

A Theory of the Corrupt Keynesian

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Abstract

We evaluate the impact of real business cycle shocks on corruption and economic policy in a model of entry regulation in a representative democracy. We find that corruption is pro-cyclical and regulation policy is counter-cyclical. Corrupt politicians engage in excessive stabilization of aggregate fluctuations and behave as if they were Keynesian. We also find that business cycle shocks can induce political instability with politicians losing office in recessions.

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1 Introduction

Do politicians collect larger bribes in booms than in recessions? Do they introduce excessive entry restrictions to create the artificial scarcity needed to collect those extra bribes? Do corrupt politicians engage in excessive stabilization of aggregate fluctuations? Are corrupt politicians Keynesian? Can business cycle shocks induce political instability? The aim of this paper is to provide some answers to these questions.

We evaluate the impact of real business cycle shocks on corruption and economic policy in a model of entry regulation in a representative democracy.¹ A leading example of the type of entry regulation that we have in mind comes from India. It takes the form of comprehensive systems of industrial licensing that “*..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*” (Bhagwati, 1993, pp. 49-50). Elected governments constructed that maze from 1950 onwards and it started to be dismantled in the 1990s, in efforts initiated by yet other elected governments. Similar systems developed in other countries in the region, such as Bangladesh and Pakistan (Srinivasan, 2000).

The cost of complying with multiple legal requirements and red tape is another example of the type of entry restrictions we want to capture. This phenomenon is extensively 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. He shows that it would take more than 300 days of work at a cost of 32 times the monthly minimum wage to get the permits and approvals needed to set up a small two-sewing machine clothing factory in a Lima shanty town. No wonder that many would-be entrepreneurs prefer to stay informal or are tempted to pay bribes to get the paperwork done faster. The corruption potential in economies with excessive entry regulation is enormous, and it is not surprising that empirical studies find that corruption levels and measures of entry regulation are strongly correlated: excessive entry regulation and corruption go hand in hand (e.g., Treisman, 2000; Djankov et al., 2002; Paldam, 2002). It is also interesting to note that after the licensing system was dismantled, India’s score on Transparency International’s corruption perception index improved from around 2.7 in the mid-1990s to 3.5 in 2007. At the same time, Sharma (2007) reports that industrial de-regulation during the 1980s led to a significant rise in firm productivity.

The tight connection between regulation of economic activity, allocative inefficiency, and corruption forms the cornerstone of our model: entry restrictions are implemented and maintained by corruptible politicians because of their corruption potential. In the model, 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. This sets the stage for social conflict. Workers earn wages, and would like to see the licensing system abolished. Entrepreneurs would like a license for themselves, as it allows them to earn super-normal profits. Politicians are elected by majority rule. Once in office, they can restrict the number of licenses and charge for the

¹The model is similar to the one developed in Aidt and Dutta (2008). In that paper, we use the model to study the relationship between growth and corruption.

ones they issue. This is the source of corruption.² Their bribe income depends on having the licensing system in place. The majority of the population are workers, and they lose out. They attempt to control politicians by holding them accountable for their actions while in office. To this end, they set performance standards, and vote a politician out of office if he is too corruption and his performance fails to comply with the standard, as in Ferejohn (1986), Coate and Morris (1999) and Persson et al. (1997).

Importantly, the economy is subject to (real) business cycle shocks. These impact directly on wages, profits and output and are propagated by the licensing policy. We study the cyclical properties of economic policy (industrial licensing) and corruption in this environment. It matters greatly for outcomes whether shocks are observed by voters or not. If voters can make their performance standards contingent on observed business cycle conditions, it is constrained efficient to induce politicians to behave as if they were Keynesian. To get reelected, they must restrict entry into the economy in a boom and allow entry in a recession. Economic policy entails excessive stabilization of aggregate fluctuations in a corrupt democracy and, as a consequence, corruption is pro-cyclical. Politicians collect bribes in a boom, less so in a recession. In contrast, when shocks are unobserved, they can induce political instability, as voters may rationally vote politicians out of office in recessions in order to discipline them in booms. This makes entry regulation pro-cyclical and corruption counter-cyclical.

