use the XCONST and DEMOC variables, which are based on political procedures that are measured in a rather objective fashion and are not likely to change dramatically within a year or two (Marshall and Jaggers, 2006). Also, the anecdotal evidence in Yergin (1991) and Kobrin (1980, 1984) suggests that the causality does not go from expropriation to institutions.

There is a possibility that the relationship between expropriations and oil price can be spurious. There are several reasons why it may be the case. First, the sharp increase in oil prices and expropriations in the 1970s could be driven by the same political events – the Yom Kippur War and the West's support for Israel that was followed by an embargo introduced by the Middle-Eastern oil producing countries. The oil embargo resulted in a sharp increase in the price of oil and was supplemented by expropriations of foreign companies that belonged to countries that supported Israel. This argument does not imply that Arab countries had to expropriate to raise prices; the same outcome could be achieved through increasing taxes. Yet, to rule out this alternative explanation, we re-estimated all the regressions without years 1972-74; all the results remained similar. As an additional robustness check of the endogeneity of the price of oil to expropriations we conducted a simple Granger causality test. It turns out that expropriations do not Granger-cause expropriations:

$$\text{OilPriceShock}_t = -0.054 + 0.071 * \text{OilPriceShock}_{t-1} + 0.090 * \mathbf{1}\{\sum_i E_{it-1} > 0\} + \eta_t.$$

(the coefficients at both lagged oil price shock and lagged expropriations are not significant).

Another issue is that expropriations in 1970s were driven by a significant increase in the managerial and technical capabilities of oil-producing countries (see Kobrin, 1984). If an increase in countries' capabilities coincides with the increase in oil prices, the relationship between the likelihood of oil-producing companies' expropriations and oil price shocks might be spurious. We are trying to control for this explanation both through including human capital and GDP per capita;

our results in pooled and fixed effects regressions are robust to adding these controls.

Yet another alternative explanation is based on the state capture theory. As oil prices rise, the private owners of oil companies have higher rents, which increases their weight in the political process. Thus, expropriation might be caused by the desire to curb this influence (see a discussion in Rajan and Zingales, 2003). Again, this argument is not consistent once we take into account the possibility of raising taxes. If the government is strong enough to expropriate the private owners of the oil companies, it should also be capable of taxing their rents without a full expropriation. As the global oil price is observable and verifiable, taxing the oil revenues is certainly technically feasible.

4   Conclusions

Recent expropriations of foreign-owned oil assets in Venezuela, Bolivia, Russia, and Kazakhstan have generated renewed interest in the political economics of expropriations. Unlike the previous studies of expropriations in the 1970s, we now have much better panel data on socio-economic indicators and political institutions and can study the determinants of expropriation while controlling for country fixed effects. The data allow us to test the conventional wisdom that expropriations are more likely to happen in the periods of higher oil prices and in countries with poorer institutions.

We back this idea by considering a dynamic model with limited commitment on behalf of both government and the foreign oil company. In this model expropriations emerge in equilibrium when oil prices are high and political institutions are weak. We then take the model to the data and show that expropriations indeed occur when oil prices are high, when political institutions are weak and when human capital is low. These results hold even if we control for country fixed effects.

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Appendix A: Proofs.

Lemma 1. *The Bellman equations (4) and (7) imply (8).*

Proof. We shall first simplify (5). Let us calculate $V_G(\widetilde{K}; p_t)$. When $p_t \geq \widetilde{p}$ the government expropriates, its payoff equals $V_G(\widetilde{K}; p_t) = -C + U_{\exp} + p_t \widetilde{K}^\alpha$. When $p_t < \widetilde{p}$ the government does not expropriate, and $V_G(\widetilde{K}; p_t)$ can be computed using formula (4) and iteratively substituting $V_G(\widetilde{K}; p_{t+i})$ into it, where $i = 1, .., \infty$.

$$V_G(\widetilde{K}; p_t) = \frac{\widetilde{T} + \delta(1 - F(\widetilde{p}))[-C + U_{\exp}] + \delta \widetilde{K}^\alpha \int_{\widetilde{p}}^{\bar{p}} p f(p) dp}{1 - \delta F(\widetilde{p})}$$

Now it is easy to find the expected government payoff:

$$\mathbb{E}_t[V_G(\widetilde{K}; p_{t+1})] = \frac{\widetilde{T} F(\widetilde{p}) + [-C + U_{\exp}](1 - F(\widetilde{p})) + \widetilde{K}^\alpha \int_{\widetilde{p}}^{\bar{p}} p f(p) dp}{1 - \delta F(\widetilde{p})}.$$

Thus, the condition (5) can be rewritten as:

$$p_t \widetilde{K}^\alpha \leq \frac{-\widetilde{K} + \delta P \widetilde{K}^\alpha + [C - U_{\exp}](1 - \delta)}{1 - \delta F(\widetilde{p})}.$$

$\square$

Proof of Proposition 2:

Proof. (i) First, we prove that $\widetilde{K} < K^*$.

