Political Economy of Corruption in 'Red Tape'♣

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Abstract

Corruption cannot exist unless there are supporters of it in the society. This paper attempts to identify the supporters of corruption in 'red tape' and the conditions under which corruption exists in 'red tape'. In the paper 'red tape' refers to a screening process institutionalized by a government as it is commonly observed in many countries to identify the deserving recipients of a targeted transfer scheme. The process takes certain time which is technologically fixed. A corrupt official promises an early delivery of the good both to a deserving and an undeserving candidate in exchange of bribe. The paper first shows that the social surplus is always higher under an honest equilibrium compared to the corrupt one which rejects the 'greasing the wheels hypothesis' of corruption. Nevertheless corruption exists in a society with the proportion of deserving applicants lying below a certain threshold and the length of the red tape being above certain threshold. Surprisingly, in these societies it is the deserving applicants who prefer existence of corruption, NOT the undeserving ones as usually thought. The threshold values and therefore the possibility of corruption crucially depend on the gap between the benefits accrued to the deserving and undeserving applicants. The possibility of existence of corruption falls either if the gap is extremely high or if it is extremely low. The paper ends up explaining why corruption is associated with red tape in certain countries/government departments, not others. It also suggests policies that can control corruption in presence of red tape.

Keywords: Corruption, Red Tape, Screening

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1. Introduction

In the existing economics literature 'red tape' and 'corruption' are the terms that always come together as bribe is paid to speed up the delivery of public goods/services. It is also posed as a typical developing economy problem. Although 'red tape' as a screening device exists in many countries for sorting out the deserving candidates from the undeserving ones as beneficiaries of government's targeted benefit programs, all are not accused to be corrupt. So the question that intrigues us is: why corruption exists in presence of red tape in certain situations, not in others? If corruption is bad, the political economy answer to this question is 'because certain sections in the society benefit from it and like it to exist'. The present paper using a theoretical model explores a more precise answer to this question. It first shows that in presence of red tape in a targeted benefit program the social surplus is always higher under an honest equilibrium compared to the corrupt one and then shows that it is the deserving applicants who prefer existence of corruption if the following two conditions are satisfied: (i) the proportion of deserving applicants in the society is lying below a certain threshold; and (ii) the length of the red tape in the program is above certain threshold; otherwise corruption does not exist. The results also suggest that for controlling corruption in such situations it is important to know the gap between the expected benefit accrued to a deserving applicant vis-à-vis an undeserving applicant in a program. If the gap between the two is very high no amount of shortening of the length of red tape is able to control the corruption.

The existing literature in economics deals with different aspects of 'red tape'. A class of papers like Banerjee (1997), Saha (2001), Guriev (2004), Fredriksson (2014) tries to explain the length of red tape. Banerjee (1997) shows why the red tape is likely to be longer in developing countries vis-à-vis developed countries. Saha (2001) shows the way the length of red tape depends on the waiting costs of the recipients of the transfer of the targeted benefit program. Guriev (2004) derives the socially optimum level of red tape and explains why in absence of proper incentive the officials may create excessive red tape. Fredriksson (2014) investigates the role of intermediaries in red tape and corruption. He shows that inclusion of intermediaries in bureaucracy leads to a longer red tape than in exclusion of it and a consequent fall in social welfare. Ahlin and Bose (2007) explore the effect of bureaucratic competition in a model of red tape. Kleven and Kopczuk (2011) look at non-participation of deserving participants due to

complexity of the screening process. The scope of the present paper differs from either of these papers. Instead of exploring the supply side factors of corruption under red tape it looks at the demand side factors. Here unlike Banerjee (1997), Saha (2001), Guriev (2004), Fredriksson (2014) the length of red tape is exogenously fixed by technological factors. It also does not deal either with bureaucratic competition or with intermediaries. The paper belongs in the tradition of 'efficient corruption' literature led by papers like Lui (1985) and Beck and Maher (1986) that assume the length of the 'red tape' is exogenously given and argues bribes 'grease the wheel' by ensuring efficient allocation of a good/service. The efficiency is achieved as the allocation takes place in favor of the individuals with both higher willingness and higher ability to pay. However these papers faced criticisms both from theoretical and empirical ground[1]. Empirically Mauro (1995) in a cross country study observed a negative relation between corruption and economic growth[2]. Theoretically Andvig (1991) pointed out that there is no reason to assume the corrupt official's objective matches the social objective. Also since the officials and the applicants would not know each other's type the search cost may also stand in the way of achieving the efficiency (Nitzan (1994), Tollison (1997)). Our paper presents a model of exogenously given red tape where all the three attributes of 'speeding things up', 'divergence between the corrupt official's objective and social objective' and 'incompleteness of information' interacts. Its contribution to the literature is threefold. First, it decidedly shows that even if it takes the form of a pure transfer the speed-money in presence of red tape always reduces social surplus in an economy. Second, surprisingly the demand for a corrupt system comes from those who are supposed to get the good/service, and not, as one might have thought, from those who are not supposed to get the good/service. Third, the success of an anti-corruption policy like shortening the length of red tape crucially depends on relative expected return of the deserving applicants vis-à-vis the undeserving applicants; it is difficult to control corruption if the gap is too high.

