The Political Economy of Rule of Law Enforcement: Interdependence between Political and Economic Choices under Imperfect Information

by
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The focus of this paper is the analysis of the creation of the "rules of the game" in the legal development process within countries where we observe slow evolution of political institutions and simultaneously fast evolution of economic ones. The paper investigates a coordination game where the executive of the government is fully informed and committed to the rule of law enforcement, whereas a continuum of managers faces imperfect information and it is keen to strip assets against the law. A diffused information on the institutional quality of the country would create an incentive to reduce stripping. In fact the existence of good institutions is not a sufficient condition to conduce to the rule of law enforcement due to the need to spread the information about their strength. High institutional quality can increase the likelihood of rule of law enforcement only when there is diffused information among managers, whereas high uncertainty is conducive to poor rule of law enforcement. If good institutions and diffused information do not go hand-in-hand, there is scope for the co-existence of poor property rights protection notwithstanding fast market reforms implementation. This result is robust to the sequential or simultanous structure of the game and highlights the key importance of the information component. (JEL: D81, K42, P26)

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1 Introduction and Motivation

The transition process from a politically centralized economy to a democratic society entails the fundamental reshaping of the legal institutions within a country. Abrupt political changes might well result in a window of opportunity to implement for pro-development reforms, such as the enforcement of the property rights within the rule of law, broad access to those rights and predicatble rules uniformely enforced by courts and regulators. These are all elements of a democratic society. However, the transition process could be also characterized by wide asset-stripping, self-dealing, consumptions of perks, outright expropriation of shareholders (expecially small shareholders), tunnelling, creative accounting, short-termism, lobbying to limit active monitoring, etc. This might happen because some politicians and managers maintained the control of the physical capital from the planned economy but did not pay the full market prices for those 'privatized' assets (Campos and Giovannoni [2006]): this phenomenon was a clear infringement of the rule of law[1]. Rule of law has hardly emerged in some economies such as Russia or Ukraine and the level of corruption -a mirror image of the absence of the rule of law enforcment- is still a relevant phenomenon.

In figure 1 the relationship between corruption and transition progress is shown (see Figure 1[2]). This paper is rooted in the stream of research on the institutional development of emerging markets, where uncertainty impinges on the possibility to enforce the rule of law[3]. At the start of the transition process, some scholars (e.g. Boycko, Shleifer and Vishny [1995]) argued that the rule of law enforcement was a "second order phenomenon": as soon as the property rights had been sufficiently widespread (despite the fact that they were not yet protected), citizens and economic agents like firms, corporations, etc. would have formed political constituencies acting as social pressure groups that in turn would have lobbied politicians to adopt policies with the aim of protecting those property rights. These authors' position has been challenged by Hoff and Stiglitz [2004a] and Hoff and Stiglitz [2008]. The basic idea of these authors is that "the probability distribution of the political outcome depends on the fraction of the population that chooses to build value, which itself depends on the probability of the political outcome".

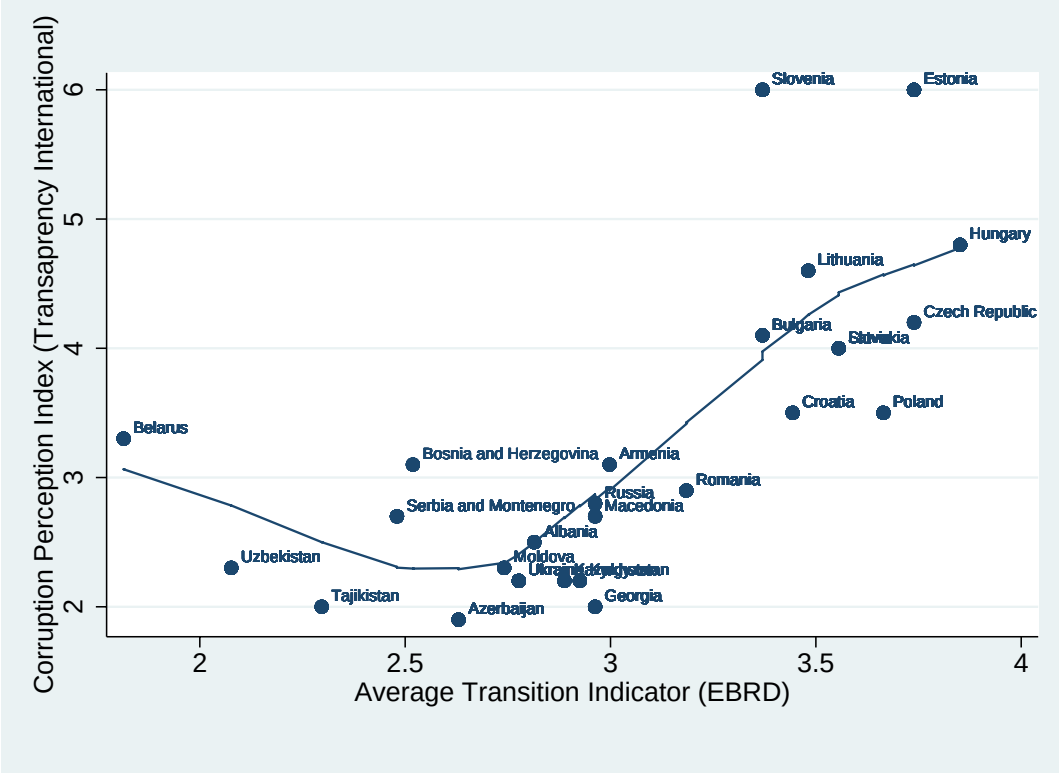
[1]For a broader definition of rule of law see $http://usinfo.state.gov/dhr/democracy/rule\_of\_law.html$: "the principle that all members of society, both citizens and rulers, are bound by a set of clearly defined and universally accepted laws. In a democracy, the rule of law is manifested by an independent judiciary, a free press and a system of checks and balances of leaders through free elections and separation of powers among the branches of government".

[2]The European Bank for Reconstruction and Development has been working on the 'Transition Indicators' of institutional development for over a decade. A joint EBRD-World Bank project has been conducted with the aim of collecting and analysing data and related information on the "Business Environment and Enterprises Performance surveys" (BEEPs) in 27 transition economies. One of the questions the study has been trying to answer is the reason behind the weak enforcement of property rights and, consequently, the feeble penetration and respect of the "rule of the game" in the legal, judicial or court systems of ex-centralized economies. See European Bank for Reconstruction and Development [2005].

[3]See Roland [2004], who investigates the role of different institutions in different transition phases and recognizes the difficulty in assessing the magnitude of the institutional development of a country.

Figure 1

Corruption Index and EBRD Transition Indicator, 2005



The corruption Index is measured on an inverted scale (6 = low corruption). The EBRD Transition Indicator is measured on an increasing scale (4 = high score, strong institutions) as an average of 9 Transition Progress Indicators. *Sources*: Transparency International and EBRD.

Stemming from this contribution, we focus on the relationship between rule of law enforcment and institutional quality in countries in the process of transition from planned to market economy (transition economies) as well as underdeveloped countries with weak property rights' institutions (e.g. Sub-Saharan Africa). Starting from the analysis of Weingast [1997] who suggests that there is a "[...] the remarkable variation among states in the rule of law, a set of stable political rules and rights applied impartially to all citizens", the following research questions are put forward: first, is it possible to avoid the trap of bad democratic governance, low property rights protection, strong power concentrated in the hands of a few rich oligarchs, no clear mechanism for enforcing checks and balances and no clear separation between legitimate and illegitimate actions? Second, what is the explanation for the persistence of lawlessness in some transition and developing countries despite their progress in the quality of market institutions? What is the role of the diffusion of information within this mechanism?

The paper is organised as follows: section2 covers a short literature review focused on game theoretic contributions on rule of law enforcement; section 3 presents the building blocks of the model; the model is solved for the equilibrium under imperfect information in section 4, where we also draw some policy implications[4]; finally section 5 suggests some points as conclusion.

2 Literature Review

On the one hand, within the political science literature there has been a wide investigation of rule of law enforcment (Licht, Goldschmidt and Schwartz [2007]), for example in the realm of historical events connected to abrupt political changes [5]. On the other hand, within the law and economics stream Cooter [1996] highlithed the differences between *rule of law state* and *rule of state law*[6], where the former involves the enforcement of property rights, widespread respect of the law, and low level of corruption, whereas the latter entails a non-democratic state with poor law enforcement.[7] In fact, the con-

[4]For a comparison with the perfect information setting see section 6 in the appendix.

[5]North and Weingast [1989] analyse the historical context of the 1688 Glorious Revolution in England, which entailed a delicate interaction between state and civil society. Weingast [1997] models this interaction in a coordination game framework, where a self-interested sovereign state decides in favour of the rule of law towards two groups of citizens. The forward looking state expects both groups to challenge its decision to enforce the rule of law and therefore it maximises its payoffs by transgressing.

