Ruling Elites' Rotation and Asset Ownership: Implications for Property Rights *

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Abstract

We provide a theory and empirical evidence indicating that the rotation of ruling elites in conjunction with elites' asset ownership could improve property rights protection in non-democracies. The mechanism that upholds property rights is based on elites' concern about the security of their own asset ownership 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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1 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 and contract rights. Indeed, such pubic goods expand 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).[1] Put differently, a long tenure

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[1] This logic is consistent with Levi (1989) earlier observation that politicians who expect to stay in power over a long period of time have the incentive to improve institutions that would generate an increased flow of revenues.

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 exercising self-restraint (Besley and 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 and Veiga, 2013). Such evidence however is inconclusive — alternative estimations show that economically successful autocracies have higher leadership turnover than unsuccessful ones (Besley and Kudamatsu, 2008).[2] Furthermore a 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 and Mihov, 2013), caused by nearly any government change. Hence adverse impact of instability on growth does not answer the question as to whether or not stable autocracies have stronger incentives to supply and maintain enabling institutions. A more straightforward empirical test should involve direct measures of institutional quality, including property rights protection. Such tests produce mixed results — on the one hand polities with lower rates of government turnover tend to have less secure property rights (Besley and Ghatak, 2010), on the other – longer tenure of an autocrat could be associated with better institutions (Holcombe and Boudreaux, 2013).

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 — from appropriation and from 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. This shortcut to the private sector is a potential substitute to democratic accountability, 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 and Olson, 1996).

[2] In fact, Olson himself in his earlier work saw benefits of political instability for the institutional quality and economic development (Olson, 1982); the evolution and possibly inconsistency of Olson's thinking on merits of political (in)stability is discussed in Rose-Ackerman (2003).

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 favor economic disputes and otherwise benefit from the principle "For my friends — anything, for my enemies — the law".[3] Without the "equal treatment" condition the outlook of an asset-owning autocracy is much bleaker (Acemoglu, 2006; Polishchuk, 2012).

Under certain conditions the protection of property rights can be improved by rotation of ruling elites. 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 value of such "institutional insurance" depends on the size of the assets which are owned by the political elites and 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 in order to prevent 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 ruling elites' rotation and asset ownership *complement each other* in improving 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 institutions could be unrelated to the degree of political competition and elites' wealth. 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 logic is the elites' *direct* self-interest in secure property rights. Usually self-interest is a weak incentive for the provision of public goods (including property rights), given the small size ("measure zero") of the elites in the society. Numerically small elite groups would be better-off by simply expropriating the resources required for public goods provision (Lizzeri and Persico, 2004). This explains elites' usual preference for rent-extracting,

[3] 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.

rather than inclusive, institutions (Acemoglu and Robinson, 2012), and their aversion to curbing expropriation and corruption (Besley and 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 in the absence of democratic accountability.

Our main contribution to the literature is in establishing, theoretically and empirically, a joint impact of elites' rotation and asset ownership for institutional quality. We propose a theoretical model that demonstrates the complementarity of these two factors in improving property rights. In the empirical part of the paper we employ standard measures of institutional quality in countries around the world and make use of various databases of political institutions. Given the paucity of direct information on ruling elites' asset ownership, we use instead two proxies — economic inequality (assuming that political elites are in the wealthiest segments of population) and regimes' tenure (assuming that authoritarian rulers use time in power to amass personal wealth). In both cases our hypothesis finds solid empirical support.

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 for institutions and public policies. A theoretical model presented in Section 3 confirms that elites' turnover and asset ownership are indeed factors jointly contributing to secured property rights. In Section 4 we describe cross-country panel data used for empirical verification of our claims. Estimation results presented in Section 5 agree with the theory's predictions and pass endogeneity and robustness tests. Section 6 concludes.

2 Rotation and asset ownership by political elites

In the case of autocracies and "democracies with adjectives" (Collier and 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 and 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 kind, when higher corruption is observed for high and low levels of elites' rotation, with less corruption in the intermediate range.

Buchanan (1954) was among the first to point out to the benefits of power shifts and coalitional instability for the acceptance and stability of social order, arguing that even a dictatorship is acceptable "…if we could be assured that every so often a new dictator would be chosen" (p. 120). A recent stream of research suggests that elite rotation in autocracies could indeed improve institutions. Besley and Kudamatsu (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). Hellman (1998) observes that a quick succession of governments facilitated the transition to market democracies in former communist countries.

Other authors put an emphasis on what is essentially the famous Aristotle's formula "to govern and be governed in turn" (see Aristotle, 1984, vol. 6, part III, p. 1317). Elites' rotation makes today's rulers concerned about their well-being after losing power, with the privileges and protection that it confers. The prospect of being "like everyone else" and exposed to the institutions available for 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 and Persico, 2004) or impose checks and balances to make institutions more cohesive and restrict expropriation by elite group in power (Besley and 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 first-best equilibria which are not affected by political constraints. Bourguignon and 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 reward him afterwards and hence government turnover strengthens the incentive to improve institutions.

Incentives of the ruling group to maintain good institutions for future use require institutional path dependency so that decisions of today's ruler who has the discretion to shape institutions will still have an impact tomorrow when institutions may or may not any longer be under his control. There are two main mechanisms to maintain such path-dependency. In one of them institutions are sticky and hence institutional changes require some time to take effect (see e.g. Besley and Persson, 2011; Besley et al., 2012). According to North (1990), "the single most important point about institutional change …is that [it] is overwhelmingly incremental" (p. 89). Delay in implementing institutional change could be due to bounded rationality, reallocation of rents, conflict resolution and bargaining. The latter are common even in autocracies where leaders have to accommodate their support groups ("winning coalitions") to institutional and policy changes (De Mesquita et al., 2003) and re-allocate rents within "limited access order" (North et al., 2009). Institutions could also exhibit complementarity (Aoki, 2001) and other kinds of mutual interdependence, which could delay the implementation of institutional changes. In addition institutions are both rules and equilibria (Greif and Kingston, 2011) and equilibria adjustments to changing rules could be delayed due to the inertia of slower-moving behavioral norms, patterns, and conventions (Roland, 2004).[4]

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' pacts or settlements (O'Donnell and Schmitter, 2013; Burton and Higley, 1987). Equilibria institutions are credible commitments (subgame perfect equilibria) of the whole elite class, with their own trigger strategies to prevent defection. Unlike the conventional theory of endogenous property rights (Besley and Ghatak, 2010), in the present case trigger 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

[4]Sticky institutions could still exhibit substantial change, even in a relatively short period of time; inertia does not prevent institutional change, but makes it less drastic.

severe punishment is a grim trigger when any deviation leads to a complete collapse of cooperation thereafter (Dixit et al., 2000).

