Policy compromises: corruption and regulation in a democracy

Toke S. Aidt[1]
Faculty of Economics and Jesus College
University of Cambridge
Jayasri Dutta[2]
Department of Economics, University of Birmingham

[1]Corresponding author: Faculty of Economics, University of Cambridge, Austin Robinson Building, Sidgwick Avenue, Cambridge CB3 9DD, Tel.: +44 1223 335231. E-mail: Toke.Aidt@econ.cam.ac.uk.

[2]Department of Economics, University of Birmingham, Tel.: +44 0121 4 146640. E-mail: J.Dutta@bham.ac.uk.

Abstract

This paper evaluates the extent of regulation in a democracy with corruption. Elected politicians can restrict entry of firms in exchange for bribes from entrepreneurs. Full liberalization implies free entry and allocative efficiency. Voters reelect politicians based on observed performance. We demonstrate that voters agree to tolerate corruption and inefficient regulation; that efficient policies can be promoted by productivity growth; that productivity growth reduces the cost of providing wage incentives; and that economic policy is counter-cyclical in a corrupt democracy.

Keywords: Corruption, entry regulation, performance voting, economic growth.

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1 Introduction

It often appears that democratic societies must live with inefficient regulation of economic activity and high levels of corruption for extended periods of time. This paper proposes a theoretical model to evaluate the extent to which entry regulation can persist over time and to analyze how democratic societies might, by designing appropriate incentives, demise of inefficient regulation and encourage honest politics. A crucial insight from the model is that sustained economic growth can be an important factor in putting incentives right.

Entry regulation often takes the form of comprehensive systems of industrial licensing. Bhagwati (1993, pp. 49-50) documents a leading example of this phenomenon in India where industrial licensing *"..sought to regulate domestic entry and import competition, ... to penalize unauthorized expansion of capacity, ... and indeed to define and delineate virtually all aspects of* *investment and production through a maze of Kafkaesque controls"*. Elected governments constructed that maze from 1950 onwards and it started to be dismantled in 1991, in efforts initiated by yet other elected governments. The corruption potential in a licensing system like this is enormous, and it is not surprising to find that corruption levels in India are high.[1] In other cases, entry to economic activities is restricted by the costs of complying with multiple legal requirements, as documented by De Soto (1990) in his seminal study of the legal obstacles that a would-be entrepreneur has to go through to operate a firm legally in Peru and for a world sample of countries by Djankov et al. (2002).

These examples illustrate the tight connection between inefficient regulation of economic activity and corruption, and motivate our main hypothesis: entry restrictions are implemented and maintained by corruptible politicians because of their corruption potential. The relevant vested interests – businesses that benefit from protection, bureaucrats who enjoy the power of enforcing regulation, and politicians who can sell more favors in a regulated economy – make it difficult to initiate reforms. The general public loses out. Politicians may be corrupt but they are aware that they have to face elections. Voters can punish politicians, who introduce too many inefficiencies, at the polls. A key question is if voters can induce honest politics and get elected politicians to implement efficient economic policies. That is, when is it possible for democracies to get rid of inefficient regulation?

We propose a model of policy compromise that can be used to analyze the extent of regulation and corruption in a representative democracy and to link the level of corruption and inefficiency to economic factors such productivity growth and business cycle shocks. Governments can regulate entry into the production sector by issuing production licenses. Output and wages increase, and profits decline with the number of licenses, or the degree of liberalization, and the stage is set for social conflict. Workers earn wages, and would like to see the licensing system abolished. Entrepreneurs would like a license for themselves but see others denied. Politicians are elected by majority rule. Once in office, they can restrict the number of licenses and charge for the

[1] In Transparency International's 2001 ranking of countries according to perceived corruption India is number 71 out of 91 countries with a score of 2.7 out of 10.

ones they issue. This is the source of corruption. Their bribe income depends on having the license system in place. The majority of the population is workers. They attempt to control politicians by holding them accountable for observed policy choices. To this end, they set performance standards, and vote a politician out of office if his policy fails to comply with the standard, as in Barro (1973) and Ferejohn (1986).

We show that the constrained efficient policy is, typically, a compromise between the preferred policy of the politician and his constituency and that voters agree to elect and reelect politicians proven to be corrupt. High levels of corruption go hand in hand with inefficient economic policy: corruption and inefficient regulation are two sides of the same coin. This is due to the fact that the politician is – up to a point – able to extract more bribes by restricting economic activity. Regulation decreases output levels *and* generates corruption at the same time. Output and corruption are therefore endogenous variables, and we must look to other factors to understand why they differ across time and space.

We are particularly interested in the role of economic factors, such as productivity growth and business cycles shocks, in this process. We show that productivity growth has a positive impact: it reduces corruption, promotes economic efficiency and reduces the cost of building efficiency enhancing institutions. The reason is subtle. The scope for corruption grows with GDP, and so politicians prefer to postpone collecting their bribe in a growing economy. To this end, they have to hang on to office, and pander to their constituency by lifting restrictions. This allows voters to reduce corruption. Institutional reforms that increase the value of political office can, in principle, promote economic efficiency. Good institutions, however, are costly to introduce and maintain. We show that although it is cheaper to pay political wages in faster growing economies, it is not optimal to eliminate corruption entirely via wage incentives. We also show that (real) business cycle shocks induce counter-cyclical regulation policies with few licenses being issued during a boom and many during a recession. The reason is that politicians want to be reelected in recessions, and collect their bribes during booms. For the latter purpose, they impose excessive regulation that lowers output and looks like "fine-tuning" of aggregate fluctuations. Unobserved shocks can, in addition, lead to political instability with corruption levels rising to extreme levels during booms.