[6]Cooter [1996]:

> "The Soviet Union exemplified the rule of *State law*, [...]. Since state law did not respond to morality, spontaneous support for law by citizens was weak. Soviet citizens, who were accustomed to a low level of spontaneous support for law by citizens, must have expected this tradition to continue after the Soviet government collapsed. These expectations created a self-fulfilling prophesy and caused the system to equilibrate with low private support for state law, which in turn made state law ineffective. The situation is the opposite of the rule of *law State* [...]".

[7]See Dixit [2004] for a comprehensive review of literature on the phenomenon of lawlessness. The author points out that, even under well functioning laws, "imperfect information, externalities and

tribution by Katz [2008] contends that the efficacy of different enforcement mechanisms depends on the costs of information and other transaction costs as well as their complementarity/sustitutability with the government tribunal system.

Murphy, Shleifer and Vishny [1993] and Sonin [2003] focus on the rent-seeking behavior of state-oligarchs in presence of individual incentives to break the rule of law, i.e. by paying bribes and avoiding taxes. Roland and Verdier [2003], Hoff and Stiglitz [2004a] and Hoff and Stiglitz [2008] model strategic complementarities and determine the existence of multiple equilibria in same context we are analysing in this paper where the ex-ante weak demand for rule of law is endogenously determined by the low expecation to be enforced, ex post.[8].

This paper starts from the assumption that good market institutions are not a sufficient condition for the establishment of good "rules of the game" in the realm of property rights enforcement. Inadequate institutions are instrumental to a likely decrease in property rights protection, but sound legal institutions might contribute to an improved rule of law enforcement *only if* there is diffused information about the strength of those institutions. In other words good institutions and good information about institutions are not necessarily found together. Blurred visibility of institutional strenght is, per se, an institutional weakness.

We model the behaviour of a continuum of managers acquiring the control over enterprises' assets after privatization of state-owned business activities. These mangaers evaluate strategically whether to build value from the assets, i.e. by making an irreversible investment, or to strip assets by tunneling their value away. Imperfect information on the institutional quality (e.g. government tribunal system) entails a blurred perception of other players' action. The model assumes that the executive of the government is fully informed on the quality of institutions and it choose either to enforce well-defined property rights under the rule of law, or to abandon the economy to anarchy. Players' payoffs are affected by strategic complementarities. In other words, this papers starts from a context of coordination failure *á la* Carlsson and van Damme [1993a] with multiple equilibria in presence of coordination failure/strategic complementarities.

The model predicts that whenever there is an high uncertainty in the number of managers stripping assets (institutionally weak society) and the sunk costs in enforcing the rule are high, we observe a convergence towards a lawlessness economy. The opposite happens if the institutions are sounds, the economy's assets are valuable and asset-stripping is costly (for example in a well enforeced government tribunal system). In the former case the economy will be jeoparised and in the latter will thrive.

3 The Model

This paper builds on the framework outlined by Hoff and Stiglitz [2004a] in the post-privatization context of transition economies. When there is a transfer of control rights

imperfect competition are well-recognized causes of market failures, and they can exist *regardless* of whether a government adequately protects property rights and enforces contracts."

[8]As the authors recognize, multiple equilibria outcomes do not allow for clear policy recommendations, the reason being that there is no specific indication on which equilibrium is selected.

over to private actors, there might be an increased demand for rule of law enforcment, precisely in order to protect those rights. Privatised assets owners might simply vote for rule of law enforcement. These individuals are concerned with the wealth they can obtain from the privatized assets, and they can build value or stripp assets. Strategic complementaries entail higher benefits of bulding value in rule of law led country. However, uncertainty about when the rule of law will be established may lead some individuals to choose stripping assets, for example by converting corporate assets to private use. Lastly,if this is the casethere might be an incentive to postpone the establishment of the rule of law and vote "out" good government. The authors assume perfect information on the ability of asset-stripping. This paper, on the contrary, assumes imperfect information as far as the institutional quality is concerned as well as the ability of asset-stripping.

3.1 Players' Strategies

A continuum of managers has control rights over enterprises' assets[9] and decides on either building value or stripping those assets. The executive of the government - the ultimate owner of the monopoly of public order and law - will decide whether to protect property rights via rule of law enforcment or surrend to anarchy.

We call θ the economy institutional quality, uniformly distributed on the [0,1] interval. High θ is attached to 'high type' economies, while low θ characterizes 'low type' economies. Neither the managers' nor the executive's actions have any effect on this variable. However, agents must guess the value of θ, while the executive has always perfect knowlegde, i.e. there is no uncertainty whatsoever on the parameter of the game for the government. This is a simultaneous model and therefore is meant to explain the determinants of rule of law enforcment given the quality of formal institutions, namely θ, that is predetermined. The model therefore explains the supply and demand of rule of law once the institution's quality and the information attached to it is known form the past. This implies the existence of two layers of institutions, a fast moving one -the rule of law- and a slow moving one -the fundamentals- (Roland [2004], Williamson [2000]). In the analysis of the short-medium run, the papers assumes that the former is endogenous and the latter is exogenous.

Managers have expectations on the establishment of the rule of law: as a general rule, they prefer to strip assets and whisk capital if they expect not to get full protection of property of the controlled assets in the future[10], as Stiglitz explains: "If you got \$1-\$2 billion in assets through illegal privatization, you would fear the next government in power would take it back so the best thing to do is *not* to reinvest in the country but to take it out as fast as you can. By moving assets to Western countries, oligarchs enjoyed the best of two worlds: they had property rights protected abroad and weak rule of law at home."

[9]See Hoff and Stiglitz [2008] on the difference between control and property in the context of transition countries.

[10]In line with Hoff and Stiglitz [2004a] the story behind the demand for law enforcement is a simplification the hypotheses put forward by the vast literature on rule of law and property rights protection.

Government executive and agents compete for the same assets. These assets can be either stolen and therefore will be poor provision of public goods or they can be protected by the government, which will redistribute them in the form of a public good, under the hypothesis of a benevolent executive. It is possible to think at the case in which agents calcalate rationally whether to evade taxes according to the expectation to be detected and punished by the rule of law enforcement. The social surplus is the sum of private and public goods and is maximized when the rule of law is implemented and there is value creating managerial action.

3.1.1 Explaining the Strategies

- **Executive of the government** The Executive of the government prefers rule of law but this is not always her optimal choice. In fact she decides whether to fully enforce the rule of law by getting the assets γ -for example via tax collection- and to redistribute them in the form of a public good, or to abandon the economy to anarchy[11] by getting nothing.

- **Managers** Managers prefer the absence of the rule of law in order to have better control over enterprises assets γ, for example by tax evasion. However this is not always their optimal choice, especially if they are caught: they can choose to strip (whisk capital in a safe place, tunnel value out) or to build value by investing.

3.2 The Enforcing (executive) and Stripping (managers) Technology

The payoff of the executive and agents is linked to other players' action. The former gains in two cases: the economy has a high institutional quality (high θ), and the percentage of managers stripping assets $\alpha \in [0, 1]$ is low. In other words, it is easier to enforce the rule of law in a high institutional type economy when few managers strip assets.

Managers are faced with the opposite situation. Their payoff is positively correlated with the number of other agents stripping assets (α), and inversely correlated with the institutional type of the economy (θ).

The executive faces a cost in enforcing, while the agents face a cost in stripping. Two cases are explained in order:

- Given θ, the higher the number of managers stripping asset, the higher enforcment costs and the lower the stripping costs[12];

- Given α, the higher the institutional quality the lower the enforcement costs and the higher the stripping costs.

[11] The anarchy concept as in Hoff and Stiglitz [2004a] and Hoff and Stiglitz [2004b] Hoff and Stiglitz [2008].

[12] The direct spillover effect among managers is *not* necessary to obtain the coordination failure result in Morris and Shin [1998]. On the contrary, in this paper that effect does matter in terms of equilibrium outcome. Strategic interactions among players have been modeled in a similar theoretical fashion by Cooter [1996] and Roland and Verdier [2003].

It is now possible to compute executive's and agents' payoffs as the difference between the benefits and the costs of their actions (given the actions of all others players). We will review case by case and summarize payoffs in table 1.

- **Executive enforcing** Assets under the rule of law are worth γ (e.g. tax collection). In the case in which the executive enforces the rule of law, it pays a cost split in two components: k is the fixed cost independent from agents' action, and $c(\alpha, \theta) = \alpha - \theta$ is the other component, i.e. α represents the proportion of stripping managers and θ is the economy institutional quality. The overall costs $[k + \alpha - \theta]$ are increasing in k, α and decreasing in θ, $\frac{\partial c}{\partial \alpha} > 0$, $\frac{\partial c}{\partial \theta} < 0$. If the executive enforces the property rights, its payoff is the assets' value minus the cost of the enforcement action, $\gamma - [k + \alpha - \theta]$. The linear cost function $c(\alpha, \theta) = \alpha - \theta$ has a straightforward interpretation: the government benefits whenever the θ are "higher" than the number of stripping managers ($\alpha < \theta$), given that the population size is normalised to 1[13].