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. Thus political uncertainty makes up for a lack of veto points in ensuring inter-elites cooperation (De Figueiredo, 2002). 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 et al., 2012).

Our hypothesis presented in the introductory section highlights elites' asset ownership as another factor contributing to property rights protection. Conventional wisdom has it that economic inequality (increased by massive asset ownership by the elites) adversely affects the quality of institutions and public policies (Keefer and Knack, 2002; Chong and Gradstein, 2007; Easterly, 2007). In democracies the concentration of wealth leads to excessive re-distribution (Meltzer and Richard, 1981), whereas in autocracies political and economic inequalities are correlated and feed upon each other (Acemoglu and Robinson, 2012). Wealth creates the economy of scale advantages in rent-seeking (Polishchuk, 2013; see also Murphy et al., 1993), and as a result wealthier agents oppose competition and market development (De Soto, 2003; Rajan and Zingales, 2004) and secured property rights (Polishchuk and Savvateev, 2004).

However McGuire and Olson (1996) saw a bright side of elites' asset ownership — it 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 their ownership of market assets and the protection of property rights.

This link however is not particularly robust. Suppose for example that assets of elites and of the rest of society ("masses") are located in non-overlapping sectors of economy which require different types of public production inputs.[5] In such case, according to Polishchuk (2013), elites' asset ownership indeed increases the supply of "their own" public production inputs, but reduces the supply of

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

public production inputs required elsewhere in the economy, including secure property rights. This could be the case when elites own assets 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 et al., 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 (1996) logic implicitly assumes the equal treatment principle which is unlikely to be honored 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.

3 The model

There are $n = 2$ elite groups, which replace each other in power (extension to $n > 2$ is straightforward). Power change is a Poisson stochastic process with hazard rate λ, and hence the probability that the incumbent elite group will continuously stay in power for at least another t years equals $\exp(-\lambda t)$. The hazard rate is given exogenously and characterizes the rate of ruling elite turnover.

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 $w_i \geq 0$; $w_1 + w_2 \leq 1$. A unit of production assets generates one unit of returns per period. The quality of property rights protection at time t is measured by the share $a \equiv a(t) \in [0,1]$ of the income generated by assets that asset owners can keep; the balance of the assets' returns is expropriated by the ruling elite group $i \equiv i(t)$ which is in power at time t (the other elite group $j \neq i$ is also a victim of such expropriation). Hence the consumption of group i at time t equals $w_i + (1 - a(t))(1 - w_i) = 1 - a(t)(1 - w_i)$, while the consumption of the other group is $a(t)w_j$ (there are no savings and investments in the model). Both groups are of equal size, and have the same neoclassical per unit of time utility function $U(c)$. Discount coefficient equals δ.

There is no political accountability of elites to the society, and institutional choices are driven entirely by elites' self-interest. We assume path dependency caused by institutional inertia; it was argued in the preceding section that such assumption reflects fundamental features of real-life institutional change. Institutional inertia means that changes, if any, of the property rights regime initiated

by the ruling elite group will not have full effect immediately. In other words, while the incumbent group determines the rules of the game, enactment and enforcement of the selected rules could be stretched over a period of time. To simplify exposition, we assume a fixed enactment lag $\tau > 0$, so that $a(t) = b(t-\tau)$, where $b(t-\tau)$ is the property rights regime selected at time $t-\tau$ by the elite group which holds power at that time. A more general version of the model with distributed lags produces qualitatively identical results.[6]

We are interested in Markov perfect equilibria where an incumbent elite group i plays a pure strategy $b_i(t) = b_i^*$ as long as it stays in power, and after a power shift the other group j plays for the duration of its term a strategy $b_j(t) = b_j^*$, etc. Group i maximizes its expected discounted utility $\int_t^\infty U(c_i(s))\exp(-\delta s)\,ds$, where the consumption $c_i(s)$ equals $w_i + (1-b(s-\tau))(1-w_i)$ if group i is in power at time s, or $b(s-\tau)w_i$ otherwise. Here $b(s-\tau)$ is the institutional choice of the group in power at time $(s-\tau)$.

To characterize equilibrium strategies b_1^*, b_2^*, denote $\pi = p(\tau) \equiv \frac{1}{2}(1-\exp(-2\lambda\tau))$ the probability that a group that holds power at time t will not hold power at time $t+\tau$ (which means that there is an odd number of power shifts in the period $[t, t+\tau]$); with the residual probability $1-p(\tau) \equiv \frac{1}{2}(1+\exp(-2\lambda\tau))$ the incumbent group at time t will also be in power at time $t+\tau$.[7] Notice that π increases in the hazard rate λ and hence can be considered as another measure of elite rotation.

Proposition 1. *Equilibrium strategies b_1^*, b_2^*, are as follows:*

$$b_i^* = \arg\max\left\{\pi U(bw_i) + (1-\pi)U(1-(1-b)(1-w_i))|0 \le b \le 1\right\},\ i = 1,2.^{8} \qquad (1)$$

■

Proofs of this and other propositions are presented in the Appendix A. Intuitively, suppose that the incumbent group i deviates for a short period of time from its equilibrium strategy b_i^*. After τ

[6] Our approach is more flexible than the "…assumption (which is common in the literature on endogenous institutions …that the incumbent government can bind its successor one period ahead" (Besley and Persson, 2011, p. 267; see also Besley et al., 2012) In the general distributed lag model one has $a(t) = \int_{t-\tau}^{t} b(s)\,d\Phi(t-s)$, for some cumulative lag distribution function Φ. In particular one could have $1 > \Phi(0) > 0$, in which case institutional changes partly (with a positive weight) have immediate effect.

[7] for small λ and/or τ one has $\pi \approx \lambda\tau$.