The theoretical literature on corruption and regulation is vast, and we shall not attempt to summarize it here.[2] Two direct links with the previous literature should, however, be pointed out. First, our concept of corruption is similar to the "grabbing hand view" of government advocated by Shleifer and Vishny (1993, 1994) according to which corruption arises when non-benevolent politicians realize that inefficient regulation can be in their personal interest. The basic point is that politicians have temporary monopoly rights to political favors and may use this position to distort economic policy to generate large rents for themselves. We add to this strand of literature by embedding the grabbing hand hypothesis within the context of a representative democracy and study how electoral accountability interacts with economic factors in restraining the grabbing hand. Second, our model is related to Persson et al. (1997) and Coate and Morris (1999). Persson et al. (1997) analyze fiscal policy choices in situations where the government can divert tax revenues away from public spending and is limited in this pursuit only by electoral accountability and "separation of powers" between different political bodies. Coate and Morris (1999) show how inefficient policies can persist over time once they have been implemented. In our model inefficiencies can also persist over time when electoral accountability is sufficiently weak. In contrast to Persson et al. (1997) and Coate and Morris (1999), our analysis is based on a complete specification of technologies, endowments, and preferences. This is what allows us to evaluate the impact of economic factors on the quality of policy making.

Our model provides a unified framework for understanding a number of stylized facts about corruption and economic performance. Treisman (2000), Paldam (2002) and others have documented a number of such facts, including a negative correlation between corruption and income, a positive correlation between corruption and entry regulation (lack of economic freedom), and a negative correlation between corruption and measures of democracy. Our model suggests that the two first stylized facts can be interpreted as equilibrium outcomes arising from the interaction between corruptible politicians

[2] The literature is surveyed by Bardhan (1997), Rose-Ackerman (1999), and Aidt (2003).

and their citizens. Moreover, in our model voters can reduce corruption and promote efficient entry policies in societies with more effective electoral accountability providing a possible explanation for the negative correlation between corruption and democracy. Finally, Mauro (1995) reports that corruption is negatively correlated with economic growth. This correlation is often interpreted as representing a causal effect running from corruption to growth. Our model, in contrast, suggests that part of the correlation may, in fact, be due to the beneficial impact of growth on corruption.

The rest of the paper is organized as follows. In Section 2, we set out the economic model. In Section 3, we describe the political system. In Sections 4, we analyze policy outcomes in a stationary economy. In Section 5, we study the role of productivity growth and political wages in reducing corruption. In Section 6, we study regulation policy and corruption in an economy that is subject to business cycle shocks. In Section 7, we conclude.

2 The Economy

We consider an economy with a continuum of individuals, indexed by j, with measure 1.[3] The size of the population is constant. Time is discrete, indexed by $t = 0, 1, 2, \cdots$. Each individual has one unit of labor each period. A homogeneous consumption good, y, is produced every period. Individuals live for ever, consume their net income each period, and derive no utility from leisure. Utility is linear in consumption. The discount factor is $\beta \in (0, 1)$.

At any point in time, an individual can either be a worker or an entrepreneur. Workers supply labor to a competitive labor market. Entrepreneurs run firms and supervise workers. The firm owned by entrepreneur j produces with the following production technology:

$$y_{jt} = A_t s_{jt}^{1-\alpha} \ell_{jt}^{\alpha}, \quad 0 < \alpha < 1, \tag{1}$$

where ℓ_{jt} denotes the labor input hired by entrepreneur j; s_{jt} denotes the time spend on supervision by entrepreneur j; and A_t is the level of technology, common to all firms. Profits are retained by the entrepreneur who runs the firm.

[3] The specification of the economy is inspired by Lucas (1978) and Dutta (2000).

A would-be entrepreneur needs to obtain a license to operate a firm from the government. The politician running the government can choose the number of licenses and determine who gets them. A license confers the right, but not the obligation to operate a firm for *one* period. License holder j chooses how much time to spend on supervision, $s_{jt} \in [0, 1]$, and supplies the remaining part of her time endowment to the labor market. Non-license holders have no choice of occupation. They work full time for a firm and earn the real wage, w_t. The real wage adjusts to clear the labor market each period. Let $\lambda_t \in [0, 1]$ be the number of licences issued in period t. We lose nothing by assuming that licenses are held by individuals $j \in [0, \lambda_t]$.[4]

The state of the economy at time t is summarized by $e_t = (A_t, \lambda_t)$. In our analysis, A_t is exogenous, while λ_t is endogenously determined (see Section 3). Let $n_t \leq \lambda_t$ be the number of firms operating in period t. National income is $Y_t = \int_0^{n_t} y_{jt} dj$. For any sequence of states $\{e_0, \cdots, e_t, \cdots\}$, with $e_t \geq 0$, an *equilibrium* of the economy is a sequence $\{\cdots, (n_t, Y_t, w_t), \cdots\}$ such that all individuals and firms optimize, and the labor market clears each period. We write $\pi_{jt} = y_{jt} - w_t \ell_{jt}$ as the equilibrium profit level of firm j at time t. At a symmetric equilibrium, $\pi_{jt} = \pi_t$.

Proposition 1 establishes that the equilibrium is stationary: the number of firms, employment, and incomes depend only on the current state of the economy.

Proposition 1 *Let $e_t = (A_t, \lambda_t)$ be the state of the economy at time t. An equilibrium exists whenever $e_t > 0$. Let $\lambda_H = (1 - \alpha)$. Then equilibrium quantities and incomes are functions of the current state of the economy*

$$n(e_t) = \min[\lambda_t, \lambda_H]; \quad Y(e_t) = A_t n(e_t)^{1-\alpha}(1 - n(e_t))^{\alpha};$$

$$w(e_t) = \alpha \frac{Y(e_t)}{1 - n(e_t)}; \quad \pi(e_t) = (1 - \alpha)\frac{Y(e_t)}{n(e_t)}.$$

Furthermore, $\pi(e_t) = w(e_t)$ if and only if $\lambda_t \geq \lambda_H$; otherwise $\pi(e_t) > w(e_t)$. For all e_t, the number of workers is greater than or equal to α. National income, Y_t, is maximized at $n_t = \lambda_H$. Wages increase and profits decrease

[4]Strictly speaking, the politician decides the measure of individuals who gets a license to operate a firm. We use the term "number of firms" for simplicity.

with λ_t whenever $\lambda_t < \lambda_H$. National income, wages, and profits increase with A_t, for all $\lambda_t \in (0, 1]$.