- **Executive not enforcing** She does not protect any asset and does not pay any cost. Her payoff is 0 and anarchy prevails[14].

- **Managers stripping** The agents pay a cost split in two components: a fix cost t and a variable cost increasing in θ and decreasing in α. In other words, they pay t and gain $\alpha - \theta$ (the opposite of government variable costs)[15], i.e. each manager benefits whenever $\alpha > \theta$. Think of α as the total number of stripping managers out of a pool of θ potentially honest managers, as if the economy had a level of dishonest people $1 - \theta$. If all the potentially honest people were stripping ($\alpha > \theta$), then the government would be paying a cost to enforce, while the agents would benefit by widespread dishonesty. By the same token, if $\alpha < \theta$, then the government is in a stronger position and managers lose from stripping due to the social stigma. However, they are rewarded differently according to the executive's action:

  - **executive enforcing** The state gains γ and the payoff of stripping is therefore $0 - [t - \alpha + \theta]$;

[13] I assume that $c(\alpha, \theta) = \alpha - \theta$ because this is a simple linear function increasing in the proportion of stripping managers α and decreasing in the economy institutional quality level θ. Morris and Shin [1998] assume a generic monotonic and continuous function $c(\alpha, \theta)$ and derive and prove the unique equilibrium result. A linear function, both monotonic and continuous, satisfies the conditions for the existence of a unique equilibrium. The model is therefore a sub case of their analysis.

[14] It would be possible to consider an out of equilibrium outcome in which the state gets γ in case nobody strips even if the rule of law is not implemented. However this out of equilibrium outcome has a zero *de-facto* probability, i.e. there will always be a noise stripper, and it is then irrelevant in the analysis of equilibria selection in the multiple agents game. This is not the case in a single agent game (see appendix).

[15] The hypothesis that the agents' variable costs are equal in value and opposite in sign with respect to the government's variable costs is a simplification taken for convenience. Any other costs functions, increasing in α and decreasing in θ for the government and vice-versa for the agents would lead to the same conclusions. For an interpretation see Appendix.

– **executive not enforcing** The value of stripping is γ, i.e. private agents indeed strip all assets: the payoff is $\gamma - [t - \alpha + \theta]$[16].

- **Managers not stripping** They get 0, having no gain[17] and no costs.

Table 1

Basic Payoff Matrix

*Agent(s)**Executive*	Enforce	not Enforce
Build Value	$0; \gamma - [k + \alpha - \theta]$	$0; 0$
Strip Assets	$-[t - \alpha + \theta]; \gamma - [k + \alpha - \theta]$	$\gamma - [t - \alpha + \theta]; 0$

[18]

A comparison with Morris and Shin [1998]. The model presented in this paper differs with respect to Morris and Shin [1998]: the agents' cost of stripping is endogenously determined by the number of stripping managers, in line with Cooter [1996] and Roland and Verdier [2003] models of rule of law. There is a "positive" externality in case of many agents stripping, in other words the cost of asset-stripping inversely depends on α. This extension of the model does have relevant implications. Coordination failure among agents and uncertainty are deeply connected: if agents could coordinate, e.g. by forming a coalition in a cooperative game framework, they could pool their idiosyncratic pieces of information and overcome the individual uncertainty for the sake of the common knowledge. Vice-versa, in a non-cooperative and more realistic imperfect information model each and every manager exploits the idiosyncratic piece of information to maximize her own utility *vis-a-vis* the behavior of all other players, and then coordination failure occurs.

This paper will show that coordination failure among managers is always conducive to an unique equilibrium, regardless of the time structure and the existence of uncertainty *á la* Morris and Shin [1998]. The paper novelty is therefore rooted in this finding, by partially extending Morris and Shin [1998] result and by enriching our understanding of the role of uncertainty *versus* coordination failure in a model of rule of law as analysed in Cooter [1996], Roland and Verdier [2003] and Hoff and Stiglitz [2004a].

Assumptions.

Strictly dominated strategies emerge for a particular set of parameters.

[16]The hypothesis underneath table 1 is that each agent i strips a tiny fraction of the whole γ, being the population a continuum of size 1. However, this is just a *scale effect* that is not affecting any result in the equilibrium solution.

[17]In case of enforcing of the rule of law also the managers, who are also voters, get a slice of the public good but this is infinitesimal with respect to the case of stripping the assets only for them.

[18]The payoff function is unchanged for the executive in case of bulding value vis-a-vis stripping. We would espect the payoff of the former case to be higher than the latter. The results of the model are unchanged as far as the payoff for the executive when enforcing while managers strip assets is greter than zero.

- $\theta = 0$**, i.e. lowest institutional quality:** when the economy has the minimum "institutional type" ($\theta = 0$), the number of stripping managers is irrelevant. Even with $\alpha = 0$, the cost for the government is higher than the value of the rule of law and therefore the state's payoff is $\gamma - k - \alpha + 0 < 0 \quad \forall\alpha \Rightarrow \gamma - k - 0 + 0 < 0 \Rightarrow k > \gamma$;

- $\alpha = 1$, i.e. **all agents strip**. In the case in which all agents strip assets, the government has a negative payoff despite the fact that the economy type could be the best ($\theta = 1$) and therefore the state's payoff is $\gamma - k - 1 + \theta < 0 \quad \forall\theta \Rightarrow \gamma - k - 1 + 1 < 0 \Rightarrow k > \gamma$;

- $\theta = 1$, i.e. **best economy institutional quality**: when the economy has the maximum "institutional type" ($\theta = 1$), no matter how many agents decide to strip (even $\alpha = 1$), the stripping fixed cost will always overcome the gain, and the manager's payoff is $\gamma - t + \alpha - 1 < 0 \quad \forall\alpha \Rightarrow \gamma + 1 - 1 - t < 0 \Rightarrow t > \gamma$.

From figure 2 and 3 it also turns out that $k - \gamma \leq 1, t - \gamma \leq 1, \gamma + 1 - t \leq 1, \gamma + 1 - k \leq 1$, rearranging:

$$0 < \underline{\theta} < 1 \Leftrightarrow \gamma \leq k \leq \gamma + 1 \tag{1}$$

$$0 < \overline{\theta} < 1 \Leftrightarrow \gamma \leq t \leq \gamma + 1 \tag{2}$$

$$\underline{\theta} < \overline{\theta} \Leftrightarrow k + t - 1 < 2\gamma \tag{3}$$

Following Obstfeld [1996] and Morris and Shin [1998] we can now divide the parameter θ space in three intervals:

- **anarchy/hell** $[0, \underline{\theta}]$. The condition under which anarchy is the dominant strategy for the executive is $k + \alpha - \underline{\theta} > \gamma \quad \forall\alpha \Rightarrow \underline{\theta} = (k - \gamma | \alpha = 0) > 0 \Rightarrow k > \gamma$ as in the worst economy institutional environment case. Below $\underline{\theta}$ "not to enforce" is a dominant strategy for the government;

- **rule of law** $[\overline{\theta}, 1]$. The condition under which building value is a dominant strategy for the managers is $\gamma - t + \alpha - \overline{\theta} < 0 \quad \forall\alpha \Rightarrow \overline{\theta} = (\gamma + 1 - t | \alpha = 1) > 0 \Rightarrow t > \gamma$ as in the best economy institutional environment case. Above $\overline{\theta}$ agents have no incentive to strip, their costs outweigh their benefits, then "building value" is a dominant strategy for the agents;

- **indetermined** $[\underline{\theta}, \overline{\theta}]$.