The theoretical model presented in the paper is close in its structure to Ahlin and Bose (2007). There are two types of recipients of the government program: deserving and non-deserving who differ from each other only in terms of the benefit accrued to them. The private and social benefit of the deserving applicants is higher than that of the undeserving applicants. The types are private information which is revealed through the length of red tape that spans over two periods:

[1] See Aidt (2003) for detailed survey of the literature.

[2]See also Aidt (2009), Gupta *et al* (2000) for similar findings.

in period 1 the applicants present their credentials and in period 2 their types are revealed; in an honest regime the deserving applicants receive the good/service for free at the end of period 2 and generate a positive externality to the society. The corrupt officials deliver the good irrespective of applicant's type in exchange of bribe. The good delivered to an undeserving applicant generates negative externality to the society. In the model the officials are monopoly in the sense that the same official who receives the credentials of the applicant in period 1 delivers the good/service in period 2. A corrupt official demands bribe from the applicants in period 1 itself with a promise of early delivery of the good. The future payoffs being discounted the applicants also may agree to the offer. Since the bribe is being offered in period 1 without knowledge about the applicant's true type and there is no way to discriminate between their types, the corrupt official charges a high bribe rate if the proportion of deserving applicants is high enough which excludes the non-deserving applicants from accepting the bribe offer; he charges a low bribe rate if the proportion of deserving applicants is low enough which encourages both types of applicants in accepting the bribe offer. The existence of the exclusionary contract in period 1 is key to understand the results of the paper. The deserving applicants prefer the honest regime to the corrupt regime if the exclusionary contract is offered. They prefer the corrupt regime if the pooling contract is offered and the length of the red tape is above certain threshold.

The results of the paper find empirical support from the work of Bussell (2012) who studied the implementation of Information Technology enabled Services (ITeS) in time-bound delivery of public services in India. The introduction of ITeS services in India since 2006 was a response to the problem of corruption in red tape. The delivery of certain government services like issuance of certificates was done through electronic application process at certain stores known as 'e-choupals' with promise of delivery within certain time. Bussell (2012) reports that the scheme saw mixed success in different states of India. On interview some of the deserving applicants told the surveyors that they were better off in the earlier regime as the delivery of the service was quicker though they had to pay bribe for it.

The plan of the paper is as follows. The next section presents the model and derives the results. The section following concludes.

2. Model

Consider a social welfare maximizing government that distributes for free a good[3] to all deserving applicants applying for it. The government *a priori* does not know the identity of the applicant that whether she is deserving or not. So, it appoints bureaucrats for verification of credentials and delivery of the good in a two-period administrative process. The bureaucracy consists of both corrupt and honest officials. While an honest official delivers the good free of charge, a corrupt official charges a price in the form of bribe for the good. Even a non-deserving applicant may get the good from a corrupt official by payment of bribe. A corrupt official is profit-maximizer in his objective compared to an honest official who is a social-welfare maximizer. It is common knowledge that among the officials ρ proportion is honest and $(1-\rho)$ proportion is corrupt.

Let us assume that the measure of number of applicants is 1. The list of applicants consists of both deserving and undeserving ones. It is common knowledge that α proportion of the applicants is deserving and $(1-\alpha)$ proportion is undeserving. The deserving ones are those who generate positive externality to the society. On the other hand, the undeserving applicants generate negative externality to the society. It is known that a deserving applicant's *ex post* net return from the project is $\beta > 0$ and that of an undeserving applicant is $g > 0$. The social return from allocation of the good to the deserving and undeserving applicants matches their respective private returns. The social cost of servicing the applicant is γ and $g < \gamma < \beta$. Thus, while the negative externality created from allocation of the good to an undeserving applicant is $(g-\gamma) < 0$ to the society, the positive externality created from allocation of the same to a deserving applicant is $(\beta-\gamma) > 0$ to the society. However, β and g are private information of an applicant.

The applicants' wealth follow a cumulative distribution function $F(\cdot)$. Of the applicants, we assume, some are able to pay the corrupt official when charged with a bribe *ex ante* while some are not. We denote the fraction of such applicants as $\omega = 1 - F(g)$.With probability $(1-\omega)$ an

[3] Examples would be delivery of free food, hospital beds for people below the poverty line etc.

applicant is not able to pay when charged with a bribe, even if she is deserving[4]. So, under corruption, some deserving applicants who are un-wealthy does not receive the good, which is bad for the society as the society loses on positive externality generated from distribution of the good to her. Again, some wealthy but undeserving applicants receive it which is also bad for the society as they generate negative externality to the society.

