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RULING ELITES' ROTATION AND ASSET OWNERSHIP: IMPLICATIONS FOR PROPERTY RIGHTS[c]

Abstract

We provide a theory and empirical evidence showing that the rotation of ruling elites in combination with elites' asset ownership could improve property rights protection, and that such association holds for non-democratic political regimes when it is based on elites' concerns about security of their own property rights in the event they lose power. Such incentives provide a solution to the credible commitment problem in maintaining secure property rights when institutional restrictions on expropriation are weak or absent.

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Introduction

Twenty years ago Mancur Olson (1993) proposed his famous "stationary bandit" metaphor to argue that an authoritarian ruler with a firm grip on power has a stake in private sector development and hence the incentives to invest in public goods, including secure property rights and contract enforcement. Indeed, such pubic goods expand the tax base, and if an increase in tax yield accrues over a sufficiently long period of time, it would recoup the investments into public goods (in the case of property rights – forgone short-term gains from expropriated property and repudiated contracts). Put differently, a long tenure moderates short-term greed and makes the commitment of a "stationary bandit" to secure property rights credible. This credibility is based on the ruler's reputation with investors, which in the spirit of the Folk Theorem becomes a valuable asset worth preserving by self-restraint (Besley, Ghatak, 2010).

The above logic leads to a testable hypothesis that stable autocracies should offer better protection of property rights and hence more enabling conditions for economic development than unstable ones. This hypothesis finds a degree of support in the empirical evidence indicating that political instability, measured by the incidence of government change, adversely affects economic growth (Alesina et al., 1996; Aisen, Veiga, 2013). Such evidence however is inconclusive – alternative estimations show that economically successful autocracies have higher leadership turnover than unsuccessful ones (Besley, Kudomatsu, 2008). Furthermore negative association between political instability and growth reflects inter alia losses and disruptions of violent government collapse brought about by coups and revolutions, as well as policy volatility and uncertainty (shown to adversely affect growth – see e.g. Fatás, Mihov, 2013), caused by nearly any government change. Hence a negative correlation between political instability and growth does not answer the question as to whether longer tenure in and of itself creates incentives for better economic policies while a regime is still in control. A more straightforward empirical test would involve direct measures of institutional quality, including property rights protection. Such tests do not support the "stationary bandit" conjecture: regimes with longer tenure tend to have less secure property rights (Besley, Ghatak, 2010).

McGuire and Olson (1996) point out to another factor that could potentially improve policies and institutions supplied by an autocratic regime, i.e. asset ownership by the ruling class. In such case the latter has two sources of income – (i) appropriated tax revenues and (ii) profit generated by the owned assets (rent income and market income, respectively; see Bourguignon and Verdier, 2012). As any other private owner, an autocrat turned businessman benefits from market-supporting institutions, including secure property rights, moderate taxes and other ingredients of

an enabling investment climate. This short-cut to the private sector is a potential substitute for democratic accountability, further aligning incentives of an asset-owning autocrat with the needs of the society at large. Such incentives could be quite powerful – sometimes even a relatively small share of the economy's assets owned by an autocrat ensures full social optimality of his policies (McGuire, Olson, 1996).

This optimistic view is however conditional on an important caveat – it implicitly assumes that the ruling class is subjected to the same rules and requirements as the rest of the private sector. In real-life autocracies this "equal treatment" assumption is routinely violated: rulers and their cronies enjoy various privileges, easily resolve in their favour economic disputes and otherwise benefit from the principle "For my friends – anything, for my enemies – the law"[1]. Without the equal treatment condition the outlook of an asset-owning autocracy is much bleaker (Acemoglu, 2006; Polishchuk, 2012).

In this paper we provide theoretical and empirical evidence that rotation of ruling elites under certain conditions improves the protection of property rights. Less than fully stable autocracies are not destined to degenerate into "roving bandits" (Olson, 1993) – they might still have the incentives to maintain secure property rights (e.g. by preserving independent judiciary) that they would need themselves in the event of losing power, when the present rulers are subjected to the same treatment as everyone else outside of the ruling circle. The strength of such concerns clearly depends on the size of assets owned by the political elites - such assets would require protection once their owners are out of power. Hence we should expect that asset ownership is another factor which increases the propensity of ruling elites to maintain secure property rights as an institutional insurance against expropriation after a power change. Without asset ownership by elites, political instability does not moderate a "roving bandit". Vice versa even massive asset ownership by a "stationary bandit" is unlikely to ensure universal protection of property rights. This leads to the conjecture that a combination of two factors – ruling elites' rotation and asset ownership – contributes to secure property rights.

Our argument does not assume democratic accountability of government – in fact in mature democracies with firmly entrenched rule of law the quality of property rights protection is not necessarily related to the degree of political competition. The above effect should be expected to be more pronounced among imperfect democracies and autocracies where property rights are endogenous and more or less in the hands of the ruling class. The essence of our argument is the elites' direct self-interest in secure property rights. Usually self-interest is a weak incentive

[1] Attributed to the Brazilian President Getulio Vargas. In the terminology of Acemoglu and Robinson (2012), non-inclusive (i.e. non-democratic) political institutions usually entail non-inclusive (discriminatory) economic institutions and policies.

for the provision of public goods (including property rights), given the small size (measure zero) of the elites in the society. Small elite groups would be better-off by simply expropriating the resources required for public goods provision (Lizzeri, Persico, 2004). This explains elites' usual preference for rent-extracting, rather than inclusive, institutions (Acemoglu, Robison, 2012), and their aversion to curbing expropriation and corruption (Besley, Persson, 2011). However what matters in the case of property rights is not the relative size of the elites, but the size of their assets, which could create sufficiently powerful incentives for the provision of this particular kind of public good even under a deficit of democratic accountability. This hypothesis is consistent with the logic of McGuire and Olson (1996), except that it requires a less-than-stationary "bandit".

Our main contributions to the literature are in establishing, theoretically and empirically, a joint impact of elites' rotation and asset ownership on institutional quality, and by focusing on property rights protection, as opposed to some other institutional quality measures, such as checks and balances (Besley et al., 2012) and corruption prevention (Campante et al., 2009).

The rest of the paper is organized as follows. In the next section we review the modern literature on the impact of ruling elites' rotation and asset ownership on institutions and public policies. A theoretical model presented next confirms that elites' turnover and asset ownership are indeed factors jointly contributing to secured property rights. In the empirical part of the paper we describe cross-country panel data used for empirical verification of our claims. Estimation results are presented next and they agree with the theory's predictions and pass endogeneity and robustness tests.

Rotation and asset ownership by political elites

Chicago school of political economy stresses the importance of political competition for the quality of institutions and public policies (Wittman, 1995) – to win votes, politicians have to supply public goods that the society needs. Empirical evidence however is mixed: there are incidences of both beneficial (Besley, Persson, Sturm, 2010) and adverse (Lizzeri, Persico, 2005) impact of political competition on institutional quality. Besides, political competition in democracies does not necessarily entail frequent power changes – in fact the opportunity to seek re-election and stay in power is a key driver of democratic performance (Ferejohn, 1986).

In the case of autocracies and "democracies with adjectives" (Collier, Levitsky, 1997) the conventional accountability of political elites to society is absent or weakened, and the link, if any, between government turnover and institutional performance should be based on other mechanisms. The above mentioned "stationary bandit" concept emphasizes the increased attractiveness of good

institutions and policies over a long period of time. The endogenous property rights theory echoes this logic: long tenure of a regime makes the commitment to secure property rights credible as long as private investors have an exit option that could be used as a trigger strategy played against the regime once its promises are broken. Low government turnover reduces the political discount rate, which makes property rights protection incentive-compatible (Besley, Ghatak, 2010).

Another reason to expect better institutional performance from firmly established autocracies is the regime's ability to tolerate moderate political turbulence caused by economic modernization, and hence discard controllable political risks associated with efficiency-enhancing reforms. However according to Acemoglu and Robinson (2006), the impact of regime stability is non-monotonic – both highly stable and very unstable polities have a higher propensity to modernize their economies than those in the interim range of political (in)stability. Campante et al. (2009) describe a U-shaped relationship of the opposite nature, when higher corruption is observed for high and low levels of elites' rotation, with less corruption in the intermediate range. These are indications that the validity of the "stationary bandit" theory is far from universal.

A recent stream of research suggests that elites' rotation in autocracies could actually improve institutions. Besley and Kudomatsu (2008) explain such contrarian effect by interpreting higher government turnover as evidence of greater accountability of autocratic rulers to their selectorates (De Mesquita et al., 2003) – groups in the society that hold key to power and can replace poorly performing leaders. This logic essentially reproduces the Chicago school dictum, except that selectorates could be much smaller than the society at large. Hellman (1998) observes that a quick succession of governments facilitated the transition to market democracies in former communist countries and prevented capture of reforms by vested interests.