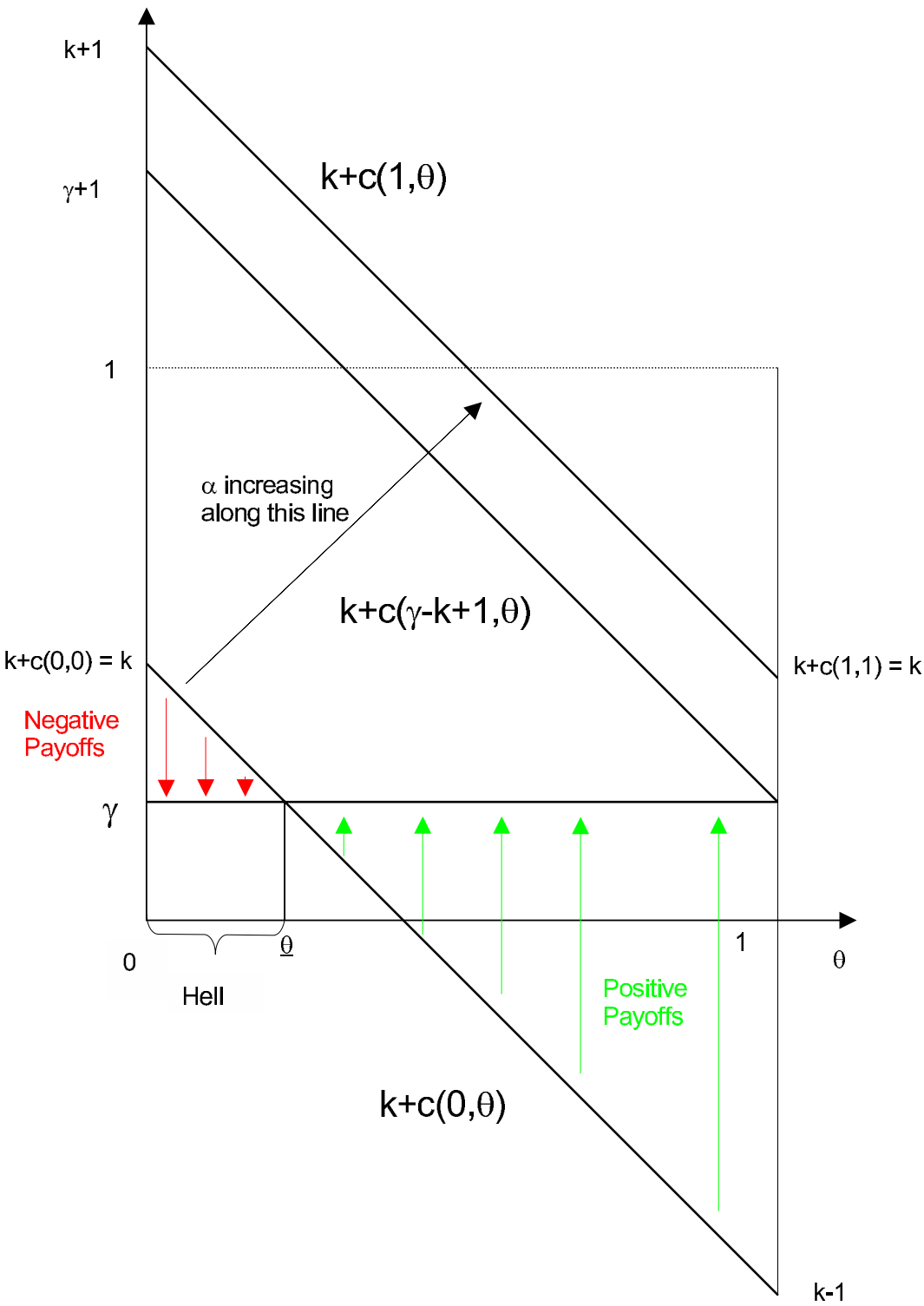
Non strictly dominant strategies emerge if

$$\theta \in [max\{0, k - \gamma\}, min\{1, \gamma + 1 - t\}] \tag{4}$$

Outside these thresholds there are strictly dominant strategies and corners solutions are observed as shown in figures 2 and 3 "hell" and "heaven" areas.

Figure 2

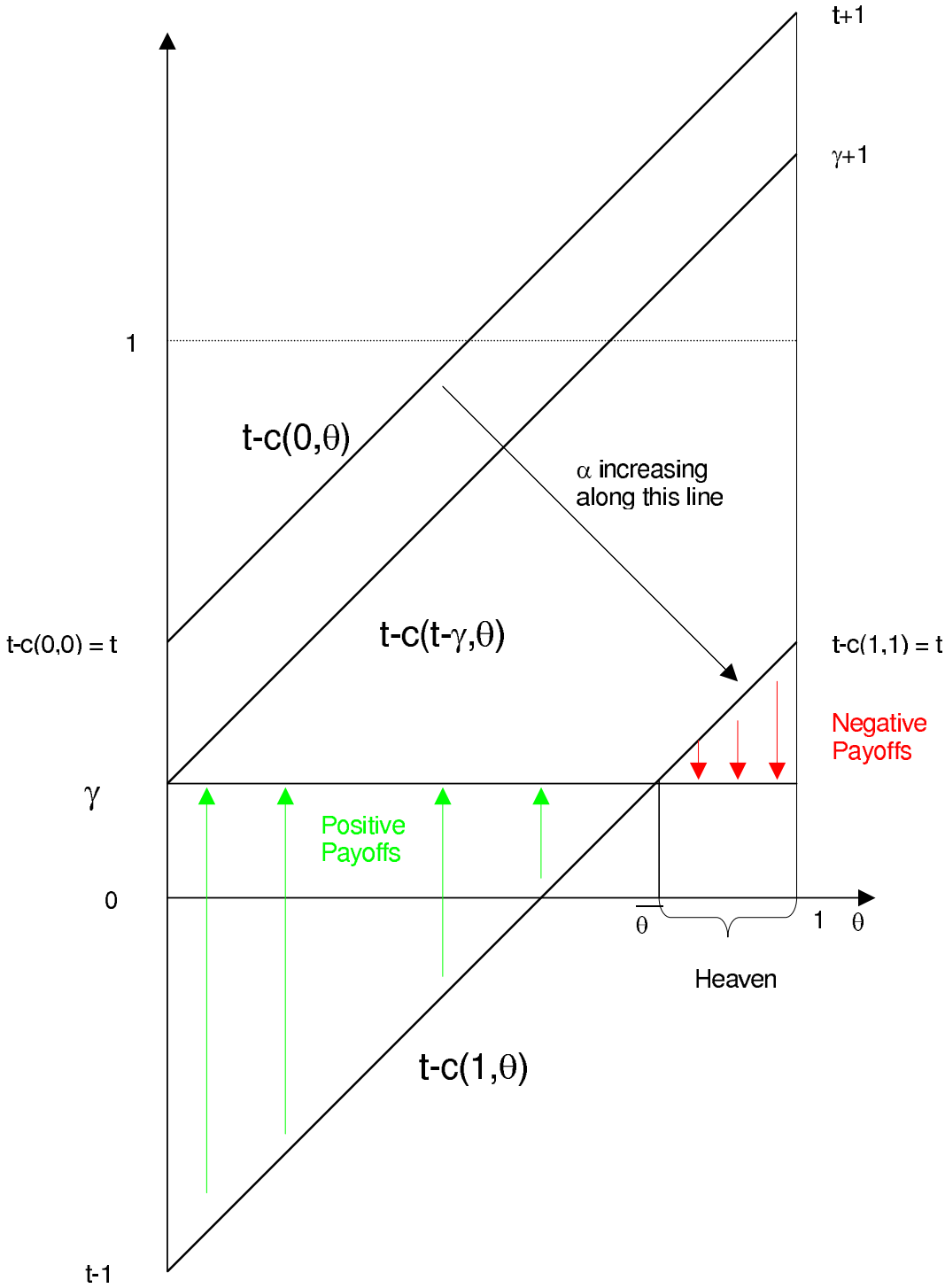
Payoff Function



State's Payoff: $\gamma - [k + \alpha - \theta]$

Figure 3

Payoff Function



Agents' Payoff: $\gamma - [t - \alpha + \theta]$

Figure 4

Timing: Sequential Play and Uncertainty

$$\begin{array}{ccccc} [x_i = \theta + \varepsilon_i] & \longrightarrow & [\alpha \in [0,1]] & \longrightarrow & [RL\ vs\ not - RL] \\ \uparrow & & \uparrow & & \uparrow \\ [0] & & [1] : Managers & & [2] : Government \end{array}$$

A possible interpretation follows: in an economy where the enforcement depends only on the variable part $c(\alpha, \theta)$, being $k = 0$, the government will take a chance to enforce, despite the fact that the economy is extremely weak in terms of reform process. A possibility ruled out when $k > \gamma$ (there will always be a hell). Conversely, if $t > \gamma$, agents are no more attracted by the asset-stripping option in a strong economy (there will always be a heaven).

4 Imperfect Information Coordination Game: solving the Model

In this section the analysis focuses on the model in which an idiosyncratic perception of a noisy signal of the economy institutional environment by each and every manager determines a blurred perception of other agents' action. In other words, this allows for the heterogeneity in perception about the economy institutional quality and, as a direct consequence, about other players' actions. The model will be initially solved in an imperfect information sequential game framework (for the perfect information version see the appendix).

Multiple agents receive an idiosyncratic information about the economy institutional type, as in Morris and Shin [1998], namely agent i receives the signal $x_i = \theta + \varepsilon_i$ ($x_i \sim Uniform$ on $[\theta - \varepsilon, \theta + \varepsilon]$ with $\varepsilon > 0$). The signal x is uniformly drawn on the interval $[\theta - \varepsilon, \theta + \varepsilon]$ with $\varepsilon > 0$. Conditions (1), (2), (2) and (4) are again satisfied.