[8] In the case of distributed lags described in Footnote 6 equation (1) still holds with $\pi \equiv \int_0^\tau p(x)\,d\Phi(x) = p(\tau) + \lambda\int_0^\tau \Phi(x)\exp(-2\lambda x)\,dx$. For example, if $a(t) = \sigma b(t) + (1-\sigma)b(t-\tau)$, i.e. institutions at time t reflect elites' choices at times t and $t-\tau$ with weights σ and $1-\sigma$, then $\pi = \frac{(1-\sigma)}{2}(1-\exp(-2\lambda\tau))$, or, for small λ and/or τ, $\pi \approx (1-\sigma)\lambda\tau$. As before, π increases in λ and can be considered as a measure of elite rotation.

units of time, when the decision comes into effect, this group will be holding power with probability $1-\pi$ and will be out of power with the residual probability π. The maximand in equation (1) is proportional to the expected utility of such deviation.

Our parameters of interest are elite rotation π and wealth w_i. Comparative statics analysis of the optimal solution of problem (1), $b_i^* = b^*(\pi, w_i)$ is straightforward (in what follows we drop subscripts). For interior solutions $b^* \in (0,1)$ one has

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

Proposition 2. *Whenever*

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

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

The intuition behind this result becomes clear if a deviation $b < 1$ from fully secured property rights is viewed as acquiring $(1-b)$ units of a 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 3. *The equilibrium level of property right protection b^* monotonically increases from 0 to 1 in the elites' rotation rate in the range $\pi \in [0, 1-w]$ and remains equal 1 for $\pi \geq 1-w$.* ■

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 some additional assumptions, as is illustrated by the following

Proposition 4. *If at least one of the following conditions holds for all $z > 0$:*

(i) absolute risk aversion $R(z) \equiv -\dfrac{U''(z)}{U'(z)}$ is non-decreasing, or

(ii) relative risk aversion $r(z) \equiv -\dfrac{zU''(z)}{U'(z)}$ does not exceed unity,

then the equilibrium level of property rights protection b^* monotonically increases from 0 to 1 in elites' market assets size $w \in [0, 1-\pi]$, and remains equal 1 for $w > 1-\pi$. ■

It is known from the portfolio theory that the holding of a risky asset decreases in wealth in the case of increasing absolute risk aversion of the portfolio owner. Condition (i) is in agreement with this result in the light of the above offered interpretation of insecure property rights as an investment in a risky asset: wealthier agents reduce their risk exposure, i.e. opt for better protection of property rights.[9] In the case of decreasing absolute risk aversion the same comparative statics result holds under condition (ii).

Proposition 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 actually *complements*. This can be seen 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 $b^* = 0$, 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.[10]

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 monotone transformations of b^*, i.e. to the selection of property rights measurement scale. For example, for Cobb-Douglas specifications $U(z) = z^{1-\beta}$ one can verify that $\dfrac{\partial^2 \ln b^*}{\partial \pi \partial w} > 0$.

The above analyses demonstrate that elites' rotation and wealth contribute to the security of property rights, but do so only in combination with each other.[11] We now turn to testing this conjecture empirically.

[9] This analogy however is incomplete, since in our case the risky asset itself depends on wealth, and hence condition (i) is sufficient, but not necessary; for details see the proof of Proposition 4 in the Appendix A.

[10] The conclusion that sufficiently sizable 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.

[11] In an alternative model of path dependency endogenous property rights obtain as a subgame perfect Nash equilibrium where strategies of elite groups reflect past history of their interaction. Elites can cooperate with each other by refraining from full expropriation while in power on the expectation of reciprocity after a power shift. In the case of defection the cooperation breaks down and all elite groups resort to full expropriation thereafter (Dixit et al., 2000). One can show that the set of sustainable allocations where defection does not occur expands as elite rotation accelerates, and for high rotation rates this set includes first-best Pareto efficient outcomes, where political constraints are not binding (Acemoglu et al., 2011). However such models say nothing about the actual institutional outcomes of elite interaction, other than stating that the set of such outcomes grows bigger, and hence have a lower predictive power than the approach presented in this section.

4 Data and measurement

To test the above theories, we have assembled a unbalanced panel comprising 110 developed and developing nations and spanning from 2000 through 2009. Panel data are recorded on yearly basis. Panel structure of the data is essential for obtaining consistent estimations in a cross-country analysis which would otherwise be beset by biases due to unobservable of omitted variables that do not evolve over time. We also take advantage of panel data "built-in" instruments to test for endogeneity by using an Arelano-Bond estimator (Section 5.3). A full list of variables is presented in Table 1, Table 2 shows summary statistics. In Table B.1 in the Appendix B we report pairwise correlations of variables, and in Table B.2 we list all countries which appear in the panel.

4.1 Property rights protection

Our main dependent variable *property rights* is based on the Fraser Institute's Economic Freedom of the World dataset (Gwartney et al., 2012). We select two indexes from this dataset: (i) Protection of property rights, and (ii) Judicial independence. The second index is added due to the key role of independent judiciary in the security of property rights (Voigt and Gutmann, 2013). We take the first principal component of these indexes and normalize it to zero mean. Our property rights measure exhibits substantial fluctuations not only between nations, but also over time (Table B.2): the median (across countries in the sample) standard deviation of property rights in a given country over the observation period equals 30% of the total standard deviation of property rights in the panel across time and space.

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 et al., 2010). Some of these measures are based on expert opinions, which could be biased by the "halo effect" (Bardhan, 2005), when assessments of economic outcomes are automatically extended onto institutions. Importantly, Fraser Institute's measures do not involve experts' judgments and rely instead on business communities' assessments collected in the Global Competitiveness Report prepared for the World Economic Forum (Schwab, 2013).

4.2 Rotation of ruling elites

There are various measures of political instability used 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 (Beck et al., 2001). This measure, calculated annually, shows the ratio of the number of exits of veto players in a given country during a given year to the number of veto players at the beginning of the year. A veto player, according to Tsebelis (2002), is a political actor who can block a move from the status quo and otherwise influences 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 account of political instability.[12] This 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; Cheibub et al., 2010; Svolik, 2012; Justesen, 2013) would not be appropriate for establishing an impact of the perceived likelihood of power change on property rights. Indeed, what is required for our purposes is a hazard rate, which is affected by a number of factors and cannot be predicted by durability alone (Sanhueza, 1999). Regime tenure measures are still useful for our purposes, but for a different reason — as proxies of elites' asset ownership, rather than their turnover (see Section 4.3).