Given the two types of officials in the bureaucracy the 'red tape' functions in the following way. In period 1, an applicant meets an official for the submission of credentials; the official if honest does not ask for a bribe and the good is delivered in due course (in period 2). However if he is corrupt, asks for a bribe of amount b_1 with a promise of declaring her 'deserving' and delivering the good immediately. Thus an official reveals his own type to the applicant by his behavior in period 1 itself. Had the type of the applicant been known *a priori*, the corrupt official would ask for their entire amount of bribe surplus from both deserving and undeserving applicants. This will surely be the case in period 2 when the corrupt official comes to know about the applicant's true type. Thus, a potential adverse selection problem exists in period 1 as when the official asks for bribe a deserving applicant can mimic an undeserving one as it leaves her with a positive surplus. If an applicant rejects the period 1 bribe offer, she knows that in the next period she would meet the same official for the delivery of the good who would extract her entire surplus through bribe.[5] The second period bribe will be denoted as b_2 in the model.

We summarize the timing of the moves in the model below as:

Period 0: Applicants apply for the good. Screening starts by some technological means.

Period 1: Each applicant meets an official. The official:

- if honest waits till the next period ;

- if corrupt offers a bribe contract.

[4] As it turns out in our model the minimum amount of bribe charged from an applicant is g.Since $g > 0$, it is always the case that $F(g) > 0$ which in turn implies there always exists a fraction of individuals however small who cannot pay bribe.

[5] Even if the deserving applicants are extorted by the corrupt official, here we assume that the cost of going to the court is prohibitively high for which they do not go to the court seeking redress. We discuss the implications of an applicant's going to the court in a separate paper.

An applicant who meets a corrupt official makes a choice between paying the bribe and getting the good in period 1 itself or rejecting the bribe offer and waiting till the next period. If the bribe offer is accepted the game ends in period 1 itself.

Period 2: It is the last period of the game. Each applicant who has not received the good in period 1, for delivery of the good meets the same official whom she met in period 1. The official:

-if honest provides the good only to all deserving applicants free of cost;

-if corrupt, distributes the good for a bribe irrespective of the eligibility of the applicants.

Payoffs are realized.

The following set of assumptions has been made for simplifying the model.

Assumption 1: Both types of the officials and the applicants discount future payoffs at the same rate of $\delta \in (0,1)$ which is common knowledge.

The private cost of waiting till the next period can be considered as $(1-\delta)$. The higher is the length of time which is required in an honest process between verification of credentials and delivery of the good, the longer is the red tape, the lower is the value of δ and the higher is the cost of waiting.

Assumption 2: There is no access to credit for an un-wealthy applicant.

Assumption 3: Outside option is zero for both types of applicants.

Now let us characterize the equilibrium with and without corruption.

2.1. The equilibrium without corruption

Under honest regime, an official does not ask for bribe in period 1 and as applicant's true type is revealed in period 2, the deserving applicant receives the good only at the end of period 2. The expected payoff of a deserving applicant is:

$U_p{}^h = \delta\beta.$ ……(1)

Since only the deserving ones receive the good in this regime the expected payoff of an undeserving applicant is:

$U_u{}^h = 0.$ ……(2)

Suppose $C(\delta)$ represents the social cost of implementing a red tape of length δ that is sunk and monotonically increasing in δ. Then the social surplus in honest regime denoted by S_h is

S_h=$\alpha(\beta - \gamma) - C(\delta)$……(3)

which is realized at the end of period 2.

2.2. The equilibrium with corruption

In a corrupt regime a bribe is paid either in period 1 or in period 2.The amount of bribe paid in each period would depend on the bribe surplus lying with the applicants in that period, which may vary with the type of the applicant whether she is deserving or not. We first look at the determination of bribe b_2 in period 2. Since g is the maximum willingness to pay for the undeserving applicants and β is the same for the deserving applicants while the outside option is zero for both (assumption 3), the corrupt official extracts the entire amount of bribe surplus lying with the applicants by charging $b_2 = \beta$ to the deserving applicants and $b_2 = g$ to the undeserving applicants. Moving backward, in period 1 the applicants can foresee their payoffs in period 2. Let V_P and V_u be the respective bribe surplus of the deserving and undeserving applicants in period 1. Since the applicant receives the good from the same official she meets in period 1, if a corrupt official is met in period 1, she knows that even if she rejects the bribe offer in period 1, she cannot avoid meeting him in the next period and would have to pay b_2 in the next period. Therefore V_P and V_u would be calculated as: $V_P = \beta - \delta(\beta - b_2)$ and $V_u = g - \delta(g - b_2)$ respectively. Since $b_2 = \beta$ for the deserving applicants and $b_2 = g$ for the undeserving applicants, it turns out that $V_P = \beta$ and $V_u = g$. So the corrupt official would charge $b_1 = \beta$ to a deserving applicant and b_1=g to an undeserving applicant if he could identify their true types in period 1. But unfortunately he cannot identify the true type of an applicant in period 1. Instead the official has the option of offering two different types of contract to an applicant: **(I) An exclusionary contract** where the corrupt official deliberately excludes the undeserving ones from receiving the good in period 1 by charging both the deserving and

undeserving applicants a bribe amount of β; and **(II) A pooling contract** where he charges bribe amount of g to both type of applicants such that either of them accepts the bribe offer[6].The corrupt official opts for the one which maximizes his own payoff.