4.1 Sequential Game

Let us consider the sequential game: each and every agent receives an imperfect information about the economy institutional quality and the government plays only *after* having observed α and θ as shown in figure 4.

Managers are conscious that the decision of the executive is simply based on the observed α and θ. However $\alpha(\varepsilon_i)$ depends on ε_i, which is a random variable. To simplify the analysis we assume that each manager chooses in the following way according to an indicator function[19]:

[19] It turns out that this is the "optimal" strategy, see Morris and Shin [1998].

$$I_{x^*}(x_i) = \begin{cases} 1 & \text{if } x_i < x^* \quad \Rightarrow StripAssets \\ 0 & \text{if } x_i \geq x^* \quad \Rightarrow BuildValue \end{cases}$$

PROPOSITION 1 *In a sequential game in which a continuum of managers faces uncertainty about the economy institutional quality and coordination failure among themselves (sequential game with agents' imperfect information) there is* ***one Sequential Nash Equilibrium*** *determined by:*

$$x^* = \theta^* + \frac{\varepsilon[3\gamma - 2(k+t)]}{\gamma + 2t + 1} \tag{5}$$

$$\theta^* = \frac{\varepsilon[1 + 2(k-\gamma)] + \gamma(1 + k - \gamma) - t + \frac{1}{2}}{\gamma + 2\varepsilon + 1} \tag{6}$$

The rule of law is enforced if the value of θ is greater than θ^*. Otherwise anarchy prevails.

PROOF

Executive Action.

By backward induction we start looking at the decision rule of the government[20]. This is in fact simple, namely to implement the rule of law if a sufficiently low number of agents strip assets, and vice versa to be content with anarchy if too many of them strip assets, where $c(\alpha, \theta) = \alpha - \theta$[21].

$$\gamma - k - \alpha + \theta \geq 0 \Rightarrow RL \tag{7}$$

$$\gamma - k - \alpha + \theta < 0 \Rightarrow not - RL \tag{8}$$

The proportion of stripping managers (α) whose actions are sufficient to induce the abandonment of the rule of law by the executive[22], is:

$$\alpha(k, \theta, \gamma) = \begin{cases} 0 & \text{if } 0 \leq \theta < k - \gamma \\ \gamma - k + \theta & \text{if } k - \gamma \leq \theta \leq \gamma + 1 - t \end{cases}$$

The function $\alpha(k, \theta, \gamma)$ is increasing in θ (the higher the economy institutional quality, the easier the implementation of the rule of law) and γ (the higher the value of the assets, the higher the effort in property rights protection and therefore redistribution). The function is negatively affected by the sunk cost k. The executive observes

[20]For a similar modeling strategy see Bennet and Estrin [2006].

[21]The executive is able to know the exact number of agents stripping assets because it can measure the amount of investment in the economy. The lower the investment, the higher the stripping. An other way to think at this possibility is the tax evasion: stripping assets do not allow the state to apply taxes on evaded (e.g. tunneled abroad) money. The low tax collection is a indirect sign of high evasion.

[22]The attribution of the equal sign to the RL or not-RL is irrelevant. The probability that $\gamma - [k + \alpha - \theta] = 0$ is zero.

the proportion of stripping managers in the economy and it compares it with $\alpha(k, \theta, \gamma)$, the maximum number of stripping managers before anarchy prevails. The higher the economy institutional quality, the fewer the stripping managers and the higher the likelihood of rule of law enforcement. Vice-versa, the lower the economy institutional quality the higher the number of stripping managers and the lower the likelihood of rule of law enforcement.

Agents' Action.

Recalling the indicator function for each agent:

$$I_{x^*}(x_i) = \begin{cases} 1 & \text{if } x_i < x^* \quad \Rightarrow StripAssets \\ 0 & \text{if } x_i \geq x^* \quad \Rightarrow BuildValue \end{cases}$$

Each agent receives a noisy signal about the economy institutional type and she strips or not according to a simple threshold rule: strong signal, above $x^* \Rightarrow$ build value; weak signal, below $x^* \Rightarrow$ strip assets. The number of managers who will *actually* strip assets (call it $S(.,.)$) depends on the signal, that is uniformly distributed in the interval $x_i \sim U[\theta - \varepsilon, \theta + \varepsilon]$ and on the economy institutional quality θ. I distinguish three cases:

- $x^* > \theta + \varepsilon \Rightarrow \theta < x^* - \varepsilon$, the economy institutional quality is lower than the minimum signal any agent can see and everyone strips;
- $x^* < \theta - \varepsilon \Rightarrow \theta > x^* + \varepsilon$, the economy institutional quality is higher than the maximum signal any agent can see and building value prevails;
- $x^* \in [\theta - \varepsilon, \theta + \varepsilon]$ the stripping assets choice derives from the expected value of α, i.e. the overall level of stripping assets:

$$E(\alpha) = \frac{1}{2\varepsilon} \int_{\theta-\varepsilon}^{\theta+\varepsilon} I_{x^*}(x)dx = \frac{1}{2\varepsilon} \int_{\theta-\varepsilon}^{x^*} I_{x^*}(x)dx + \frac{1}{2\varepsilon} \int_{x^*}^{\theta+\varepsilon} I_{x^*}(x)dx =$$
$$\frac{1}{2\varepsilon}\left[x^* - (\theta - \varepsilon)\right] = \frac{1}{2} - \frac{(\theta - x^*)}{2\varepsilon}$$

Summarizing, the share of agents stripping assets is:

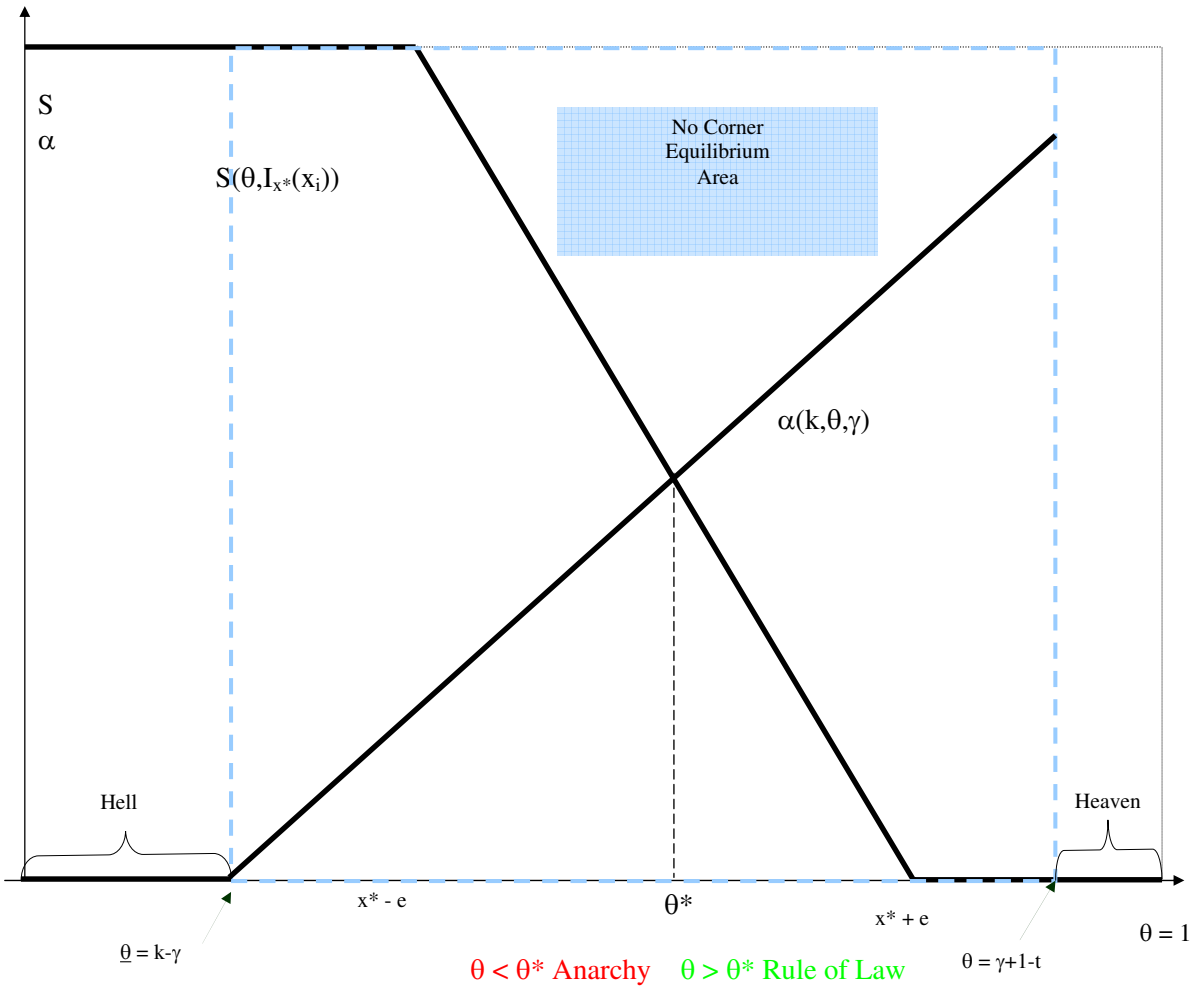
$$S(\theta, I_{x^*}(x_i)) = \begin{cases} 1 & \text{if } x^* > \theta + \varepsilon & \theta < x^* - \varepsilon \\ \frac{1}{2} - \frac{1}{2\varepsilon}(\theta - x^*) & \text{if } x^* \in [\theta - \varepsilon, \theta + \varepsilon] & \theta \in [x^* - \varepsilon, x^* + \varepsilon] \\ 0 & \text{if } x^* < \theta - \varepsilon & \theta > x^* + \varepsilon \end{cases}$$