Proof. See Appendix ■

When the number of licenses issued is less than λ_H, all licenses are fully utilized and they carry a scarcity rent, i.e., $\pi_t > w_t$. The number of firms is $n_t = \lambda_t$ and the licensing system imposes a binding constraint on entry and output: the economy is allocative inefficient. When the number of licenses is greater than (or equal to) λ_H, the economy is fully liberalized and licenses are no longer scarce and some are not utilized in equilibrium. The number of firms is $n_t = \lambda_H$ and each license holder is indifferent between being a full time entrepreneur or a full time worker, i.e., $\pi_t = w_t$. Liberalization achieves allocative efficiency and maximum national income. Workers welcome this, while entrepreneurs do not, as they see profits decline.[5] This distributional impact is central to our analysis. An increase in productivity (A_t) increases national income, wages and profits proportionally. Liberalization is contentious, but productivity growth is not.

3 A Representative Democracy

We wish to study the determination of entry regulation and corruption in societies with representative democracy. In a representative democracy, voters delegate decisions to elected politicians, who once in office, are free to design the licensing system as they see fit. Voters can respond after the fact and hold the politician accountable for past decisions, as in Barro (1973) and Ferejohn (1986).[6] Proposition 1 shows that the faction of workers is at least α. We assume that $\alpha > 1/2$ and so the majority of the population are workers. For simplicity, we refer to the worker-voters as the voters.[7] Formally, the

[5] Krusell and Rios-Rull (1996) and Parente and Prescott (2000) argue along similar lines that opposition to efficiency enhancing reforms comes from the activities of those who stand to lose their economic rents.

[6] The notion that politicians are held accountable for what they do while in office has received substantial empirical support (see e.g., Nannestad and Paldam, 1994)

[7] Although entrepreneurs can also vote, it is without loss of generality that we focus exclusively on the voting behavior of workers.

incumbent politician runs against a challenger in the election held at the end of each period, and is reelected for another term if he gains a majority. At the beginning of his tenure, voters announce an election rule, $\eta_t(.)$, specifying the probability of reelection as a function of the policy choice. We restrict attention to rules that specify a *performance standard*, λ_t^s:

$$\eta_t(\lambda_t;\lambda_t^s)=\begin{cases}1 & iff \lambda_t\geq\lambda_t^s\\ 0 & otherwise\end{cases}. \tag{2}$$

A stationary election rule specifies a constant standard λ^s.

The fact that a license to run a firm can have economic value suggests that it can be sold at a price. The incumbent politician has a temporary monopoly on the sale of licences and is tempted to sell government property for personal gain.[8] Each period, the incumbent chooses λ_t, and the price, b_t, at which he sells each licence. Accordingly, the politician's *bribe income* is:

$$B_t=\lambda_t b_t. \tag{3}$$

Lemma 1 evaluates the bribe function, relating the number of licenses to the total surplus that can be extracted.

Lemma 1 *The incumbent politician prices each license at* b_t *where*

$$b_t=\max[A_t\left((1-\alpha)\left(\frac{1-\lambda}{\lambda}\right)^{\alpha}-\alpha\left(\frac{\lambda}{1-\lambda}\right)^{1-\alpha}\right),0]. \tag{4}$$

The politician's bribe income, $B_t(\lambda_t,A_t)=\lambda_t b_t$*, is maximized at*

$$\lambda_t=\lambda_L\equiv\frac{1}{2}(2-\alpha-\sqrt{(4-3\alpha)\alpha}) \tag{5}$$

with $0<\lambda_L<\lambda_H$*.* λ_L *is independent of* A_t*.*

Proof. See Appendix ■

In the absence of elections, the politician extracts the maximum bribe, $B(\lambda_L,A_t)=A_tB(\lambda_L)$, every period by setting $\lambda_t=\lambda_L$. Since $\lambda_L<\lambda_H$, the

[8] This is the definition of corruption given by Shleifer and Vishny (1993).

bribe maximizing policy imposes excessive regulation. The intuition follows from Proposition 1. A license is valuable only if it is scarce. Liberalization reduces scarcity and the price each licence commands.

Politicians care about holding public office for many reasons. Two of these are money and power. For sure, power allows them to make money, because they can sell government property and earn B_t. In addition, politicians, typically, like power for its own sake and earn the ego–rent $m > 0$ by being in office. Thus, the payoff of the politician in office at time t is

$$u_t^p = m + B_t. \tag{6}$$

We normalize the payoff of politicians out of office to zero and assume that there is an unlimited supply of potential politicians willing to serve.[9] Politicians apply the same discount factor as citizens.

We can now define the game between politicians, workers, and would-be entrepreneurs, as it unfolds over time. Workers earn the market wage and get utility $u_t^w = w_t$. Entrepreneurs have to pay the bribe, b_t, to obtain their license. Lemma 1 implies that entrepreneurs get per-period utility $u_t^e = \pi_t - b_t = w_t$ and so workers and entrepreneurs obtain the *same* utility, net of bribes. Entrepreneurs are willing to pay the bribe when asked, but pay enough to want the system abolished *ex post*.

The timing of events is as follows. At the beginning of each period, a politician is already in office. Voters announce a performance standard, $\bar{\lambda}_t$. Next, the politician chooses how many licenses to issue and at what price. Would-be entrepreneurs can accept or reject the offer of a license at the announced price.[10] Once bribes and licenses have been exchanged, production takes place. Finally, at the end of each period, an election is held. The outcome of the election is determined by the policy implemented

[9] Alternatively, we could allow politicians to return to the private sector if they lose office. Doing so complicates the analysis without adding substantive new insights (for details see the working paper version of the paper, Aidt and Dutta, 2004).

[10] We could assume that the surplus is being split by means of Nash bargaining, as in Besley and McLaren (1993) in order to bring out the underlying conflict of interest between workers and entrepreneurs more clearly. However, since this is not important for the results, we focus on the simpler case where the politician has all bargaining power.

by the incumbent relative to the standard. After that, the sequence of events repeats itself.