It is well-documented empirically that corruption depends on economic factors such as the level of GDP, the growth rate of output, inflation etc. (e.g., Treisman, 2000; Paldam, 2002). We are, however, not aware of any studies that evaluate corruption at the business cycle frequency. The existing theoretical literature studies the link between economic development (economic growth) and corruption.³ The focus is on the long run rather than on short run implications of corruption. The main contribution of this paper is to make a beginning at closing this gap. We do so by proposing a theory of corruption and business cycle shocks. Before we present the theory, however, it is instructive to look at some data on the cyclical properties of the industrial licensing system in India. Table 1 reports the correlation between the number of industrial licenses issued (or the number of factories) and the Solow residual (in the previous year) for the pre-liberalization period (1975-1989) and the post-liberalization period (1990-2003), respectively. The correlations are conditional on unobserved state fixed effects and the number of firms in the previous year. We observe, firstly, that the licensing policy *is* statistically significantly affected by business cycle conditions. Insofar as industrial licenses are a major source of corruption, this is indirect evidence that corruption has a cyclic component. Secondly, we notice that the licensing policy is pro-cyclical in the period 1975-1989, but the number of firms has been counter-cyclical since deregulation – we pick 1990 arbitrarily: deregulation of licenses started in the late 1980’s and was essentially completed by 1993. In other words, the cyclical properties of the number of firms seems to have changed dramatically after

²This concept of corruption is similar to the “grabbing hand view” of government advocated by Shleifer and Vishny (1993, 1994). For an overview of the vast literature on corruption, see Bardhan (1997), Rose-Ackerman (1999), and Aidt (2003).

³See, for example, Murphy et al. (1991), Parente and Prescott (2000), Krusell and Rios-Rull (1996), Blackburn et al. (2006) and Aidt et al. (2008).

Dependent variable	Log(factories) _t	Log(factories) _t
Period	1975-1989	1990-2003
Constant	3.32 (7.27)	0.99 (3.10)
Log(factories) _{t-1}	0.66 (15.06)	0.87 (24.07)
Solow Residual _{t-1}	0.14 (3.24)	-0.04 (-1.78)
Number of states	16	16
Number of observations	240	208
Notes: The regressions include state fixed effects. t-statistics in brackets.		

Table 1: The Relationship between the number of industrial enterprises and the Solow residual in India, 1975-2003.

the liberalization initiated in the 1990s.⁴

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 Section 4, we study regulation policy and corruption in an economy that is subject to (real) business cycle shocks. In Section 5, we conclude.

2 The Economy

We consider an economy with a continuum of individuals, indexed by j , with measure 1.⁵ The size of the population is constant. Time is discrete, indexed by $t = 0, 1, 2, \dots$. 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:

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

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.

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

⁴The source is Annual Survey of Industries data for 1975 -2003. Solow residuals calculated in the usual way.

⁵The specification of the economy is inspired by Lucas (1978).

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 $j \in [0, \lambda_t]$.

The state of the economy at time t is summarized by $e_t = (A_t, \lambda_t)$. In our analysis, the stochastic process that drives A_t is exogenous, while λ_t is endogenously determined. 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 $\{e_0, \dots, e_t, \dots\}$, with $e_t \geq 0$, an *equilibrium* of the economy is a sequence $\{\dots, (n_t, Y_t, w_t), \dots\}$ 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 only*

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

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

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 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. 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. This distributional impact is central to our analysis. Positive productivity shocks increases national income, wages and profits proportionally. Negative shocks has the opposite effect. In an economy with λ_H firms, these fluctuations are efficient.

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 Ferejohn (1986). Proposition 1 shows that the fraction 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.⁶ Formally, the incumbent politician runs against a challenger in the election held at the end of each period. He is reelected for another term if he gains a majority. At the beginning of his tenure, voters announce an election rule, $\eta_t(\cdot)$, specifying the probability of reelection as a function of observable indicators of the politician's performance.⁷ We restrict attention to threshold election rules that specify a *performance standard* that the politician has to satisfy to get reelection. That is, $\eta_t(\cdot) = 1$ if the standard is satisfied and zero otherwise.