Observation 1: If $\alpha > \frac{g-\delta g}{\beta-\delta g}$, a corrupt official offers an exclusionary contract in period 1; if $\alpha \leq \frac{g-\delta g}{\beta-\delta g}$, he offers a pooling contract.

Proof: Since $V_P = \beta$ and $V_u = g < \beta$, under the exclusionary contract only the deserving applicants accept the bribe offer of β. Therefore the expected payoff of a corrupt official is calculated as:

$\pi^E = \alpha\omega\beta + (1-\alpha)\omega\delta g$.....(4)

Under pooling contract since $V_P = \beta > g$ and $V_u = g$, both deserving and undeserving applicants accept the bribe offer of g. Therefore the expected payoff of a corrupt official is calculated as:

$\pi^P = \omega g$. .....(5)

From comparison of (4) and (5) the statement of the observation follows. □

The intuition behind observation 1 is straightforward. If $\alpha > \frac{g-\delta g}{\beta-\delta g}$, the number of deserving applicants is high enough. So even if the corrupt official does not know the true type of the applicant it is better for him to charge β to both of them. But if $\alpha \leq \frac{g-\delta g}{\beta-\delta g}$ and he sticks to the same strategy, it is more likely that his offer gets rejected. So he charges g to both of them, which is likely to be accepted.

[6]A self-selecting contract offering $({b_1}^u, {b_2}^u)$ for undeserving applicants and $({b_1}^p, {b_2}^p)$ for the deserving applicants does not exist in our case as the deserving applicant's payoff function $(\beta - {b_1}^p - \delta {b_2}^p)$ and the undeserving applicant's payoff function $(g - {b_1}^u - \delta {b_2}^u)$ do not satisfy the single crossing property.

Now we discuss two separate cases with $\alpha > \frac{g-\delta g}{\beta-\delta g}$ and $\alpha \leq \frac{g-\delta g}{\beta-\delta g}$. Notice that in both the cases being unable to pay the bribe no un-wealthy applicant receives the good from the corrupt official.[7]

Case I: $\alpha > \frac{g-\delta g}{\beta-\delta g}$.

It follows from observation 1 that here the corrupt official in period 1 offers exclusionary contract to the applicants. The expected payoff of a wealthy and deserving applicant in such a case is:

$$U_p{}^E = \rho\delta\beta + (1-\rho)(\beta-\beta). \qquad \text{.....(6)}$$

The first term on the RHS of (6) represents a deserving applicant's payoff if an honest official is met in period 1 and the second term represents her payoff if a corrupt official is met. Notice if an honest official is met in period 1 she receives the good at the end of period 2 and therefore she discounts the payoff by δ; but if a corrupt official is met she pays bribe β and receives the good in period 1 itself.

Similarly the expected payoff of a wealthy but undeserving applicant in this case is calculated as:

$$U_u{}^E = \rho.0 + (1-\rho)0 = 0. \qquad \text{.....(7)}$$

The first term on the RHS of (7) represents an undeserving applicant's payoff if an honest official is met in period 1 and the second term represents her payoff if a corrupt official is met. Notice if an honest official is met in period 1 she does not receive the good and if a corrupt official is met, she rejects the bribe offer but the same official is met in the next period. She receives the good but her entire surplus gets extracted.

Now let us calculate the expected social surplus in this case as:

$$S^E = \alpha\rho(\beta-\gamma) + \alpha(1-\rho)\omega(\beta-\gamma) + (1-\alpha)(1-\rho)\omega(g-\gamma) - C(\delta) \text{.....(8)}$$

[7]An un-wealthy deserving applicant receives the good if she meets an honest official. Thus her expected payoff is $\rho\delta\beta$.

The first term on the RHS of equation (8) is the social surplus if a deserving applicant meets an honest official in period 1 and obtains the good in period 2. The second term is the social surplus when a deserving applicant meets a corrupt official in period 1 and she is wealthy enough to pay bribe and receive the good. The third term is the social surplus when an undeserving applicant meets a corrupt official in period 1 rejects his bribe offer and goes to the next period. Since this is corrupt system where as explained above she meets the same corrupt official in period 2 while the corrupt official extracts the entire return of the applicant, the undeserving applicant receives the good. In no other case the good is distributed. The bribe being a pure transfer does not enter the social surplus calculation.