The natural solution concept is subgame perfect Nash equilibrium. Strategies in a subgame perfect Nash equilibrium can depend in complex ways on the history of policy choices. We restrict attention to election rules that depend only on the current policy choice and focus on those which are constrained efficient. That is, we require that voters, for any sequence of productivity levels $\{A_0, \cdots, A_t, \cdots\}$, set the performance standard such that their life-time utility is maximized subject to the incentive compatibility constraints – that politicians want to comply to the standard at each t rather than being voted out of office – and subject to equilibrium in the private sector.

4 Policy Compromises

From Proposition 1, we know that the level of technology together with the policy choice determine all variables of economic interest at each t. Outcomes, hence, depend critically on the sequence of technology levels or, more generally, on the nature of technological progress. We start by analyzing constrained efficient outcomes in a stationary economy.

Proposition 2 *Suppose $A_t = A > 0$ for all t. Define*

$$\hat{\lambda} = \max\{\lambda | B(\lambda) = (1-\beta)B(\lambda_L) - \beta m\}. \tag{7}$$

The constrained efficient licence policy is $\lambda_t = \lambda$ at each t with

1. $\lambda = \lambda_H$ *whenever* $\hat{\lambda} \geq \lambda_H$;
2. $\lambda = \hat{\lambda}$ *whenever* $\lambda_L < \hat{\lambda} < \lambda_H$.

Proof. Let $\lambda^s > \lambda_L$ be a stationary performance standard. The value function of the incumbent politician is

$$v(\lambda_t) = m + B(\lambda_t) + \beta\eta(\lambda_t, \lambda^s) \max v(\lambda_{t+1}). \tag{8}$$

If the politician chooses a policy below the standard, he is replaced by the challenger at the next election and has the continuation payoff of zero. Alternatively, he can choose a policy at or above the standard and be reelected. The payoffs associated with these two options are denoted $v^D(.)$ and $v^C(.)$, respectively. Formally,

$$\begin{aligned} \lambda_t &< \lambda^s \quad \Rightarrow \quad v^D(\lambda_t) = m + B(\lambda_t) \qquad (9) \\ \lambda_t &\geq \lambda^s \quad \Rightarrow \quad v^C(\lambda_t) = m + B(\lambda_t) + \beta \max v(\lambda_{t+1}). \qquad (10) \end{aligned}$$

The politician chooses $\lambda_t = \lambda^s$ if and only if the following conditions are satisfied

$$v(\lambda^s) = \max_{\lambda_t} v^C(\lambda_t), \tag{11}$$

$$v(\lambda^s) \geq v^D(\lambda_L) = m + B(\lambda_L), \tag{12}$$

where $v(\lambda^s) = \frac{m+B(\lambda^s)}{1-\beta}$ is the value of keeping office for ever and $\lim_{\lambda \to 1^-} B(.) = -\infty$. If these conditions fail, the politician implements $\lambda_t = \lambda_L$. Condition (11) is satisfied whenever $\lambda^s > \lambda_L$ because $B'(.) \leq 0$ for $\lambda \geq \lambda_L$. Condition (12) – the incentive compatibility constraint – ensures that the incumbent conforms to the standard. It is satisfied whenever

$$B(\lambda^s) \geq (1-\beta)B(\lambda_L) - \beta m. \tag{13}$$

The function $B(.)$ is strictly decreasing in the interval $(\lambda_L, 1]$. Voters' utility increase with λ, and they choose the standard, λ^s, to be as high as possible subject to condition (13). If $\beta m \geq (1-\beta)B(\lambda_L)$, then $\lambda = \lambda_H$; otherwise $\lambda = \hat{\lambda}$ where $\hat{\lambda}$ the solution to $B(\lambda) = (1-\beta)B(\lambda_L) - \beta m$ for $\lambda \in (\lambda_L \, \lambda_H)$ ■

Proposition 2 shows that, in the best case scenario, full liberalization and honesty can be sustained in a representative democracy, but only if the following condition is satisfied:

$$B(\lambda_L) \leq \frac{\beta m}{1-\beta}. \tag{14}$$

Condition (14) says that the maximum bribe that can be collected ($B(\lambda_L)$) is less that the payoff to perpetual honesty and permanent tenure. It can be read as a "folk theorem": for m large enough, economic policy in a representative democracy is efficient. The intuition is clear. A politician, who values office highly, is more anxious to please his constituency. A similar role is played by the discount factor.

More often, condition (14) fails, and society must compromise between disparate interests and the constrained efficient policy is $\hat{\lambda} \in (\lambda_L, \lambda_H)$. The majority of voters want full liberalization ($\lambda_t = \lambda_H$). Politicians want to preserve regulation to protect their bribe income and prefer to implement $\lambda_t = \lambda_L$ every period but realize that doing so jeopardizes reelection prospects. The compromise solution ($\hat{\lambda}$) satisfies neither side. Voters agree to live with inefficient regulation and corruption. A "zero-tolerance" rule is counterproductive: it suffices to note that the performance standard $\lambda^s = \lambda_H$ will lead to $\lambda = \lambda_L$ and every politician will fail to get reelected, as in Coate and Morris (1999). Politicians conform to the standards set by voters because they want to be reelected. An implication, then, is that inefficient regulation and corruption can persist in democratic societies: they are the two sides of the same coin of policy compromise. Since inefficient regulation reduces national income, corrupt societies tend, moreover, to be poor.

5 Growth and Politics

In societies with technological progress (or regress), productivity growth and shocks are important determinants of the quality of economic policy and corruption levels. In this section, we study the role of productivity growth, while the next section studies the role of productivity shocks.

