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Incentives, Norms and the Persistence of Corruption*

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Abstract

The paper argues that purely incentive based approaches can only lead to an incomplete understanding of persistence of corruption. It is difficult to treat corruption purely as an incentive problem because corruption endogenises and undermines the incentive system itself. These need to be supplemented by considerations of values and norms. Using ideas from evolutionary (game) theories, we discuss how corruption can be immune to interventions and it can sustain itself against different behavioural norms.

JEL Classification: K42, B52, D73, A13

Keywords: Corruption, Norms, Incentives, Evolution

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1. Introduction

Is corruption simply a manifestation of deviant behaviour from the norm or is it the norm itself? Corruption is commonly defined as misuse of public office for private gains. Hence the very definition of corruption would suggest that corrupt acts are deviations from implicit or explicit behavioural norms (with or without legal and ethical connotations). One the other hand, the widespread nature of corruption in some societies indicates that corrupt behaviour is the norm itself. Since norms can be viewed as persistent behaviour, this seems to lie at the centre of the persistence issue.

Economists have viewed this as a multiple equilibria problem. In economics, the answer to the question in the previous paragraph lies in whether corruption (endemic corruption) can be equilibrium behaviour or not. It has been noted that different societies with relatively same levels of development, judicial machinery and politico-legal structures can exhibit varying degrees of "illegal (pre) occupation" like corruption, tax evasion and other regulatory non compliance. The explanation for this observation is that different societies can get caught in different equilibria. At a general level, this multiplicity arises due to various forms of externality. For example, if people expect more people to be corrupt, then the expected cost of being corrupt would be less (probability of apprehension might be low or even the social sanction against corruption could be low) leading to more people being corrupt[1]. Like all models of multiple equilibria these models can not explain why some get caught in the bad equilibrium, but still aid to our understanding of the persistence of corruption in some societies.

However, it is possible to argue that one can get rid of the bad equilibrium by making changes to the structure of incentives (rewards, penalties). For example, if more people are corrupt because the social sanction attached to corruption is low, one can

[1] Andvig and Moene (90) showed how "corruption may corrupt" others and lead to a situation of widespread corruption. Likewise, Sah (91) and Tirole (96) focus on this multiple equilibria phenomenon to throw light on the persistence of crime and corruption. See also the survey by Bardhan (97).

augment social incentives by explicit provision of new monetary or non-monetary sanctions. In that case, corruption can be reduced by the provision of adequate incentives. This would reduce the persistence problem to the problem of 'choosing the right incentives'. There may be some merit in this view, since some societies or organisations have managed to get out of the high corruption equilibrium.

This is somewhat similar to the recent issue of corruption and competition. It is generally believed that greater competition in the form of privatisation and deregulation would lead to substantially lower levels of corruption. But the recent experience of many countries (including some of the transition countries) shows that this may not indeed be the case. Corruption seems to be on the rise despite large scale privatisation and deregulations. One can argue, as in the preceding paragraph, that the reforms have not been proper or adequate and the right incentives are still not in place[2].

But we wish to argue that this view of confining attention to the right market incentives gives an incomplete picture, at least in the context of corruption. First, it ignores the fact that implementing any penalty or reward scheme requires an agency which needs to *acquire information* and then *implement the incentives properly.* When information acquisition is costly, other factors like 'beliefs' assume crucial importance. As we show in the next section, these beliefs can be self enforcing and once again lead to equilibria with different levels of corruption and compliance. Secondly, even when information is not the problem, collusion possibilities can render the incentive mechanism ineffective. In the next two sections, we discuss how the costly nature of information acquisition and the presence of collusion possibilities can undermine the incentive system. We show how beliefs, customs and social attitudes play a crucial role.

However, explanations based on aggregate beliefs and social norms can be tautological. In section 4, we shift attention to individual norms of behaviour. We introduce some preliminary ideas from evolutionary game theory to discuss the persistence (and success) of certain behavioural norms. In our view, a better understanding of corruption (and its persistence) can be obtained by looking at both individual behavioural norms as well as social norms. These considerations should complement the incentive approach.