Case II: $\alpha \leq \frac{g-\delta g}{\beta-\delta g}$.

It follows from observation 1 that here the corrupt official in period 1 offers pooling contract to the applicants. The expected payoff of a wealthy and deserving applicant in such a case is:

$U_p{}^P = \rho\delta\beta + (1-\rho)(\beta - g)$ ……..(9)

The first term on the RHS of (9) represents a deserving applicant's payoff if an honest official is met in period 1 and the second term represents her payoff if a corrupt official is met. Notice if an honest official is met in period 1 she receives the good at the end of period 2 and therefore she discounts the payoff by δ; but if a corrupt official is met she pays bribe g and receives the good in period 1 itself enjoying a surplus of $(\beta - g)$.

Similarly the expected payoff of a wealthy but undeserving applicant in this case is calculated as:

$U_u{}^P = \rho.0 + (1-\rho).(g-g) = 0.$ …….(10)

The first term on the RHS of (10) represents an undeserving applicant's payoff if an honest official is met in period 1 and the second term represents her payoff if a corrupt official is met. Notice if an honest official is met in period 1 she does not receive the good and if a corrupt official is met, although she pays bribe g and receives the good in period 1 itself since her entire bribe surplus is extracted, she receives zero payoff.

Now let us calculate the expected social surplus in this case as:

$$S^P = \alpha\rho(\beta - \gamma) + \alpha(1-\rho)\omega(\beta - \gamma) + (1-\alpha)(1-\rho)\omega(g - \gamma) - \mathrm{C}(\delta) \ldots\ldots\ldots (11)$$

The first term on the RHS of equation (11) is the social surplus if a deserving applicant meets an honest official in period 1 and obtains the good in period 2. The second term is the social surplus when a deserving applicant meets a corrupt official in period 1 and she is wealthy enough to pay bribe and receive the good. The third term is the social surplus when an undeserving but wealthy applicant meets a corrupt official in period 1 and receives the good by paying the bribe. In no other case the good is distributed. The bribe being a pure transfer does not enter the social surplus calculation.

Proposition 1: *In an economy satisfying assumptions 1 – 3, for distribution of a good by the government,* $S_h > S^E = S^p$ *i.e. the society prefers honest regime over corrupt regime.*

Proof: From equations (3), (8) and (11):

$S^E - S^p = 0.$

$S_h - S^E = \alpha(1-\rho)(\beta - \gamma)(1-\omega) + (1-\alpha)(1-\rho)\omega(\gamma - g) > 0.$

Therefore the statement of the proposition follows. □

Since some undeserving applicants receive the good and generate negative externality to the society, with 'red tape' the social surplus in presence of corruption is expected to fall compared to an honest regime. However, the variation in proportion of deserving applicants in an economy (α), though determines the type of contract that takes place between an applicant and a corrupt official, does not make any difference in calculation of social surplus. This happens because what matters to the society is the identity of the applicant receiving the good, not the time at which she receives it.

Proposition 1 shows that in presence of 'red tape' the social surplus in a corrupt regime is never greater than the social surplus in an honest regime. The proposition decidedly rejects the 'greasing the wheel' hypothesis. Notice that this counterintuitive result is obtained in our model as here unlike Banerjee (1997) 'red tape' has been considered as an efficient screening device. As Becker (1968) pointed out earlier, here also, since corruption overturns an efficient system, social surplus falls.

If an honest regime is always socially desirable than the corrupt regime why corruption persists? There must be a political economy explanation behind it. It must be the case that some groups of individuals in the society prefer the corrupt regime to the honest regime and make arrangements for its survival. While it is not surprising that the corrupt officials would like the survival of the corrupt regime, but what about the applicants? Would any of the applicants like to support the corrupt regime to the honest regime? Proposition 2 below addresses this question.

Proposition 2: *In an economy satisfying assumptions 1 – 3, for distribution of a good by the government, given* $\alpha^* = \frac{g-\delta g}{\beta-\delta g}$ *and* $\delta^* = 1 - \frac{g}{\beta}$ *,*

(i) If $\alpha > \alpha^*$ *and the contract is exclusionary, while a deserving applicant prefers an honest regime to a corrupt regime, an undeserving applicant remains indifferent between the two;*

(ii)If $\alpha \leq \alpha^*$ *and the contract is pooling, a deserving applicant prefers a corrupt regime to an honest regime if and only if* $\delta < \delta^*$*(an honest regime is preferred to a corrupt regime if and only if* $\delta \geq \delta^*$*) while an undeserving applicant remains indifferent between the two.*

Proof: (i) If $\alpha > \alpha^*$ from observation 1 we know that a corrupt official offers an exclusionary contract to the applicants in period 1. In such a situation a deserving applicant's expected payoff is given by ${U_p}^E$ as in equation (6) and that of an undeserving applicant is given by ${U_u}^E$ as in equation (7). Comparing ${U_p}^h$ and ${U_p}^E$ from equations (1) and (6) respectively:

$${U_p}^h - {U_p}^E = \delta\beta(1-\rho) > 0,$$

And comparing ${U_u}^h$ and ${U_u}^E$ from equations (2) and (7) respectively:

$${U_u}^h - {U_u}^E = 0.$$

The statement of the first part of the proposition follows.