5.1 Growth and Corruption

Consider an economy with constant productivity growth

$$A_t = (1+g)^t A_0 \quad 0 < g < \frac{1-\beta}{\beta}. \tag{15}$$

From Proposition 1 and Lemma 1, we recall that all economic variables are proportional to A_t:

$$Y_t = A_t Y(\lambda_t); \quad w_t = A_t w(\lambda_t); \quad \pi_t = A_t \pi(\lambda_t); \tag{16}$$

and

$$B_t(\lambda_t) = A_t B(\lambda_t). \tag{17}$$

In the next proposition, we characterize the "best" stationary license policy that can be sustained indefinitely in a growing economy. By "best" we mean the policy that maximizes voters' utility subject to incentive compatibility.

Proposition 3 *Suppose $A_t = (1+g)^t A_0$, with $0 < g < \frac{1-\beta}{\beta}$. Define*

$$\overline{\lambda} = \max\{\lambda |\, B(\lambda) = (1-\beta(1+g))B(\lambda_L)\}. \tag{18}$$

The "best" stationary license policy is $\overline{\lambda} \in (\lambda_L, \lambda_H)$. Moreover, $\frac{\partial \overline{\lambda}}{\partial g} > 0$.

Proof. Consider the stationary election rule

$$\eta(\lambda_t, \lambda^s) = \begin{cases} 1 & iff \quad \lambda_t \geq \lambda^s \\ 0 & otherwise \end{cases}. \tag{19}$$

The stationary license policy $\lambda = \lambda^s$ is incentive compatible if and only if the politician is willing to implement it at each t, i.e., $v_t^C(\lambda^s) \geq v_t^D(\lambda_L)$ at each t. This is equivalent to

$$\frac{m}{1-\beta} + \frac{A_t B(\lambda^s)}{1-\beta(1+g)} \geq m + A_t B(\lambda_L) \tag{20}$$

at each t. Rearranging equation (20) yields

$$\frac{\beta m}{1-\beta} + A_t q(\lambda^s) \geq 0, \tag{21}$$

where $q(\overline{\lambda}) = A_t \left(\frac{B(\lambda^s)}{1-\beta(1+g)} - B(\lambda_L) \right)$. Since $\lim_{t\to\infty} A_t = \infty$, inequality (21) holds at each t if and only if $q(\lambda^s) \geq 0$. Since $(1-\beta(1+g)) \in (0,1)$ and $B' < 0$ for $\lambda > \lambda_L$, it follows that $\lambda^s = \overline{\lambda}$, where $\overline{\lambda}$ is defined in condition (18), maximizes wages subject to incentive compatibility at all t and that $\overline{\lambda} \in (\lambda_L, \lambda_H)$ ■

Proposition 3 shows that economic growth has a beneficial impact on the quality of policy and helps societies reduce corruption. A larger economy presents greater temptations and politicians stand to gain more from selling favors. Importantly, however, the scope for corruption grows with GDP, and so politicians prefer to postpone collecting their bribe in a growing economy. To this end, they have to hang on to office, and pander to their constituency by lifting entry restrictions. This allows voters to reduce corruption and to promote efficient policies without tempting politicians to maximize their bribe income.

The proposition characterizes the "best" stationary licence policy. There are other, non-stationary incentive compatible paths with monotonically declining levels of liberalization, and increasing corruption where the limiting value is defined by equation (18). These paths are incentive compatible because the net gain of compliance takes the form $\frac{\beta m}{1-\beta}+A_t q(\lambda_t)$. The relative importance of the ego-rent is higher when A_t is low. In the early phases of growth, voters can exact much higher standards of performance from their elected leaders. This may provide an alternative explanation for the observation made by Olson (1982) that societies tend to grow inefficient over time[11], and implies that it is *not* possible to sustain the efficient policy λ_H for ever in a growing economy.

5.2 Growth and Political Wages

Societies can invest in institutions of governance that promote efficient policies and reduce corruption, as pointed out by, for example, Gradstein (2004). A simple institution that, in principle, can achieve this is a political wage. A political wage increases the value of political office and this allows voters to demand more efficient policies in return for reelection.[12] Paying political wages is, however, costly. The fact that a corrupt democracy is allocative inefficient implies that there is substantial surplus from which the cost of good institutions could be financed, yet the question remains: is the population willing to pay the cost of reducing or even eliminating corruption? To answer

[11]This result is valid only in economies where the ego-rent (m) is less than proportional to the size of the economy (A_t). We find this a plausible condition.

[12]The role of political wages is emphasized by Barro (1973), Becker and Stigler (1974) and Besley and McLaren (1993) among many others, but is just one example of an institution that increases the value of political office. For a recent discussion, see Besley (2004).

this question, suppose that the politician is paid the political wage

$$\omega_t = \omega A_t, \tag{22}$$

where the base wage $\omega \geq 0$ is indexed to the size of the economy. For simplicity, we assume that $m = 0$. Per-period utility of the politician is

$$u_t^p = \theta \omega_t + B(\lambda_t). \tag{23}$$

The parameter θ captures the relative value placed on official income relative to unofficial (bribe) income.[13] We assume that $\theta \geq 1$. Workers design an incentive package consisting of a political (base) wage ω and a performance standard $\widetilde{\lambda}$. The next proposition characterizes the constrained efficient incentive package.

Proposition 4 *Assume that $\theta > 1$. Let $\overline{\lambda}$ be the constrained efficient license policy with $\omega = 0$. The constrained efficient incentive package is stationary. There exists a $K \in (0, 1)$ such that*

1. The constrained efficient incentive package is $\left(\omega(\widetilde{\lambda}), \widetilde{\lambda}\right)$ *with* $\widetilde{\lambda} \in (\overline{\lambda}, \lambda_H)$ *and*
$$\omega(\widetilde{\lambda}) = \frac{(1 - (1+g)\beta) B(\lambda_L) - B(\widetilde{\lambda})}{\theta \beta (1+g)} \tag{24}$$
whenever $\beta(1+g) > K$*;*

2. The constrained efficient incentive package is $\left(0, \overline{\lambda}\right)$ *whenever* $\beta(1+g) \leq K$*.*

Proof. Assume that $\theta > 1$. Suppose voters announce the incentive package (ω, λ) where λ is a stationary performance standard and ω is the (base) wage. If the politician complies at time t, he gets

$$v_t^C = \theta \omega A_t + A_t B(\lambda) + \beta v_{t+1}. \tag{25}$$

[13] The parameter θ can also be interpreted as an inverse measure of the transaction cost of collecting bribes.