Assume that $\widetilde{K} \geq K^*$, then the constraint in the optimization problem (9) implies:

$$\widetilde{p}(1 - \delta F(\widetilde{p}))\widetilde{K}^\alpha = -\widetilde{K} + \delta P \widetilde{K}^\alpha + [C - U_{\exp}](1 - \delta).$$

Let us now prove that by decreasing $\widetilde{K}$ we can achieve a higher value of $\widetilde{p}\widetilde{K}^\alpha$. Indeed, the right-hand side does not decrease, since $\widetilde{K} \geq K^*$ and $\widetilde{p}$ increases.[6] Hence:

$$d\left[\widetilde{p}(1 - \delta F(\widetilde{p}))\widetilde{K}^\alpha\right] = -\delta f(\widetilde{p})\widetilde{p}\widetilde{K}^\alpha d\widetilde{p} + (1 - \delta F(\widetilde{p}))d\left[\widetilde{p}\widetilde{K}^\alpha\right] \geq 0,$$

i.e. $\widetilde{p}\widetilde{K}^\alpha$ in fact increases. Thus $\widetilde{K} \geq K^*$ cannot be the case.

(ii) Let us now prove that $\widetilde{K} \to K^*$ as $C \to \infty$

First of all, if $\bar{p} < \infty$, then when C is big enough, condition (3) holds; hence $\widetilde{K} = K^*$.

Let $\bar{p} = \infty$. Since the government nationalizes only if it is better than getting taxes, $\mathbb{E}_t[V_G(\widetilde{K}; p_t)] > \frac{\widetilde{T}}{1-\delta} = \frac{-\widetilde{K} + \delta \widetilde{K}^\alpha \int_{\widetilde{p}}^{\bar{p}} p f(p) dp}{1-\delta}$. On the other hand, this equilibrium is always worse

---

[6] If $\tilde{p}$ decreased it would contradict the assumption that $\tilde{K}$ was the solution of the optimization problem (9). Indeed, if we increased $\tilde{K}$, then $\tilde{p}$ would increase, and hence, $\tilde{p}\tilde{K}^\alpha$ would also increase.

than the first best, hence $\mathbb{E}_t[V_G(\widetilde{K}; p_t)] < \frac{-K^* + \delta P K^{*\alpha}}{1-\delta}$. From the equation (8) for $\tilde{p}$ it follows that $\widetilde{p} \to \infty$ as $C \to \infty$, if the government set $\widetilde{K} = K^*$ then $\mathbb{E}_t[V_G(K^*; p_t)] \to \frac{-K^* + \delta P K^{*\alpha}}{1-\delta}$. If the government sets $\widetilde{K} \neq K^*$, then expected government payoff would converge to a level strictly below the first best level. This completes the proof.

(iii) $\widetilde{K}$ and $\widetilde{p}$ increase in both C and γ.

Consider the optimization problem (9). Denote $y = \widetilde{K}^\alpha$ and $x = [C - U_{\exp}](1-\delta)$. We will study the comparative statics with regard to x and show that an increase in x results in higher y and $\widetilde{p}$.

Let us rewrite the optimization problem:

$$\max \widetilde{p} y$$

subject to

$$\frac{x}{y} = -\delta P + \widetilde{p}[1 - \delta F(\widetilde{p})] + y^{1/\alpha - 1} \tag{12}$$

The Lagrangian: $\max \widetilde{p} y + \lambda \frac{x}{y} + \lambda \delta P - \lambda \widetilde{p}[1 - \delta F(\widetilde{p})] - \lambda y^{1/\alpha - 1}$ implies the first-order conditions

$$
\begin{aligned}
\widetilde{p} - \lambda \frac{x}{y^2} - \lambda \frac{1-\alpha}{\alpha} y^{1/\alpha - 2} &= 0; \\
y - \lambda[1 - \delta F(\widetilde{p})] + \lambda \delta \widetilde{p} f(\widetilde{p}) &= 0.
\end{aligned}
$$