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 license. Accordingly, the politician's *bribe income* is:

$$B_t = \lambda_t b_t. \quad (2)$$

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

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

$$b_t = \max\left[A_t \left((1 - \alpha) \left(\frac{1 - \lambda}{\lambda} \right)^\alpha - \alpha \left(\frac{\lambda}{1 - \lambda} \right)^{1 - \alpha} \right), 0\right]. \quad (3)$$

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

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

with $0 < \lambda_L < \lambda_H$. λ_L is independent of A_t while the maximized bribe income is proportional to A_t .

Proof. See Appendix ■

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

⁶Although entrepreneurs can also vote, it is without loss of generality that we focus exclusively on the voting behavior of workers.

⁷The constrained efficient performance standard may be specified in terms of the number of licenses or in terms of utility levels depending on circumstances and on the information available to voters.

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

regulation. The intuition follows from Proposition 1. A license is valuable only if it is scarce. Liberalization reduces scarcity and the price each license commands. We note that politicians can, *ceteris paribus*, for a given license policy extract more rent in a booming economy than during a recession.

Politicians care about holding public office for many reasons. One of them is that power allows them to make money, because they can sell government property and earn B_t . We assume that the payoff of the politician in office at time t is

$$u_t^p = B_t. \tag{5}$$

We normalize the payoff of politicians out of office to zero. We assume that there is an unlimited supply of potential politicians willing to serve. 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 $u_t^e = \pi_t - b_t = w_t$. The timing of events is as follows. At the beginning of each period, a politician is already in office. Voters announce a performance standard. 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.⁹ 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 by the incumbent relative to the standard. After that, the sequence of events repeats itself. With regard to the business cycle shock, we shall consider two scenarios. In one scenario, the shock is realized at the beginning of each period and observed by everyone. In the other, we assume that voters cannot observe business cycle conditions directly, nor can they infer them from observing their wage income. This effectively means that we assume that voters cannot observe policy directly. We continue, however, to assume that the politicians can observe the shock and tailor his policy to it. We require that voters, given the information they hold about within-period events, set the performance standard such that their life-time utility is maximized subject to the sequence of incentive compatibility constraints and subject to equilibrium in the private sector.

4 Corruption and the Business Cycle

From Proposition 1, we know that the level of technology together with the licensing policy determine all variables of economic interest at each t . Outcomes, hence, depend critically on the sequence of technology levels. An implication, then, is that corruption varies with the business cycle. Business cycle shocks are propagated by the licensing system which is the only propagation mechanism operating in the model. Since the allocation of resources

⁹We could assume that the surplus is being split more evenly between the politician and the entrepreneurs. This would 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.

is efficient in the absence of a licensing system, any stabilization of aggregate fluctuations introduced by the system is inefficient and excessive.

It matters greatly for the nature of these inefficiencies, however, whether shocks are observed by voters or not. As mentioned above, we consider two cases. In the first case, voters observe the state of the business cycle before they announce their performance standard. In the second case, voters neither observe the state of the business cycle, nor the policy choice (or the level of corruption). The politician, on the other hand, observes the shock before setting the licensing policy.

4.1 The Corrupt Keynesian

To keep it simple, suppose that the stochastic process for technology shocks is given by

$$A_t = \begin{cases} 1 + \mu & \text{with probability } p \geq 0 \\ 1 & \text{with probability } 1 - p \end{cases}, \quad (6)$$

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 interpret μ as a measure of the amplitude of the cycle. The probability p , on the other hand, can be interpreted as a crude measure of persistence. If, for example, p is close to one booms are almost permanent in the sense that A_t is almost always $1 + \mu$.

Voters observe the state of the business cycle before they announce the performance standard for the period. In this case, it is without loss of generality that we specify the election rule as a function of the observed policy directly, i.e.,

$$\eta_t(\lambda_t; \lambda^s(A_t)) = \begin{cases} 1 & \text{iff } \lambda_t \geq \lambda^s(A_t) \\ 0 & \text{otherwise} \end{cases}. \quad (7)$$

Since business cycle conditions are known at the time when the standard is set, it is optimal to tailor the performance standard to business cycle conditions. In particular, let

$$\lambda(A_t) = \begin{cases} \lambda_B & \text{if } A_t = 1 + \mu \\ \lambda_R & \text{if } A_t = 1 \end{cases} \quad (8)$$

be the state dependent performance standard used by voters.