If he deviations, he get $v_t^D = \theta\omega A_t + A_t B(\lambda_L)$. The incentive compatibility constraint at each t then reads

$$B(\lambda) \geq (1 - \beta(1+g))B(\lambda_L) - \theta\beta(1+g)\omega. \tag{26}$$

Voters (workers) design the incentive package by solving the following (stationary) problem

$$\max_{\lambda,\omega} w(\lambda) - \omega \tag{27}$$

subject to $B(\lambda) \geq (1 - \beta(1+g))B(\lambda_L) - \theta\beta(1+g)\omega$; $\lambda_L \leq \lambda \leq \lambda_H$ and $\omega \geq 0$. The Lagrangian is

$$L = w(\lambda) - \omega + \upsilon\left(B(\lambda) - (1 - \beta(1+g))B(\lambda_L) + \theta\beta(1+g)\omega\right), \tag{28}$$

where $\upsilon \geq 0$ is the Lagrange multiplier. Noticing that the solution must have $\lambda > \lambda_L$, the Kuhn-Tucker conditions can be written as

$$\frac{\partial L}{\partial \lambda} = \frac{\partial w}{\partial \lambda} + \upsilon\frac{\partial B}{\partial \lambda} \geq 0 \quad w.c.s. \tag{29}$$

$$\frac{\partial L}{\partial \omega} = -1 + \upsilon\theta\beta\left(1+g\right) \leq 0 \quad w.c.s. \tag{30}$$

$$\frac{\partial L}{\partial \upsilon} = B(\lambda) - (1 - \beta(1+g))B(\lambda_L) + \theta\beta(1+g)\omega \geq 0 \quad w.c.s., \tag{31}$$

where w.c.s. means with complementary slack. Suppose that $\omega > 0$. This implies that $\upsilon = \frac{1}{\theta\beta(1+g)} > 0$. Denote by $\widetilde{\lambda}$ the choice of performance standard ($\frac{\partial L}{\partial \lambda}\left(\widetilde{\lambda}\right) = 0$). Note that $\frac{\partial L}{\partial \lambda}(\lambda_H) < 0$ and $\frac{\partial L}{\partial \lambda}(\lambda_L) > 0$. Moreover,

$$\begin{aligned} & \frac{\partial^2 w}{\partial \lambda^2} + \upsilon\frac{\partial^2 B}{\partial \lambda^2} \\ = \; & \frac{1}{\theta\beta(1+g)}\alpha(1-\alpha)\lambda^{\alpha-2}\left(1-\lambda\right)^{-\alpha-1}\left(1 - \lambda + \alpha(1 - \theta\beta(1+g)) - 2\right) < 0 \end{aligned} \tag{32}$$

for $\upsilon = \frac{1}{\theta\beta(1+g)}$. Thus, $\widetilde{\lambda} \in (\lambda_L, \lambda_H)$ is unique and a maximum. The corresponding political wage is $\omega(\widetilde{\lambda}) = \frac{(1-(1+g)\beta)B(\lambda_L) - B(\widetilde{\lambda})}{\theta\beta(1+g)}$. Since $B' < 0$, $\omega(\widetilde{\lambda}) > 0$ if and only if $\widetilde{\lambda} > \overline{\lambda}$. To establish when this is the case, we evaluate

$$\theta\beta\left(1+g\right)\frac{\partial w}{\partial \lambda}(\overline{\lambda}) + \frac{\partial B}{\partial \lambda}(\overline{\lambda}). \tag{33}$$

Tedious calculations show that this is equal to

$$\rho(\overline{\lambda})\overline{\lambda}^{-\alpha}\left(1-\overline{\lambda}\right)^{\alpha-2},$$

where

$$\rho(\overline{\lambda}) = \left[\left(\theta\beta\left(1+g\right)-1\right)\alpha\left(1-\alpha\right)+\left(1-\alpha\right)\left(1-\overline{\lambda}\right)-\overline{\lambda}\left(1-\overline{\lambda}\right)\right]. \quad (34)$$

Let $\widetilde{\beta} = \beta\left(1+g\right)$ and write $\overline{\lambda}(\widetilde{\beta})$. We note that $\overline{\lambda}(1) = \lambda_H$, that $\overline{\lambda}(0) = \lambda_L$ and that $\frac{\partial\overline{\lambda}}{\partial\widetilde{\beta}} > 0$. We see that $\rho(\overline{\lambda}(1)) > 0$ for $\theta > 1$ and that $\rho(\overline{\lambda}(0)) = 0$. It follows from the fact that $\rho(\overline{\lambda})$ is a strictly convex function of $\overline{\lambda}$ that there must exist a $K \in (0,1)$ such that $\rho(\overline{\lambda}(\widetilde{\beta})) > 0$ for $\widetilde{\beta} > K$ and $\rho(\overline{\lambda}(\widetilde{\beta})) \leq 0$ for $\widetilde{\beta} \leq K$. Thus, $\widetilde{\lambda} > \overline{\lambda}$ if and only if $\widetilde{\beta} > K$. Otherwise, $\omega = 0$ and $\lambda = \overline{\lambda}$ at the solution to the voters' problem with

$$\upsilon = -\frac{\frac{\partial w}{\partial\lambda}(\overline{\lambda})}{\frac{\partial B}{\partial\lambda}(\overline{\lambda})} < \frac{1}{\theta\beta\left(1+g\right)}. \quad (35)$$