4.1.1 Equilibrium

The two functions $\alpha(k, \theta, \gamma)$ (increasing in θ) and $S(\theta, I_{x^*}(x_i))$ (decreasing in θ) cross at the 'equlibrium value' θ^*:

Figure 5

Equilibrium: θ^*



$$\gamma - k + \theta = \frac{1}{2} - \frac{1}{2\varepsilon}(\theta - x^*) \Rightarrow \tag{9}$$

$$\theta^* = \frac{1}{1+2\varepsilon}\{x^* + \varepsilon[1 + 2(k-\gamma)]\} \tag{10}$$

$$\begin{cases} \theta > \theta^* & \Rightarrow \alpha(k,\theta,\gamma) > S(\theta, I_{x^*}(x_i)) \quad RL \\ \theta < \theta^* & \Rightarrow \alpha(k,\theta,\gamma) < S(\theta, I_{x^*}(x_i)) \quad Not - RL \end{cases}$$

The executive defends property rights and the rule of law is enforced if the proportion of agents stripping assets (S) is lower then the maximum bearable percentage (α). The opposite happens if the inequality is reversed and anarchy prevails, see figure 5[23].

Agents' payoff. Finally, we analyse the agent's uncertain payoff. We start from the payoff in case of asset-stripping, which depends on the subsequent action of the state with regards to the implementation or not of the rule of law.

$$h(\theta, x^*) = \begin{cases} \alpha - \theta - t & ;\theta > \theta^* \quad ;\alpha(\theta) > S(\theta, I_{x^*}(x)) \quad RL \\ \gamma + \alpha - \theta - t & ;\theta < \theta^* \quad ;\alpha(\theta) < S(\theta, I_{x^*}(x)) \quad Anarchy \end{cases}$$

$h(\theta, x^*)$ represents the realized payoffs in case of common knowledge (no uncertainty). On the contrary, agents observe an idiosyncratic noisy signal, taking their stripping vs. build decision on the basis of $E_i\{h(\theta, x^*)|x_i\} \lesseqgtr 0$. Solving for the expected value of the indifferent agent, I will show that x^* is indeed unique and that the strategy summarized by the indicator function $I_{x^*}(x)$ is the optimal strategy.

Every agent is identical and knows that the other agents face exactly the same problem, therefore a representative agent (subscript i dropped for simplicity) will compute the following expected value, knowing that the signals are distributed around $x_i \sim U[\theta - \varepsilon, \theta + \varepsilon] \Rightarrow \theta \in [x - \varepsilon, x + \varepsilon]$:

$$\frac{1}{2\varepsilon}\int_{x-\varepsilon}^{\theta^*}[\gamma + \alpha - \theta - t]d\theta + \frac{1}{2\varepsilon}\int_{\theta^*}^{x+\varepsilon}[\alpha - \theta - t]d\theta =$$

$$\frac{1}{2\varepsilon}\left[\int_{x-\varepsilon}^{x+\varepsilon}[\alpha - \theta - t]d\theta + \gamma\int_{x-\varepsilon}^{\theta^*}d\theta\right]$$

$$\frac{1}{2\varepsilon}\left[\int_{x-\varepsilon}^{x+\varepsilon}[\alpha - \theta - t]d\theta + \gamma(\theta^* - x + \varepsilon)\right]$$

The indifferent agent is the one observing exactly x^* (this agent exists due to the uniform distribution hypothesis of the noisy signals) and she does not gain nor lose from stripping, in other words $E_i\{h(\theta, x^*)|x_i^*\} = u(x_i^*, x^*) = 0$.

[23] If the θ^* was implicitly derived through $\alpha(k,\theta,\gamma) = S(\theta, I_{x^*}(x))$, then it could be shown that $0 < \frac{\partial\theta^*}{\partial x^*} < 1$: any increase in the agents' threshold rule positively affects (less then proportionally) the economy institutional quality threshold under which there is asset-stripping.

$$\frac{1}{2\varepsilon}\left[\int_{x^*-\varepsilon}^{x^*+\varepsilon}[\alpha-\theta-t]d\theta+\gamma(\theta^*-x^*+\varepsilon)\right]=0 \tag{11}$$

Solving for θ^* and exploiting 10:

$$x^*=\theta^*+\frac{\varepsilon[3\gamma-2(k+t)]}{\gamma+2\varepsilon+1} \tag{12}$$

$$\theta^*=\frac{\varepsilon[1+2(k-\gamma)]+\gamma(1+k-\gamma)-t+\frac{1}{2}}{\gamma+2\varepsilon+1}. \tag{13}$$

Q.E.D.

4.1.2 The case with No Uncertainty

Refer now to the limit of equilibria as the noise converges to zero, $\varepsilon \to 0$.

Corollary 1 *In a <u>simultaneous</u> (<u>sequential</u>) game with no uncertainty about the economy institutional quality (i.e. $\varepsilon \to 0$) and coordination failure among agents, there is* ***one Sub-Game Perfect Nash equilibrium*** *(****one Sequential Nash Equilibrium****) determined by:*

$$x^*=\theta^*=\frac{\gamma(1+k-\gamma)-t+\frac{1}{2}}{\gamma+1} \tag{14}$$

The rule of law is enforced if the value of θ selected by nature is greater than θ^*, otherwise anarchy prevails.

Proof This is the case in which agents observe perfectly θ and choose according to the known θ: from propositions (1) and (2) the function describing the share of agents not complying would become a step function $S(\theta^*, I_{x^*}(\theta))$, i.e. $\varepsilon \to 0 \Rightarrow x^*=\theta^*$,

$$S(\theta, I_{x^*}(\theta))=\begin{cases} 1 & \text{if } x^*=\theta^*>\theta \\ 0 & \text{if } x^*=\theta^*<\theta \end{cases}$$

and (14) immediately follows. *Q.E.D.*

4.1.3 Comparative Statics

The derivatives of the threshold for the signal (x^*) and the threshold for the economy institutional quality (θ^*) with respect to ε (the degree of uncertainty), γ (the value of assets in the economy), k (the sunk cost of the government enforcing the rule of law) and t (the fixed cost of stripping) provide the mapping of the comparative statics exercise on the model, that allows for the following:

Corollary 2 *The increase in uncertainty (ε) and enforcement fixed cost (k) expand the area (likelihood) of the equilibrium for anarchy, whilst the increase in assets value γ*[24] *and stripping costs t expand the area (likelihood) of the equilibrium for the rule of law.*

Proof See Appendix.

Predation by the executive.

The parameter γ has been so far interpreted as a public good, that is shared by the economy as a whole. However it could be possible to think that the action of the executive in enforcing the rule of law on the assets is motivated by expropriation and rent-seeking (or alternatively by a weak bureaucratic apparatus). If agents know that the rule of law enforcement might well turn to be an ex-post predation (low or zero γ) by the state instead of redistribution in the form of a public good, they would steal as much as possible and leave the state to have an ex-ante low incentive to actually protect property rights themselves. This might well happen in case of politicians who are non credible in their commitment to a non-expropriation action by the state they represent. In other words, the corner solution of $\gamma = 0$ always leads to an anarchy state, as it would reasonably be expected.

On the same token, if the state is going to redistribute the entire value of assets (γ) and this value is sufficiently high, agents expect the redistribution of γ in the form of a public good by the enforcement of the rule of law. In this case, agents anticipate this effect and refrain from stripping assets by investing.

Sunk Costs of Enforcement and Stripping Assets.

High sunk cost in enforcement of the rule of law increases the likelihood of anarchy and high asset-stripping fixed cost induces lower stripping and higher probability of rule of law establishment.

