

Appendix (Supplementary Information): A Signaling Model of Autocratic Expropriation

A simple signaling model demonstrates the existence of a pooling equilibrium, in which loyal dictators cannot differentiate themselves from unloyal ones due to the high costs of expropriation, and a separating equilibrium, in which as the costs of expropriation for a loyal dictator decline relative to the payoffs received from it, he expropriates the PE and thus distinguishes himself from an unloyal dictator. The game is visually depicted in Figure 1 below.

Consider a dynamic game played between a dictator D and his LO. Whether the dictator is an unloyal type $D^{\sim L}$ unwilling to share rents and rely solely on his LO for support in office or a loyal type D^L willing to turn against the PE is known to a dictator but not his LO. Common priors on Nature's actions, however, imply that the LO knows the likelihood μ that the dictator they put into power is an unloyal rather than a loyal type. Upon assuming office, the dictator can choose whether or not to expropriate the PE. If the LO observes the dictator choose not to expropriate the PE, it is in the first information set, whereas if the LO observes the dictator expropriate the PE, it is in the second information set.

The LO's beliefs are conditional on the distribution of nature's choice regarding the dictator's type, together with the belief that the LO holds about the strategy that the dictator is playing. The LO updates its beliefs about the dictator's type using Bayes' Rule. For example, suppose that the dictator is using a mixed strategy, where type L chooses not to expropriate ($\sim E$), with probability, σ^L and type $\sim L$ chooses to expropriate (E), with probability $\sigma^{\sim L}$. If both σ^L and $\sigma^{\sim L}$ are between 0 and 1, to find beliefs for the LO's information sets the LO performs the following calculation:

$$\mu_{\sim E} = p \sigma^L / \sigma^L + (1 - p) \sigma^{\sim L}$$

and

$$\mu_E = p(1 - \sigma^L) / (1 - \sigma^L) / p(1 - \sigma^L) + (1 - p)(1 - \sigma^{\sim L})$$

The payoffs from expropriation are as follows. If the dictator expropriates from the PE, he takes all their wealth and generates some level of rents $r \in [0,1]$ that is announced to the LO. A higher level of rents benefits D but is worse for LO. Let D's utility function be $u_D(r) = r$, and LO's utility function be $u_{LO}(r) = 1 - r$. If D chooses to expropriate, he also suffers a cost that corresponds to his type. An unloyal dictator has higher costs of expropriation than a loyal dictator since he does not want to solely rely on the LO, and both types have non-zero costs, so that $c_{-L} > c_L > 0$. Once D chooses his level of rents, LO may either accept or reject this offer. If LO accepts the offer from D^{-L} , it suffers an additional cost c_1 relative to the offer of D^L for living with an unloyal dictator. If LO rejects the offer of the dictator, then it mounts a coup with cost c that succeeds with probability p . If LO rejects the offer from D^L , it suffers an additional cost c_1 relative to its payoff for rejecting D^{-L} because it would prefer to live with a loyal dictator relative to an unloyal one.