Other authors put an emphasis on what is essentially the famous Aristotle's formula "to govern and be governed in turn"[2]. Elites' rotation makes today's rulers concerned about their well-being after losing power and the privileges and protection that it confers. The prospect of being like everyone else and exposed to the institutions available to the general public outside of the ruling circle creates an incentive to maintain such institutions functional even at a substantial cost to the rulers. Such incentives could also motivate political reforms that expand voting rights and hence increase the provision of public goods (Lizzeri, Persico, 2004) or impose checks and balances to make institutions more cohesive and restrict expropriation by the elite group in power (Besley, Persson, 2011; Besley et al., 2012). Acemoglu et al. (2011) arrive to a similar conclusion: more frequent rotation of ruling elites reduces political distortions in the economy and expands the set of sustainable (i.e. achievable given the elites' incentives) first-best allocations. Bourguignon and

[2] Aristotle. The Politics // Chicago: University of Chicago Press. 1984, Vol. 6, part III, 1317

Verdier (2012) demonstrate that government rotation makes ruling elites less willing to invest in the fiscal capacity of the state (which could be turned against them down the road), and conjecture that the same logic could motivate the elites to strengthen the rule of law.

It is useful to contrast the above logic with the "stationary bandit" theory, where the ruler benefits from good institutions while he is in power, and hence government turnover weakens the incentives to improve institutions. In the present case good institutions restrain the ruler and make him worse-off while he is in power, but benefit him afterwards and hence government turnover strengthens the incentive to improve institutions. Notice that such link between political instability and better institutions does not necessarily involve democratization, as in Acemoglu and Robinson (2006) or Lizzeri and Persico (2004) – in fact, Besley et al. (2012) find that instability caused by exogenous shocks (death or serious illness of the ruler) strengthens constraints on the executive, but causes no systematic expansion of voting rights.

Incentives of the ruling group to maintain good institutions for future use require institutional continuity so that decisions of today's ruler who has the discretion to shape institutions will still have an impact tomorrow when institutions are not any longer under his control. One possibility of such path-dependency is that institutions are sticky and hence today's institutional decisions (such as checks and balances, independent courts etc.) will be binding tomorrow. This logic is implicit in the assumption that institutional decisions are made for the next period, perhaps because it takes time to alter institutions (Besley, Persson, 2011; Besley et al., 2012). Alternately institutions can be sustained as equilibria transcending government changes. Such equilibria implement a Political Coase Theorem (Acemoglu, 2003) and could take form of elites' settlements (Burton, Higley, 1987) or elite pacts – "explicit …agreement(s) among a select set of actors which seek to define …rules governing the exercise of power on the basis of mutual guarantees for the 'vital interests'" (O'Donnell, Schmitter, 1990, p. 37). Similarly to market-supporting institutions expected from a "stationary bandit", such equilibria institutions are also credible commitments, this time of the whole elite class, with their own trigger strategies to prevent defection. In the present case such strategies are played not by private sector agents against the (incumbent) government, but by successor governments who would punish a defector once he loses power, and would deny him the institutional protection that he himself previously broke. The most severe punishment is a grim trigger when any deviation leads to a complete collapse of cooperation thereafter (Dixit, Grossman, Gul, 2000).

Credible commitment is often considered as an outcome of checks and balances (see e.g. Keefer, Stasavage, 2002). Government rotation could be viewed as a dynamic version of checks and balances, as it creates mutual dependence of elite groups similar to the conventional static

version - hence political uncertainty makes up for a lack of veto points in ensuring inter-elites co-operation (De Figueiredo, 2002). Both the static and dynamic versions break a political monopoly, but unlike the conventional checks and balances, government turnover is also feasible and observed in autocracies. A commitment to secure property rights of different elite groups is an example of an endogenous "rule of law for elites", which is a doorstep condition for establishing an open access order with universally available market-supporting institutions, including property rights (North, Wallis, Webb, 2012).

Our hypothesis presented in the introductory section highlights elites' asset ownership as another factor contributing to property rights protection. The conventional wisdom is that economic inequality (increased by massive asset ownership by the elites) adversely affects the quality of institutions and public policies (Keefer, Knack, 2000; Chong, Gradstein, 2007). In democracies concentration of wealth leads to excessive re-distribution (Meltzer, Richard, 1981), whereas in autocracies political and economic inequalities are correlated and feed upon each other (Acemoglu, Robinson, 2012) and the elites opt for extracting institutions better serving their economic interests (Acemoglu, Robinson, 2009). Wealth creates the economy of scale advantages in rent-seeking (Polishchuk, 2013; see also Murphy, Shleifer, Vishny, 1993), and as a result wealthier agents oppose competition and market development (De Soto, 2000; Rajan and Zingales, 2003) and secured property rights (Polishchuk, Savvateev, 2004).

However McGuire and Olson (1996) find a bright side of elites' asset ownership – the latter makes the elites to better appreciate public production inputs that enhance the returns to their privately held factors of production. While choosing the level of property rights protection that best serves their interests, elites face a trade-off between maintaining market-supporting institutions (which they value as asset owners) and rent extraction (which they value as the rulers). The relative strength of the first of these two conflicting motives increases in the size of the elites' assets, suggesting a positive link between the ownership of market assets and protection of property rights.

This link however is not particularly robust. Suppose for example that assets of elites and of the rest of society are located in non-overlapping sectors of economy which require different types of public production inputs[3]. In such case, according to Polishchuk (2013), elites' asset ownership indeed increases the supply of public production inputs that support the sectors where the elites have their assets, but reduces the supply of public production inputs required elsewhere in the economy. These under-provided inputs could include secure property rights, especially when elite's assets are

[3] Acemoglu and Robinson (2008) similarly assume that elite and non-elite take utility in different types of public goods. See also Bourguignon, Verdier, 2012, on how the type of assets owned by the elites affects institutions and economic policies.

in resource industries, which are less sensitive to the quality of general purpose institutions, and the above distortions lead to an institutional resource curse (Mehlum, Moene, Torvik, 2006). In the same vein, ruling elites who are business owners might have the incentive to manipulate factor prices (e.g. suppress wages) to serve their commercial interests (Acemoglu, 2006).

Finally, as it was mentioned earlier, McGuire and Olson's logic implicitly assumes the "equal treatment" principle which is unlikely to be honoured by a "stationary bandit". Rotation of ruling elites is a proxy for equal treatment, and as the model presented in the next section demonstrates, it restores the validity of McGuire and Olson's insight.

The model

Our assumptions and model setup are similar to Besley and Persson (2011), and Besley et al. (2012). There are n elite groups, which replace each other in power in periods $t \in \mathbb{N}_0$. Power shifts occur as follows. Each period t could be politically stable with a given probability $(1-\pi_0)$ and politically unstable with the residual probability π_0. In the former case the incumbent group's grip on power remains unchallenged and safely continues into the next period $t+1$. In the case of instability the ruling group is denied the incumbency advantage and has to compete with other $n-1$ groups on an equal footing to keep power in the period $t+1$; each group wins such contest with the same probability $1/n$. I Therefore the effective probability of losing power, or ruling elites' rotation rate, is $\pi \equiv \pi_0 \left[(n-1)/n\right]$. The stock of production assets in the economy, normalized to unity, is owned by the elites and non-elite agents; the share of assets owned by the i-th elite group equals $w_i \geq 0$, $\sum_{j=1}^{n} w_j \leq 1$. A unit of production assets generates one unit of returns per period.

The quality of property rights protection in period t is measured by the share $\alpha = \alpha_t \in [0,1]$ of the income generated by assets that asset owners can keep; the balance of the assets' returns is expropriated by the ruling elite group $i \in \{1,\ldots,n\}$ (elite groups $j \neq i$ which are not in power are also victims of such expropriation). Hence the consumption of the group i in period t equals $w_i + (1-\alpha_t)(1-w_i)$, while for all other groups their consumption in the same period is $\alpha_t w_j$ (there are no savings and investments in the model). All groups have the same neoclassical one-period utility function $U(z)$ (for simplicity we assume that groups $i \in \{1,\ldots,n\}$ are of equal size). Discount coefficient equals λ.

There is no political accountability of elites to the society, and their institutional choices are driven entirely by their self-interest. We use two setups to model such choices. In the first one, as in Besley et al. (2012) the incumbent elite group in period t sets institutions for the next period by selecting α_{t+1}; this choice is binding even if this group is not in power in period $(t+1)$

(such assumption reflects persistence of institutions). In this version of the model an institutional trajectory obtains as a subgame perfect equilibrium. In the second setup all elite groups under the "veil of ignorance" jointly select the same level of property rights protection α that they commit to maintain under an "elite pact" (see also Besley and Persson, 2011) for all $t \in \mathbb{N}_0$. We present both versions which lead to similar comparative statics results.