Proposition 2 *Define*

$$\lambda_B = \max\{\lambda \mid (1 + \mu)B(\lambda_B) = (1 - \beta + \mu(1 - p\beta))B(\lambda_L)\} \quad (9)$$

$$\lambda_R = \max\{\lambda \mid B(\lambda_R) = (1 - \beta - \mu p\beta)B(\lambda_L)\}. \quad (10)$$

The constrained efficient licensing policy is

1. $\lambda_t = \lambda_B$ if $A_t = 1 + \mu$
2. $\lambda_t = \lambda_R$ if $A_t = 1$

with $\lambda_H > \lambda_R > \lambda_B > \lambda_L$.

Proof. Let voters announce the performance standard given in equation (8). If period t is a boom, the value function of the politician is

$$v_t^B = (1 + \mu)B(\lambda_B) + \beta \max v_{t+1} \quad (11)$$

and if period t is a recession, the value function is given by

$$v_t^R = B(\lambda_R) + \beta \max v_{t+1}. \quad (12)$$

We note that $v_{t+1} = pv_{t+1}^B + (1 - p)v_{t+1}^R$. In either case, if the politician chooses a policy below the standard, he is replaced by the challenger at the next election and his continuation payoff is zero. Alternatively, he can choose a policy at or above the standard and be reelected. The payoffs associated with these two options are denoted $v_i^D(\cdot)$ and $v_i^C(\cdot)$, respectively, for $i \in \{R, B\}$. The politician chooses $\lambda_t = \lambda^s(A_t)$ if and only if the following conditions are satisfied

$$v(\lambda^s(A_t)) = \max_{\lambda_t} v_i^C(\lambda_t), \quad (13)$$

$$v(\lambda^s(A_t)) \geq v_i^D(\lambda_L) \quad (14)$$

where $i = B$ if $A = 1 + \mu$ and $i = R$ if $A = 1$. The first condition is satisfied whenever $\lambda^s(A_t) > \lambda_L$ because $B'(\cdot) \leq 0$ for $\lambda_t \geq \lambda_L$. The second condition – the incentive compatibility condition – requires that $v_t^B \geq (1 + \mu)B(\lambda_L)$ and $v_t^R \geq B(\lambda_L)$, respectively. Solving equations (11) and (12), we get

$$v^B = \frac{B(\lambda_R)\beta(1 - p) + (1 + \mu)B(\lambda_B)(1 - \beta(1 - p))}{(1 - \beta)}, \quad (15)$$

$$v^R = \frac{B(\lambda_R)(1 - \beta p) + B(\lambda_B)\beta p(1 + \mu)}{1 - \beta}. \quad (16)$$

The constrained efficient performance standard solves $v^B = (1 + \mu)B(\lambda_L)$ and $v^R = B(\lambda_L)$. A simple calculation yields the expressions given in equations (9) and (10). 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 $\lambda_R > \lambda_B$. We note that $\lambda_R < \lambda_H$ and $\lambda_B > \lambda_L$ ■

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.*

Proposition 2 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. An alternative intuition is that politicians want to get reelected in recessions so that they can be around to collect large bribes in booms. This makes it easier for voters to discipline politicians in a recession.

The distortion in economic policy is increasing in the amplitude of the cycle (μ). This is simply because larger fluctuations in output enhance the temptation to collect bribes when the economy is booming. A high degree of persistence (as captured by a larger p) makes it harder for voters to reduce corruption and to promote efficient licensing policies both in booms and recessions. The reason is that a high p makes the temptation to collect bribes almost permanent. This makes it harder for voters to discipline their politicians and corruption is as a result high most of the time. An implication of the analysis, then, is that corruption tends to be high, on average, in societies with large, but relatively persistent movements in technology.

4.2 Unobserved Shocks and Political Instability

Unobserved and unanticipated productivity shocks may result not only in cyclical movements in economic policy, but also in political instability. In fact, it may be constrained efficient for voters to set performance standards that politicians *cannot* comply to in some states of the world.