We assume that incumbent elites form expectations of the likelihood of losing power by ob-

[12] Still, this measure does not fully reflect important features of political institutions, such as the distinctions between parliamentary and presidential systems. However such distinctions are less relevant for nominal democracies and autocracies which are countries of interest for our analysis.

serving the 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.[13]

4.3 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 asset ownership and rely instead on two alternative proxies. The first one is general economic inequality which serves as an estimate of the (relative) size of elites' assets. Such proxy selection is motivated by 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 divide between higher and lower inequality countries, where the former are expected to have higher asset ownership by ruling elites.

Economic inequality is a crude proxy for the wealth of ruling elites, and in order to verify our findings from an independent source, we use chief executive's tenure in office as an alternative proxy for elites' wealth. Proverbial kleptocracy, grand corruption and embezzlement by non-democratic regimes (Rose-Ackerman, 1999; Ezrow and Frantz, 2011) lead to the assumption that in weak democracies and autocracies (where we expect to find confirmation of our hypotheses) ruling elites can take advantage of being in power to amass personal wealth, and hence the duration of staying in power could indeed be used as a proxy for elites' asset ownership.

The variable required for our purposes is the length of stay in power of an incumbent Chief Exec-

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

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 et al., 2012).
turnover	Average share of veto-players leaving their office for previous 20 years based on *stabns* measure from Database of Political Institutions (Beck et al., 2001).
non-democracy score	$(10 - \text{Democracy score})$, where Democracy score is from Polity IV Project (Marshall and Jaggers, 2012).
inequality	Gini coefficient from Standardized World Income Inequality database (Solt, 2009).
chief executive tenure	Chief Executive current tenure in office. Based on data from Democracy and Dictatorship Revisited dataset (Cheibub et al., 2010).
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.

utive since taking the office until the year of observation. Such data are available from the Democracy and Dictatorship Revisited (DD) dataset (Cheibub et al., 2010) which covers years 1946-2008 and almost all the countries in our sample (other similar data sources have narrower geographic coverage).

4.4 Control variables

An important objective of our empirical analysis is 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 particular property rights regimes, or, as it is claimed in the paper, that political elites are motivated by their immediate self-interests, based on the concerns about their well-being after losing power. As it was argued earlier, we do not expect to find a robust association between elite rotation and property rights in fully developed democracies, because grassroots political pressure could either strengthen or weaken the protection 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 and Jaggers, 2012). We prefer *democ* to the resulting *polity2* index, because it better reflects variations in democratic quality, especially in the

Table 2: Descriptive statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
property rights	972	0.00	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
inequality	767	0.37	0.10	0.22	0.67
school enrolment	851	104.89	10.73	63.53	154.15
ln(population)	952	9.50	1.63	5.61	14.10
ln(GDP)	952	9.05	1.25	5.60	11.29
natural resources	941	6.60	11.43	0	63.95
chief executive tenure	845	5.19	5.64	1	39

middle of the range, by taking account of electoral processes and checks and balances, which restrict the executive authority. In what follows we re-scale this index into a non-democracy score which 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 regimes. One of the controls is GDP per capita — according to 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 enrollment (the same "development hypothesis" suggests that education strengthens the demand for sound institutions and advances reforms establishing such institutions); population (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 et al., 2006 and Mehlum et al., 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.

5 Estimation results

5.1 Elites' rotation and property rights

Our theory predicts that in less democratic countries ruling elites' rotation and asset ownership should be positively associated with 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. The panel spans over 10 years from 2000 through 2009 and relates the quality of property rights protection in a given year and country to the rotation of ruling elites estimated over the preceding twenty years period:

$$(\text{property rights})_{it} = \alpha + \beta(\text{turnover})_{it} + \gamma_k(\text{controls})_{itk} + \epsilon_{it} \tag{4}$$

Estimation results are reported in Column 1 of Table 3. The coefficients for *turnover* is positive, but insignificant, and the same remains true after the inclusion of various sets of controls (we do not present here such robustness tests). Hence the rotation of ruling elites for democracies and non-democracies 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:

$$(\text{property rights})_{it} = \alpha + \beta(\text{turnover})_{it} + \mu(\text{turnover}^2)_{it} + \gamma_k(\text{controls})_{itk} + \epsilon_{it} \tag{5}$$

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.[14] 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 $turnover = 0.16$. We divide all countries into groups of high turnover (turnover is higher than 0.16 at least for one year of observation) and low turnover otherwise. For lower rotation rates the coefficient for elites' turnover

[14] Recall that Campante et al. (2009) observed a U-shaped relationship between corruption and elite rotation.

Table 3: Baseline model estimation

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Sample	**Full sample**				**Low turnover**	**High turnover**
Dependent variable	**property rights**				**property rights**	
turnover	**0.469**	**5.392*****	**4.345*****	**4.226*****	**2.365****	**-1.334***
	[0.76]	[1.58]	[1.41]	[1.35]	[1.17]	[0.71]
turnover^2		**-15.50*****	**-13.15*****	**-13.51*****		
		[4.01]	[3.74]	[3.43]		
ln(GDP)				1.097***	0.923**	1.305***
				[0.315]	[0.40]	[0.47]
school enrolment			-0.001	-0.001	-0.003	-0.001
			[0.00]	[0.00]	[0.01]	[0.00]
ln(population)			0.351	1.062	0.604	2.375**
			[0.58]	[0.655]	[0.92]	[1.03]
natural resources			-0.003	-0.006	-0.001	-0.010*
			[0.00]	[0.00]	[0.00]	[0.01]
Observations	962	962	840	840	427	413
Number of id	110	110	102	102	54	48
R^2-within	0.435	0.453	0.474	0.497	0.412	0.600

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

becomes positive and significant at the 5% level (Column 5), whereas in the higher rotation range this coefficient turns negative, but becomes much smaller in absolute value and less significant (Column 6). Controls have the expected signs, but are mostly statistically insignificant, except for GDP per capita.

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 parabola 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 near-median threshold level) is 0.1, whereas for the rest of the sample formed by stronger democracies this average is 0.16.[15] 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.

[15] The actual gap in average rotation rates between democracies and non-democracies is probably even higher, because over the time span of observation the political changes were mostly 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.