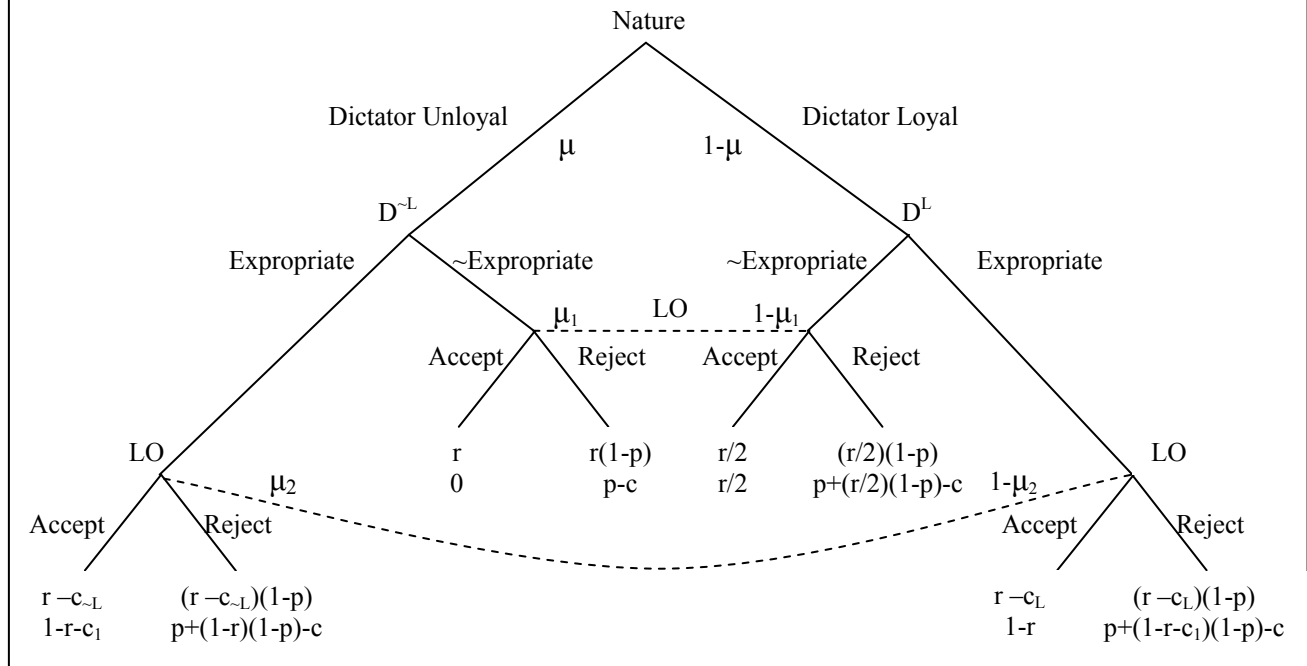
If the dictator does not expropriate the PE, he still extracts some rents from them, with the residual wealth remaining in the hands of the PE rather than redistributed to the LO. It is assumed, for simplicity, that the level of rents that D^{-L} chooses in the case of no expropriation is the same as that after expropriation, and that he shares nothing with LO. D^L , by contrast, shares these rents equally with LO. Once D chooses his level of rents, LO can accept or reject the offer. If LO rejects the offer, it again mounts a coup with cost c that succeeds with probability p . If LO wins, it allocates all the wealth to itself. But if it loses, it still gains the residual rents left from the dictator.

There are a number of possible equilibria that obtain for different ranges of the variables, but the existence of two particular equilibria are of interest. The first is a pooling perfect Bayesian equilibrium (PBE) in which both D^{-L} and D^L choose not to expropriate the PE. In this case, LO gains no information when D does not expropriate, and beliefs about the likelihood that D is unloyal, μ_1 , is equal to μ . If LO has off the equilibrium path beliefs μ_2 about the likelihood that D is unloyal if he expropriates such that $\mu_2 > [c + c_1 - p(c_1 + r)]/c_1$, and if the costs of an overthrow attempt satisfy

$c < p - [pr(1 - \mu)]/2$, then LO will reject the dictator's offer whether he chooses to expropriate or not. The cost constraint for $D^{\sim L}$ trivially implies that he will not want to deviate from this equilibrium. And when the costs of expropriation to D^L are sufficiently high, where $c_L > r/2$, then he too will not deviate. Finally, as the probability of coup success increases relative to the costs of expropriation, $D^{\sim L}$ can also be induced to expropriate, mimicking the behavior of the loyal dictators and negating the signaling value of expropriation.

The second equilibrium of interest is a separating PBE in which $D^{\sim L}$ chooses to not expropriate and D^L chooses to expropriate. In this equilibrium, the act of expropriation of the PE will enable the LO to discern that the dictator relies upon them rather than the PE for political support, so that $\mu_1 = 1$ and $\mu_2 = 0$. LO will reject the offer from $D^{\sim L}$ and accept the offer from D^L when $p > c > p(c_1 + r) - c_1$. $D^{\sim L}$ will not want to deviate from this equilibrium when his costs of expropriation are sufficiently high such that $c_{\sim L} > rp$, and D^L will not deviate provided that his costs of expropriation remain sufficiently low, where $c_L < (r/2)(1 - p)$.