To see this, suppose that politicians have an informational advantage over workers. While politicians can observe the state of the business cycle before deciding on the licensing policy for the period, workers cannot observe neither A_t nor λ_t . They only observe their wage income $w_t = A_t w(\lambda_t)$. Workers must therefore specify the performance standard in terms of utility levels (incomes), rather than in terms of policy outcomes. We continue to assume that the stochastic process for A_t is given by equation (6) and that the shocks are independent over time.¹⁰ We restrict attention to values of μ that satisfy the following condition:

Assumption 1 $\mu \in \left(\frac{w(\lambda_H)}{w(\lambda_B)} - 1, \frac{w(\lambda_H)}{w(\lambda_L)} - 1 \right)$ where $\lambda_B \in (\lambda_L, \lambda_H)$ is defined in equation (9).

The assumption ensures two things. It guarantees that workers can demand higher utility levels in booms than in recessions. A sufficient condition for this is that the amplitude of the cycle, μ , is larger than $\frac{w(\lambda_H)}{w(\lambda_B)} - 1$. On the other hand, if the the amplitude is too large, workers can in effect design a utility standard that replicates the constrained efficient, state dependent solution characterized in Proposition 2. In particular, this is possible if it is impossible in a recession for a politician who liberalizes the economy completely to deliver the lowest possible wage income that can be delivered in a boom $((1 + \mu) w(\lambda_L))$. In this case, workers simply ask for $(1 + \mu)w(\lambda_B)$ if $w > (1 + \mu) w(\lambda_L)$ and for $w(\lambda_R)$ if not where λ_B and λ_R are defined in Proposition 2. Politicians will comply to this, and outcomes are

¹⁰This rules out the possibility that workers can use any information that they learn about the state of the business cycle in one period to predict what the state might be in the following period.

as if workers could observe the cycle directly. To rule this possibility out, we assume that $\mu < \frac{w(\lambda_H)}{w(\lambda_L)} - 1$. This implies that observing wage income is not sufficient to deduce if wages are high because the economy is booming or because of liberalization.

Since workers can neither observe nor, under Assumption 1, deduce the state of the business cycle, the performance standard must be state independent, i.e.,

$$\eta_t(w_t; w^s) = \begin{cases} 1 & \text{iff } w_t \geq w^s \\ 0 & \text{otherwise} \end{cases}, \quad (17)$$

where w^s is the utility threshold required for reelection. Faced with the performance standard w^s politicians must implement a state dependent licensing policy in order to be reelected. Denoting the best response to the standard w^s in state i by $\lambda_i(w^s)$ for $i = B, R$, we can write the incentive compatibility constraints in the two states as

$$\begin{aligned} IC^B & : v_t^B = (1 + \mu) B(\lambda_B(w^s)) + \beta v_{t+1} \geq (1 + \mu) B(\lambda_L) \\ IC^R & : v_t^R = B(\lambda_R(w^s)) + \beta v_{t+1} \geq B(\lambda_L) \end{aligned}$$

where $v_{t+1} = pv_{t+1}^B + (1-p)v_{t+1}^R$. We can make the following preliminary observation. Since w^s is the same in a boom as in a recession, if the politician tries to comply, he must issue more licenses in a recession than in a boom. Importantly, this implies that the politician may not always be willing to comply in a recession. In particular, we can show the following result.

Lemma 2 *Let Assumption 1 be satisfied. If workers set w^s such that the politician is just willing to seek reelection in a boom (IC^B binds), then the politician will not seek reelection in a recession (IC^R fails).*

Proof. Assumption 1 implies that workers can demand higher utility in return for reelection in a boom than in a recession. Let the highest utility standard that politicians will comply to in a boom be w^B and let the corresponding utility standard in a recession be w^R . The corresponding number of licences issued are $\lambda_B(w^B)$ and $\lambda_R(w^R)$. Suppose that reelection requires delivery of at least w^B at all times. In a recession, the politician must issue licences λ'_R to satisfy $w^B = w(\lambda'_R)$ where $\lambda'_R > \lambda_R(w^R)$. It follows immediately that the politician will not comply to this. Whenever w^s is set to make IC^B bind, he accordingly deviates and sets $\lambda = \lambda_L$ in a recession ■

Lemma 2 basically shows that workers face a trade off. If they want the politician to implement the best possible licensing policy in a boom, they cannot get him to comply in a recession. They may, therefore, consider setting a standard that the politician will, in fact, satisfy in both states of the cycle. In this case, we can show the following result.