Table 4: Extended model estimation

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Dependent variable	**property rights**					
turnover	**0.627**	**-0.744**	**0.136**	**-0.699**	**-0.064**	**-0.941**
	[0.78]	[0.88]	[0.70]	[0.89]	[0.64]	[0.80]
non-democracy score	**-0.020**	**-0.132****	**-0.063*****	**-0.141*****	**-0.055****	**-0.136****
	[0.02]	[0.06]	[0.02]	[0.05]	[0.02]	[0.05]
non-democracy score × turnover		**0.570****		**0.398***		**0.417***
		[0.27]		[0.22]		[0.21]
ln(GDP)					1.187***	1.196***
					[0.29]	[0.29]
school enrolment			-0.001	-0.002	-0.001	-0.001
			[0.00]	[0.00]	[0.00]	[0.00]
ln(population)			0.646	0.615	1.447**	1.421**
			[0.58]	[0.56]	[0.64]	[0.62]
natural resources			-0.004	-0.004	-0.007	-0.007*
			[0.00]	[0.00]	[0.00]	[0.00]
Observations	920	920	802	802	802	802
Number of id	104	104	96	96	96	96
R^2-within	0.443	0.454	0.481	0.485	0.508	0.513

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

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

$$\begin{aligned}(\text{property rights})_{it} = \alpha + \beta(\text{turnover})_{it} + \delta(\text{non-democracy score})_{it} + \\ \varphi(\text{interaction})_{it} + \gamma_k(\text{controls})_{itk} + \epsilon_{it},\end{aligned} \tag{6}$$

which in addition to model (4) 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).

In all estimations with 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 $[\beta + \varphi(\text{nondemocracy score})_{it}]$. For the estimation reported in Column 6 of Table 4, the cutoff 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 by using the same cut-off level 2 of the *non-democracy score*, and estimate the baseline model (4) for each of the halves. Estimation results presented in Table B.3 show that for less democratic countries the impact of ruling elites' rotation is positive and statistically significant, whereas for more democratic ones

it is of much lower magnitude and statistically insignificant. To summarize the above findings, we can conclude that the rotation of ruling elites indeed improves the protection of property rights under non-democratic regimes and has no such effect in democracies.

5.2 Role of asset ownership

We now turn to testing the complementarity between elites' rotation and their ownership of market assets, and begin with the first proxy of asset ownership of those outlined in Section 4.3, i.e. economic inequality. The positive association between elites' rotation and the security of property rights that we have just established for non-democracies is consistent with the contributing role of asset ownership proxied by inequality, since the latter is common among non-democracies (see e.g. Acemoglu and Robinson, 2012; according to Table B.1, the correlation between the non-democracy score and Gini coefficient for our sample equals 0.31).

To find direct evidence of the expected complementarity, we further divide the subsample of less democratic countries into quarter-samples with high and low inequality levels by using the above introduced cut-off of the Gini coefficient 0.4. Estimation results of the baseline model for each of the quarter-samples are reported in Table 5.[16] 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 6, Table B.3) 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 there are no statistically significant associations between elites' rotation and the security of property rights (Columns 3–4, Table 5). The reported estimation results are robust to the inclusion of different sets of controls (we do not show here such estimations).

To further stress that elites' asset ownership complements elites' rotation in securing property rights only for weak democracies and autocracies, we perform a series of regressions for rolling subsamples starting from 568 most democratic country-years (with non-democracy scores less or equal

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

Table 5: Baseline model estimation on quarter-samples

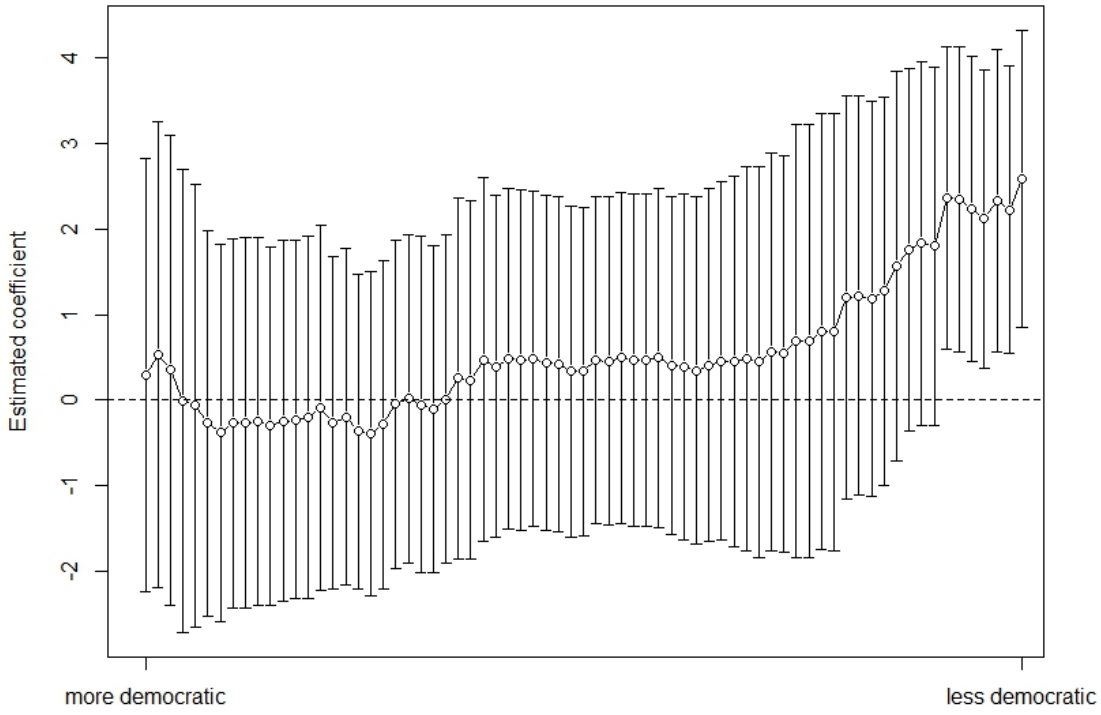
Model	**(1)**	**(2)**	**(3)**	**(4)**
Sample	**non-democracy score>2**		**non-democracy score≤2**	
	inequality>0.4	**inequality≤0.4**	**inequality>0.4**	**inequality≤0.4**
Dependent variable	**property rights**		**property rights**	
turnover	**3.029*****	**1.370**	**-0.051**	**-1.100**
	[0.93]	[3.28]	[1.24]	[0.92]
ln(GDP)	0.778	1.140**	0.358	1.823***
	[0.53]	[0.45]	[0.56]	[0.50]
school enrolment	-0.005*	0.008	0.000	-0.002
	[0.00]	[0.01]	[0.01]	[0.01]
ln(population)	0.511	3.622***	-0.081	1.037
	[1.36]	[1.10]	[1.88]	[1.68]
natural resources	-0.013	-0.012	-0.002	-0.032***
	[0.01]	[0.01]	[0.01]	[0.01]
Observations	131	112	163	364
Number of id	23	22	22	41
R^2-within	0.597	0.634	0.661	0.483