Equilibrium property rights

Due to the one-shot deviation principle (Fudenberg, Tirole, 1991), a set of strategies forms a subgame perfect Nash equilibrium if and only if no agent can increase her payoff by deviating from her strategy for one period of time and reverting back to it thereafter. The institutional choice α_{t+1} of the elite group that holds power in period t is obviously independent of the current period's property rights protection α_t (recall that the probability of losing power is exogenously given and not affected by the incumbent government's policies; see also Besley et al., 2012). Therefore a deviation α from the incumbent's choice α_{t+1} in period t would only affect the portion of this group's expected payoff that accrues in period $(t+1)$. This portion equals

$$(1-\pi)U(w_i + (1-\alpha)(1-w_i)) + \pi U(\alpha w_i),$$

and therefore the choice $\alpha = \alpha_{t+1}$ of the elite's group with wealth $w = w_i$ can be found from the following optimization problem

$$\max_{\alpha \in [0,1]} \big[(1-\pi)U(w + (1-\alpha)(1-w)) + \pi U(\alpha w)\big]. \tag{1}$$

Comparative statics analysis of the optimal solution $\alpha^* = \alpha^*(\pi, w)$ is as follows. For interior solutions $\alpha^* \in (0,1)$ one has

$$\frac{U'(\alpha^* w + 1 - \alpha^*)}{U'(\alpha^* w)} = \frac{\pi w}{(1-\pi)(1-w)}. \tag{2}$$

The left-hand side of the equation (2) is less than or equal to one, which leads to the following proposition.

Proposition 1. *Whenever*

$$\pi + w \geq 1 \tag{3}$$

incumbent elite group with wealth w will select full protection of property rights $\alpha^* = 1$. ■

Another way to explain this result is to view the elites' deviation from full security of property

rights as acquiring $\beta = 1 - \alpha$ units of lottery which pays $(1 - w)$ with probability $(1 - \pi)$ and $-w$ with probability π. When inequality (3) holds, such lottery has a non-positive expected value, and will hence be rejected by a risk-averse agent.

For an interior solution, the equilibrium level of property rights protection monotonically increases in the rate of elites' rotation.

Proposition 2. *The level of property right protection α^* monotonically increases from zero to one in the elites' rotation rate in the range $\pi \in [0, 1 - w]$ and remains equal 1 for $\pi \geq 1 - w$.*

Proof. One can easily check that the left-hand side of the equation (2) is a monotonically increasing function of $\alpha \in [0, 1]$ and also takes values from zero to one. According to (2), it means that indeed α increases from zero to one in the range $\pi \in [0, 1-w]$. For $\pi > 1-w$, the corner solution $\alpha^* = 1$ obtains. ■

We now turn to the impact of asset ownership on elites' institutional choice. In the range $w \in [0, 1 - \pi]$ increase in the size of elites' assets usually improves property rights protection. This statement could be made precise under mild additional assumptions; one such possibility is illustrated by the following

Proposition 3. *If relative risk aversion $r(z) \equiv -\frac{zU''(z)}{U'(z)}$ does not exceed unity, for all $z > 0$, then the equilibrium level of property rights protection α^* monotonically increases from zero to one in elites' market assets size $w \in [0, 1 - \pi]$, and remains equal one for $w > 1 - \pi$.*

Proof. When $w = 0$, $\alpha^* = 0$ - with no production assets elites are oblivious to property rights after losing power, and hence prefer full expropriation. When $w > 1 - \pi$, as stated earlier, property rights are fully secured ($\alpha^* = 1$). In the range $(0, 1 - \pi)$ the problem (2) has an interim solution, and differentiating the first-order condition (2) by w yileds

$$\frac{\partial \alpha^*}{\partial w}\left[w^2 R(\alpha^* w) + w(1-w)R(\alpha^* w + 1 - \alpha^*)\right] = \\ = \frac{1}{(1-w)} + \alpha^* w\left[R(\alpha^* w + 1 - \alpha^*) - R(\alpha^* w)\right]. \quad (4)$$

Here $R(z) \equiv -\frac{U''(z)}{U'(z)}$ is the measure of absolute risk aversion. To conclude the proof, observe that $\alpha^* w R(\alpha^* w) = r(\alpha^* w) \leq 1 < 1/(1-w)$. ■

Condition (3) indicates that elites' rotation π and asset ownership w substitute each other as factors of full protection of property rights. However when property rights protection is less than perfect, these two factors are complements. This can be seen first from the fact that none of these

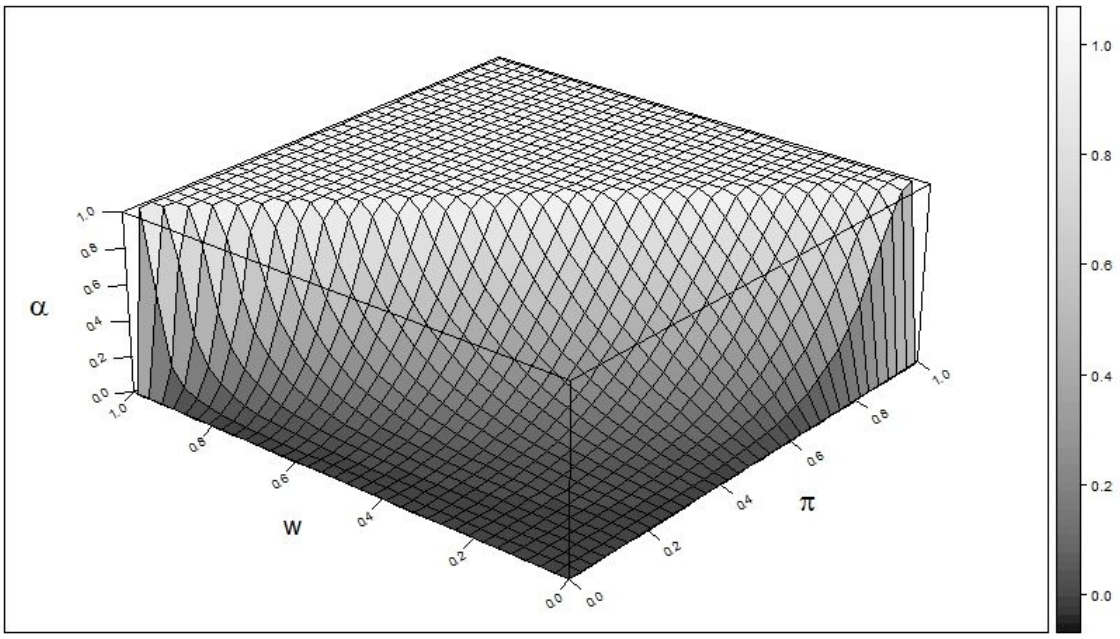
factors alone can ensure any positive level of property rights protection. Indeed, according to (1), with $\pi = 0$ a fully "stationary bandit" will optimally choose $\alpha^* = 0$, i.e. full expropriation. Vice versa, when ruling elites have no assets ($w = 0$) they have nothing to lose, and also opt for full expropriation.[4]

Another way to observe complementarity between elites' rotation and asset ownership is to explore cross partial derivatives of property rights protection by π and w. Caution however is required, since signs of such derivatives are not invariant to monotonic transformations of α^*, i.e. to the selection of property rights measurement scale. For example, for Cobb-Douglas specifications the following complementarity result (which can be established by direct calculations) holds.

Proposition 4. *If* $U(z) = z^{1-\beta}$, $\beta \in (0,1)$, *then* $\dfrac{\partial^2 \ln \alpha^*}{\partial \pi \partial w} > 0$. ■

Figure 1 illustrates the dependence $\alpha^*(\pi, w)$ of property rights protection on elites' rotation π and asset ownership w in the case of $\beta = \frac{1}{2}$.

Figure 1: Security of property rights (α) in relation to political elites' turnover (π) and market assets endowment (w)



Property rights under the "veil of ignorance"

Suppose that the elites jointly select the level of property rights protection α that they commit to maintain as a Coasean bargain for all $t \in \mathbb{N}_0$. This selection is made under the "veil of ignorance"

[4] The conclusion that sufficiently sizeable asset ownership by ruling elites ($w > 1 - \pi$) makes their policies socially optimal is similar to McGuire and Olson's (1996). Notice however that in our case this conclusion requires elites' rotation ($\pi > 0$) and hence is inapplicable to a "stationary bandit". This is a yet another evidence of the complementarity between elites' rotation and asset ownership.

when the elites do not know which particular groups will be holding power at $t = 0$ and thereafter; furthermore elites are uncertain of their wealth and each group $i \in \{1, \ldots, n\}$ expects that its wealth w_i will be randomly drawn from the distribution $F(w|\sigma)$ for some $\sigma > 0$, with $F(0|\sigma) = 0$, $F(1|\sigma) = 1$. The parametric family $F(\cdot|\sigma)$ is first-degree stochastic dominance ordered, i.e. $F(w|\sigma_1) < F(w|\sigma_2)$, for all $w \in (0, 1)$ and $\sigma_1 > \sigma_2 > 0$; furthermore assume $F_\sigma(w|\sigma)$ exists and is negative for all $w \in (0, 1)$ and $\sigma > 0$; $\lim_{\sigma \to +0} F(w|\sigma) = 1$, for all $w > 0$. The parameter σ can be interpreted as an index of wealth of the elites' class.