(ii) *If* $\alpha \leq \alpha^*$ again from observation 1 we know that a corrupt official offers a pooling contract to the applicants in period 1. In such a situation a deserving applicant's expected payoff is given by ${U_p}^p$ as in equation (9) and that of an undeserving applicant is given by ${U_u}^p$ as in equation (10). Comparing ${U_p}^h$ and ${U_p}^p$ from equations (1) and (9) respectively:

$U_p{}^h - U_p{}^p = (1-\rho)[g-(1-\delta)\beta]$

which is negative (positive) if and only if $\delta < (>)\ 1-\frac{g}{\beta} = \delta^*$.

Similarly, comparing $U_u{}^h$ and $U_u{}^p$ from equations (2) and (10) respectively:

$U_u{}^h - U_u{}^p = 0.$

The statement of the second part of the proposition follows.□

Proposition 2 points out as commonly perceived it is not that the undeserving applicants that would prefer a corrupt regime to an honest regime: it is other way round. An applicant would prefer a corrupt regime to an honest regime if and only if she enjoys a higher payoff in the corrupt regime. In an honest regime an undeserving applicant receives zero payoff as she does not receive the good. In a corrupt regime also she receives zero payoff, since: (i) under exclusionary contract she waits and gets the good in period 2 but ends up paying a bribe g that extracts her entire surplus; (ii) under a pooling contract although she gets the good in period 1 itself, the bribe charged g for it extracts her entire surplus. The deserving applicant however gains $(\beta - g) > 0$ when the pooling contract is offered in a corrupt regime that is when the number of deserving applicants is below the threshold: she does not wait till period 2, receives the good in period 1 itself and gains. So in such a situation a deserving applicant would support corruption if the red tape is too long (i.e. $\delta < \delta^*$) and waiting does not pay, which is also the conventional explanation of existence of corruption in red tape. If the red tape is short enough (i.e. $\delta \geq \delta^*$), the deserving applicant knows that even if she rejects the bribe offer, she does not have to wait long for getting the good free of cost and she prefers the honest regime to the corrupt regime.

Notice that proposition 2 highlights importance of following two factors in generating political support for corruption in presence of red tape: (i) presence of a low proportion of deserving applicants in the society (below the threshold $\alpha^* = \frac{g-\delta g}{\beta-\delta g}$); and (ii) existence of sufficiently long red tape ($i.e.\ \delta < \delta^* = 1-\frac{g}{\beta}$). While (ii) has appeared as an important explanatory factor in the existing literature on red tape and corruption, the role played by (i) has not been highlighted. The proportion of deserving applicant in a corrupt society matters because a high value of it

(above the threshold α^*) induces the choice of exclusionary contract by corrupt officials which forces the deserving applicant to prefer an honest regime. In such a situation against the conventional wisdom the length of the red tape cannot explain existence of corruption. The length of red tape (above the threshold) can explain existence of corruption if the proportion of deserving applicants is low enough (below the threshold α^*) as in such situations the corrupt officials offer pooling contract and the deserving applicants gain by accepting the bribe offer in period 1.

The implications of proposition 2 can be illustrated in figure 1 below, where the horizontal and vertical axis represent the values of $\delta \in (0,1)$ and $\alpha \in (0,1)$ respectively.