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[2] See Dutta and Mishra (2003) for the references and an extended discussion of this issue.

2. Costly Information

In this section we consider a simple example where proper implementation of the incentive mechanism requires acquisition of costly information. Our intention is to show that in such situations, despite the presence of proper incentives, beliefs and norms play an important role in explaining high levels of corruption or other forms of non-compliance.

Consider a group of firms facing a certain pollution standard[3]. A firm can choose whether to comply with the prescribed standard or not. A firm will be denoted as an *a*-type firm (abider) or a *v*-type firm (violator) depending on whether it chooses to comply or not. The gain from non-compliance *g* differs across firms and is distributed according to some distribution G(g). It can be interpreted as abatement cost savings to the firm, hence different abatement technologies would account for the difference in gains. Firms compare the expected cost of non-compliance with this gain while making their decisions. Each firm expects to be inspected with a certain probability *p* by an officer. The officer can report the firm to the court or the higher authority as a violator. We assume the technology to be perfect so that the firm's type is revealed in the court with certainty. A firm found guilty by the court is charged a fine *f* and the officer receives a reward *r*. This resembles the standard incentive mechanism that would be suggested to ensure honest reporting by the officer and compliance by the firm.

However, it is possible that the *a*-type firm can be reported as well. In that case, the firm is eventually acquitted by the court, but it incurs a cost *c*. To discourage the officer from such misreporting we suppose that the officer, in such cases, incurs a cost *d*. The officer on the other hand can take a bribe from the firm and choose not to report the firm. The reward and penalty structure is given and satisfies the following assumption. We assume that $r < f$ and $c < f$.

Inspection in itself does not reveal anything, it all depends on whether the officer has put in the necessary effort or not. Effort can be given a very broad interpretation to

[3] This based on Mishra (1998). We could reinterpret the situation as corruption deterrence, where the officer is to be monitored by other officers. In the present section, we make no distinction between corruption and any other criminal activity. In the next section we draw attention to some of the differences.

include investments by the officer in learning, human capital development or skill acquisition. It is a measure of the competence of the officer. Competence may have several connotations, but in our model context it implies that a competent officer is able to make out the *a*-types from the *v*-types upon inspection[4]. To avoid confusion, we shall call an officer informed if he has put in this effort.

We can summarise the situation as a two stage process. In the first stage, each firm chooses its type, $t \in \{a, v\}$. The officer chooses effort e, $e \in \{0, 1\}$. Effort is costly, whenever $e = 1$, it costs the officer an amount E. The second stage is a simple bribe game. If the firm and the officer agree on a bribe (including a bribe of zero), the firm is not reported. Otherwise, the firm is reported. The firms and the officer work out the expected payoffs in this stage while making decisions in the first stage.

Firm's gain g is not observable to anyone other than the firm, though the distribution is known to all. Neither the officer nor the other firms can observe a particular firm's choice $t = a, v$. Prior to inspection, the officer has some belief about the firm's type. This is denoted by π, where it the probability that the firm is of *a*-type. This belief can be based on some aggregate signal[5] of the firms' choices such as the total pollution level. For example, if the officer infers from the total pollution level that half of the firms must have violated the pollution standard, when confronted with a particular firm he believes that with probability 1/2 this firm is a violator.

We also assume that firms can observe the level of e chosen by the officer[6]. This is however non verifiable, and hence non contractible. So the authority cannot force the officer to choose a particular level of e.

We shall skip the analysis concerning the actual bribing process. Note that we can have two types of situations. Depending on the choice of the officer, the firms might be facing an informed or uniformed officer. It seems reasonable to suppose that the *a*-types would prefer an informed officer to an uninformed one. The exact opposite preference is expected for the *v*-type. In fact, under some conditions it does turn out to be the case.