Denote $V_I(w)$ the expected discounted utility of an elite group with wealth w which holds power at $t = 0$, and $V_O(w)$ - the expected utility of an elite group with same wealth that is out of power at $t = 0$. One has

$$V_I(w) = U(w + (1 - \alpha)(1 - w)) + \lambda \left[(1 - \pi)V_I(w) + \pi V_O(w)\right],$$
$$V_O(w) = U(\alpha w) + \lambda \left[\frac{\pi}{n-1} V_I(w) + \left(1 - \frac{\pi}{n-1}\right) V_O(w)\right],$$

and hence

$$\frac{1}{n} V_I(w) + \frac{n-1}{n} V_O(w) = \frac{1}{1-\lambda} \left[\frac{1}{n} U\left(w + (1 - \alpha)(1 - w)\right) + \frac{n-1}{n} U(\alpha w)\right].$$

The expected utility under the "veil of ignorance" of an elite group equals

$$\int_0^1 \frac{1}{1-\lambda} \left[\frac{1}{n} U\left(w + (1 - \alpha)(1 - w)\right) + \frac{n-1}{n} U(\alpha w)\right] dF(w|\sigma),$$

and the level of property rights protection jointly chosen by the elites solves the following problem:

$$\max_{\alpha \in [0,1]} \int_0^1 \left[(1 - \rho) U\left(w + (1 - \alpha)(1 - w)\right) + \rho U(\alpha w)\right] dF(w|\sigma), \tag{5}$$

where $\rho \equiv 1 - 1/n$. Observe that $\pi \equiv \pi_0 \rho$, and hence, ρ is proportional to π for given π_0 and thus can be interpreted as elites' reduced form rotation rate - when the number of elite groups n goes up, inter-elite competition increases, and so does the effective rate of elite turnover.

Through the remainder of this section we will keep the assumption $r(z) \leq 1$, where $r(z) \equiv -\frac{zU''(z)}{U'(z)}$ is relative risk aversion; further assume that $\lim_{z \to +0} zU'(z) = 0$. Denote $\Psi(\alpha|\rho, \sigma)$ the objective function of problem (5); observe that this function is concave in α. If $\alpha^* = \alpha^*(\rho, \sigma)$ is the optimal level of property rights protection, then for an interior optimum one has

$$\Psi_\alpha(\alpha^*|\rho, \sigma) = 0. \tag{6}$$

Direct calculations show that the following necessary and sufficient condition for full protection of property rights holds.

Proposition 5. *Full protection of property rights* $\alpha^* = 1$ *obtains whenever* $\Psi_\alpha(1|\rho,\sigma) > 0$*, or*

$$\rho + \frac{\int_0^1 wU^{'}(w)\,dF(w|\sigma)}{\int_0^1 U^{'}(w)\,dF(w|\sigma)} > 1. \tag{7}$$

■

Integrating by parts, one obtains

$$\frac{\int_0^1 wU^{'}(w)\,dF(w|\sigma)}{\int_0^1 U^{'}(w)\,dF(w|\sigma)} = \frac{\int_0^1 \left[U^{'}(w) + wU^{''}(w)\right] F(w|\sigma)\,dw - U^{'}(1)}{\int_0^1 U^{''}(w)F(w|\sigma)\,dw - U^{'}(1)},$$

and since $U^{''}(w) < 0$ and $U^{'}(w) + wU^{''}(w) \geq 0$, this expression due to the stochastic dominance condition monotonically increases in σ. Hence the condition (7), similarly to (3) in the case of equilibrium model, states that full protection of property rights ensues when a total of the elite rotation rate and a measure of elites' wealth exceeds a certain threshold. Other comparative statics results are also similar to those obtained for the equilibrium model.

Proposition 6. *For interior optima,* $\alpha^*(\rho,\sigma)$ *monotonically increases in the elites' rotation rate.*

Proof. Due to concavity of $\Psi(\alpha|\rho,\sigma)$ in α, $\Psi_{\alpha\alpha} \leq 0$. On the other hand,

$$\Psi_{\alpha\rho} = \int_0^1 \Big[(1-w)U^{'}(w + (1-\alpha)(1-w)) + wU^{'}(\alpha w)\Big]\, dF(w|\sigma) > 0.$$

Since $\Psi_{\alpha\alpha}\alpha_{\rho^*} + \Psi_{\alpha\rho} = 0$, one has $\alpha_{\rho^*} > 0$. ■

Proposition 7. *For interior optima,* $\alpha^*(\rho,\sigma)$ *monotonically increases in the elites' wealth index* σ*.*

Proof. Using integration by parts, one has

$$\begin{aligned}\Psi_\alpha = \int_0^1 \Big[-(1-\rho)(1-w)U^{'}\left(w + (1-\alpha)(1-w)\right) + \rho w U^{'}(\alpha w)\Big]\, dF(w|\sigma) = \\ = \int_0^1 \Big[-\rho U^{'}(\alpha w) - \rho\alpha w U^{''}(\alpha w) - (1-\rho)U^{'}\left(w + (1-\alpha)(1-w)\right) + \\ + \alpha(1-w)(1-\rho)U^{''}\left(w + (1-\alpha)(1-w)\right)\Big] F(w|\sigma)\,dw + \rho U^{'}(\alpha).\end{aligned}$$

Furthermore, $-\rho U^{'}(\alpha w) - \rho\alpha w U^{''}(\alpha w) \leq 0$ due to $r(z) \leq 1$. The rest of the expression under the last integral is negative, and since $F_\sigma(w|\sigma) < 0$ due to the stochastic dominance condition, one has $\Psi_{\alpha\sigma} > 0$. ■

Here too elites' rotation ρ and wealth σ complement each other as factors of property rights protection. Indeed, as can be seen from (5), under a political monopoly which corresponds to $\rho = 0$ a "stationary bandit" again chooses $\alpha^* = 0$. To show that, vice versa, at least some elites' wealth is essential for their rotation to matter for property rights protection, observe that

$$\lim_{\sigma \to +0} \Psi_\alpha(\alpha|\rho, \sigma) = -(1-\rho)U^{'}(1-\alpha) < 0, \forall \alpha > 0, \rho \in [0, 1),$$

which means that $\lim_{\sigma \to +0} \alpha^*(\rho, \sigma) = 0$, $\forall \rho \in [0, 1)$. Therefore no matter how rapid is elites' rotation, low level of their wealth pushes the protection of property rights down to zero.

The above analyses demonstrate that in both settings elites' rotation and wealth contribute to the security of property rights, but do so only in combination with each other. We now turn to testing this conjecture empirically.

Data and measurement

To test the above theories, we have assembled a panel comprising 111 developed and developing nations and spanning from 2000 through 2009. Panel data are recorded on yearly basis. A full list of variables is presented in Table 1, Table 2 shows summary statistics, in Table A.1 (in the Appendix) we report pairwise correlations of variables, and in Table A.2 we list all countries which appear in the panel.

Property rights protection

Our main dependent variable **property rights** is based on the Fraser Institute's Economic Freedom of the World dataset (Gwartney, Hall, and Lawson, 2012). We select two indexes from this dataset: (i) Protection of property rights, and (ii) Judicial independence. The second index is added due to critical importance of independent judiciary for the security of property rights (Voigt, Gutmann, 2013). We take the first principal component of these indexes and normalize it to zero mean and unit standard deviation.

There are alternative sources of property rights protection measures, such as Heritage Foundation (Miller et al., 2012) and Freedom House (2013), which are incorporated in the aggregate Rule of Law index produced by the Governance Matters project (Kaufmann, Kraay, and Mastruzzi 2010). Some of these measures are based on expert opinions, which could be biased due to the "halo effect" (Bardhan, 2005), when assessments of economic outcomes are automatically extended onto institutions. Importantly, Fraser Institute's measures do not involve experts' judgements and rely

instead on business communities' assessments collected in the Global Competitiveness Report prepared for the World Economic Forum (Schwab, 2012).

Rotation of ruling elites

There are various measures of political instability employed in the literature. Alesina et al. (1996) register incidences of executive power transfer, including irregular ones (e.g., by coups), as well as major changes in ruling coalitions. Aisen and Veiga (2013) measure the frequency of cabinet changes, which involve a new premier and/or a replacement of more than half of cabinet members. Beck et al. (2001), Besley and Kudamatsu (2008) and Carmignani (2009) keep track of leadership change, and Besley et al. (2012) – of leaders' random exits, due to accidents, illness, and death from natural causes. Finally, Campante et al. (2009) calculate average government tenure over a period of observations.

Our measure of political elites' rotation is based on the *stabns* variable from the Database of Political Institutions (Keefer, 2010). This measure, calculated annually, shows the ratio of the number of exits of veto players in a given country during a year to the number of veto players at the beginning of the year. Veto player, according to Tsebelis (2002), is a political actor who can block a move from the status quo and otherwise influence essential government policies. For autocracies or near autocracies, chief executives are the only veto players in their polities. Depending on the type of political system, veto players could also include heads of legislative chambers, political parties in government coalition, etc.