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

the median among all observations with available Polity IV data), and sliding the subsample upwards along the non-democracy axis by adding 10 observations at the top and removing another 10 at the bottom. In each of these rolling subsamples we retain observations with inequality level above the 0.4 cut-off, and estimate regressions of property rights on elites' turnover with the same set of controls as above. The results are presented on Figure 1, where the regression coefficients of the turnover variable are marked by circles, and vertical segments show the 95% confidence intervals. The graph demonstrates that the coefficients of interest are close to zero and statistically insignificant for sub-samples of stronger democracies, but increase steeply and become significant for weak democracies and autocracies, consistently with what we expect.

Another proxy for asset ownership — tenure of chief executives — needs to be properly modified before it can be entered in our regression models. On the one hand, short term in power is insufficient to amass significant assets that would affect autocrats' attitudes to property rights. On the other hand, after a certain number of years in power the contribution of a yet another year to asset accumulation should be declining. To account for such nonlinearity, we estimate for the subsample of less democratic

Figure 1: Rolling subsample regression



countries the following family of regression models:

$$\begin{aligned}(\text{property rights})_{it} = \alpha + \beta(\text{turnover})_{it} + \omega\, \mathbb{1}(\text{chief executive tenure} > s)_{it} + \\ \varphi(\text{interaction})_{it} + \gamma_k(\text{controls})_{itk} + \epsilon_{it},\end{aligned} \tag{7}$$

where $\mathbb{1}(\text{chief executive tenure} > s)_{it}$ is a dummy variable which is equal one if by year t in country i the incumbent chief executive has been in power continuously for more than s years, and zero otherwise. Estimation of such models for $s = 1,2,\ldots$ produces qualitatively similar results, where coefficients β and φ are positive, and ω — negative. For small s the significance of these coefficients is low or absent, but it rises in s (and so does the value of coefficient φ), reaches a peak at $s = 6$, and starts declining afterwards.[17] This is consistent with the above reasoning as to how autocrat's tenure affects asset accumulation and hence the attitude to property rights.

Estimation results of model (7) for $s = 6$ with various sets of controls are presented in Table 6. In

[17] To put this in a perspective, for 738 autocrats in the Svolik (2012) dataset, their average stay in power was 12.4 years, whereas the median stay in power — just 3.2 years, or well short of the six years "saturation threshold" (Holcombe and Boudreaux, 2013). According to Ezrow and Frantz (2011), average number of years in office is 10 years for "personalist dictators", 8 years for single-party dictators, and 3 years — for military dictators.

Table 6: Regression of Property Rights Protection index on Turnover, Dummy for Chief Executive Age in Office being greater than 6 and interaction term for subsample of less democratic countries (non-democracy score > 2)

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Dependent variable	**property rights**				
turnover	2.888***	2.807***	1.618	1.372	1.859*
	[1.153]	[1.041]	[1.122]	[1.111]	[1.075]
turnover $\times \mathbb{1}$(**executive age in office** > 6)	2.924***	2.538***	2.950***	2.748***	2.200***
	[1.043]	[0.728]	[0.822]	[0.816]	[0.745]
$\mathbb{1}$(**executive age in office** > 6)	-0.190*	-0.178*	-0.207*	-0.186*	-0.194*
	[0.102]	[0.0925]	[0.107]	[0.106]	[0.114]
ln(GDP)		1.164**	1.387***	1.429***	0.731*
		[0.457]	[0.258]	[0.217]	[0.426]
ln(population)			2.488***	2.859***	1.015
			[0.760]	[0.764]	[1.110]
natural resources				-0.00797*	-0.00360
				[0.00429]	[0.00462]
school enrolment					-0.00245
					[0.00312]
Observations	298	298	298	297	242
Number of id	46	46	46	46	40
R^2-within	0.483	0.511	0.533	0.535	0.531

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

these specifications the interaction term has a positive coefficient which is significant at the 1% level, thus confirming that elites' rotation and asset ownership are indeed complements. The coefficient of elites' rotation alone is positive, but only mildly significant or, depending on controls, altogether insignificant. This means that without sufficient assets owned by an autocrat political instability does not create strong incentives to protect property rights, in agreement with the "roving bandit" metaphor. Finally, the negative coefficient ω is significant at 10% level for all sets of controls. This means that a "stationary bandit" who has had time to accumulate significant assets and faces no perceptible risk of losing power is not interested in good institutions, as predicted by Acemoglu (2006).

The above analysis also reconciles our findings with those of Holcombe and Boudreaux (2013) who observed a positive association between institutional quality and the tenure of autocrats. This observation does not contradict our claim that government rotation in autocracies could improve property rights, since autocrat's tenure is a proxy of asset ownership, whereas elites' rotation is a hazard rate-type characteristic of a polity at large, rather than its individual representatives. Such hazard rate should be estimated over a long period of observations potentially including several autocrats who kept power for different lengths of time.

5.3 Path dependency and endogeneity

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 as, when appropriate, lagged controls, and estimate the following regression models:

$$(\text{property rights})_{it} = \alpha + \theta(\text{property rights})_{i(t-1)} + \beta(\text{turnover})_{it} + \gamma_k(\text{controls})_{i(t-1)k} + \epsilon_{it} \tag{8}$$

$$(\text{property rights})_{it} = \alpha + \theta(\text{property rights})_{i(t-1)} + \beta(\text{turnover})_{it} + \mu(\text{turnover}^2)_{it} + \gamma_k(\text{controls})_{i(t-1)k} + \epsilon_{it} \tag{9}$$

The estimation results are presented in Table B.4 in the Appendix B. When model (9) is estimated for the full sample, and model (8) — for half-samples of less and more democratic countries (Columns 1–3), 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 (9) reported in Column 1 of Table B.4 is qualitatively similar to the estimation of model (4) 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 (8) for more and less democratic subsamples (Columns 2–3 of Table B.4) produce results similar to those reported in Columns 7–8 of Table B.3 — elites' rotation matters for property rights when democracy is lacking, and is irrelevant otherwise.