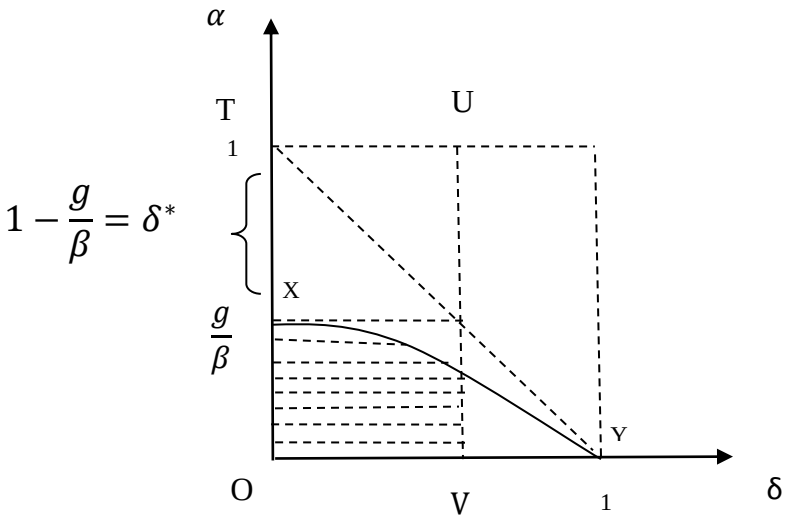

Figure 1: Combinations of α and δ for which corruption in red tape exists

The curve XY in above figure represents $\alpha^* = \frac{g-\delta g}{\beta-\delta g}$. The first part of proposition 2 implies that at all the points above XY curve in the unit square the deserving applicants prefer an honest regime to a corrupt regime and corruption does not exist in red tape.The second part of proposition 2 implies that corruption exists in red tape at the combinations of α and δ such that $\alpha \leq \alpha^*$and $\delta < \delta^*$. In the figure above the length XT = $1-\frac{g}{\beta} = \delta^*$ = length TU = length OV. Therefore the vertical line UV represents δ^* which in independent of α and the shaded area XOV represents the combinations of α and δ for which corruption in red tape exists.

Notice that the shape of the area XOV depends on $\frac{g}{\beta}$ i.e. the ratio of benefits accrued to an undeserving applicant vis-à-vis a deserving applicant from the distribution scheme. As $\frac{g}{\beta} \to 1$ i.e. there is not much difference in benefits accrued to the two groups, the XY curve becomes steeper as X moves to T, δ^* falls and the UV line shifts in the inward direction to the vertical axis as V moves to O. The opposite happens if $\frac{g}{\beta} \to 0$ i.e. there is sharp difference between the benefit accrued to a deserving applicant vis-à-vis an undeserving applicant. These two extreme cases are represented in figure 2 below.

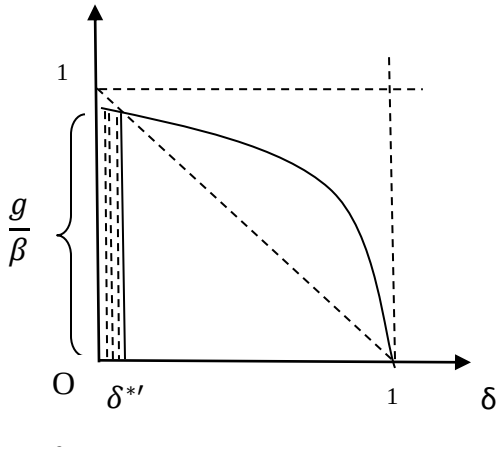

Fig. 2(a): Extreme Case I:

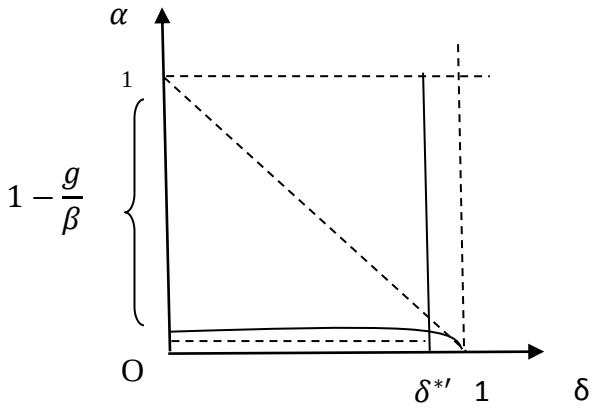

Fig. 2(b): Extreme Case II:

$\frac{g}{\beta} \to 1$ $\frac{g}{\beta} \to 0$

From the discussion above two important observations follow:

Observation 2: Of all the possible combinations of α (the proportion of deserving applicants) and δ (the length of red tape), the corruption exists in less than 50% combinations.

Observation 3: The possibility of existence of corruption in red tape sharply falls both in the cases where there is not much difference between the benefits accrued to a deserving and to an undeserving applicant and there is extreme difference between the two. In former case, corruption takes place almost independent of proportion of deserving applicants in the society but for extremely large length of red tape. In the later, it takes place almost independent of the length of red tape but only if the proportion of deserving applicants is low enough.

It is clear from Proposition 2(i) that as long as an exclusionary contract is offered a deserving applicant will have no incentive to switch her preference from an honest to a corrupt regime since her payoff in any period is zero if she meets a corrupt official. The only case where she can switch to the corrupt regime is when the corrupt official offers a pooling contract of bribe amount g and the length of red tape is longer than the threshold. As described in Proposition 2(ii), $(\beta - g)$is the payoff of a deserving applicant if she accepts period 1 bribe offer. She compares it with her payoff $\delta\beta$ in an honest regime in deciding her support for the corrupt regime. Notice that she is indifferent between the two regimes if there exists a value of $\delta = \delta^*$ such that $\delta^*\beta = \beta - g$ holds. As the gap between β and g falls, at given value of $\delta^*$and β, she prefers the honest regime to the corrupt regime. Corruption can exist only if the red tape is long enough i.e. δ^* is low enough. On the other hand if the difference between $\beta$and g rises, at given value of $\delta^*$and β, she prefers the corrupt regime to the honest regime. The indifference between the two is achieved at a very high value of δ^*so that corruption can exist for almost any length of red tape. But since a higher gap between β and g implies a lower value of α^* at each possible value of δ, at a less number of cases corruption exists.