■

The constrained efficient incentive package trades off the welfare gain of lower corruption and more efficient economic policy with the cost of financing political wages. The growth rate of the economy plays an important role in settling this trade off. In economies with a low growth rate $\left(1+g \leq \frac{K}{\beta}\right)$, it does not pay to offer political wages at all: it is too expensive because the effective discount factor $(\beta\left(1+g\right))$ of the politician is too low. In contract, in fast growing economies $\left(1+g > \frac{K}{\beta}\right)$, political wages are offered and corruption is, as a consequence, reduced.[14] The constrained efficient political wage is defined by equation (24) and can be interpreted as the minimum cost required to get the politician to implement the policy $\lambda_t = \widetilde{\lambda}$ at each t. This cost is decreasing in the growth rate of the economy: growth reduces the cost of paying political wages. Importantly, however, it is never optimal to pay for full liberalization. An implication, then, is that corruption and inefficient

[14] It is important that the politician values official income more than bribe income: for $\theta = 1$, $K = 1$ and voters are never willing to pay political wages.

policy can persist even in societies where voters strengthen electoral incentives by paying political wages. The analysis focuses on political wages, but the basic idea applies to other institutions as well. Voters are more willing to make investments in good institutions of governance in economies that grow fast: the marginal cost is lower because politicians prefer to postpone collecting their bribe in a growing economy and more so, in a fast growing one.

6 Shocks and Politics

Corruption varies with the business cycle in an economy that is exposed to productivity shocks. It matters greatly for outcomes, however, whether shocks are observed and anticipated by voters or not. We begin with the case where voters do observe the state of the business cycle before they announce their performance standard. To keep it simple, suppose that

$$A_t = \begin{cases} 1+\mu & \textit{with probability} \quad p \geq 0 \\ 1 & \textit{with probability} \quad 1-p, \end{cases} \tag{36}$$

and that the shocks are independent over time. The economy is in a boom if $A_t = 1+\mu > 1$ and, else, in a recession. We can interpret μ as a measure of the amplitude of the cycle. It is optimal to tailor the performance standard to business cycle conditions. Let

$$\lambda(A_t) = \begin{cases} \lambda_B & \text{if} \quad A_t = 1+\mu \\ \lambda_R & \text{if} \quad A_t = 1 \end{cases} \tag{37}$$

be the state dependent performance standard used by voters. We assume that $m < \frac{(1-\beta-\mu p\beta)B(\lambda_L)}{\beta} = \bar{m}$ and that $\omega = 0$ in order to concentrate on the situation with $\lambda_t < \lambda_H$ both in booms and recessions.

Proposition 5 *Assume that $m < \bar{m}$. Define*

$$\lambda_B = \max\{\lambda|\,(1+\mu)B(\lambda_B) = (1-\beta+\mu\,(1-p\beta))\,B(\lambda_L) - \beta m\} \tag{38}$$

$$\lambda_R = \max\{\lambda|\,B(\lambda_R) = (1-\beta-\mu p\beta)\,B(\lambda_L) - \beta m\}. \tag{39}$$

The constrained efficient licence policy is

1. $\lambda_t = \lambda_B$, *if* $A_t = 1 + \mu$

2. $\lambda_t = \lambda_R$ *if* $A_t = 1$

with $\lambda_R > \lambda_B$.

Corollary 1 (The corrupt Keynesian) *Corruption is pro-cyclical and economic policy is counter-cyclical, i.e., entry regulation is lax in a recession and strict in a boom.*

Proof. Let voters announce the performance standard given in equation (37). If period t is a boom, the value function of the politician is

$$V_t^B = m + (1 + \mu)B(\lambda_B) + \beta V_{t+1} \tag{40}$$

and

$$V_t^R = m + B(\lambda_R) + \beta V_{t+1} \tag{41}$$

if it is a recession. We note that $V_{t+1} = pV_{t+1}^B + (1 - p)V_{t+1}^R$. We solve for a stationary solution to these two equations:

$$V^B = \frac{B(\lambda_R)\beta(1-p) + m + (1+\mu)B(\lambda_B)(1-\beta(1-p))}{(1-\beta)}; \tag{42}$$

$$V^R = \frac{m + B(\lambda_R)(1-\beta p) + B(\lambda_B)\beta p(1+\mu)}{1-\beta}. \tag{43}$$

Incentive compatibility requires that $V^B \geq m + (1+\mu)B(\lambda_L)$ and $V^R \geq m + B(\lambda_L)$. Assuming that $m < \bar{m}$, the constrained efficient performance standard solves $V^B = m + (1+\mu)B(\lambda_L)$ and $V^R = m + B(\lambda_L)$. A simple calculation yields the expressions given in equations (38) and (39). Notice that $\frac{(1-\beta+\mu(1-p\beta))}{1+\mu} - (1 - \beta - \mu p\beta) = \frac{\beta\mu + p\beta\mu^2}{1+\mu} > 0$. Since $B' < 0$, we conclude that $\lambda_R > \lambda_B$. The condition that $m < \bar{m}$ implies that $\lambda_R < \lambda_H$ ■

Proposition 5 shows that economic policy is more inefficient during booms than during recessions. Since inefficient economic policy by itself reduces output this phenomena can be interpreted as active Keynesian stabilization policy driven by the desire of corrupt politicians to collect bribes. The other side of the coin, then, is that corruption is pro-cyclical. A booming economy presents greater temptations, and politicians stand to gain more from selling favors. As a consequence, societies must concede more to dishonest politics. The intuition is straightforward. An increase in national income raises the stakes because politicians can potentially extract much larger bribes. They are, therefore, more likely to defect from a given standard. Realizing this, voters are willing to accept more entry restrictions and higher levels of corruption during a boom than during a recession. The distortion in economic policy is increasing in the amplitude of the cycle (μ).