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[4] To give an example, tax inspectors often spend considerable time and effort researching on related areas before they do the true assessments.

[5] Collective reputation, such an aggregate but imperfect measure, plays an important role in Tirole (96).

[6] Strictly speaking this assumption can be avoided. The firms can form belief about e in the first stage and in equilibrium this belief is justified. But one has to restrict these beliefs to end points only and all firms have same beliefs.

When the officer is informed, he would never like to report the *a*-type because of the cost *d*. But when he is uninformed, the *a*-type will be reported with positive probability (it is increasing in the reward *r*) and will incur some cost. Let payoffs to the firm in the informed and uninformed cases be denoted by U_I and U_{UI} respectively. It can be shown that $U_I(a) > U_{UI}(a)$ and $U_I(v) \leq U_{UI}(v)$. For the officer, let his payoffs from the bribe game be V_I and V_{UI} in the informed and uniformed cases. The difference will depend on the belief π and information cost *E* (in addition to the incentive parameters *r*, *f* and *d*). For a given *E*, the officer will choose to be informed ($e = 1$) if π is relatively high.

From the above inequalities, $U_I(a) - U_I(v) > U_{UI}(a) - U_{UI}(v)$. Hence, when the officer is uninformed, even firms with lower gain *g* will choose to pollute. This implies that, when the officer is expected to be uninformed, more firms would choose to be on the wrong side of the law than when the officer is informed. This, in turn, can make the officer's decision to choose $e=0$ optimal. So we might see a greater degree of violations of law with uninformed officer. Similarly, when firms expect the officer to be informed, fewer firms would choose *v* and π is likely to be high and this, in turn, makes the officer's decision to choose $e = 1$ an optimal one. This would suggest that for certain parameter values, there exist two equilibria. There is a high compliance equilibrium with fewer firms choosing to pollute (π is high) and the officer remains informed. The other is the low compliance equilibrium where the officer is uninformed and greater fraction of the firms chooses to pollute.

The key to the exercise is the fact that the fraction of the population engaged in illegal activity and the prior belief of the officer of a firm being of type *v* are same in equilibrium. In some sense beliefs play a crucial role. One could also introduce belief by the firms about whether the officer is informed or not. One set of beliefs would support (and are supported by) the low compliance or high corruption equilibrium.

3. Corruption as Collusion

Here we discuss how collusion between individuals can undermine the incentive mechanism. Corruption is often associated with explicit or implicit collusion[7]. Collusion refers to the case where two or more parties collude to choose a course of action (not the legal or prescribed course in our context). Hence all colluding parties are beneficiaries of the corrupt act. In most enforcement situations like tax collection, regulation or policing, these two (corruption and collusion) are in fact the same. In some other cases, collusion may not be apparent but the possibility of collusion facilitates the corrupt act. Consider, for example, the case of a public official demanding a bribe for some public service or siphoning off public resources for personal use. There is no act of collusion, but such behaviour is possible because the official believes that he could collude with whoever detects or monitors him. The same can be said about other cases of corruption- extortion or fraud. In this sense, corruption makes the incentive structure endogenous by shaping its implementation. To what extent the official's act is uncovered and punished depends on the extent of collusion possibilities.

Basu, Bahattacharya and Mishra (92) showed how a single corrupt act is likely to be backed by the possibility of several layers of collusion. Much of the corruption literature normally assumes that there is an honest agency which is supposed to enforce the penalties and rewards stipulated by the incentive structure. This is keeping in line with the Principal – Agent literature where there is always a principal who would use incentives to make the agent choose the desired action. But one of main reasons why corruption persists is that we don't often have such a principal. We can have a corrupt office monitored by another corrupt office and so on. Various authors have shown indefinite possibility of bribery along the chain[8].

The possibility of such indefinite bribe chain resembles an open loop. One can argue that we can close the loop by ensuring that those who loose from the corrupt act have the power to monitor the system at some level. This would seem to be true in case

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[7] This is one of the main differences between ordinary criminal activities like theft, murder etc and corruption.