The estimation results of model (8) for the quarter-samples reflecting various combinations of democracy and economic inequality (Columns 4–7 of Table B.4) are consistent with those with no lagged variables (Table 5) — the only combination in which the elites' rotation is relevant for property rights is of high inequality (proxying elites' asset ownership) and a lack of democracy. Notice that for this combination the joint effect of elites' rotation and asset ownership is powerful enough to suppress path dependency — the lagged property rights variable is statistically insignificant in Column 4, while it is highly significant in Columns 5–7, where the above effect of rotation and asset ownership is weakened or absent.

Since property rights fluctuations are moderated by institutional inertia, a one year lag could be insufficient to properly test for path dependency.[18] To address this concern, we include in our

[18] We are grateful to a reviewer of the Journal for pointing out to the need of path dependency analysis for earlier years.

estimation, still for the quarter-sample of interest, i.e. comprised by non-democracies with high economic inequality, lagged property rights for year $t-s$, $s \geq 1$, an report estimations for $s = \overline{1,4}$ in Table B.5 (this time there are no lags in control variables). Estimation results are qualitatively identical to those reported in Column 4 of Table B.5 — elites' rotation remains significant at the 0.01 level and suppresses path dependency.[19]

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 Granger causality test to see whether lags of main dependent variable *property rights* are good predictors of *turnover* and vice versa. The estimation results of fixed effects models with lagged *property rights* are reported in Table B.6. There is no impact of lagged property rights protection on the rotation of ruling elites, which rejects the above reverse causality hypothesis.

Another reverse causality could be suspected in using economic inequality as a proxy for elites' asset ownership and observing inequality's impact for the protection of property rights. One could argue that property rights protection in its turn affects inequality (e.g. better protection of property rights boosts entrepreneurial activity which could deepen inequality). To rule out such concerns we perform Granger causality test for lagged property rights explaining inequality (Table B.7) and find no evidence of the above conjecture.

Finally, 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, when lags are essentially used as instrumental variables (Arellano and Bond, 1991). We perform such procedure using the bias-corrected fixed effects estimator (Bruno, 2005) for two sub-samples with high and low inequality, and present estimation results in Table B.8 and Table B.9. For high inequality (elite's asset ownership) countries the impact of elites' rotation remains positive and significant at the 1% level in a bias-corrected estimation, and no such effect is observed for lower inequality (elites' asset ownership) countries.

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

[19] Lags of 5 years and more leave too few observations in the truncated panel, and the quality of estimation deteriorates.

6 Concluding remarks

Democracies and autocracies alike could violate private property rights and 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 deliver robust economic performance.

More recent studies indicate that government turnover could be beneficial for development, but there is a risk that 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 their combination strengthen autocrats' incentives to protect property rights. Turnover of asset-owning elites creates a dynamic version of checks and balances in non-democratic polities. 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 also noteworthy that such effect is specific to autocracies and weak democracies, where the combination of power shifts and asset ownership serves as a substitute for conventional democratic accountability.

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 just economic, but also political institutions: 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 the event 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 Proofs of Propositions

Proof of Proposition 1

Assume that group i holds power at time t, and consider for a small $\epsilon > 0$ and $b^0 \in [0,1]$ the following "spike variation" $\widetilde{b}_i(s)$ of the strategy b_i^*: (i) $\widetilde{b}_i(s) = b^0$ for $s \in [t, t+\epsilon]$, unless group i loses power before $s = t+\epsilon$, in which case b^0 is played until the first power shift, and both groups play their initial strategies afterwards; and (ii) group i reverts to its original strategy b_i^* for $s > t+\epsilon$. The strategy b_j^* of group j remains unchanged. One can verify that the change ΔU_i of group i's expected utility from time t onwards allows the following representation:

$$\Delta U_i = \Big\{ \Big[\pi U(b^0) + (1-\pi)U(1-(1-b^0)(1-w_i))\Big] - \Big[\pi U(b_i^* w_i) + (1-\pi)U(1-(1-b_i^*)(1-w_i))\Big] \Big\} \times \exp(-2\lambda\epsilon) \int_\tau^{\tau+\epsilon} \exp(-\delta t)\, dt + D(b^0, \epsilon),$$

where $\lim_{\epsilon \to 0} \dfrac{D(b^0,\epsilon)}{\epsilon} = 0$ uniformly by b^0. (The expression $\exp(-2\lambda\epsilon)$ is the probability that the incumbent group at time t will stay in power at least until $t+\epsilon$, and that the incumbent group at time $t+\tau$ will stay in power at least until $t+\tau+\epsilon$; given the nature of the Poisson process, these are independent events).

One has $\Delta U_i \leq 0$, and therefore

$$0 \geq \lim_{\epsilon \to 0} \frac{\Delta U_i}{\epsilon} = \Big\{ \Big[\pi U(b^0 w_i) + (1-\pi)U(1-(1-b^0)(1-w_i))\Big] - \Big[\pi U(b_i^* w_i) + (1-\pi)U(1-(1-b_i^*)(1-w_i))\Big] \Big\} \exp(-\delta\tau),$$

for any b^0, which entails Proposition 1. ■

Proof of Proposition 2

Since $b^* w + 1 - b^* \geq b^* w$, the left-hand side of the first-order condition (2) is less than or equal to one. On the other hand inequality (3) holds if and only if the right-hand side of (2) is greater than or equal to one, and therefore whenever $\pi + w \geq 1$, the corner solution $b^* = 1$ obtains. ■

Proof of Proposition 3

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

Proof of Proposition 4

When $w = 0$, $b^* = 0$ - 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 ($b^* = 1$). In the $(0, 1-\pi)$ range the problem (1) has an interim solutions, and differentiating the first-order condition (2) by w yields

$$\frac{\partial b^*}{\partial w}\Big[w^2 R(b^* w) + w(1-w)R(b^* w + 1 - b^*)\Big] = \frac{1}{1-w} + b^* w\Big[R(b^* w + 1 - b^*) - R(b^* w)\Big].$$