The scope of Information.

In case of high uncertainty, more agents receive signals far away from the true value of the institutional quality, and this determines a higher proportion of asset-stripping managers. This is true notwithstanding the decrease of x^*, an effect that would *per se* increase the probability of the rule of law enforcement, but it is not enough to counteract the simultaneous increase of ε, i.e. the *uncertainty* area.

Equations 12 and 13 allow for the computation of the level of uncertainty, call it $\overline{\varepsilon}$, over which there is anarchy and under which there is enforcement of property rights, given the other parameters and exploiting condition (4):

[24] This will hold if γ is sufficiently large.

$$\overline{\varepsilon} = \frac{\theta(1+\gamma) - \gamma\,(1+k-\gamma) + t - \frac{1}{2}}{1+2(k-\gamma-\theta)}$$
$$\overline{\varepsilon} = \frac{\theta(1+\gamma) - \gamma\,(1+\underline{\theta}) + t - \frac{1}{2}}{1+2(\underline{\theta}-\theta)}$$

This critical level of uncertainty is an increasing function of the quality of institutions θ, the sunk cost of stealing t, while it decreases with k, the cost of enforcing the rule of law. In a country where the combination of these parameters is not favorable (bad bureaucracy and bad institutions), even a low level of uncertainty can lead to anarchy and information becomes crucial[25]. On the contrary, within a solid economic context (good enforcement by bureaucracy, no expropriation risk, good general institutional quality) the above threshold is pushed upward, and the likelihood to end up in a bad equilibrium is extremely low.

Rule of Law Enforcement and Information.

This model allows for tentative policy implications in terms of what is needed to counteract the risk of anarchy, namely many agents stripping and government not enforcing property rights or even expropriating. If the economy is a laggard as far as the implementation of reform is concerned (low economy institutional environment), there are really few options in order to lead to economy towards a virtuous path. This is probably the case in countries where institutions change very slowly (Roland [2001]; Roland [2004]) and the economy is not recovering fast enough from a negative shock of the transition period, a sort of hysteresis effect. These are the countries that in figure 1 are laying at the bottom left. In other words, in economies where the institutional quality is poor, and hence the expectation of the rule of law implementation is low, the anarchy outcome is unfortunately the most likely equilibrium result.

The best case scenario is less interesting: if good bureaucracy and fast reform development pro-good institutional environment are jointly showing up, this simply allows for an easier establishment of the rule of law, as it was the case in the Visegrad countries, the Baltics and Slovenia, shown at the top right of figure 1.

However, the mixed cases are the more interesting. Russia and Ukraine, which are laying in the middle part of figure 1, register among the highest corruption rates, are therefore are a suitable example. In these economies the executive is still unable to enforce the rule of law, i.e. weak contract enforcement implementation and lack of emphasis on the importance of cooperation and on property rights protection prevail.

Two policy implications are in order. On the one hand the effort should be put on pushing forward economic reform process in a broad sense (privatisation, improved pruductivity, reduced labour hoarding, etc.). The government and the civil society must seize any chance of the reciprocal collaboration. This is because the overall cooperative

[25] On the role of information within a model where corrupt officials can take bribes ex ante to reduce red tape or corrupt bureaucrats can create more red tape in order to reveal information and extort bribes see Guriev [2004].

action guarantees higher payoffs for everybody (the social surplus is maximized via co-operation as in Weingast [1997]). On the other hand, the policy maker should work on the reduction of any distorting information signals by allowing free media and information flows, i.e. media being pluralistic and independent from the state control[26]. The state, whose information on the parameter θ is perfect, *could* signal that institutions are strong and that it will be bold in law enforcement, *ipso facto* increasing the probability of law enforcement. However, this signal might result to be not credible [27]. The *big push* argument *á la* Murphy, Schleifer and Vishny [1989] in this context would be justified by the need to escape from the coordination failure characterizing the collective action problem.

Black, Kraakman and Tarassova [2000] summarise this idea in a very compelling way

> In Russia "[...] company managers and kleptocrats opposed effeorts to strengthen or enforce the capital market laws [...] and what they didn't want, they didn't get."

On more positive note, by recalling the results in Hoff and Stiglitz [2004a] we can assess that there are conditions favouring the emergence of the rule of law: when the beneficiaries of privatistaion are too weak individually to obtain priviledged property rights protection from the state, they can however be aware that they are strong enough collectively to secure the rule of law when there is sufficient strenght in the political demand for its enforcment.

5 *Concluding Remarks*

At the beginning of the transition process from the central planning system to a market economy, some countries witnessed the separation between control and property of the assets obtained through the mass privatization process (Hoff and Stiglitz [2008]). The state confronted a context of massive stripping of assets, privatization in favour of few big businessman, whisking of capital, tunneling and difficult contract enforcement. After more than two decades from the start of the transition, some countries are still characterized by widespread "corruption", and a limited rule of law implementation.

This paper tries the understand why the above phenomenon occurs by extending the Hoff and Stiglitz [2004a] model of the quest for the rule of law and by exploiting the global games approach (Morris and Shin [1998]) to solve a coordination game with imperfect information. The quality of institutions and the information on such quality jointly determine whether anarchy or rule of law prevail. In this model, information conveys a noisy signal to agents, whose choice is based on the expectation of other players' actions. Some managers will strip assets if they expect many others to do the same. Vice versa, other agents will build value if they expect few others to strip assets.

[26]See for example the international Russian TV digital channel, "Russia Today", still solidly in government's hands.

[27]I thank Jan Fidrmuc for pointing out the signaling option by the informed state.

Countries in the reform process pro-good institutions will guarantee the enforcement of the rule of law, while laggard countries will be confronted with anarchy.

This paper does show that high uncertainty and sunk costs of law enforcement have an overall negative effect on the rule of law, by pushing the economy towards an anarchy equilibrium. The high value of economy's assets and the extent of redistribution in the form of a public good has a positive influence, by leading to rule of law enforcement.

The stylised framework of this paper offers a representation of the period of uncertainty and poor reform commitment in some transition countries and low/middle income countries where property rights' protection is low, despite a relative advanced stage of convergence to pro-market economy reforms. In a context of sound institutional quality, the policy implication would be to require the government to intervene in order to decrease uncertainty by promoting the diffusion of information. Conversely, in a context of poor institutional quality, the sole reduction of uncertainty would not be sufficient. The model proposed in this paper gives an in-depth representation of the complex situation experienced by transition countries showing a relative advanced stage of convergence to pro-market economy institutions but lacking in an effective property rights protection.

The recognition that a country could be bound to underdevelopment in the long run if burdened by a potentially predatory state and weak rule of law finds some consensus. The results of this paper can apply to a wide range of economic situations within the heterogeneous context of transition economies as well as developing countries.

Appendix

6 Perfect Information: a Toy illustrative Model in the sequential and simultanous cases

Players actions are strategic complements if they affect best activity of others, and positive externality if they affect the payoff structure of other players, who will be better off by increasing their own activity in turn (Cooper [1999]). If a coordination game is played in a perfect information setting, i.e. every agent knows the other agents' payoff (deterministically instead of probabilistically), and the so called common knowledge hypothesis is valid, then there are multiple equilibria.

In fact, if we suppose that conditions (1), (2) and (3) are satisfied and further suppose that a unique agent plays against the executive, then the coordination failure *among* agents vanishes. This implies that $\alpha \in \{0, 1\}$ and no longer $\alpha \in [0, 1]$, i.e the corner case in which all agents strip or build value in a cooperative manner through a coalition.

The equilibrium outcome will indeed be different according to the time structure, be it simultaneous or sequential, of the "collapsed" two players' (one agent and the State) game with perfect information. At this stage there is no role for uncertainty, in other words the lack of coordination failure does imply the lack of uncertainty, θ is predetermined and perfectly known by all players involved, both executive and agents.

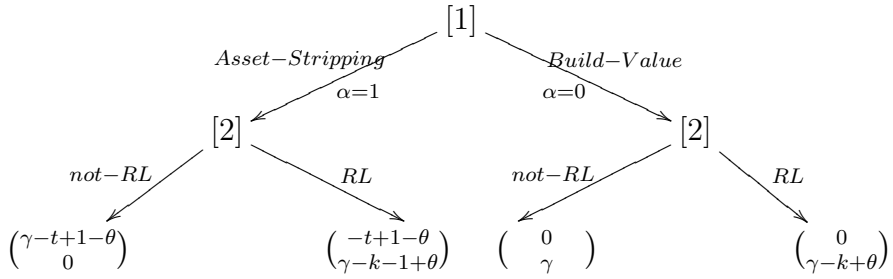
A.1 Sequential Game

Consider a sequential setting as depicted in figure 6, the executive plays in period 2.