[8] See Mishra (2002), Bac (1996) and Carillo (1996). Rose-Ackerman also draws attention to this issue in an organisational context (1978, 1999).

of a democracy where bureaucracy is meant to be overseen by elected representatives. But in such a case, other collusion possibilities will arise if there are several principals and there exist sufficient heterogeneity amongst them.

Consider a population of three individuals {1, 2, 3}, supposed to receive a public good/benefit. Public official O chooses to siphon off an amount Z. Let the resultant loss (from the official's action) to the individuals be Z_1, Z_2 and Z_3. Politician P is supposed to prevent the official from such act. Assume that the politician needs a majority approval[9] by the group of individuals to continue and the politician always wants to continue. So the individuals have some instrument of control, they can terminate P if O does not deliver properly[10].

Collusion possibilities still exist. O can collude with P and pass on some fraction of its benefit αZ to P. Will the individuals terminate P? Not necessarily. If individuals can be compensated to the tune of βZ_i for their loss, they have no reason. Note that β can be very low as well. If an individual thinks that by terminating the incumbent, one is not guaranteed of another $P^{/}$ who will behave differently then $\beta = 0$. P can collude with two members (say 1 and 2) and continue if $\alpha Z > \beta(Z_1 + Z_2)$. That way we have collusion between O and P and then between P and the majority {1,2}. Only individual 3 looses out in the process. Of course it is simplistic, but it shows that collusion possibilities can render the incentive system ineffective. It is unlikely to happen if (1) β is high (2) corruption is highly inefficient $Z_1+Z_2+Z_3 >> Z$. A high value of β would suggest that political competition is effective. So we could conclude that with effective political competition, such collusion possibilities are limited and the public official is less likely to misappropriate. Likewise, the second inequality would suggest that individual losses can not be compensated because of substantial growth opportunities. Hence collusion possibilities are greater in developing economies in areas with limited growth opportunities.

Collusion imposes constraints on design of incentives. Hence one form of corruption can undermine efforts to curb another type of corruption. One can argue that

[9] In a general case different voting systems and political structures would lead to different outcomes. See Myerson (1993) and Parssons et.al. (2002).

[10] This is an incomplete specification to say the least. We need to consider P's loss from being terminated and also P's possible replacements.

collusion formation itself is a costly process. Moreover different societies and cultures will have different costs. When and how people can collude-depends on variety of factors. First, collusion might be difficult if there is sufficient informational asymmetry between the colluding parties. This is of relevance in designing the delivery mode of public services. For example, in the context of decentralization of public service delivery, Bardhan and Mookherjee (2000) argue that such collusion formation (capture) is easier at local level because of familiarity and lack of information asymmetries. This also has a bearing on the placement and transfer policy of personnel in many public offices. Second, collusion in most instances involves bribery and by its very nature a bribe transaction is a personalised transaction[11]. Hence customs, practices, attitudes also determine the environment in which collusion takes place. These are similar to what Rose-Ackerman calls 'cultural factors' affecting corruption[12].

4. Evolutionary Stability

In this section we look at some of the ideas from evolutionary theories to see whether the persistence issue can be addressed in such a framework. There are at least three motivations for focusing on an evolutionary approach. First, recent work on evolutionary game theory has shown that evolutionary stability can address the issue of equilibrium selection to some extent. Since corruption happens to one such equilibrium, we can ask what kind of social dynamics would select such an outcome (equilibrium). Second, we also need to look at individual norms of behaviour and not just social norms. 'Driving on the left or right' is part of social norm. An individual living in different societies would follow the social norm and accordingly drive on the left or right. But the same individual might follow a norm 'Drive carefully when people are crossing the road'

[11] Anthropologists would argue that the 'self ' is involved in such transactions. Market transactions are atomistic and does not involve the individual self (characteristics and attributes)