Since $b^* w + 1 - b^* \geq b^* w$, the required result immediately follows from condition (i). Alternately observe that $b^* w R(b^* w) = r(b^* w) \leq 1 < 1/(1-w)$, and the same result follows from (ii). ■

Appendix B Tables

Table B.1: Pairwise correlations of variables

	property rights	turnover	inequality	non-democracy score	school enrolment	ln(population)	ln(GDP)	natural resources	chief executive tenure
property rights	1.00								
turnover	**-0.12***	1.00							
inequality	**-0.51***	0.01	1.00						
non-democracy score	**-0.33***	**-0.42***	**0.31***	1.00					
school enrolment	**-0.12***	-0.03	**0.21***	0.02	1.00				
ln(population)	**-0.21***	**0.10***	**0.12***	0.05	0.06	1.00			
ln(GDP)	**0.69***	**0.06***	**-0.53***	**-0.48***	**0.09***	**-0.21***	1.00		
natural resources	**-0.23***	**-0.24***	**0.24***	**0.45***	-0.04	-0.00	**-0.07***	1.00	
chief executive tenure	-0.01	**-0.41***	0.04	**0.53***	**0.12***	**-0.11***	-0.05	**0.39***	1.00

*p-value < 0.05

Table B.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 B.3: Baseline model estimation on subsamples

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Sample	**non-democracy score**							
	>2	**≤2**	**>2**	**≤2**	**>2**	**≤2**	**>2**	**≤2**
Dependent variable	**property rights**							
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 B.4: Lagged dependent variable model estimation

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Sample	**full sample**	**non-democracy score**		**non-democracy score>2**		**non-democracy score≤2**	
		>2	**≤2**	**inequality>0.4**	**inequality≤0.4**	**inequality>0.4**	**inequality≤0.4**
Dependent variable	**property rights$_t$**						
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 B.5: Estimations with multi-year lags

Model	**(1)**	**(2)**	**(3)**	**(4)**
Dependent variable	**property rights$_t$**	**property rights$_t$**	**property rights$_t$**	**property rights$_t$**
property rights$_{t-1}$	0.113			
	[0.102]			
property rights$_{t-2}$		0.172		
		[0.102]		
property rights$_{t-3}$			-0.149	
			[0.120]	
property rights$_{t-4}$				0.0777
				[0.0904]
turnover$_t$	3.821***	4.706***	5.517***	6.739***
	[1.109]	[1.537]	[1.564]	[2.270]
school enrolment$_t$	-0.00544	0.00236	0.00123	0.00356
	[0.00347]	[0.00426]	[0.00669]	[0.0136]
ln(population)$_t$	-0.126	-1.402	-1.874	-2.319
	[1.206]	[1.839]	[2.176]	[2.457]
ln(GDP)$_t$	0.721	0.872	1.066	1.899*
	[0.481]	[0.560]	[0.654]	[1.064]
natural resources$_t$	-0.0115	-0.0111	-0.0138	-0.0122
	[0.00738]	[0.00999]	[0.0108]	[0.00722]
Observations	113	98	83	70
Number of id	22	21	19	17
R^2-within	0.713	0.717	0.733	0.654

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

Table B.6: Reverse causality test: Regression of Turnover on lagged Property Rights Protection index

Model	**(1)**	**(2)**	**(3)**
Dependent variable	**turnover$_t$**		
turnover$_{t-1}$	0.582***	0.538***	0.479***
	[0.04]	[0.05]	[0.04]
property rights$_{t-1}$	**-0.002**		
	[0.00]		
property rights$_{t-2}$		**0.002**	
		[0.00]	
property rights$_{t-3}$			**0.000**
			[0.00]
non-democracy score	-0.001	-0.001	-0.001
	[0.00]	[0.00]	[0.00]
school enrolment$_{t-1}$	-0.000	-0.000	-0.000
	[0.00]	[0.00]	[0.00]
ln(population)$_{t-1}$	-0.020	-0.052	-0.034
	[0.04]	[0.04]	[0.04]
ln(GDP)$_{t-1}$	0.012	0.008	-0.006
	[0.02]	[0.02]	[0.02]
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

Table B.7: Reverse causality test: Regression of Inequality on lagged Property Rights Protection index

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Sample	**non-democracy score>2**			**full sample**		
Dependent variable	**gini$_t$**			**gini$_t$**		
property rights$_{t-1}$	-0.342			-0.158		
	[0.655]			[0.279]		
property rights$_{t-2}$		-0.00681			-0.135	
		[0.529]			[0.262]	
property rights$_{t-3}$			-0.265			-0.156
			[0.509]			[0.256]
school enrolment$_t$	0.0947*	0.114	0.0359	0.0462	0.0262	-0.00430
	[0.0495]	[0.0781]	[0.0729]	[0.0302]	[0.0416]	[0.0319]
ln(population)$_t$	-11.01	-11.66	-11.38	-22.24***	-22.91**	-22.54**
	[14.27]	[14.16]	[15.48]	[8.064]	[9.126]	[10.51]
ln(GDP)$_t$	8.079	13.37+	13.77	-0.767	-0.235	-0.530
	[6.353]	[9.784]	[11.66]	[2.452]	[3.046]	[3.109]
natural resources$_t$	-0.0129	0.0124	0.00676	0.00723	0.0239	0.0236
	[0.0457]	[0.0645]	[0.0750]	[0.0277]	[0.0414]	[0.0425]
Observations	141	114	91	606	523	439
Number of id	32	29	28	93	91	90
R^2-within	0.324	0.310	0.294	0.152	0.123	0.114

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

Table B.8: Bias-corrected dynamic fixed effects model estimation

Model	**(1)**	**(2)**	**(3)**	**(4)**
Sample	**inequality>0.4**	**inequality≤0.4**	**inequality>0.4**	**inequality≤0.4**
Dependent variable	**property rights$_t$**			
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.

Table B.9: Dynamic fixed effects model estimation on subsamples with bias-corrected fixed effects estimator

Model	**(1)**	**(2)**	**(3)**	**(4)**
Sample	**non-democracy score>2**		**non-democracy score≤2**	
	inequality>0.4	**inequality≤0.4**	**inequality>0.4**	**inequality≤0.4**
Dependent variable	**property rights$_t$**		**property rights$_t$**	
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.