Figure 1. Model of Expropriation Choices for Dictators



Appendix (Supplementary Information). Codebook for *If You're Against Them You're With Us: The Effect Of Expropriation On Autocratic Survival*

I. MEASURES OF EXPROPRIATION

1. LAND EXPROPRIATION

For most years we found the exact quantity of land expropriated, and therefore the measure varies by year for those years. But in some cases we only knew how much was redistributed over a certain leader's tenure or for the span of a few years. Absent information about the program increasing or decreasing in intensity over time, we divided the full amount of redistribution over that leader's tenure. This was not an issue in constructing the dummy variable for large-scale land expropriation (>3% of cultivable land in a given leader year), since it was clear in all cases whether or not a given leader's land expropriation exceeded this threshold.

Based on the literature on land reform, for Ecuador we only coded land redistribution until 1990 because we are unsure about whether there is land redistribution after 1990. We coded zeroes for Bolivia, Brazil, Peru, Chile, Argentina, Colombia, Venezuela, and Uruguay from 1990 to 2000. These years may have witnessed negligible rates of land reform in some instances.

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Cases of Land Reform in Latin America, 1950-2002

Country	Land reform years under democracy	Amount redistributed (ha)	Land reform years under autocracy	Amount redistributed (ha)	Cultivable land area (ha)	Notes
Argentina	1951	50,280	-	-	177 million	Most land transfers 1951-90 through markets
Bolivia	1979, 1982	635,842	1955-78, 1980-81	30,708,452	26 million	Most under Decree 3464 of 1953 (Paz Estenssoro)
Brazil	1979-90	8,959,637	1964-78	9,052,745	49 million	Significant colonization of state-owned land
Chile	1952, 1956, 1959-63, 1965-73	10,658,353	1973-81	2,965,638	5.1 million	Most under Law 16.640 of 1967 (Frei)
Colombia	1963, 1965-84	59,629	-	-	16.2 million	Most land transfers 1951-90 bought by or ceded to government rather than expropriated. Also titling of uncultivated lands.
Costa Rica	1963-66, 1968-90	170,207	-	-	3.4 million	Mostly colonized public land or purchased land 1951-90
Cuba	-	-	1959-63	8,066,507	6.7 million	Most under 1959 Agrarian Reform Law (Castro)
Dominican Republic	1966-90	294,657	1951-64	313,997	2.6 million	Most under Decree 6988 of 1961 (Balaguer) and 1972 Agrarian Laws (Balaguer)
Ecuador	1979-90	428,436	1964-78	467,836	10.5 million	Significant colonization of state-owned land
El Salvador	1984-90	15,884	1980-83	265,508	1 million	Most under 1980 Agrarian Reform Law (Duarte)
Guatemala	1953-4	603,615	1954-5	601,200	2.9 million	Law 900 of 1952 (Arbenz) reversed by Law 31 of 1954 (Castillo Armas)
Honduras	1962, 1971, 1982-90	112,021	1963-70, 1972-81	291,003	2.8 million	Most under Decree 8 of 1972 (López)
Mexico	-	-	1951-90	53,743,531	35 million	Greatest intensity under Díaz Ordaz (1964-70)
Nicaragua	1984-90	356,317	1979-83	936,015	1.3 million	Initial expropriations from Somoza and associates 63% of cultivable land.
Panama	1964-7	111,112	1968-90	386,277	1.7 million	
Paraguay	-	-	1963, 1965-6	28,251	24 million	Stroessner distributed some land to military also, but this was small. Massive titling program.
Peru	1964-68, 1980-1	761,829	1968-80	7,889,008	7.6 million	Early efforts by Belaúnde outpaced by 1969 Agrarian Reform Law (Velasco)
Uruguay	1951-56	94,896	-	-	4 million	
Venezuela	1961-83	429,831	-	-	11 million	Most land transferred 1951-90 purchased by state

Note: Land reform here refers only to expropriated private property. Some of the years not included may have witnessed negligibly small expropriations. Data are missing for 63 country years; they are interpolated where possible (15 country years) and extended to the first or last year of the period using the most proximate observation otherwise (43 country years).