PROPOSITION 2 *In a sequential game in which a single agent faces no uncertainty about the economy institutional quality and therefore no coordination failure (i.e. one agent, sequential game with perfect information) there is* ***one Sub-Game Perfect Nash Equilibrium (SPNE)*** *where the agent strips assets and the rule of law is not enforced.*

Proof of Proposition 2

I can write the game in extensive form by taking into account the **out of equilibrium outcome** in case of only one agent (see note (14)). Substituting for the functional form $c(\alpha, \theta) = \alpha - \theta$ the following game appears under conditions (1), (2) and (3):



Using backward induction, the government will choose to give up the enforcement of the Rule of Law if the agent strips, and vice versa, it will enforce if she does not for $\theta > k$. The agent, exploiting the *first mover's advantage*, will strip and the Sub-Game Perfect Nash equilibrium (Strip Assets; Not-RL) prevails. For $\theta < k$ the state will not enforce facing a non-stripping agent, however the equilibrium will be again (Strip Assets; Not-RL).

The uniqueness of the equilibrium is generated by the sequential structure of the game. The agent exploits the *first mover's advantage* and strips, this in turn leads the economy to a SPNE with full stripping of assets and lack of rule of law.

A.2 Simultaneous Game

Let now suppose that the executive and the agent play simultaneously in period 1 as described in figure 7.

PROPOSITION 3 *In a simultaneous game in which a single agent faces no uncertainty about the economy institutional quality and therefore no coordination failure (i.e. one agent, simultaneous game with perfect information) there are* ***two Nash Equilibria*** *for $k < \theta$*[28]*: one in which the executive leaves the economy to anarchy and the agent strips assets, and an other in which the rule of law is enforced when the agent builds value.*

[28]The unique equilibrium solution is not ruled out for the restricted set of parameters, i.e. $k > \theta$, see Appendix for an interpretation.

Figure 6

Timing: Sequential Play

$$\begin{tikzcd}
{[\theta]} \arrow[r] & {[\alpha = \{0,1\}]} \arrow[r] & {[RL\ Vs.\ not-RL]} \\
{[0]} \arrow[u] & {[1] : Agent} \arrow[u] & {[2] : Government} \arrow[u]
\end{tikzcd}$$

Figure 7

Timing: Simultaneous Play

$$\begin{tikzcd}
{[\theta]} \arrow[r] & {[\alpha = \{0,1\}]} & {[RL\ Vs.\ not-RL]} \\
{[0]} \arrow[u] & {[1] : Agent} \arrow[u] & {[1] : Government} \arrow[u]
\end{tikzcd}$$

Proof of Proposition 3

The game can be represented in strategic (normal) form again by taking into account the **out of equilibrium outcome** in case of only one agent (see note (14)). Substituting for the functional form $c(\alpha, \theta) = \alpha - \theta$ the following payoffs matrix appears under conditions (1), (2) and (3):

Table 2

Nash Equilibria in Strategic Form

Agent$\diagdown$*State*	RL	Not-RL
Build Value	$0; \gamma - k + \theta$	$0; \gamma$
Strip Assets	$-t + 1 - \theta; \gamma - k - 1 + \theta$	$\gamma - t + 1 - \theta; 0$

For $\theta > k$ two Nash equilibria emerge : (Build-Value; RL), (Strip Assets; Not-RL), whilst $\theta < k$ implies an unique equilibrium (Strip Assets; Not-RL). However, this latter result is much less likely given that the condition (3) imposes $k < \gamma + \theta$, true only if the state is overburden by sunk costs -lowering incentive to act for the rule of law at all- *and* γ is particularly high.

The multiplicity of equilibria is generated by the interaction between the executive and the single agent due to effect of agent's decision on the variable cost of the executive enforcement costs.

Figure 8

Timing: Simultaneous Play and Uncertainty

$$\begin{array}{ccc} [x_i = \theta + \varepsilon_i] & \longrightarrow & [\alpha \in [0,1]] \qquad\qquad [RL\ vs\ not - RL] \\ \uparrow & & \uparrow \qquad\qquad\qquad \uparrow \\ [0] & & [1] : Multiple\ \ Agents \qquad [1] : Government \end{array}$$

Proof of Corollary 2

$$\text{(A1)} \qquad \frac{\partial x^*}{\partial \varepsilon} = \frac{\gamma[3\gamma - 2(t+k)]}{\gamma + 2\varepsilon + 1} < 0, \frac{\partial \theta^*}{\partial \varepsilon} = \frac{2(k+t) - 3\gamma}{(\gamma + 2\varepsilon + 1)^2} > 0;$$

$$\text{(A2)} \qquad \frac{\partial x^*}{\partial \gamma} = \frac{[2\varepsilon(1 + k + t + \varepsilon) + k + t + 1/2 - \gamma(2 + \gamma + 4\varepsilon)]}{(\gamma + 2\varepsilon + 1)^2} < 0,$$

$$\text{(A3)} \qquad \frac{\partial \theta^*}{\partial \gamma} = \frac{1/2 + k + t - \varepsilon[4(\varepsilon + \gamma) + 1] - \gamma(\gamma + 2)}{(\gamma + 2\varepsilon + 1)^2} < 0;$$

$$\text{(A4)} \qquad \frac{\partial x^*}{\partial k} = \frac{\gamma}{(\gamma + 2\varepsilon + 1)} > 0, \frac{\partial \theta^*}{\partial k} = \frac{2\varepsilon + \gamma}{\gamma + 2\varepsilon + 1} > 0;$$

$$\text{(A5)} \qquad \frac{\partial x^*}{\partial t} = -\frac{2\varepsilon + 1}{(\gamma + 2\varepsilon + 1)} < 0, \frac{\partial \theta^*}{\partial t} = -\frac{1}{\gamma + 2\varepsilon + 1} < 0$$

The inequalities' exploit the conditions $\gamma < k < \gamma + 1$, $\gamma < t < \gamma + 1$ and the possibility that γ is not too small. In fact, equations A2 and A3 are valid, respectively, if:

$$\text{(A6)} \qquad \gamma + (2\varepsilon + 1) > \sqrt{6\left(\frac{1}{2} + \varepsilon\right)^2 + (2\varepsilon + 1)(k + t)}$$

$$\text{(A7)} \qquad \gamma + (2\varepsilon + 1) > \sqrt{3\left(\frac{1}{2} + \varepsilon\right) + (k + t)}$$

The right hand side of equation A6 is always larger than the right hand side of equation A7, therefore the former results to be sufficient for both inequalities A2 and A3.

7 Imperfect information: Simultaneous Game

Suppose now that the game is simultaneous as figure 8 shows.

PROPOSITION 4 *In a* <u>*simultaneous*</u> *game in which a continuum of managers faces uncertainty about the economy institutional quality and coordination failure among themselves (simultanous game with imperfect information) there is* ***one Bayes-Nash Equilibrium*** *determined by:*

$$x^* = \theta^* + \frac{\varepsilon[3\gamma - 2(k+t)]}{\gamma + 2t + 1}$$
$$\theta^* = \frac{\varepsilon[1 + 2(k-\gamma)] + \gamma(1 + k - \gamma) - t + \frac{1}{2}}{\gamma + 2\varepsilon + 1}$$

The rule of law is enforced if the value of θ selected by nature is greater than θ^*. Otherwise anarchy prevails.

PROOF See proof of proposition (1) and the following argument.

The sequential model was solved by backward induction. In that case I looked at executive's action, whose disadvantage relies in moving *only* in period 2, passively facing agents' actions taken in period 1. However it has the advantage of playing without uncertainty, θ is perfectly known by the state. In fact, the executive will enforce only if θ falls below a threshold that is computed in the proof of Proposition (1), namely equation (13). In turn, agents strip assets only if their signal falls below a threshold x^*, equation (12), the reason being that they know that the state has perfect information and that it will play according to the observed α and known (by the state...but not by them) θ.

Given $E(\alpha) = S(\theta, I_{x^*}(x_i))$

$$S(\theta, I_{x^*}(x_i)) = \begin{cases} 1 & \text{if } x^* > \theta + \varepsilon & \theta < x^* - \varepsilon \\ \frac{1}{2} - \frac{1}{2\varepsilon}(\theta - x^*) & \text{if } x^* \in [\theta - \varepsilon, \theta + \varepsilon] & \theta \in [x^* - \varepsilon, x^* + \varepsilon] \\ 0 & \text{if } x^* < \theta - \varepsilon & \theta > x^* + \varepsilon \end{cases}$$

Is there any reason for which the observed α (sequential game) could be different from the expected α (simultaneous game)? The state's information set is unchanged and the optimal strategy is independent from playing simultaneously or sequentially; also agents know that the state will not change its strategy and, will not change their strategies either.

Propositions (1) (2) are indeed identical, and the simultaneous and sequential games have the very same equilibrium outcome. *Q.E.D.*

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