The turnover of veto players measured by *stabns* serves our purposes better than rotation measures of heads of state only, as it shows the replacement rate of individuals who occupy key policy-making positions in the ruling polity, and thus produces a richer and more informative picture and improves the odds of capturing and correctly measuring the impact of elites' turnover on property rights protection. Furthermore measures of regime durability, as in Campante et al. (2009; see also Chang and Golden, 2010; Justesen, 2012) would not be appropriate for our purpose to establish an impact of the perceived likelihood of power change on property rights. Indeed, what is essentially required is a hazard rate, which in general is affected by a number of factors and cannot be predicted by durability alone (Sanhueza, 1999).

We assume that incumbent elites form expectations of the likelihood of losing power by observing a history of elite rotation and extrapolating it in the future. Hence we calculate the turnover index for a given country and year as a sliding average of the *stabns* variable for this country over the preceding twenty-year period. The earliest of such periods in our sample starts in

1980.[5]

Asset ownership by ruling elites

Our theory suggests that security of property rights should be related to the size of economic assets owned by political elites. We do not have direct measures of such assets and rely instead on general economic inequality measures as proxies for the (relative) size of elites' assets. Such proxy selection is based on the assumption that political elites belong to the wealthiest part of population and hence the relative size of their holdings should be positively correlated with general indexes of wealth inequality. This conjecture finds support in Leigh (2007) and Atkinson et al. (2011), where economic inequality is shown to be associated with wealth concentration; in particular the Gini coefficient predicts the share of income in a society owned by top 10% and top 1% of wealth distribution (Leigh, 2007).

Gini coefficient values (*gini*) are obtained from the Standardized World Income Inequality Database (SWIID; see Solt, 2009). This dataset is integrated in the World Income Inequality Database (UNU-WIDER, 2008) where it is supplemented by data from other sources and adjusted for cross-country comparisons. An important advantage of the SWIID database for the purposes of our study is the inclusion of property income in the overall income calculation. We use the 0.4 level of the Gini coefficient as a cut-off point and introduce a dummy variable which equals one for a high-inequality country where for at least two years in the 2000-2009 observation period the Gini coefficient was above 0.4, and zero for all other countries which are deemed low-inequality. Notice that this dummy variable is time-independent. There are 40 high-inequality and 62 low-inequality countries in the panel according to this measure.[6]

Control variables

An important part of our empirical analysis was to establish whether a relationship between the rotation of ruling elites and quality of property rights protection is based on the conventional political competition, where competing parties are trying to win voters' support by supplying secure property rights, or, as it is claimed in the paper, that political elites are motivated by their immediate self-interests, based on concerns about their well-being after losing power. As it was argued earlier, we do not expect an association between elites' rotation and property rights in fully developed democracies, because grassroots political pressure could either strengthen or weaken the protection

[5]There is no earlier information in the Database of Political Institutions

[6]The total number of high- and low-inequality countries is lower than total number of countries in our sample due to missingness in the Gini coefficient data

Table 1: Data description and sources

VARIABLE	DESCRIPTION AND SOURCE
property rights	First principal component of Judicial independence and Property rights protection measures from Economic Freedom of the World by Fraeser Institute (Gwartney, Hall, and Lawson, 2012).
turnover	Average share of veto-players leaving their office for previous 20 years based on *stabns* measure from Database of Political Institutions (Keefer, 2010).
non-democracy score	$(10 -$ Democracy score$)$, where Democracy score is from Polity IV Project (Marshall et al., 2011).
$\mathbb{1}$**(gini>40)**	Indicator variable which equals 1 if Gini index exceeds 0.4 threshold for two or more years of observation. Data is from Standardized World Income Inequality database (Solt, 2009).
ln(GDP), **ln(population)**, **school enrolment**, **natural resources**	Set of controls (logarithms of population and GDP per capita, natural resources rents, net school enrolment and full set of country and year dummies) from World Development Indicators database by World Bank.

of property rights, or because property rights are protected by the rule of law irrespective of political processes. However, when democracy is suppressed or absent, elites' rotation is expected to be relevant for property rights protection.

To reflect this distinction in empirical analysis, we use the institutionalized democracy index *democ* obtained from the Polity IV database (Marshall et al., 2011). We prefer *democ* to the resulting *polity2* index, because it better describes variation in democratic quality, especially in the middle of the range by reflecting electoral processes and checks and balances restricting the executive authority. In what follows we re-scale this index into a *non-democracy score* so that it takes values from 0 (democracy) to 10 (autocracy). The threshold non-democracy score, 2, is the median, with 47% of the sample below and 37% above this level. In what follows we consider the observations (nations in a given year) as more democratic if their non-democracy score is less than 2, and less democratic otherwise; this divides the sample almost evenly.

We include in our regression models various control variables (Table 1), which account for major existing theories explaining cross-country variations of property rights security. One of controls is GDP per capita – as per the "development hypothesis", economic development brings about better institutions (Glaeser et al., 2004); vice versa, secure property rights create enabling conditions for economic growth (see e.g. Rodrik et al. 2004). Other controls are the level of education, measured by school enrolment (according to the same development hypothesis, education strengthens demand for sound institutions and advances reforms establishing such institutions); population

Table 2: Descriptive statistics

VARIABLE	Obs	Mean	Std. Dev.	Min	Max
property rights	972	0	1.36	-3.09	2.56
turnover	962	0.14	0.08	0	0.36
non-democracy score	920	2.77	3.23	0	10
$\mathbb{1}$(gini>40)	908	0.39	0.49	0	1
school enrolment	861	104.82	10.68	63.53	154.15
ln(population)	962	9.49	1.62	5.61	14.10
ln(GDP)	962	9.07	1.25	5.60	11.29
natural resources	941	6.60	11.43	0	63.95

(according to Spolaore (2006), it is easier, ceteris paribus, to create and maintain good institutions in more populous countries); and natural gas and oil rents as a percentage of GDP (natural riches cause the resource curse, which adversely affects the quality of institutions, including property rights - see Robinson, Torvik, Verdier, 2006, and Mehlun, Moene, Torvik, 2006). Since we use panel regressions with country and year fixed effects, we omit controls that do not vary in time, such as legal origins, fractionalization, geography, etc.

Pairwise correlations of our main variables are presented in Table A.1.

Estimation results

Panel regressions

Our theory predicts that in less democratic countries ruling elites' rotation and asset ownership turnover should be positively associated with the property rights protection. We test this hypothesis by a series of regression models with various specifications and control variables.

We start with a country and year fixed effects panel estimation with robust standard errors accounting for country specific omitted variables (legal origins, geography, etc.). The panel spans over 10 years from 2000 through 2009 and relates the quality of property rights protection in the given year and country to the rotation of ruling elites estimated over the preceding twenty years period:

$$\text{(property rights)}_{it} = \alpha + \beta\text{(turnover)}_{it} + \gamma_k\text{(controls)}_{itk} + \epsilon_{it} \tag{8}$$

Estimation results are reported in Column 1 of Table 3. The coefficient for turnover is positive, but insignificant, and this result is robust to various sets of controls (we do not present here such robustness tests). Hence the rotation of ruling elites for democracies and non-democracies

Table 3: Baseline model estimation

VARIABLE	*Dependent variable:* property rights					
	Full sample				Low turnover	High turnover
	(1)	(2)	(3)	(4)	(5)	(6)
turnover	**0.469**	**5.392*****	**4.345*****	**4.226*****	**2.658*****	**-1.448***
	[0.76]	[1.58]	[1.41]	[1.35]	[0.80]	[0.78]
turnover^2		**-15.50*****	**-13.15*****	**-13.51*****		
		[4.01]	[3.74]	[3.43]		
ln(GDP)				1.097***	1.121***	1.072**
				[0.315]	[0.33]	[0.52]
school enrolment			-0.001	-0.001	-0.005	0.004
			[0.00]	[0.00]	[0.00]	[0.01]
ln(population)			0.351	1.062	1.156	1.531
			[0.58]	[0.655]	[0.76]	[1.20]
natural resources			-0.003	-0.006	-0.000	-0.011*
			[0.00]	[0.00]	[0.01]	[0.01]
Observations	962	962	840	840	410	430
Number of id	110	110	102	102	53	49
R^2-within	0.435	0.453	0.474	0.497	0.473	0.506

*p-value < 0.1, **p-value < 0.05, ***p-value < 0.01

alike without accounting for elites' asset ownership has no statistically significant impact on property rights.

To find out if perhaps a more robust nonlinear association between elites' rotation and property rights can be established, we estimate the following quadratic model:

$$(\text{property rights})_{it} = \alpha + \beta(\text{turnover})_{it} + \mu(\text{turnover}^2)_{it} + \gamma_k(\text{controls})_{itk} + \epsilon_{it} \tag{9}$$

Results of this estimation with various sets of controls are presented in Columns 2-4 of Table 3. In all specifications linear and quadratic terms become highly significant, and their signs indicate an inverted u-shaped relationship of elites' rotation and the security of property rights. To separately explore the ascending and descending branches of the parabola, we identify its top point which corresponds (for the specification with full set of controls reported in Column 4) to the rotation rate turnover $= 0.16$. For lower rotation rates elites' turnover becomes negative and significant at the 1% level (Column 5), whereas in the higher rotation range this coefficient turns positive, but gets more than two times smaller in absolute value and much less significant (at 10% level). Notice that controls have the expected signs, but are mostly statistically insignificant, except for GDP per capita.