2. RESOURCE EXPROPRIATION

For resource expropriations, we code whether expropriation acts occur. Therefore, after an initial expropriation, there can be more expropriations. There can either be privatization after initial nationalization only to be followed by re-nationalization again – as in Bolivia. Or, more likely, there is the expropriation of one firm and years later other firms follow. This is because we coded firm expropriations. That is, if Standard oil was expropriated in 1952, it gets a 1, and if Shell was expropriated in 1953, it gets coded as a 1 again. Finally if oil starts out state-owned, there can still be concessions to foreign firms to explore and to produce oil and they can later be expropriated, such as Argentina.

Unless otherwise indicated, the episodes of oil firm expropriations are from Korbin's multiple datasets on the expropriation of transnational corporations (several years).

To provide a historical perspective, below we also outline several expropriations before 1950, although they were not included in the data analysis.

Sources for Oil Expropriation

For pre-1950 this is from the authors' own research and is listed below.

For 1960 to 2006, this is from Guriev, Sergei, Anton Kolotilin, and Constantin Sonin. 2009. Determinants of Nationalization in the Oil Sector.

Sources for Mineral Expropriation

For the entire panel, this is from authors' own research and is listed below.

Mining expropriations

Dominican Republic

The government expropriates Bauxite in 1974 (Duncan 2006)

Mexico:

The government expropriates sulfur mining in 1967 (Del Duca 2003).

Brazil:

Goulart in 1962 Hanna Mines expropriated (Rossen 1971: 309)

Peru:

- Velasco Alvarado, 1973, expropriated Branch of Standard Oil of California; also Cerro de Pasco Copper company was expropriated in 1973 (See Sigmund 1980).
- Velasco Alvarado, 1975, expropriated both Gulf Oil Subsidiary and Marcona Iron Mines (see Sigmund 1980).

Bolivia:

- Paz Estenssoro in 1952 nationalizes the tin mines (Morales 2003: 145).
- Copper and Gold (Matilda) mines owned by US are nationalized in 1971 by Torres (see Baklanoff 1975: 3)

Chile:

- We attributed the first expropriation to Eduardo Frei in 1970 according to Lasaga 1981: 17-18.
- We attributed the second and complete expropriation to Salvador Allende according to Oppenheim 1993: 56.

Oil expropriations

To provide a historical perspective, below we also outline several expropriations before 1950, although they were not included in the data analysis.

Notes on pre-1950 expropriations:

- Peru: violation of terms of contract (Imperial Oil Company) by Pardo in 1918
- Mexico: Full nationalization of oil under Cardenas in 1938
- Bolivia 1937: nationalization by David Toro of Standard Oil (Ingram 1974: 361).

Cases that do NOT count as expropriations

Argentina creates a national oil company in 1910. But they do not nationalize any private oil producers in doing so because the government was the first entity to discover oil—there were no private firms operating at the time. Argentine states allow private companies to drill with no problem.

The same is true of Brazil, which creates a national oil company to explore and produce in 1953.

The end of an oil production concession to a private company that is not renewed by the state does not count as expropriation, so Colombia's decision to nationalize in 1951 does not count (see Wirth 1985).

Chile's oil nationalization in 1927 *preceded* any assets from being deployed by private companies. The companies lost expenditures related to exploration, but nothing else, so this does not therefore count as an expropriation (see Odell 1964).

Expropriations: adjudicating between leaders

Argentina:

We attributed expropriation of standard oil assets to Illia in 1963 according to "La Fogata Digital": http://www.lafogata.org/04arg/arg5/ar_recur1.htm

Bolivia:

- We attribute expropriation of tin mines to Paz Estenssoro in 1952 according to Morales 2003: 145.
- We attribute expropriation of oil to Obando Candia in 1969 according to Chang et al. 2009

Ecuador:

- We attribute oil expropriation to Rodriguez Lara in 1972 and not to Velasco Ibarra (Guillaume Fontaine. 2004. *Petroleo y Desarrollo Sostenible en Ecuador*, p. 50).
- We attributed the oil expropriation of 1979 to Roldos Aguilera and not to Poveda Burbano because it was Poveda's first year in power and he was the first democratically elected leader after democratization, whereas Aguilera was the last leader of a military regime that was leftist and redistributionist.