[12] In some societies even so called market transactions are not necessarily impersonal. One could cite several examples. One frequents a shop not because of any obvious clientele benefits but because of personal links. Similarly, it is often reported that people might vote for someone because he or she had visited them in the past- akin to a pretense of personal knowledge. As Basu (2000) points out, in India, you have the right to ask a stranger travelling with you about various personal details like age, salary , family life etc., because getting to know the person is a done thing. In many other societies it would be considered rude.

irrespective of which society he live in. The analysis of the first section showed that we could have different compliance levels as different equilibria or (social) norms. But then these do not explain the presence of certain social norms. In the present section we shall be primarily concerned with individual norms of behaviour. Last, we want to see whether corruption persists because of imperfect information, underlying beliefs and the ease of collusion or it persists because corruption has a self-replicating nature in a very basic and primitive way. Suppose we have a set of honest (non corrupt) individuals. Clearly, the analysis of sections 2 and 3 would suggest that there can not be any corruption equilibrium. Suppose we introduce some corrupt individuals into this population. Do we still have the no corruption equilibrium? This question is at the heart of evolutionary game theory[13].

Suppose individuals are programmed to play certain strategies (act in certain manner) in some strategic situation under consideration. Unlike standard decision theory or game theory, there are no rational calculations involved. We consider a case where a large population plays the following symmetric 3-person[14] distribution game. We shall assume that 1 unit of resource is to be distributed between three randomly matched individuals. Individuals are either Collusive (C) or Non-Collusive (H). Alternatively, C stands for corrupt behaviour. A collusive individual always colludes with similar agents to further his own share in the distribution process. On the other hand, a non-collusive individual never colludes (this represents honest behaviour). Players meet randomly and play the game. Each individual has an outside option – not to participate in the game and receive z, $z \geq 0$ and small.

One can use various modelling strategies to analyse the payoffs from this distribution game. We could model the situation as a strategic bargaining process with disagreement leading to payoff of 0 for everyone. Alternatively, we could assume that with equal probability one person is authorised to distribute the resource. Rather than describe the details of the distribution process we shall suppose that the following

[13] Pioneering work by biologists Maynard Smith and Price (1973) has led to a substantial literature. See surveys by Kandori (1996), Vega-Redondo (1996) and Weibull (1997).

[14] It is normal to compare strategies in a pair-wise fashion, hence it is normal to consider 2-person games. Here also we shall compare two strategies but to motivate the idea of collusion/corruption we are using an example of 3-person matchings.

outcomes (payoff distributions) result when different C or H types are matched. We shall denote the payoff to strategy X when it is matched with Y and Z as g(X; Y,Z).

- (H,H,H): When three H type are matched, each gets an equal share and g(H,H,H) = 1/3.
- (H,H,C): Again each gets 1/3. The presence of one C does not make a difference because C can not collude with anyone.
- (H,C,C): H gets z, and C gets (1-z)/2 since the two C types collude. Hence g(H;C,C) = z and g(C;C,H) = (1-z)/2
- (C,C,C): each gets (1-d)/3. This reflects that fact that collusion formation is competitive and wasteful here, d > 0.

Definition: Let A be the set of pure strategies and S be the set of mixed strategies. A strategy X is evolutionary stable (ESS) if there exists δ^* such that for all $\delta \in (0 \;\; \delta^*]$ and for all Y

$$g(X, (1-\delta)X + \delta Y) > g(Y, (1-\delta)X + \delta Y)$$

This captures the basic idea that if everyone in the population plays X and there is a small invasion of mutants (playing Y), then population of X is immune to such invasion. In biological contexts, payoffs represent fitness and ability to replicate. In the above definition, X is an evolutionary stable strategy because the payoff to playing X in a population where everyone plays X except a small (δ) fraction of mutants is higher. Since the mutants don't do very well (payoff is smaller) they are not able to replicate and overrun the X population. In our case, replication can be interpreted as imitation or adoption of the successful strategies. So we could think of a scenario where individuals look at their own payoff as well the payoffs to other individuals. Individuals can switch to some other strategy which gives a higher payoff. This way a successful strategy gets replicated. This is called the replication or imitation dynamics.