Table 4: Extended model estimation

VARIABLE	*Dependent variable:* property rights					
	(1)	(2)	(3)	(4)	(5)	(6)
turnover	**0.627**	**-0.740**	**0.136**	**-0.699**	**-0.060**	**-0.940**
	[0.79]	[0.89]	[0.70]	[0.89]	[0.64]	[0.80]
non-democracy score	**-0.020**	**-0.132****	**-0.063*****	**-0.141*****	**-0.055****	**-0.136****
	[0.021]	[0.06]	[0.02]	[0.05]	[0.02]	[0.05]
non-democracy score $\times$ turnover		**0.570****		**0.398***		**0.417***
		[0.27]		[0.22]		[0.21]
school enrolment			-0.001	-0.002	-0.001	-0.001
			[0.00]	[0.00]	[0.00]	[0.00]
ln(population)			0.646	0.616	1.447**	1.421**
			[0.58]	[0.56]	[0.63]	[0.62]
natural resources			-0.004	-0.004	-0.007	-0.007*
			[0.00]	[0.00]	[0.00]	[0.00]
ln(GDP)					1.187***	1.196***
					[0.29]	[0.29]
Observations	920	920	802	802	802	802
Number of id	104	104	96	96	96	96
R^2-within	0.437	0.446	0.471	0.475	0.499	0.503

*p-value < 0.1, **p-value < 0.05, ***p-value < 0.01

One way to interpret the above findings is to suggest that the rotation rates of ruling elites are on the average higher in democracies than in non-democracies, in which case the ascending branch of the above parabolas reflects the expected positive impact of ruling elites' rotation for the security of property rights in non-democracies, whereas among democracies such association is much less pronounced and is almost statistically insignificant. Indeed, the average rotation rate of ruling elites for the countries with non-democracy score above 2 (the threshold level) is 0.1, whereas for the rest of the sample formed by stronger democracies this average is 0.16.[7] Another way to prove the above conjecture is to observe that on the ascending branch of the parabola the average non-democracy score equals 4.33, whereas on the descending one the average score is 2.00.

To test the role of democracy directly, we estimate the following model:

$$\text{(property rights)}_{it} = \alpha + \beta\text{(turnover)}_{it} + \delta\text{(non-democracy score)}_{it} + \\ + \phi\text{(interaction)}_{it} + \gamma_k\text{(controls)}_{itk} + \epsilon_{it}, \quad (10)$$

which in addition to model (9) also includes the non-democracy score and its interaction with rotation of ruling elites. The estimation results are presented in Table 4 (Columns 1-6).

[7] The actual gap in average rotation rates between democracies and non-democracies is probably even higher, because in the time span of observations most of political changes were from less to more democracy, and hence the rotation rates for countries deemed to be democracies in a given year could be pulled down by the non-democratic portions of the preceding twenty years periods.

In all estimations including the interaction term its coefficient comes out positive and statistically significant. This means that the contribution of ruling elites' rotation to the security of property rights grows stronger when the quality of democracy declines, which is consistent with our hypotheses. More specifically, consider the full marginal effect of the elites' rotation which equals $[\beta + \phi(\text{nondemocracy score})_{it}]$. For the estimation reported in Column 6 of Table 4, the cut-off level of the *non-democracy score* above which the marginal effect is positive equals 2.26, which is near the median level of the *non-democracy score*. Finally, we split the sample into groups of more and less democratic countries and estimate the baseline model (8) for each of the halves. Estimation results, presented in Table A.3, show that for less democratic countries the impact of ruling elites' rotation is positive and statistically significant, whereas for less democratic ones it is of much lower magnitude and statistically insignificant. To summarize the above findings, we can conclude that rotation of ruling elites indeed improves the protection of property rights under non-democratic regimes and has no such effect in democracies.

We now turn to finding empirical evidence of the complementarity between the elites' rotation and their ownership of market assets. In doing so we proxy elites' asset ownership by economic inequality and further subdivide the subsample of less democratic countries for which elites' turnover has been shown to positively affect the security if property rights into quarter-samples with the high and low inequality levels. We estimate the baseline model (8) for each of the quarter-samples and report the results in Table 5.[8] For the quarter-sample of more unequal and less democratic countries (Column 1) the coefficient of elites' rotation is positive and significant at the 1% level. Notice that for the whole subsample of less democratic countries irrespective of their inequality level (Column 7, Table 4) such coefficient is 30% lower and significant only at the 10% level; therefore higher inequality makes the association between elites' rotation and the protection of property rights much sharper. For the quarter-sample of less unequal and less democratic countries (Column 2, Table 5) the coefficient is still positive, but more than 50% smaller than for the previous quarter-sample, and statistically insignificant. For the remaining two quarter-samples of more democratic countries with high and low inequality levels there are no statistically significant associations between elites' rotation and the security of property rights (Columns 3 and 4, Table 5). The reported estimation results are robust to the inclusion of different sets of controls (we do not show here such estimations).

Property rights protection exhibits significant path dependency which could lead to autocorrelation in our panel. We address such concerns by including lagged dependent variables as well

[8]Notice that since the inequality dummy is time-independent, we cannot use country fixed effects in such estimations.

Table 5: Baseline model estimation on subsamples

VARIABLE	*Dependent variable:* property rights			
	non-democracy score>2		non-democracy score≤2	
	𝟙(gini>40)=1	𝟙(gini>40)=0	𝟙(gini>40)=1	𝟙(gini>40)=0
	(1)	(2)	(3)	(4)
turnover	**3.029*****	**1.37**	**-1.14**	**-0.11**
	[0.93]	[3.28]	[0.89]	[1.22]
school enrolment	-0.005*	0.008	0.001	-0.000
	[0.00]	[0.01]	[0.01]	[0.01]
ln(population)	0.511	3.622***	1.08	-0.162
	[1.36]	[1.10]	[1.61]	[1.88]
ln(GDP)	0.778	1.140**	1.790***	0.391
	[0.53]	[0.45]	[0.49]	[0.56]
natural resources	-0.013	-0.012	-0.032***	-0.002
	[0.01]	[0.01]	[0.01]	[0.01]
Observations	131	112	390	166
Number of id	23	22	44	23
Adj. R^2	0.548	0.582	0.462	0.627

*p-value < 0.1, **p-value < 0.05, ***p-value < 0.01

as, when appropriate, lagged controls, and estimate the following panel regression model on the whole sample and on subsamples:

$$\text{(property rights)}_{it} = \alpha + \theta\text{(property rights)}_{i(t-1)} + \beta\text{(turnover)}_{it} + \gamma_k\text{(controls)}_{i(t-1)k} + \epsilon_{it} \quad (11)$$

The estimation results are presented in the Appendix in Table A.4. Notice first that lagged property rights are statistically significant at the 1% level, which confirms institutional path dependency. Furthermore main conclusions of the preceding empirical analysis are robust to the inclusion of lagged variables. The estimation of a quadratic model reported in Column 1 of Table A.4 is qualitatively similar to the estimation of model (9) presented in Table 3 – again we observe a parabola with ascending and descending branches with respectively lower and higher rotation rates. Estimations of lagged linear models for more and less democratic sub-samples (Columns 2 and 3 of Table A.4) produce results similar to those reported in Columns 7 and 8 of Table 4 – elites' rotation matters for property rights when democracy is lacking, and is irrelevant otherwise. The interaction between rotation and democracy continues to be significant and has the expected sign (Column 4 of Table A.4), similarly to Columns 2, 4, and 6 of Table 4. Finally, the estimation results for the quarter-samples reflecting various combinations of democracy and economic inequality (Columns 5-8 of Table A.4) are consistent with those with no lagged variables (Table 5) – the only combina-

tion in which the elite's rotation is relevant for property rights is of high inequality (proxying elites' asset ownership) and a lack of democracy.[9]

Endogeneity issues

The above estimations could be biased due to endogeneity caused by reverse causality and/or omitted variables. Reverse causality in the established association between property rights protection and elites' turnover is possible because e.g. secure property rights make ruling elites less keen to cling to power, since there is no threat of expropriation after power shift. We address the reverse causality concern by performing a proper Granger causality test to see whether lags of main dependent variable *property rights* are good predictors of turnover and vice versa. It is well known that the presence of a lagged dependent variable in fixed effects regressions could cause biased and inconsistent estimates when the lagged variable and the error term are correlated. Judson and Owen (1999) examine various proposed solutions and find that the bias-corrected least-squares-dummy-variable estimator developed by Kiviet (1995) performs better than other proposed estimators, even for relatively few observation periods. Hence we estimate dynamic fixed effects models using the bias-corrected fixed effects estimator (implemented in Bruno, 2005).