Peru:

- We attribute oil expropriation to Velasco in 1968 and not Belaunde because Velasco and the left-wing military contingent that took power in that year did so with the express purpose of nationalizing several industries, first and foremost the oil sector.
- We attribute oil expropriation to Alan Garcia in 1982 and not to Belaunde because Garcia was a populist and Belaunde was conservative and pro-business.

3. BANK EXPROPRIATION

CUBA

Three banks are expropriated by Castro in 1960 (Sigmund 1980: 36).

Who owned them?

Castro expropriated both domestic and foreign banks, in separate acts, both in 1960:

<http://lanic.utexas.edu/la/cb/cuba/asce/cuba4/shelton.html>

"After 1958, with the Castro regime, the commercial banking system of Cuba ceased to exist. The 1960 Bank Nationalization Law was issued by the regime. Promulgated on June 1, 1960, Law 851 authorized the executive branch to expropriate all business enterprises, including banks belonging to citizens of the United States. On September 17, 1960, the Cuban government confiscated all the branches of the National City Bank of New York, Chase National Bank and the Bank of Boston. This was followed on October 13 by Law 891 which nationalized all Cuban-owned banks on the island. The Bank of Nova Scotia and the Royal Bank of Canada were the only banks able to make special mutually acceptable compensatory arrangements with the Castro Government before their Cuban operations were closed in December 1960. "

MEXICO

Several banks are expropriated in 1916. (Noel Maurer, *the Power and the Money*).

Who owned them?

A mix of foreign and domestic owners.

1982, Lopez Portillo expropriates (Haber et al. 2008)

Who owned them?

All of them were national banks (Haber et al. 2008)

EL SALVADOR

Since 1980 the entire Salvadoran banking system has been owned and operated by the government. Some of the more important "banks" included the Investment and Savings Bank, the Credit and Savings Bank, the Commercial Farm Bank, and the Popular Credit Bank. The Salvadoran Coffee Company and the Salvadoran Cotton Cooperative also provided seasonal credit to their members. Their activities were not financed by deposits, but rather by loans from foreign banks (mostly United States institutions). See Country Studies, US State Department.

Expropriation by Duarte

Who owned them?

They were all domestic banks (Paige 1993: 10).

Nicaragua

El 17 de septiembre de 1980, después de que habían pasado a ser propiedad del Estado los bancos, mediante Decreto No. 527 se promulgó la ley de Absorción de Instituciones Financieras por el Banco Nicaragüense. En el artículo primero de esta Ley se establece que el BANIC será sucesor legal sin solución de continuidad de todos los bienes, derechos adquiridos y obligaciones legalmente contraídas por las siguientes instituciones del Sistema Financiero Nacional.

Who owned them?

These were national banks (Sholk 1984).

Expropriation by Ortega

Costa Rica

1953: Banking expropriation

Ley Orgánica del Banco Central de Costa Rica y sus reformas, No. 1552, del 23 de abril de 1953.")

Artículo 2º- Exprópiense por motivos de utilidad pública, las acciones del Banco de Costa Rica, del Banco Anglo Costarricense y del Crédito Agrícola de Cartago. El Estado, por medio del Ministerio de Economía, tomará posesión inmediatamente de esas instituciones bancarias. La forma y condiciones de pago de las acciones expropiadas serán reglamentadas por un decreto posterior.

Who owned them?

A mix of foreign and domestic banks.

Colombia

Lopez Michelsen in 1976: According to Sigmund 1980: 39, Citibank is forced to sell 51% interest to the government.

Colombian Nationalizations that we do not count:

Those that took place in the early 1980s after a severe recession in Colombia induced a share rise in loan defaults. These nationalizations were due to a financial crisis that rendered several banks insolvent

PERU

Nationalization of "Banco Popular" on June 12 1970. It was owned by the Prados, an elite family that got undercut by Velasco after helping finance his coup. Gilbert (1977, 261). Also, according to Sigmund 1980: 37, Chase Manhattan Bank shares in a Peruvian Bank are expropriated.