Unobserved and unanticipated productivity shocks may result not only in counter-cyclical economic policy, but also in political instability. To see this, imagine an economy with a constant level of technology until period t: $A_{t-i} = A_0 = 1$ for $i < t$. Suppose further that the ego rent is $\frac{1-\beta}{\beta}B(\lambda_L)$, ensuring that $\lambda_{t-i} = \lambda_H$. In period t, there is a temporary productivity shock, and $A_t = 1+\nu$ with $\nu \in (-1, 1)$. The shock is unanticipated and only observed by the politician. Voters continue to require that the politician implements the efficient policy to get reelected. What is the likely effect on policy outcomes? In period t, the maximum bribe is $(1 + v)B(\lambda_L)$, which is larger than usual in a temporary boom and smaller in a temporary recession. The politician defects and sets $\lambda_t = \lambda_L$, if

$$(1+\nu)B(\lambda_L) > \frac{\beta m}{1-\beta} \tag{44}$$

Substituting for $m = \frac{1-\beta}{\beta}B(\lambda_L)$, we see that $\lambda_t = \lambda_L$ if $\nu > 0$. Policy reversals happen in booms, not in recessions. That is, positive economic shocks can lead to political instability and – temporary – to inefficient policies. Better technologies generate more output, and increase the potential revenue from bribes. Corrupt politicians seize the day in the boom and collect the larger bribe, realizing that they are going to be punished at the polls for doing so.

7 Conclusion

We analyze how corrupt politicians may implement and preserve excessively high levels of regulation, and the extent to which voters can control the resulting inefficiency. We show, in Proposition 2, why we expect to observe compromise politics; in Proposition 3 that economic growth can promote efficient economic policies; in Proposition 4 that more efficient outcomes can sometimes be attained by an appropriate design of performance standards and official rewards to office holders; and in Proposition 5 that economic policy entails excessive stabilization of aggregate fluctuations in a corrupt democracy. Many questions are, however, left unanswered. In particular, we concentrate on situations where growth is exogenous, and not affected by political mistakes or diversion of resources to rent-seeking. In reality, bad policies can have growth effects, by affecting the incentives to invest in, or adopt, new technologies[15] or by making it attractive to engage in rent-seeking.[16] This implies, of course, that bad policy choices and corruption itself can have a persistent, negative impact on the economy. At the same time, even corrupt politicians are unlikely to make very bad mistakes, because they would rather take their cut from a growing pie.

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[15] Benhabib and Rustichini (1996) and Dutta (2000) evaluate two kinds of feedback effects.

[16] See, for example, Murphy et al. (1991) and Acemoglu and Verdier (1998).

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8 Appendix

Proof of Proposition 1. For each $\lambda > 0$, individuals $j \leq \lambda$ are license holders, and have the right to choose $s_j > 0$ and employ workers in their firm. Suppose $s_j(e) > 0$. Profit maximization implies

$$\ell_j(e,w) = s_j \left(\frac{\alpha A}{w}\right)^{\frac{1}{1-\alpha}}$$

and

$$y_j = A s_j^{1-\alpha} \ell_j^{\alpha} \equiv s_j y(w); \quad \pi_j = (1-\alpha) y_j \equiv s_j \pi(w).$$

A license holder earns $\pi(w)s_j + w(1-s_j)$ which is maximized at $s_j = 1$ whenever $\pi(w) > w$. In this case, all licences are used, i.e., $n(e) = \lambda$ and the total supply of labor is $1-\lambda$. Labor market clearing requires that $\lambda \ell_j(e,w) = 1-\lambda$. Therefore, equilibrium national income, the wage rate, and profit per firm satisfy

$$Y(e) = A\lambda^{1-\alpha}(1-\lambda)^{\alpha}; \quad w(e) = \alpha \frac{Y(e)}{1-\lambda}; \quad \pi(e) = (1-\alpha)\frac{Y(e)}{\lambda}.$$

From these, we obtain the condition

$$\pi(e) > w(e) \Rightarrow \lambda < (1-\alpha) \equiv \lambda_H.$$

Suppose $\lambda \geq \lambda_H$. Let $n \leq \lambda$. Firms maximize profits and all labor is employed. Equilibrium national income, the wage rate, and profit per firm satisfy

$$Y(A,n) = An^{1-\alpha}(1-n)^{\alpha}; \quad w(A,n) = \alpha\frac{Y(A,n)}{1-n}; \quad \pi(A,n) = (1-\alpha)\frac{Y(A,n)}{n}.$$

Note that $n > 0 \Rightarrow \pi(A,n) \geq w(A,n)$ from the occupational choice of individuals $j \leq \lambda$; that $n = \lambda_H$ is the unique solution to $\pi(A,n) = w(A,n)$; and that $\pi(A,n) < w(A,n)$ whenever $n > \lambda_H$. This establishes that $\pi(e) = w(e) \Leftrightarrow \lambda \geq \lambda_H$ and that $n(e) = \lambda_H$ for $\lambda \geq \lambda_H$. We see that $1 - n(e) \geq \alpha$ for all e. Finally, write

$$Y(e) = An(e)^{1-\alpha}(1-n(e))^{\alpha} \quad with \quad n(e) = \min[\lambda, \lambda_H];$$

$$w(e) = \alpha A\left(\frac{n(e)}{1-n(e)}\right)^{1-\alpha}; \quad \pi(e) = (1-\alpha)A\left(\frac{1-n(e)}{n(e)}\right)^{\alpha}.$$

We note that Y, w and π are monotonically increasing in A; that π and $\frac{1}{w}$ decrease with n; and that Y attains its maximum at $n = \lambda_H$.

Lemma 1. A license is valid for one period. Its "price", b_t, cannot exceed its value to the holder, i.e.,

$$b_t \leq \pi(\lambda_t, A_t) - w(\lambda_t, A_t). \tag{45}$$

The politician extracts the entire surplus and so, condition (45) is binding. The total bribe is

$$B(\lambda, A) = \lambda\left(\pi(\lambda, A) - w(\lambda, A)\right). \tag{46}$$

The bribe function is concave and differentiable, with $B(0,A) = 0 = B(\lambda_H, A)$, $\lim_{\lambda\to 0} B'(0,A) = \infty$, and $B'(\lambda_H, A) \leq 0$. Hence, the total bribe income is maximized at some $\lambda_L \in (0, \lambda_H)$. Note that λ_L is stationary, and independent of productivity A_t. Thus, we can write $B(\lambda_L, A_t) = AB(\lambda_t)$.