In Table A.4 we already tested the direct causality part of a Granger-like test and showed that all of our main empirical conclusions hold in lagged versions of econometric models. In Table A.5 (Columns 1-3 for different lags) we present results of reverse causality testing with the same control specifications as in Table A.4. Estimation results clearly show that there is no impact of lagged property rights protection on the rotation of ruling elites, which is an indication that the presence of reverse causality is unlikely.

Endogeneity could also be caused by omitted variables, and the inclusion of control variables in the above regression models does not fully alleviate such concerns. To this end, we estimate a dynamic fixed effects model with bias-corrected fixed effects estimator. Bias-correction is initialized using the one-step estimator introduced by Arellano and Bond (1991); standard errors are bootstrapped and generated with 20 iterations. We avoid using the interaction term as in model (10) lest there are two variables correlated with turnover. We therefore proceed instead by dividing our sample into two groups of countries by the same inequality dummy used as an asset ownership proxy, and present estimation results in Table 6.

According to the above table, for high inequality (elite's asset ownership) countries the impact of elites' rotation is positive in a bias-corrected estimation as well and significant at the 10%

[9]Notice however that estimations of lagged models should be interpreted with caution due to possible correlations between the lagged variables and error terms (see the next subsection).

Table 6: Bias-corrected dynamic fixed effects model estimation

VARIABLE	*Dependent variable:* property rights$_t$			
	𝟙(gini>40)=1	𝟙(gini>40)=0	𝟙(gini>40)=1	𝟙(gini>40)=0
	(1)	(2)	(3)	(4)
property rights$_{t-1}$	0.370***	0.489***	0.377***	0.549***
	[0.08]	[0.05]	[0.08]	[0.05]
turnover	**1.367***	**-0.489**	**1.360***	**-0.088**
	[0.75]	[1.01]	[0.80]	[0.98]
school enrolment	-0.005	0.002	-0.005	0.003
	[0.01]	[0.00]	[0.01]	[0.00]
ln(population)	0.031	1.216	-0.677	0.214
	[1.61]	[0.79]	[1.74]	[0.82]
ln(GDP)	0.633	0.863***		
	[0.56]	[0.26]		
natural resources	-0.005	-0.001	-0.004	0.004
	[0.01]	[0.01]	[0.01]	[0.01]
Observations	259	447	259	447
Number of id	40	62	40	62

*** $p< 0.01$, ** $p< 0.05$, * $p< 0.1$; Absolute value of z-statistics are presented in brackets; Bias-correction is initialized using the Arellano-Bond estimator; standard errors are bootstrapped and generated with 20 iterations.

level (Columns 1 and 3). No such effect is observed for lower inequality (elites' asset ownership) countries. We perform similar bias-corrected analysis for the quarter-samples used previously in Table 7, and again observe a statistically significant positive impact of elites' rotation on property rights only for the quarter-sample with high inequality and lack of democracy (Column 1).[10]

The above analysis shows that our findings pass commonly used endogeneity tests.

Concluding remarks

Democracies and autocracies alike could violate private property rights and hence none of these political regimes in and of themselves guarantee market-enabling institutions. Twenty years ago Mancur Olson (1993) conjectured that in the case of autocracies longer tenure of the regime improves property rights protection, in the spirit of the henceforth famous "stationary bandit" metaphor. This conjecture however lacks empirical support – ossified dictatorships rarely delivery robust economic performance. More recent works emphasize the benefits of government turnover, but quick succession of dictators could make them unbridled predators acting like "roving bandits". In this paper we emphasize the importance of ruling elites' rotation and asset ownership, which in

[10] All control variables (except lags) are dropped from these estimations due to small sizes of sub-samples.

Table 7: Dynamic fixed effects model estimation on subsamples with bias-corrected fixed effects estimator

VARIABLE	*Dependent variable:* property rights$_t$			
	non-democracy score>2		non-democracy score≤2	
	𝟙(gini>40)=1	𝟙(gini>40)=0	𝟙(gini>40)=1	𝟙(gini>40)=0
	(1)	(2)	(3)	(4)
property rights$_{t-1}$	0.294***	0.554***	0.594***	0.463***
	[0.11]	[0.08]	[0.06]	[0.14]
turnover	**2.792***	-0.384	-0.161	-1.749
	[1.59]	[1.00]	[0.86]	[2.61]
Observations	133	166	380	116
Number of id	24	24	46	22

*** p< 0.01, ** p< 0.05, * p< 0.1; Absolute value of z-statistics are presented in brackets; Bias-correction is initialized using the Arellano-Bond estimator; standard errors are bootstrapped and generated with 20 iterations.

combination strengthen the incentives for property rights protection. Turnover of asset-owning elites creates a dynamic version of checks and balances even in autocracies. We thus confirm the beneficial impact of elites' asset ownership, as posited by McGuire and Olson (1996), but only conditional on elites' rotation. It is noteworthy that such effect is observed only in autocracies where the combination of power shifts and asset ownership serves as a substitute for conventional democratic accountability.

Property rights in autocracies are endogenous, i.e. they are equilibria outcomes rather than based on a firmly established rule of law. The traditional mechanism of endogenous property rights involves regime's reputation with private investors who would sanction a violation by exiting the economy. Reputation thus becomes a valuable asset that the regime wants to preserve. This paper is based on an alternative solution of a credible commitment problem, where the present rulers are aware that their institutional choices will affect them once they are out of power. Alternately secure property rights could be inter-elite Coasean bargain, whereby sanctions to violators are imposed not be private investors, but by successive rulers.

The paper shows that a degree of political competition, even if taking place in a non-democratic setup, still could noticeably improve economic outcomes. Similar incentives could ultimately make better not only economic, but political institutions as well: Besley et al. (2012) show that a sudden regime change could lead to establishing conventional checks and balances, while according to Lizzeri and Persico (2004), elites' concerns about their well-being in case they lose out in the inter-elite power struggle could explain the extension of voting rights and transition to democracy.

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Appendix A

Table A.1: Pairwise correlations of variables

	property rights	turnover	turnover^2	$\mathbb{1}$(gini>40)	non-democracy score	non-democracy score × turnover	school enrolment	ln(population)	ln(GDP)	natural resources
property rights	1.00									
turnover	**-0.12***	1.00								
turnover^2	**-0.11***	**0.95***	1.00							
$\mathbb{1}$(gini>40)	**-0.40***	-0.01	0.02	1.00						
non-democracy score	**-0.33***	**-0.42***	**-0.33***	**0.23***	1.00					
non-democracy score × turnover	**-0.45***	**0.27***	**0.23***	**0.24***	**0.57***	1.00				
school enrolment	**-0.13***	-0.03	-0.02	**0.21***	0.02	**-0.10***	1.00			
ln(population)	**-0.21***	**0.10***	**0.11***	0.07	0.05	**0.18***	0.06	1.00		
ln(GDP)	**0.69***	0.06	0.06	**-0.40***	**-0.48***	**-0.50***	**0.09***	**-0.21***	1.00	
natural resources	**-0.23***	**-0.24***	**-0.20***	**0.12***	**0.45***	**0.13***	-0.04	0.00	**-0.08***	1.00