One can easily check that the second-order conditions are satisfied. Solving for λ, we find

$$\widetilde{p}[1 - \delta F(\widetilde{p})] - \delta \widetilde{p}^2 f(\widetilde{p}) = \frac{x}{y} + \frac{1-\alpha}{\alpha} y^{1/\alpha - 1}$$

Substituting $\widetilde{p}[1 - \delta F(\widetilde{p})] + y^{1/\alpha - 1} - \frac{x}{y} = \delta P$ from the constraint, we obtain

$$\delta P = \delta \widetilde{p}^2 f(\widetilde{p}) + \frac{1}{\alpha} y^{1/\alpha - 1}$$

As we assumed that $\widetilde{p}^2 f(\widetilde{p})$ decreases in $\widetilde{p}$, this equation determines an increasing relationship between y and $\widetilde{p}$.

Therefore, if x increases then either both y and $\widetilde{p}$ increase or both decrease. The latter cannot be the case as it contradicts the constraint (12). $\qquad \square$

Appendix B: Tables.

Table B1: List of expropriations, 1960–2002.

Year	Country	Year	Country	Year	Country	Year	Country
1971	Abu Dhabi⋆	1959	Cuba	1972	Iraq	1976	Nigeria
1972	Abu Dhabi⋆	1975	Dubai⋆	1972	Iraq	1979	Nigeria
1973	Abu Dhabi⋆	1969	Ecuador	1973	Iraq	1972	Oman
1974	Abu Dhabi⋆	1972	Ecuador	1975	Iraq	1974	Pakistan
1962	Algeria	1973	Ecuador	1977	Iraq	1968	Peru
1967	Algeria	1974	Ecuador	1972	Kuwait	1985	Peru
1970	Algeria	1976	Ecuador	1972	Kuwait	1973	Philippine
1971	Algeria	1977	Ecuador	1973	Kuwait	1972	Qatar
1974	Algeria	1979	Ecuador	1974	Kuwait	1974	Qatar
1976	Algeria	1961	Egypt	1975	Kuwait	1976	Qatar
1976	Angola	1962	Egypt	1977	Kuwait	1977	Qatar
1977	Angola	1964	Egypt	1969	Libya	1972	Saudi Arabia
1978	Angola	1975	Ethiopia	1970	Libya	1974	Saudi Arabia
1963	Argentina	1973	Gabon	1971	Libya	1975	Saudi Arabia
1974	Bahrain	1976	Gabon	1972	Libya	1976	Sudan
1977	Bahrain	1974	Ghana	1973	Libya	1969	Trinidad and Tobago
1979	Bahrain	1976	Guyana	1974	Libya	1974	Trinidad and Tobago
1975	Bangladesh	1975	India	1973	Malaysia	1979	Trinidad and Tobago
1969	Bolivia	1981	India	1975	Morocco	1981	Trinidad and Tobago
1962	Burma	1960	Indonesia	1976	Mozambique	1970	Uganda
1968	Cambodia	1965	Indonesia	1973	Nepal	1974	United Arab Emirates
1972	Colombia	1973	Iran	1971	Nigeria	1971	Venezuela
1974	Congo PR	1979	Iran	1973	Nigeria	1975	Venezuela
1975	Congo PR	1961	Iraq	1974	Nigeria	1969	Yemen
						1980	Zambia

⋆ Abu Dhabi and Dubai are emirates of the United Arab Emirates

Table B2: Ordered logit between-effects regressions.

	Number of expropriations in a country, 1960–2002						
Executive constraints	-0.17		-0.48			-0.22	
	[0.20]		[0.16]***			[0.17]	
Democracy		-0.13		-0.28			-0.15
		[0.12]		[0.09]***			[0.09]
Percent literate	-0.03	-0.03			-0.05	-0.04	-0.04
	[0.03]	[0.03]			[0.01]***	[0.01]***	[0.01]***
Log GDP per capita in 1965	-0.13	-0.11	-0.13				
	[0.47]	[0.47]	[0.47]				
Average log oil production	0.65	0.65	0.58	0.59	0.68	0.69	0.66
	[0.18]***	[0.18]***	[0.10]***	[0.10]***	[0.11]***	[0.11]***	[0.10]***
Logarithm of population	-0.45	-0.44	-0.25	-0.27	-0.36	-0.34	-0.31
	[0.35]	[0.35]	[0.20]	[0.20]	[0.17]**	[0.19]*	[0.20]*
Number of Countries	93	93	131	131	139	129	130

Robust standard errors are in brackets. Regional dummies are controlled for, but not reported.

* significant at 10%; ** significant at 5%; *** significant at 1%