Lemma 3 *Let Assumption 1 be satisfied. If workers set w^s such that the politician is just willing to seek reelection in a recession (IC^R binds), then the politician will also seek reelection in a boom (IC^B is non-binding).*

Proof. Suppose that $w^s = w^R$ is such that IC^R binds. In a boom, the politician can satisfy this standard by issuing licenses up to the point where $w^R = (1 + \mu) w (\lambda'_B)$. Assumption 1 implies that $\lambda'_B < \lambda_B(w^R)$ and it follows immediately that the politician will comply ■

The two lemmas allow us to restrict attention to two types of performance standards. Performance standard PS1 is such that the politician only complies in a boom, while performance standard PS2 is such that he always complies, and receives an additional rent in a boom.

We begin by characterizing the performance standard of type PS1 that maximizes the lifetime utility of workers. Suppose for this purpose that workers set a standard w^{PS1} that makes IC^B bind. Lemma 2 implies that the politician does not comply in a recession, and the value function associated with that state of the cycle is

$$v_t^R = B(\lambda_L). \quad (18)$$

Given that, we can write the value function in a boom as

$$v_t^B = (1 + \mu) B(\lambda_B(w^{PS1})) + \beta p v_{t+1}^B + \beta (1 - p) B(\lambda_L). \quad (19)$$

We can solve this equation to get

$$v^B = \frac{(1 + \mu) B(\lambda_B(w^{PS1})) + \beta (1 - p) B(\lambda_L)}{1 - \beta p}. \quad (20)$$

To maximize their wage income in a boom, workers set w^{PS1} such that $v^B = (1 + \mu) B(\lambda_L)$. To satisfy this standard, the politician would have to issue $\lambda_B^{PS1} \in (\lambda_L, \lambda_H)$ licences in a boom where λ_B^{PS1} is the largest λ that solves

$$B(\lambda) = \frac{1 - \beta + \mu(1 - \beta p)}{1 + \mu} B(\lambda_L). \quad (21)$$

We notice that $\lambda_B^{PS1} = \lambda_B$. The optimal reelection threshold is then $w^{PS1} = (1 + \mu) w (\lambda_B^{PS1})$. The expected lifetime utility of a worker is

$$U^{PS1} = \frac{p(1 + \mu) w (\lambda_B^{PS1}) + (1 - p) w (\lambda_L)}{1 - \beta}. \quad (22)$$

In a similar fashion, we can characterize the performance standard of type PS2 that maximizes workers' lifetime utility. Let w^{PS2} and λ_R^{PS2} denote the utility threshold required for reelection and the licensing policy required in a recession to achieve the threshold, respectively. Lemma 3 implies that the politician will also want to satisfy the utility threshold w^{PS2} in a boom and can do so by setting $\lambda_B'' = w^{-1} \left(\frac{w^{PS2}}{1 + \mu} \right)$. Given that, we can write the value functions associated with compliance in the two states as

$$v_t^R = B(\lambda_R^{PS2}) + \beta p v_{t+1}^B + \beta (1 - p) v_{t+1}^R \quad (23)$$

$$v_t^B = (1 + \mu) B(\lambda_B'') + \beta p v_{t+1}^B + \beta (1 - p) v_{t+1}^R. \quad (24)$$

Solving for v^B and substituting the result into the expression for v^R and rearranging yields

$$v^R = \frac{(1 - \beta p)}{1 - \beta} B(\lambda_R^{PS2}) + \frac{\beta p (1 + \mu)}{1 - \beta} B(\lambda_B''). \quad (25)$$

To maximize their wage income in a recession subject to compliance, workers set w^{PS2} such that $v^R = B(\lambda_L)$. To achieve this, the politician issues λ_R^{PS2} licenses where λ_R^{PS2} is either the largest λ that solves

$$B(\lambda) = \frac{(1 - \beta)B(\lambda_L) - \beta p (1 + \mu) B(\lambda_B'')}{1 - \beta p} \quad (26)$$

or λ_H if $(1 - \beta)B(\lambda_L) - \beta p (1 + \mu) B(\lambda_B'') < 0$. λ_B'' is implicitly defined by $w(\lambda_R^{PS2}) = (1 + \mu) w(\lambda_B'')$. The optimal utility threshold of type PS2 accordingly is $w^s = w(\lambda_R^{PS2}) \leq w(\lambda_H)$. The lifetime utility of workers is

$$U^{PS2} = \frac{w(\lambda_R^{PS2})}{1 - \beta}. \quad (27)$$

Comparing the maximized lifetime utility associated with the two types of performance standards, we get the main result of the analysis.