*p-value < 0.05

Table A.2: Sample countries and property rights

COUNTRY	Code	Mean	Std.Dev.	Obs.	COUNTRY	Code	Mean	Std.Dev.	Obs.
Albania	ALB	-1.53567	0.336409	6	Kenya	KEN	-1.14184	0.397441	8
United Arab Emirates	ARE	0.729664	0.382751	7	Korea, Republic of	KOR	0.288053	0.495702	10
Argentina	ARG	-1.84197	0.291457	10	Kuwait	KWT	0.741659	0.447116	6
Australia	AUS	2.098246	0.188721	10	Sri Lanka	LKA	-0.2981	0.668068	9
Austria	AUT	1.882348	0.345896	10	Lithuania	LTU	-0.52618	0.62172	9
Burundi	BDI	-1.85408	0.111245	5	Luxembourg	LUX	1.592623	0.30356	10
Belgium	BEL	1.270771	0.279502	10	Latvia	LVA	-0.33017	0.564036	9
Benin	BEN	-0.73311	0.461819	6	Morocco	MAR	-0.43881	0.4724	9
Bangladesh	BGD	-1.44278	0.509667	9	Madagascar	MDG	-1.3376	0.289939	8
Bulgaria	BGR	-1.34034	0.31568	10	Mexico	MEX	-0.76564	0.377705	10
Bahrain	BHR	0.483683	0.578004	7	Mali	MLI	-0.8145	0.43801	8
Bahamas	BHS	-0.98939	0	3	Malta	MLT	0.723711	0.528439	8
Bolivia	BOL	-2.22773	0.3987	10	Mauritius	MUS	0.334646	0.777673	10
Brazil	BRA	-0.42925	0.33096	10	Malawi	MWI	-0.13221	0.462078	9
Barbados	BRB	1.108785	1.030006	6	Malaysia	MYS	0.605396	0.621692	10
Botswana	BWA	0.653622	0.42632	9	Namibia	NAM	0.823332	0.640126	10
Canada	CAN	1.804502	0.320544	10	Nigeria	NGA	-0.9018	0.5112	9
Switzerland	CHE	2.136807	0.274747	10	Nicaragua	NIC	-2.07056	0.340367	9
Chile	CHL	0.349174	0.496299	10	Netherlands	NLD	2.132361	0.222596	10
China	CHN	-0.46284	0.611909	10	Norway	NOR	1.777363	0.429153	10
Cote d'Ivoire	CIV	-1.71296	0.012185	3	Nepal	NPL	-0.79728	0.431798	5
Cameroon	CMR	-1.32438	0.151584	8	New Zealand	NZL	1.97129	0.260947	10
Colombia	COL	-0.6821	0.49635	10	Oman	OMN	0.984306	0.345318	4
Costa Rica	CRI	0.226762	0.443169	10	Pakistan	PAK	-1.18308	0.620358	8
Cyprus	CYP	1.00958	0.431695	7	Panama	PAN	-0.82842	0.480445	9
Czech Republic	CZE	-0.04426	0.203225	10	Peru	PER	-1.64417	0.4826	10
Germany	DEU	2.238053	0.216921	10	Philippines	PHL	-1.05004	0.480232	10
Denmark	DNK	2.263988	0.174332	10	Poland	POL	-0.56471	0.451663	10
Dominican Republic	DOM	-0.87038	0.400113	9	Portugal	PRT	1.003359	0.306201	10
Algeria	DZA	-1.08766	0.585473	8	Paraguay	PRY	-2.28724	0.27659	9
Ecuador	ECU	-1.98784	0.396475	10	Romania	ROM	-1.04697	0.549329	9
Egypt	EGY	-0.3177	0.932707	10	Russian Federation	RUS	-1.71102	0.271992	10
Spain	ESP	0.319724	0.401861	10	Rwanda	RWA	0.794722	0	1
Estonia	EST	0.951738	0.459223	9	Senegal	SEN	-0.89026	0.131034	7
Finland	FIN	2.231499	0.221865	10	Singapore	SGP	1.636708	0.316314	10
France	FRA	1.245442	0.282243	10	El Salvador	SLV	-0.80021	0.199621	10
United Kingdom	GBR	1.920155	0.238519	10	Slovak Republic	SVK	-0.43369	0.402728	10
Ghana	GHA	-0.21032	0.264397	6	Slovenia	SVN	0.283506	0.246353	9
Greece	GRC	0.15862	0.298519	10	Sweden	SWE	1.97105	0.417736	10
Guatemala	GTM	-1.26485	0.650965	9	Syria	SYR	0.0186	0.476395	4
Guyana	GUY	-1.2625	0.618847	6	Chad	TCD	-2.27043	0.24753	8
Hong Kong	HKG	1.590599	0.48768	10	Thailand	THA	0.131887	0.326855	10
Honduras	HND	-1.38693	0.679198	9	Trinidad and Tobago	TTO	-0.11193	0.380415	9
Croatia	HRV	-1.0611	0.480769	9	Tunisia	TUN	0.78078	0.29049	9
Haiti	HTI	-3.08914	0.000188	4	Turkey	TUR	-0.62732	0.625882	10
Hungary	HUN	0.291887	0.288948	10	Taiwan	TWN	0.561813	0.299582	10
Indonesia	IDN	-0.99558	0.524393	10	Tanzania	TZA	-0.57543	0.229387	8
India	IND	0.442868	0.605606	10	Uganda	UGA	-0.94607	0.208374	8
Ireland	IRL	1.677145	0.493355	10	Ukraine	UKR	-1.82957	0.306053	10
Iran	IRN	-0.21535	0	1	Uruguay	URY	0.369533	0.375188	9
Iceland	ISL	1.84402	0.239686	10	United States	USA	1.511463	0.400489	10
Israel	ISR	1.384745	0.320441	10	Venezuela	VEN	-2.57334	0.260352	10
Italy	ITA	-0.03297	0.409939	10	South Africa	ZAF	1.112357	0.318625	10
Jamaica	JAM	-0.04824	0.480404	9	Zambia	ZMB	-0.59403	0.34696	10
Jordan	JOR	0.752072	0.43279	10	Zimbabwe	ZWE	-2.0214	0.613551	10
Japan	JPN	1.281929	0.504106	10	**TOTAL**		**-1.11E-10**	**1.357448**	**972**

Table A.3: Baseline model estimation on subsamples

VARIABLE	*Dependent variable:* property rights							
	non-democracy score							
	>2	≤2	>2	≤2	>2	≤2	>2	≤2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
turnover	**3.268****	**-0.69**	**3.278****	**-0.64**	**2.20****	**-0.54**	**2.061***	**-0.78**
	[1.44]	[0.84]	[1.43]	[0.84]	[1.01]	[0.84]	[1.07]	[0.74]
non-democracy score			**0.005**	**-0.0955****	**-0.06**	**-0.0970****	**-0.06**	**-0.06**
			[0.04]	[0.04]	[0.04]	[0.05]	[0.04]	[0.06]
ln(GDP)							0.746**	1.502***
							[0.37]	[0.41]
school enrolment					-0.003	0.0012	-0.002	-0.001
					[0.00]	[0.01]	[0.00]	[0.01]
ln(population)					-0.18	0.728	0.534	2.214**
					[1.07]	[0.96]	[1.22]	[1.02]
natural resources					-0.0007	-0.006	-0.003	-0.012
					[0.00]	[0.01]	[0.01]	[0.01]
Observations	341	621	341	579	275	527	275	527
Number of id	49	71	49	64	44	61	44	61
Adj. R^2	0.425	0.443	0.423	0.459	0.473	0.467	0.479	0.509

*p-value < 0.1, **p-value < 0.05, ***p-value < 0.01

Table A.4: Lagged dependent variable model estimation

VARIABLE	*Dependent variable:* property rights$_t$						
	Full sample	non-democracy score		non-democracy score>2		non-democracy score≤2	
		>2	≤2	𝟙(gini>40)=1	𝟙(gini>40)=0	𝟙(gini>40)=1	𝟙(gini>40)=0
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
property rights$_{t-1}$	0.336***	0.237***	0.419***	0.173	0.230***	0.378***	0.359***
	[0.04]	[0.06]	[0.04]	[0.10]	[0.06]	[0.11]	[0.05]
turnover	**3.728*****	**2.576****	**-0.72**	**4.186*****	**-2.005**	**-0.232**	**-0.895**
	[1.1]	[0.98]	[0.61]	[1.02]	[1.94]	[0.70]	[0.91]
turnover^2	**-11.09*****						
	[2.89]						
school enrolment$_{t-1}$	-0.005*	-0.005	-0.005	-0.007**	0.002	-0.003**	-0.005
	[0.003]	[0.003]	[0.004]	[0.005]	[0.006]	[0.008]	[0.005]
ln(population)$_{t-1}$	1.388***	1.035	1.147	-0.310	1.546***	-1.856	0.716
	[0.52]	[0.89]	[0.76]	[0.96]	[1.46]	[1.44]	[1.41]
ln(GDP)$_{t-1}$	0.819***	0.23	0.913***	0.352	-1.490*	0.456	1.152***
	[0.22]	[0.42]	[0.24]	[0.36]	[0.84]	[0.42]	[0.36]
natural resources$_{t-1}$	-0.002	-0.003	-0.001	-0.010	-0.005	-0.001	0.012
	[0.00]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.00]
Observations	747	240	507	112	100	147	329
Number of id	99	40	67	22	19	22	41
R^2-within	0.599	0.585	0.617	0.740	0.723	0.736	0.568

*p-value < 0.1, **p-value < 0.05, ***p-value < 0.01; All regression models include time and country fixed effects.

Table A.5: Reverse causality test

VARIABLE	*Dependent variable:* turnover_t		
	(1)	**(2)**	**(3)**
turnover_{t-1}	0.582***	0.538***	0.479***
	[0.04]	[0.05]	[0.04]
$\text{property rights}_{t-1}$	**-0.002**		
	[0.00]		
$\text{property rights}_{t-2}$		**0.002**	
		[0.00]	
$\text{property rights}_{t-3}$			**0.000**
			[0.00]
non-democracy score	-0.001	-0.001	-0.001
	[0.00]	[0.00]	[0.00]
$\text{school enrolment}_{t-1}$	-0.000	-0.000	-0.000
	[0.00]	[0.00]	[0.00]
$\ln(\text{population})_{t-1}$	-0.020	-0.052	-0.034
	[0.04]	[0.04]	[0.04]
$\ln(\text{GDP})_{t-1}$	0.012	0.008	-0.006
	[0.02]	[0.02]	[0.02]
$\text{natural resources}_{t-1}$	0.000	0.000	0.000
	[0.00]	[0.00]	[0.00]
Observations	719	629	541
Number of id	93	93	93
Adj. R^2	0.405	0.318	0.256

*p-value < 0.1, **p-value < 0.05, ***p-value < 0.01

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