In the present context we have assumed that success is measured purely in terms of monetary payoffs. This is where the social value system comes into play. It is quite possible that individuals might continue with their honest strategy despite the corrupt strategy yielding higher economic payoff. The latter might yield less prestige or social esteem. Clearly the underlying value system is a major determinant of the imitation dynamics[15].

For the 3-person case we can reinterpret g(X, $(1-\delta)X + \delta Y$) as payoff to X when all other opponents are playing a mixed strategy with randomisation probabilities given by $(1-\delta)$ and δ. It can be shown[16] that the non-collusive strategy H is an ESS if δ (d/3) + z – 1/3 > 0. This inequality is not likely to be satisfied and hence H is not immune to invasion by C. On the other hand, C is an ESS if $(1-\delta)^2[(1-d)/3 - z] + 2(1-\delta)\delta\,[(1-z)/2 - 1/3] > 0$. This is likely to be true. Clearly collusive behaviour is immune to the invasion by H (a few good men can't help). This would suggest that corruption is not a deviation but it is the norm itself. However, it is easy to check that it is an inefficient situation. Societies which can establish H behaviour as the norm would do much better.

We can extend the previous analysis in a few directions. First, recall that we have a static distribution game. Consider a situation where agents have to invest some effort in the production of the output before distribution. In that case, one can devote effort to forming collusion or to raising output. This would make the cost of collusion very high (high d) because collusive behaviour implies lost growth opportunities. In such a case, a population of C types would rather do badly. This suggests that process of development itself can bring about changes in whether corruption can persist or not. Second, in a similar vein, one could ask what would lead to high values of z, the outside option. A high z would imply that the H type's share does not depend so much on the nature of matched opponents. This suggests that more market oriented societies would be better suited to sustain non-collusive behaviour over the long-run.

A third way would be to consider sets of behaviour rules[17] and not just one. For example, the H type could imply a collection of behaviour- never collude and always divide equally, leave the game rather than accept anything that is not fair. Now when the H type meets two of the C types, the H type could leave the game resulting in payoffs of z to everyone. This may not be a gain to the H type but the mutants C types are not going to do very well. Given that they don't do very well against their own types, they will not

[15] This can be related to Huntington's modernisation and corruption hypothesis (1968). Modernisation brings a different social dynamics to an otherwise traditional society.
[16] It follows from $(1-\delta)^2 g(H,H,H) + 2(1-\delta)\delta\, g(H,H,C) + \delta^2 g(H,C,C) > (1-\delta)^2 g(C,H,H) + 2(1-\delta)\delta\, g(C,H,C) + \delta^2 g(C,C,C)$
[17] This is based on the analysis of 'rationality limiting norms' in Basu (2000).

be able to replicate. Hence the H type could be immune to invasion by the C types. A society develops (has to develop) such behavioural rules and norms over time to sustain the honest and more efficient mode of behaviour.

5. Conclusion

The aim of the paper is rather modest. We have tried to point out some limitations of the purely incentive based approach to the study of corruption. There is no doubt that incentives play a major part, but the very incentive mechanism which is in place to fight corruption, gets undermined by the pervasive nature of corruption. Hence the same incentive system can generate low and high corruption equilibria. Incentives also get diluted by the extent of collusion possibilities. We showed how beliefs, customs and social norms affect the extent of corruption in equilibrium.

The second half of the paper has been rather exploratory. It is argued that in addition to aggregate norms and behaviour, one must also look at individual behaviour and norms. We have tried to pose the persistence of corruption issue in an evolutionary setting. This provides us with a framework in which we can analyse how non-corrupt behaviour can survive over the long-run. The analysis has been somewhat speculative and rudimentary, a detailed development is left for future research.

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