Proposition 3 *Suppose that Assumption 1 holds. There exists a $\bar{p} \in (0, 1)$ such that for $p > \bar{p}$, it is constrained efficient for voters to use performance standard PS1.*

Proof. A direct comparison of equations (22) and (27) yields that performance standard PS1 is better than performance standard PS2 iff

$$p(1 + \mu)w(\lambda_B^{PS1}) + (1 - p)w(\lambda_L) > w(\lambda_R^{PS2}). \quad (28)$$

We notice $w(\lambda_R^{PS2}) \leq w(\lambda_H)$. It follows that $(1 + \mu)w(\lambda_B^{PS1}) > w(\lambda_H) \Rightarrow (1 + \mu)w(\lambda_B^{PS1}) > w(\lambda_R^{PS2})$. Assumption 1 ensures that this is the case. It then follows that for p close enough to 1, inequality (28) must hold ■

Corollary 2 *(Political instability) Unobserved real business cycle shocks induce political instability. Politicians lose office during recessions and are reelected in booms.*

The proposition and the corollary establish that it can be constrained efficient for workers to induce political instability. This happens when recessions are unlikely and the amplitude of the cycle is moderately large. The intuition is that workers want politicians to deliver as efficient a policy in a boom as possible but is unable to tell when the economy is booming. Unfortunately, politicians are unwilling to replicate this in a recession. They then forgo reelection and collect the maximum bribe. Workers are willing to accept this inefficiency when recessions are rare. We observe that in contrast to the case where the performance standard can be tailored to the cycle, performance standard PS2 magnifies rather than dampens aggregate fluctuations. That is, more licenses are issued in a boom

than in a recession. Moreover, measured by bribe income relative to GDP, corruption is counter-cyclical. Lots of bribes are collected in a recession because politicians make no attempt to get reelected, while in a boom they must pander to voters to stay in office.

This result is consistent with evidence from numerous studies of vote and popularity functions. This literature shows that incumbent politicians are much more likely to be reelected when economic conditions are benign than when they are not (see, e.g., Nannestad and Paldam, 1994). This empirical regularity is usually interpreted as evidence that politicians are rewarded for good performance. Our analysis, however, suggests an alternative interpretation: it is rational for voters to ask too much of their politicians in recessions and that is why they only get reelected in booms.

5 Conclusion

In a corrupt democracy, corruption levels and regulation of economic activity fluctuate systematically with the business cycle. We show that corrupt politicians behave like Keynesians when voters can tailor their performance standards to business cycle conditions. Economic policy entails excessive stabilization of aggregate fluctuations in a corrupt democracy and, as a consequence, corruption levels are pro-cyclical. Politicians collect bribes in a boom and hold back in a recession. In contrast, when voters cannot observe business cycle conditions, it may be constrained efficient to induce political instability with turnover of politicians in recessions. In this case, entry regulation magnifies aggregate fluctuations and corruption becomes counter-cyclical.

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6 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

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

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

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

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

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.,

$$b_t \leq \pi(\lambda_t, A_t) - w(\lambda_t, A_t). \quad (29)$$

The politician extracts the entire surplus and so, condition (29) is binding. The total bribe is

$$B(\lambda_t, A_t) = \lambda_t (\pi(\lambda_t, A_t) - w(\lambda_t, A_t)). \quad (30)$$

The bribe function is concave and differentiable, with $B(0, A_t) = 0 = B(\lambda_H, A_t)$, $\lim_{\lambda \rightarrow 0} B'(\lambda, A_t) = \infty$, and $B'(\lambda_H, A_t) \leq 0$. 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 $B(\lambda_L, A_t) = A_t B(\lambda_L)$.