Observation 4: Corruption in presence of red tape can generally be controlled in two steps: (i) by calculating $\delta^* = 1 - \frac{g}{\beta}$; (ii) by setting the length of red tape in such a way that $\delta \geq \delta^*$. However, corruption is almost impossible to control if $\frac{g}{\beta} \to 0$.

Proof: Follows from the discussion above. □

3. Conclusions

The paper focuses on political economy aspect of existence of corruption in presence of red tape. It presents a theoretical model where the government wants to implement the social optimum in which only the deserving applicants receive a public good/service for free, but corrupt officials sell it for a bribe both to the deserving and undeserving applicants. Due to lack of information about qualification of the applicants the government uses red tape as a screening device that reveals information about the applicants' true type. It takes certain time which is technologically fixed. Corruption may speed up delivery of the good by violating the red tape, but in the process reduces social surplus as negative externality is generated by consumption of the good by

undeserving applicants. This confirms the intuition of Becker (1968) that a process which overturns an efficient system reduces social surplus. The model also analyzes the efficient choice of bribe contract by a corrupt official and finds that for speeding up the delivery of the good he cannot use discriminatory bribes. If the number of deserving applicants in the society is above certain threshold he decides on a bribe rate that aims to extract the entire surplus of the deserving applicants and does not serve the non-deserving applicants. Otherwise it is optimum for him to serve both types of applicants by offering a lower bribe rate that target to extract the entire surplus of the undeserving applicants. The applicants foresee the choice of the corrupt officials, calculate their own surplus in corrupt regime vis-à-vis an honest regime and form their preferences over the two regimes. The results of the paper, contrary to conventional wisdom, suggest that it is the deserving applicants' choice over the regimes matter for supporting the corrupt regime. While the undeserving applicants always remain indifferent between the regimes, the deserving applicants prefer a corrupt regime if the number of deserving applicants in the society is below a certain threshold and if they have to wait too long (above certain threshold) for the delivery of good in an honest regime. The results show that the threshold values and therefore the possibility of corruption crucially depend on the gap between the benefits accrued to the deserving and undeserving applicants. The possibility of existence of corruption falls either if the gap is extremely high or if it is extremely low. The results of the paper explain why corruption is associated with red tape in certain countries/government departments, not in others. It also helps us to understand why some deserving applicants preferred corruption in red tape to an honest ITeS based system of public service delivery in certain states of India as observed by Bussell (2012).

The paper also contributes to the literature on 'efficient corruption' which takes the length of the red tape as exogenously fixed. The contribution is threefold. First, it decidedly shows that even if it takes the form of a pure transfer the speed-money in presence of red tape always reduces social surplus in an economy. Second, surprisingly the demand for a corrupt system comes from those who are supposed to get the good/service, and not, as one might have thought, from those who are not supposed to get the good/service. Third, the success of an anti-corruption policy like shortening the length of red tape crucially depends on relative expected return of the deserving applicants vis-à-vis the undeserving applicants; it is difficult to control corruption if the gap is too high.

The results of the paper develop a novel insight in designing the policies for controlling corruption in presence of red tape. They suggest that in designing of such policies in the short run it is important to know the ratio of expected benefits accrued to the deserving and undeserving applicants in the targeted transfer scheme. Since shortening the length of red tape requires technological innovation which is costly, the knowledge of the ratio allows the government to choose the length of the red tape appropriately for eradicating corruption. If the expected benefits are almost equal, the ratio is nearly one and red tape is unlikely to generate corruption. At the opposite extreme, if the gap between the expected benefits is extremely large, no shortening of the length of red tape is sufficient for eradicating corruption.

The theoretical model presented in the paper can be adopted for future research in many different ways. First, the robustness of the current results can be checked by relaxing the assumption of the model that the credit constraint does not bind in the corrupt equilibrium. Second, the issue of redress of the extortion complaints at the court which has been assumed away in the present model for the sake of simplicity can be analyzed. Third, one can bring in outside option by introducing competition among officials e.g. a scheme where the applicant if she wants can take the delivery of the good from another official instead of whom she met for screening and try to find out the effect of the two regimes on the social surplus and existence of corruption in the economy. Fourth, a government's optimum corruption eradication policy in presence of corruption in red tape in more than one of its departments can be worked out. These remain as our future research agenda.

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