Who owned them?

The expropriation was both domestic and foreign.

Failed attempt at expropriation

(We do not code this as an expropriation, only note it.) In 1987 the García government attempted to nationalize Peru's banks, financial institutions, and insurance companies. Under the legislation, which Congress approved despite a judicial ruling against the government's proposals, the government was to hold 70 percent of shares of nationalized banks, with the remaining 30 percent offered for sale to the public. The legislation excluded foreign banks operating in Peru from the nationalization program but prohibited them from opening any new branches in Peru. This set of proposals stimulated

widespread public opposition and provoked a breakdown of cooperation between business leaders and the government. Private investment fell abruptly. García attempted to pursue the nationalization despite all the opposition, but adverse judicial rulings slowed implementation and finally killed the proposals.

Chile

Allende, 1971: According to Sigmund 1980: 38, Bank of America & First Natl. Bank are expropriated (law number 13305).

Who owned them?

This is coded as both foreign and domestic expropriated.

BRAZIL

In 1944 the state of Minas Gerais expropriated a French-owned bank (Rossen 1972: 857).

ARGENTINA

In 1973 Isabella Peron expropriates 5 foreign banks, including Chase Manhattan. Law No. 20.522 (Rossen 1974)

II. INDEPENDENT VARIABLES

1. Gross Domestic Product Per Capita

We measure real gross domestic product per capita on an annual basis for each country in our dataset in International Dollars in 2000 constant prices.

Sources and Procedures:

Our goal was to create consistent time series of real gross domestic product per capita with the greatest coverage possible for each country in our dataset. We drew on several sources in order to construct this measure:

- A. The Penn World Tables (Version 6.2), hereafter PWT.
- B. Angus Maddison, *The World Economy: Historical Statistics* (March 2009 version), hereafter Maddison.
- C. Robert Barro and Jose Ursua, "Macroeconomic Crises since 1870," *Brookings Papers on Economic Activity*, Spring 2008. The dataset to this paper is available at: http://www.economics.harvard.edu/faculty/barro/data_sets_barro. Hereafter cited as Barro and Ursua.
- D. World Bank, World Development Indicators Online, hereafter cited as (WBDI).

The reason we pull data from multiple sources is that no one dataset was able to maximize coverage on its own. We used the source of GDP data according to the following rule: Choose the one source of GDP per capita data that maximizes coverage in first-differences for each country. If coverage is equal the preference order is: PWT, WBDI, Barro and Ursua, and finally Maddison.

2. Total Income from Resources Per Capita

We take this variable from Haber and Menaldo (2009), who develop a measure of Total Resource Income Per Capita that is composed of Total Fuel Income Per Capita plus Total Metals Income Per Capita, in 2007 dollars. This measure is based on a measure often used in resource curse research, the Hamilton and Clemens Mineral Depletion variable (see Kirk Hamilton and Michael Clemens, "Genuine Savings Rates in Developing Countries," *World Bank Economic Review* (1999) 13: 333-56). Their measure differs from Hamilton and Clemens (as well as the researchers who use their measure) in three respects. First, they estimate our measures back to 1950, while the Hamilton and Clemens measure only goes back to 1971. Second, the Hamilton and Clemens measure includes non-metallic minerals (e.g. Gypsum), which we do not include because the rents from these minerals are quite small. Third, the Hamilton and Clemens measure subtracts out the imputed costs of production and the normal rate of return on capital.

3. Civil Wars

We code the incidence of civil war for each country-year as a dichotomous indicator variable that takes on the value 1 if a country is observed as having at least one intra-state conflict with at least 1,000 battle deaths in a given year and 0 otherwise.

Kristian Skrede Gleditsch, "A Revised List of Wars within and between States", *International Interactions* 30-3 (2004), pp. 231-262 provides a list of intra-state wars from 1816-2005. We transformed the original datasets from a list of civil wars, participants, starting dates, and ending dates to a country-year panel by coding the participant undergoing intra-state war as the country experiencing civil war for each year between the starting date and ending date.